Ministerial Advisory Committee
Technical Working Group on the Third Wave

APPENDIX

Part 1 – Epidemiological considerations

Overview of South Africa's first and second waves

NOTE: This document uses terminology related to wave definitions and monitoring of increasing trends that were introduced in the Ministerial Advisory Committee Technical Working Group on the Second Wave Report ("Epidemiological assessment of the likelihood of a second COVID-19 wave, and recommendations regarding COVID-19 surveillance and response activities", dated 2020-10-22, available at: https://sacoronavirus.co.za/wp-content/uploads/2020/12/Secondwave-Appendix.pdf)[1].

Current status of the epidemic

To date, South Africa has experienced two epidemic waves, with the second wave having a higher peak and larger numbers of cases, hospital admissions, and deaths than the first wave nationally (Figure 1). As of 2021-03-18, there have been 1,533,961 laboratory confirmed cases identified[2]. The total number of laboratory-confirmed deaths stands at 51,724[2], though the number of excess deaths since the start of the pandemic is substantially higher (145,022 as of 2021-02-27, approximately 85-95% of which are estimated to be COVID deaths)[3].

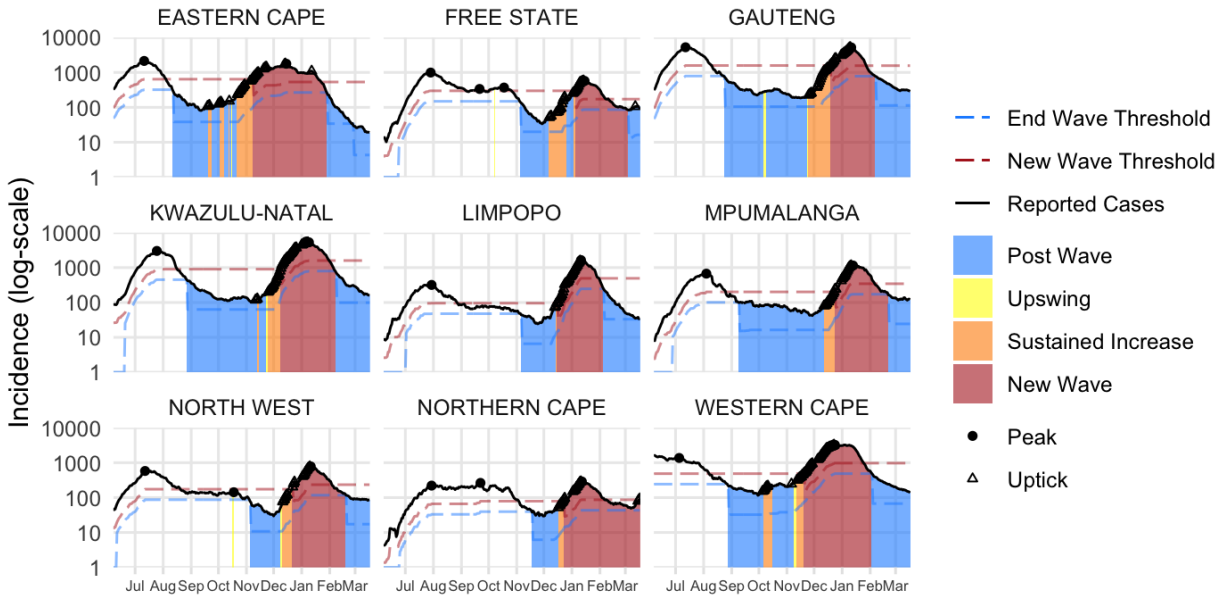

Figure 1. The epidemic trajectory in South Africa by province. Reproduced from the South Africa COVID-19 Modelling Consortium's Epidemic Explorer[4].

Comparison of epidemiology between waves

Detailed epidemiological analyses have been undertaken to compare the epidemiology of cases, hospital admissions, and hospital-based deaths between epidemic waves.

Throughout both waves, it has been evident that increasing hospital admissions are strongly associated with increased risk of death (WC DoH analysis of CoCT Metro cases and admissions; NICD analysis of DATCOV data). Although an early analysis of mortality patterns among hospitalized patients in three metro areas (Nelson Mandela Bay Metro, City of Cape Town Metro, eThekwini Metro) found no evidence of increased mortality in the second wave after accounting for this effect[5], more recent analyses at the national level indicate that the odds of death among hospital admissions was 20% higher in second wave, when controlling for the rate of hospital admissions[6] Similar analyses conducted among adults in the public health sector in the Cape Town Metro area found a 33% (95% CI: 18-50%) increase in the adjusted hazard ratio for death among laboratory-confirmed cases and a 17% (95% CI: 3-33%) increase among people hospitalized for COVID-19 in the second wave, when adjusting for the number of admissions (Western Cape Department of Health, personal communication). In both of these studies, there may be residual confounding that is unaccounted for.

The age distribution of hospitalized cases was similar between the two waves (Figure 2). The average age of admitted patients increased close to the wave peaks, likely as a result of changing hospital admission criteria.

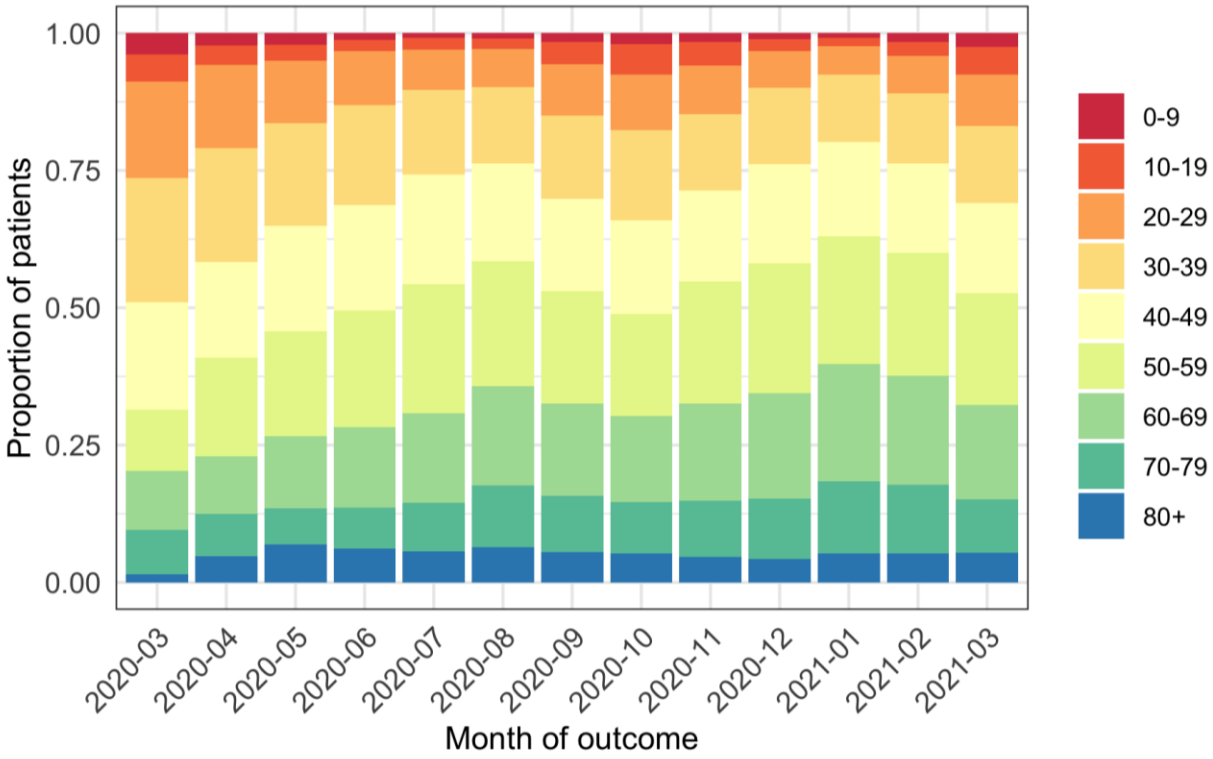

Figure 2. Temporal trends in the age distribution of hospitalized cases by outcome date, 2020-03-05 through 2021-03-09. Data source: DATCOV, NICD.

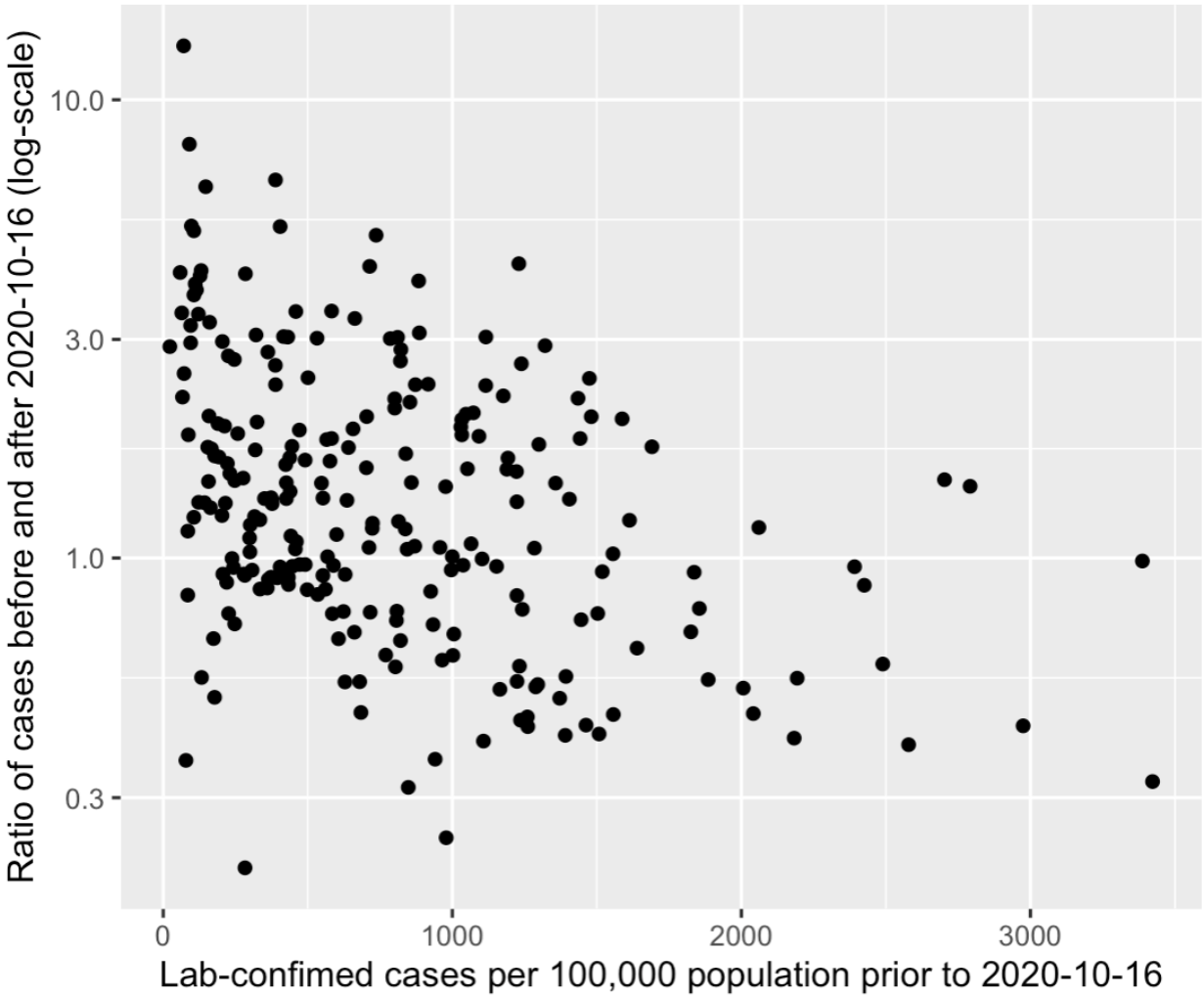

Figure 3. Relationship between the number of lab-confirmed cases per 100,000 population prior to 2020-10-16 and the ratio of cases before versus after 2020-10-16 by health subdistrict. Data source: National Notifiable Medical Conditions Surveillance System (based on cases reported through 2021-03-04).

Analysis of routine surveillance data on laboratory confirmed cases at the district and subdistrict level indicates that there was a negative correlation between the cumulative number of lab-confirmed cases per 100,000 population prior to 16 October (wave 1) and the relative number of lab-confirmed cases before versus after 16 October (Figure 3).

Additional analysis was undertaken in the Cape Town Metro area, where serological data are available from October / November. These data were obtained by testing residual specimens collected for routine HbA1c testing among adult diabetes patients at public sector health facilities. At the subdistrict level, a strong inverse correlation was found between seroprevalence (as measured in residual clinical samples from diabetics near the end of October 2020) and the ratio of COVID-19 deaths occurring after 16 October (wave 2) to before (wave 1) (Western Cape Department of Health, personal communication).

These analyses indicate that the relative magnitude of the second wave was generally smaller in areas that had higher first-wave attack rates and is suggestive of protection resulting from prior infection. Furthermore, all districts and subdistricts had substantial numbers of lab-confirmed cases in the second wave, indicating that none of these areas had robust herd immunity – i.e., sufficient population-level immunity following the first wave to prevent resurgence in the face of increasing contact rates and the emergence of the N501.V2 variant.

Epidemiological context in South Africa following the second wave

Summary of serological evidence

Several studies have been undertaken to estimate the seroprevalence of anti-SARS-CoV-2 antibodies in specific populations. Although each study is limited in scope and has potential biases, collectively they indicate that there is substantial variation in seroprevalence in different communities and settings. In particular:

- a study undertaken by the South African National Blood Service among blood donors in four provinces between 7 and 25 January 2021 found that there was substantial variation in seroprevalence by province and racial group (Figure 4)[7];
- a household-level community cohort study undertaken in two sites found substantially higher seroprevalence in the urban site (37% in Jouberton, Klerksdorp, North West Province) than in the rural site (21% in Agincourt Demographic Surveillance Site, Mpumalanga) based on samples collected between 25 January and 20 February 2021 (Prof Cheryl Cohen, personal communication);
- a healthcare utilization and seroprevalence survey found substantial variation between three urban sites in different parts of the country based on samples taken in January 2021, although sample sizes were small: 38% (n=294) in Edendale, KwaZulu-Natal, 32% (n=41) in Klerksdorp, North West, and 56% (n=205) in Mitchell's Plain, City of Cape Town, Western Cape[8]; and
- a study undertaken in employees at the Victoria and Albert Waterfront in Cape Town toward the end of the first wave (17 August to 4 September 2020) found a strong and significant negative correlation between seropositivity and several indicators of socioeconomic status[9];
- based on convenience samples collected in early- to mid-February among patients accessing public healthcare facilities, seroprevalence estimates in some Cape Town Metro subdistricts that had large numbers of cases in both the first and second waves approach 70%; seroprevalence estimates in patients accessing public healthcare facilities in other subdistricts were considerably lower, as were estimates for a convenience sample of patients accessing private sector services (WCDoH, personal communication)

(Note that a population-representative serosurvey is being undertaken by the Human Sciences Resource Council[10], but no results have been released at this time.)

Taken together, these studies indicate that there is substantial variation in community-level susceptibility to resurgence and that affluent and rural communities may remain particularly vulnerable. Furthermore, few of the communities surveyed have estimated seroprevalence approaching the putative herd immunity threshold of approximately 65-70%, suggesting that most areas are susceptible to at least minor resurgences.

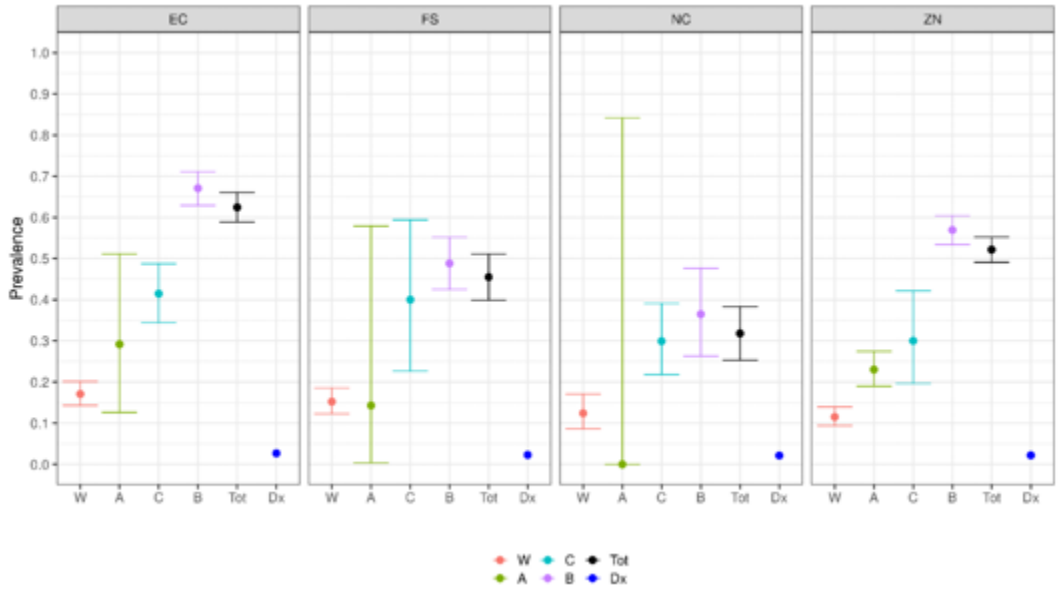

Figure 4. Seroprevalence among blood donors in four South African provinces. Reproduced from Sykes et al. 2021 (preprint)[7]. EC = Eastern Cape, FS = Free State, NC = Northern Cape, ZN = KwaZulu-Natal, W = White, A = Asian, C = Coloured, B = Black, Tot = total, Dx = number of laboratory confirmed cases per population

Summary of circulating variants and variants of concern

The second epidemic wave in South Africa was driven by the emergence of a new SARS-CoV-2 variant (N501Y.V2 aka B.1.351, Figure 5)[11]. Model-based analyses suggest that the observed faster epidemic growth rate during the second wave could have been due to higher transmissibility of the variant, partial immune escape, or a combination of these factors[12]. The potential for a third epidemic wave to be driven by a new variant is of particular concern, especially if the variant is able to evade immune response due to prior infection and/or vaccination. Internationally, three variants of concern (VOC) and several other variants of interest (VOI) have been identified:

- B.1.351 (VOC) was first identified in South Africa in December 2020 from a sample taken in the Eastern Cape on 2020-10-08. This variant has 8 lineage-defining mutations, including two on the receptor-binding domain of the spike protein that may be of functional significance (N501Y, which increases receptor binding affinity, and E484K, which decreases antibody binding affinity). The variant has been found in 59 countries as of 2021-03-19[13].
- B.1.1.7 (VOC) was first identified in the United Kingdom in December 2020 from a sample taken in Kent on 2020-09-20. This variant has 13 lineage-defining mutations and 3 characteristic deletions[14]; in addition, some sequences have acquired the E484K and

other mutations[15]. B.1.1.7 is associated with higher transmissibility and mortality than previously circulating variants[16,17]. The variant has been found in 102 countries as of 2021-03-19[18] and has been detected in South Africa from a sample taken in the Western Cape on 2021-01-09 (GISAID).

- P.1 (VOC) was first identified in Brazil from a sample taken on 2020-12-04. This variant has 21 characteristic mutations and shares the N501Y and E484K mutations found in B.1.351. The variant has been found in 27 countries as of 2021-03-19[19].
- A.23.1 (VOI) was first identified in Uganda in December 2020[20]. This variant has been detected in South Africa from a sample taken in the Eastern Cape on 2021-01-11 (GISAID). Specimens of A.23.1 have been found in the UK and The Netherlands that include the E484K mutation[15].
- B.1.1.318 (VOI) was first identified in England in February 2020. This variant includes the E484K mutation and has not been found outside the United Kingdom as of 2020-03-10[15].
- B.1.324.1 with E484K (VOI) was first identified on 2020-03-03 in travelers returning to the United Kingdom. The variant has not been found outside the United Kingdom as of 2020-03-10[15].
- B.1.427 (VOI) was first identified in the United States from a sample taken in California on 2020-09-28. The variant has been found in 14 countries as of 2021-03-19[21] but has not yet been detected in South Africa.
- B.1.429 (VOI) was first reported in the United States from a sample taken in California on 2020-07-13. The variant has been found in 28 countries as of 2021-03-19[22] but has not yet been detected in South Africa.
- B.1.525 (VOI) was first identified in the United Kingdom on 2021-02-02. The variant had been found in 25 countries as of 2021-03-10[15] but has not yet been detected in South Africa.
- B.1.526 (VOI) was first identified in the United States from a sample taken in New York on 2020-11-15. The variant has been found in 12 countries as of 2021-03-19[23] but has not yet been detected in South Africa.
- P.2 (VOI) was first identified in Brazil and has 9 lineage-defining mutations. The variant had been found in 26 countries as of 2021-03-10[15] but has not yet been detected in South Africa.

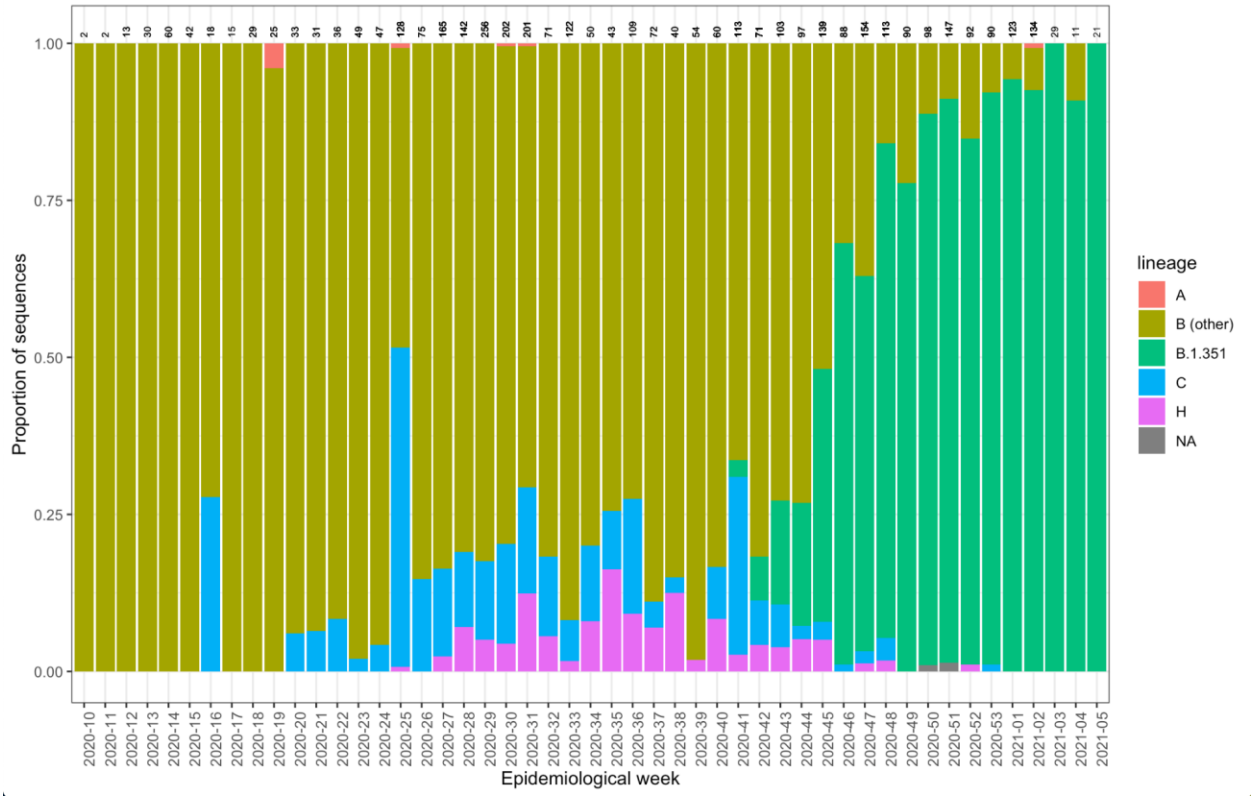

Figure 5. Proportion of SARS-CoV-2 viruses sequenced in South Africa by lineage through time. Data from GISAID (www.gisaid.org), downloaded 2021-03-10. Note that the viruses sequenced do not necessarily represent the circulating virus variants at the time. Nevertheless, the majority of sequenced samples from week 46 of 2020 through week 5 of 2120 were classified as belonging to the B.1.351 variant.

Summary of vaccine rollout status and plans

As of 2021-03-18, a total of 177,275 doses of the Johnson and Johnson vaccine have been administered in South Africa[2], primarily to health care workers, and vaccine administration is currently taking place only via a Phase 3b clinical trial. While confirmed timelines for acquisition and rollout of COVID-19 vaccinations in South Africa have not been released, it appears unlikely that COVID-19 vaccines will have a substantial indirect effect before the fourth quarter of 2021.

Summary of third waves in other countries

As of 2021-03-08, based on MAC definitions[1], 17 countries including South Africa had concluded a second wave. Of these, only Israel, Oman, Serbia, and Trinidad & Tobago have entered third waves. No country has yet met the end-of-wave criterion for its third wave. Table 1 shows key dates and features of the epidemic dynamics in each of these countries (and South Africa for comparison).

Table 1.

	Israel	Oman	Serbia	Trinidad & Tobago	South Africa	South Africa*
1st wave peak	2020-03-31	2020-07-15	2020-04-19	2020-09-14	2020-07-19	2020-07-18
1st wave end	2020-05-04	2020-08-04	2020-05-28	2020-11-10	2020-09-07	2020-09-06
2nd wave start	2020-06-16	2020-09-17	2020-06-26	2020-11-18	2020-12-06	2020-12-05
2nd wave peak	2020-09-27	2020-10-10	2020-08-01	2020-11-23	2021-01-11	2021-01-11
2nd wave end	2020-10-26	2020-12-27	2020-09-12	2021-01-03	2021-02-10	2021-02-09
2nd peak : 1st peak	Higher	Lower	Higher	Lower	Higher	Higher
3rd wave start	2020-12-16	2021-02-16	2020-10-13	2021-01-15	-	-
3rd peak : 2nd peak	Higher	Lower / TBD	Higher	Lower / TBD	-	-
Data source	OWID	OWID	OWID	OWID	OWID	* NMC-SS

OWID: Our World in Data (www.ourworldindata.org)
NMC-SS: National Notifiable Medical Conditions Surveillance System data (analysed by specimen report date)

Closer examination of the time series of confirmed cases in Oman and Trinidad & Tobago reveals that both countries exited the second wave as a result of sharp dips in case numbers at the end of December 2020. Although reliable time series of tests conducted are not available for either country, the timing of the dips suggests that the end-of-wave criteria may have been met artifactually due to reduced testing over the holiday period. The two countries show similar overall epidemic trajectories, with second waves peaking at lower levels than the first wave and relatively high incidence in the inter-wave periods (not dipping much below the end-of-wave threshold and rebounding relatively quickly).

In Israel and Serbia, in contrast, each epidemic wave has been larger than the previous, and the third wave began within 1-2 months of the end of the second wave. We examine these countries in more detail to gain an understanding of the epidemiological patterns they have experienced.

Both countries had early responses to their first epidemic wave but lacked efficient contact tracing, isolation, and quarantine procedures, relying on strict lockdowns to bring their epidemics under control. They had intermediate first wave peaks (72.1 and 56.4 confirmed cases per million population, respectively) and moderate numbers of cases in the first wave (1865.7 and 1660.6 cumulative confirmed cases per million population, respectively). Thus, their first waves were substantially smaller than the first wave in South Africa, which peaked at 212.2 confirmed cases per million population and ended with 10780.2 cumulative confirmed cases per million population. Their second waves were more substantial, ending with 35952.4 and 4746.8 cumulative

confirmed cases per million population, respectively (compared to South Africa's 24994.8), though comparisons across countries are difficult to interpret due to differences testing practices. Seroprevalence data following the first or second waves have not been published for either country.

Factors associated with Israel and Serbia's second waves were reviewed in the Ministerial Advisory Committee Technical Working Group on the Second Wave Report[1]. In Israel, strict lockdown measures were implemented from mid-September to bring the second wave under control[24,25] and these restrictions began to be lifted again as the second wave was ending. For example, elementary schools resumed face-to-face instruction on 1 November, while many "non-essential" businesses, including street-front stores and strip malls, began reopening in the following weeks in most areas. A substantial rise in case numbers followed from mid-November, and the new wave threshold was crossed on 16 December. It is worth noting that the restrictions in place during this rise, even though relaxed relative to earlier restrictions, were substantially stricter than regulations in place throughout the South Africa's second wave (Level 1 and Adjusted Level 3).

In Serbia, there does not appear to have been a relaxation of restrictions between the second and third waves[26], though it is hard to find English language information on the exact nature of the restrictions that were in place.

In addition to the countries that have started a third wave, there are numerous countries experiencing mid-wave resurgences as part of their second waves, including many European countries. In many of these countries, the second wave resurgence has exceeded the size of the original second-wave peak (e.g., Portugal, Spain, The Netherlands); in others, incidence remains below the initial second-wave peak but remains on an increasing trajectory (e.g. France, Germany, Italy). These epidemics demonstrate the rapidity with which the epidemic trajectory can shift from decreasing to increasing in the face of introduction of new variants and / or relaxation of preventative measures.

Third wave scenarios

Several factors have been identified as potential drivers of a third wave. Formal third wave scenario modelling is being undertaken by the South African COVID-19 Modelling Consortium (SACMC). Here, we outline broad expectations regarding the scale, timing, and populations affected if resurgences are driven by each of these factors. It is important to note that the factors are not mutually exclusive and that several drivers could contribute to the occurrence of a third wave.

Behaviour change (increased contacts)

Increasing contact rates have the potential to substantially increase transmission as a result of reduced adherence to infection prevention and control (e.g. masking, hand hygiene) and other non-pharmaceutical interventions (e.g. social distancing), easing of restrictions, holiday travel,

and super-spreading events. A resurgence in transmission driven by behaviour change is likely to particularly affect communities that have had relatively low levels of transmission to date. Areas that experienced large epidemics during the first and second waves may be less affected by a third wave driven by behaviour change. A behaviour-based resurgence may happen quickly (1-2 months after the end of the second wave) or more slowly, depending on the speed and extent to which contact rates increase, and is preventable through maintenance of individual and community practices that reduce spread. At the provincial and national levels, a third wave driven by behaviour change is likely to be smaller than the second wave, but at a smaller spatial scale, communities with relatively smaller first and second waves may experience their worst wave to date.

Viral mutation

As seen in the second wave, viral mutation has the potential to produce new SARS-CoV-2 variants with altered epidemiological properties. Viral variants that are more easily transmissible from person-to-person and/or are able to evade existing immunity have the potential to cause substantial epidemic resurgences. A variant with increased transmissibility but no immune escape properties would be expected to affect mainly individuals who have not been previously infected and communities that were relatively unaffected in the first and second waves. An immune-escape variant, on the other hand, may cause many reinfections and could affect both new communities and those that experienced high case numbers in the first and/or second waves. Both the timing and scale of a third wave driven by viral mutation are thus difficult to predict, though a variant with increased transmissibility and substantial immune escape could lead to a third wave that matches or surpasses earlier peaks. Early detection of variants associated with increased reinfections, vaccine breakthrough, or rapid spread is essential for understanding the epidemiological implications of viral mutation. In the event of a resurgence driven by viral mutation, early intervention, including increasing of public health and social measures to reduce transmission and reduce pressure on the health system, is recommended.

Seasonal factors

Many viruses, including other human coronaviruses, produce seasonal waves of infection, likely due to small changes in contact rates, ventilation practices, host susceptibility, and / or viral stability. For emerging pathogens, such as SARS-CoV-2, these seasonal factors play a relatively small role in driving transmission[27]. As immunity accumulates in the population, seasonal variation may be important for driving the reproduction number above 1, particularly if it has been a long time since the previous wave of transmission. Close monitoring of the time-varying reproduction number as we move into the winter season is recommended, particularly if we still have not seen a third wave or major resurgence since the second wave. At the provincial and national levels, a third wave driven by seasonal factors is likely to be smaller than earlier waves, but at a smaller spatial scale, communities with relatively smaller first and second waves may experience their worst wave to date.

Waning immunity

There has been substantial interest in the duration of immunity produced by SARS-CoV-2 infection, with increasing evidence that reinfections occur in some individuals on a short time scale (similar to other human coronaviruses[28]), though such reinfections with SARS-CoV-2 appear to be rare[29–31]. Given substantial heterogeneity in the strength and duration of immunological memory in recovered SARS-CoV-2 patients[32], waning immunity may result in a gradual increase in population-level susceptibility. If other factors, such as contact rates remain constant, this may gradually increase the incidence of infections to a higher level but is unlikely to result in a major resurgence. Combined with changes in other factors, however, waning immunity could help drive seasonal resurgences in the longer term[33–35].

Surveillance and monitoring

Surveillance methods for the detection of epidemic resurgence were reviewed extensively in the Ministerial Advisory Committee Technical Working Group on the Second Wave Report[1], and readers are referred to that document.

The approach to surveillance and monitoring used to assess trends prior to the second wave remains relevant. In preparation for a third wave, additional emphasis should be placed on (1) communication of important epidemiological events (such as superspreading events) and trends across levels (facility, subdistrict, district, province, national) to enable rapid assessment and (2) enabling an agile response to emerging epidemiological patterns. In particular, when cases are clustered in space and time and common exposures can be identified, the public health response should aim for **containment**, with heavy emphasis on contact-tracing, isolation, and quarantine to prevent or delay establishment of community transmission. However, once sustained community transmission is identified in an area (as indicated by the occurrence cases not linked to transmission chains and/or multiple unrelated clusters in several areas), the public health response must rapidly switch to a **mitigation** approach, taking measures to prevent the health system from being overwhelmed, with an emphasis on increased services to prevent morbidity and mortality and introduction of public health and social measures to reduce transmission and competing demands on the health system. Targeted containment of certain outbreaks (such as in long-term care facilities or prisons) may be warranted during the mitigation phase, but it is not necessary to identify all cases outside of these settings.

The decision to switch from the containment paradigm to the mitigation paradigm should be driven by local assessment of the epidemiological situation, though national operational guidelines developed by the Incident Management Team are needed to clarify the actions appropriate in each phase of response. In addition, a national structure is needed for instituting restrictions at district or provincial level but should be based on local epidemiological assessment (bottom-up).

Recommendations

- Surveillance for increasing trends must be multidimensional and take place at all scales (from facility level through national). Regular ‘data huddles’ should take place at the district and province levels to improve rapid detection of emerging patterns based on local intelligence, in addition to regular monitoring of cases, admissions, positivity, outbreaks / superspreading events, genomic data, wastewater monitoring, time-varying reproduction number, and resurgence metrics.
- National operational guidelines are needed outlining **containment** measures that must be undertaken when transmission is low (cases are clustered in space and time and common exposures can be identified) and **mitigation** measures that must be undertaken when there is sustained community transmission (as indicated by the occurrence cases not linked to transmission chains and/or multiple unrelated clusters in several areas). The decision to switch from the containment paradigm to the mitigation paradigm should be driven by local assessment of the epidemiological situation. Districts and provinces must be prepared and empowered to rapidly switch from containment to mitigation once sustained community transmission is identified. Guidelines should also emphasize preparation to switch approaches in districts closely connected to those with sustained community transmission.
- Systems must be put in place to rapidly assess drivers of resurgence once community transmission is identified in an area. In particular, we must enable:
    - rapid assessment of the populations affected (e.g, are cases coming from previously affected communities or new areas)
    - genomic surveillance to identify potential variants of concern
    - rapid identification of reinfections and vaccine breakthrough infections

Part 2 – Preparing the Health System to Deal with a Third Wave

Planning and management

Recommendation	Rationale	Evidence	Approach
• Review and revise resurgence plans at national, provincial, district and facility levels	• Clear roles and responsibilities to ensure preparedness for increase in cases	• Lessons from response to the 1st and 2nd waves	• Have agility within provinces. • Differentiated approach to monitor
• Integrate hospital platform across levels of care	• Ensure support for lower levels of hospital care; supports efficient triage	• District hospital personnel need clinical support to improve quality of care	• System to link to specialist support • Vula tool
• Establish bed bureaus	• Ensure availability of beds across the health sector (public and private)	• Beds unavailable for some patients during 2nd wave	
• Hold daily management huddles (e.g., one hour each morning)	• To assess needs, review implementation and plan changes • This mechanism (huddles) useful for both for overall platform as well as specific functions like oxygen, outbreak response, bed access and referrals	• Agility in decision-making at all provincial and facility levels were required	
• Use of data dashboards for planning (beds, staffing, oxygen, test turnaround time at hospitals etc)	• Patterns can be assessed daily and assist planning	• Inconsistent use of information for planning at district level	• NDoH integrated dashboard • DATCOV daily summaries

Testing criteria

Recommendation	Rationale	Evidence	Approach
• Revise testing criteria as case numbers change • Share changes with the broader public/civil society to support monitoring • Close liaison between NDoH and Labs to monitor the number of specimens	• Need to ensure rapid turnaround times of test results • Titrating supply and demand of tests	• Testing criteria changed to reduce turnaround times	• Surveillance and testing group (various specialists). Mechanism to meet regularly to monitor and adapt testing strategy.
• Surveillance and proactive testing and screening based on predicted super spreading events/ work places/communities. (use testing as surveillance tool)			

Primary care

Recommendation	Rationale	Evidence	Approach
• Patient awareness of need for early hospital referral; Provide high risk patients with pulse oximetry for home use	• Enable self-monitoring at home & early treatment/admission	• Many patients admitted late and demise within first 1-3 days	• Risk stratifying for who should get pulse oximeters • Dedicated call centre for patients to discuss concerns and when to go to hospital
• GPs/IPAs to be trained/supported to deal with mild disease	• May prevent progression to severe disease • Frees hospital beds	• Early treatment in community results in fewer hospital admissions	• Webinars on the clinical management • Ambulatory Clinical protocols for care • GPs to assist with call centres

• Repurpose community health workers			
• Ambulatory Care	• Effective and correct care of patients with mild diseases at home will result in improved outcomes, less community deaths, better early referrals	• High numbers of community deaths, late referrals to hospital of very sick patients, early deaths	• The Vector Project proactively identifying at risk diabetics, and closely monitoring status, admitting at earliest signs of decompression. (this could be expanded to include other comorbidities).

Referral systems

Recommendation	Rationale	Evidence	Approach
• Clear referral guidelines to manage movement of patients between levels of care	• To ensure appropriate and rapid transfer of patients	• Delays may cause avoidable mortality • Transfers of sick patients to higher level of care improves mortality • Transfers of stable patients to lower levels of care relieves bed pressures	• Integrated clinical platform, understands capacity at each level of care, with clear criteria for transfer, down-refer, escalation
• EMS capacity and protocols for referral	• To ensure appropriate level of care for hospital admission	• Sick patients brought from home to inappropriate levels of care	• Need dedicated ambulance services • EMS protocols for referral
• Develop clear discharge criteria for step down and home	• To clear beds as soon as clinically indicated	• Lack of availability of beds during 2nd wave	
• Strengthen ability to commission intermediate care	• IC beds are a critical lever in improving access	• Review of experience in provinces/districts	

(IC) beds at short notice • Explore spare capacity in public and private sectors to service IC purpose	for Covid patients, also decanting patients from acute hospitals to free up capacity for more ill patients		

Hospitals

Recommendation	Rationale	Evidence	Approach
• Prepare surge capacity (HR-e.g. training/clinical governance, PPEs, equipment, beds, oxygen) in line with resurgence plan and along the continuum of care • Clinical Governance • Planning to include general beds and Critical Care Capacity	• Early preparation leads to improve ability to cope with increased patient load • District hospitals need support	• Use epi and modelling estimates for surge • How were field hospitals effectively used	
• Access to critical care beds needs to be strengthened across public and private sectors	• Critical care beds were under immense pressure during both waves. • Private sector has larger capacity of critical care beds which needs to be accessed for public sector patients as well.	• Experience from 1st and 2nd waves. • Strict triage criteria were used for critical care especially in second wave resulting in high mortality	
• Mentoring, support and training by critical specialists to prepare district hospitals to treat COVID patients	• High mortality in district hospitals during the 2nd wave	• DATCOV data shows high mortality in district hospitals (especially in rural areas)	• Have a critical specialist assigned to a district to assist with challenges • Audits in hospitals where

			high mortality seen
• Ensure sufficient oxygen availability including flow pressure to create sufficient pressures to run ventilators. (suctioning also needed)	• Some facilities did not have sufficient oxygen (and supporting systems for oxygen, e.g. pressure)	• Crisis calls from CEOs during the 2nd wave	
• Prepare staff for a surge • Improve staff safety in terms of PPE etc, as well as mental and emotional health • Systematise staff health and wellness guidelines	• Need sufficient staff, with necessary skills and strengthened morale	• Staff on leave in December and still weary from the first wave	• Rotation of staff in covid and non-covid areas • Support staff safety • Directives for staff deployment
• Strengthen collaboration with the private health sector to improve access and optimize utilization of resources	• Limited Resources need to be pooled during surge crises and used optimally for the total population.	• WC experience of developing SLAs to access private hospitals • 2nd wave- private sector were diverting patients to public sector	
• Improve local coordination and governance (integrate hospital boards and clinic committee into outbreak plans)	• Improve coordination and transparency will allow for use of community assets to encourage early health seeking and contribute to lower mortality		• Example in KZN – working model
• Resources allocated to track and trace approach	• Adjusting resource as case numbers increase (e.g. from direct contact which is time and resource intensive to telephonic)		

Part 3 – Clinical and IPC Considerations

Review of national and international IPC guidelines

- Existing IPC guidelines and MAC-COVID-19 IPC advisories were reviewed:
    - National IPC Strategic Framework (March 2020)
    - Implementation Manual of National IPC Strategic Framework (March 2020)
    - IPC Guidelines for COVID-19 (May 2020)- to be urgently reviewed and additions incorporated
    - WHO guidelines – from the IPG Guideline Development Group (GDG), Ventilation GDG, Vaccination GDG; published guidelines from WHO website
    - CDC guidelines- online publications for domestic and international audiences
    - ECDC guidelines: published guidelines
    - Gaps and areas for strengthening/emphasis were identified
- A table of guidelines indicating which stay and which need updating is shown below (Table 2.) The sense was that guidelines are reasonable but application and behavioural issues were the concerns.
- Review of the contact time used in defining at-risk contacts (e.g., for contact tracing) is recommended.
- The following specific areas to be addressed in the Third Wave were highlighted:
    - Ventilation of spaces/environment
    - Vaccination IPC recommendations
        - e.g. gloves etc. needs an advisory
        - How do guidelines change with vaccination e.g. time periods, isolation/quarantine etc.
    - Training of HCW in IPC – need for single message using South Africa guidelines for all levels of healthcare training
    - Decontamination of mechanical ventilation equipment- in current IPC COVID-19 guidelines – for review
    - Nebulisation of COVID-19 patients- in current IPC guidelines – for review.
- Methods for increased guideline distribution and uptake to get message out there so the IPC teams at HCF level can disperse the information in their workplace via the existing NDoH communication systems.

Table 2.

Guideline	First wave	Second wave	Third wave
National COVID-19 guidelines May 2020	Document completed	No change	Revise
National IPC Strategic Framework	Document completed		No change
Implementation Manual for National IPC strategic Framework	Document completed	No implementation	Recommend appointment of a national IPC coordinator

Review of clinical management guidelines

- The NICD “Clinical management of suspected or confirmed Covid-19 disease” were reviewed in an attempt to identify areas to be developed or modified.
- Overall, the guidelines cover all the essential areas and are deemed to be suitable for national use. It was noted that specific parts of the guidelines could be better presented for easier acceptance by readers. A team is already working on this.
- Concern was also raised on the distribution of the guidelines so as to maximise adoption by clinicians at the coalface. Methods for increased guideline distribution and uptake need to be explored and should extensively involve existing DoH systems at all levels.
- The capacity of the system to respond quickly so that emerging evidence could be appropriately and timeously incorporated needs to be ensured. The existing system including NEMLC rapid evidence reviews works well.
- The following specific clinical issues need consideration:
    - There is a need to consider all different levels of care across the spectrum including community/public health, the general practitioner network and district level facilities in addition to regional and tertiary facilities which received significant attention in the previous waves.
    - Although patient care is fairly standard at each level, co-ordination of care is the crucial element all levels.
    - Enhanced communication among various levels of HCWs is mandatory. Clarification of referral criteria between levels of care will allow for easier communication and expedited transfers up and down the clinical chain.
    - The issue of diagnostics was raised with a query as to whether antigen testing needs to be reviewed for the 3rd wave.
    - There is a need for a comment on an appropriate approach to the use of re-purposed drugs as this has stirred much debate and has created much distraction from standard of care.
    - The impact of lockdown regulations on clinical patient loads was substantial. This was clearly evident in relation to alcohol regulations and trauma cases. Consideration of similar may be necessary dependent on the extent of the third wave.
    - The integration of the public and private clinical platforms needs further consideration. Standardised admission guidelines and clinical protocols across both platforms need consideration. Differences in how each platform functions need to be recognized.
    - Pulse oximetry to detect early deterioration of patients with COVID-19 in primary and community care settings is vital.
    - The impact of “long COVID” was seen with the second wave and management of such patients and referral systems to be in place for management of patients presenting with long- COVID needs consideration in the third wave.
    - Non-COVID diseases are severely impacted by delays as a result of prioritization of COVID-19. Systems need to cater for patients with Non-COVID diseases during the time of the third wave. Such would include early referral of other emergencies, dispensing of longer supplies of outpatient medications etc.

Review of MAC IPC & Clinical management advisories

It was deemed useful to review all IPC and clinical management advisories that have been issued by the MAC. This was done via the advisory tracker and enabled:

- Identification of advisories temporally as per the first and second wave.
- A gap analysis of advisories that would be needed
- Identification of advisories that would need modification for the third wave

Table 3 is a log of all advisories to date, highlighting those involving IPC and clinical management. The MAC has also recently issued an advisory on IPC related to vaccination.

Table 3.

Topic	**Advisory / guideline**	**First wave**	**Second wave**	**Third wave**
PPE for Health Care Workers (HCWs)				
General	National COVID-19 Guidelines (March 2020)	No change	No change	No change
Masks				
Medical face covers		HCW – surgical or N95	No change	No change
Surgical / respirators / face shields				
Body coveralls	No advisory	Not indicated		No change
Overshoes		Not indicated		No change
Non-pharmaceutical Interventions (NPIs)				
Community – fabric masks	Fabric masks	Community – fabric masks	No change	No change
Social distancing				Social distancing at 1.5 m to remain
Hand hygiene				Alcohol-based hand sanitizer
Environment				
Disinfectant / disinfection	Disinfection of the environment; disinfection tunnels	no disinfection tunnels; use chlorine or alcohol for surface disinfection	No change	No change; reinforce chlorine and alcohol as surface disinfectants
Ventilation	Increased ventilation; standard requirements			Short and long distance aerosols transmission occurs but not as frequently as droplets. Dependent on

				closed spaces, poor ventilation, and lack of filtered air
Crowding in enclosed spaces	Funerals, social, and church gatherings			Controlled occupation of closed spaces
Outdoor activities	Sports, visiting beaches and open spaces, walking			Access to beaches controlled during holidays
Public spaces - schools				
Reopening of schools	Multiple advisories			
Disinfection of the environment	Disinfection of the environment	Use alcohol or chlorine	No change	No change
Length of closure after positive cases found	Length of closure after positive cases found	2 days	As long as it takes to clean and disinfect	Minimal closure required: time to clean and disinfect and then reopened
Masking for children and exemption	Masks for children of school going age	Not indicated	No change	No change
Public spaces – restaurants / bars / pubs				
Spacing and layout		Spacing between tables 1.5m, outdoor setting	No change	Continue with more outdoor settings where possible
Ventilation				Improved ventilation
Health care worker infections				
General		Follow South African IPC C-19 guidelines	Follow South African IPC C-19 guidelines	Reinforce messaging – no change. Use South African Guidelines
Work environment	Areas of transmission at the workplace	Social distancing, hand hygiene	Follow IPC C-19 guidelines	No change
PPE	Staff to staff transmission	Reduce occupancy of tearoom and rest areas	No change	No change
Administrative controls	Patient to staff transmission	minimal transmission if IPC GL followed	No change	No change
Administrative controls	Patient to patient transmission	Increased space between beds;	No change	No change

		improved ventilation; reduce clutter		
Training of HCW in IPC				
Curriculum		Mixed messages; several different groups involved in training with own guidelines	Continued with mixed messages	Use SA guidelines for training of HCW for all IPC training
Calibre, qualification, and skill of trainers		Unqualified personnel involved in training; mixed messages	No change	Use SA guidelines for training of HCW for all IPC training
Refresher and mentorship in IPC for province & districts, healthcare facilities		None	None	To be introduced
Vaccination roll-out				
PPE during vaccination	Face covers needed; gloves not essential	None	None	IPC vaccination protocol in place; face cover for both HCW and community essential. Review messaging – Public Health interventions (PHI) to continue.
PPE during vaccination	Hand hygiene	None	None	Before and after each patient contact
PPE during vaccination	Skin prep – alcohol or dry swab	None	None	Either
Post vaccination PPE	Continue with transmission based precautions	None	None	No change

Review of DATCOV data

The NICD DATCOV data provides the best available data that allows some clinical comparison of the first and second waves in South Africa. Some key factors noted were:

- Weekly case fatality rate (CFR) in second wave exceeded peak in first wave (v CFR lower in second wave globally)
- CFR higher in the public sector
- Age and sex distribution similar for both waves
- Proportion of severe cases slightly higher in 2nd wave (30,1 v 28.0%)
- 20% of deaths in public sector within first day
- Proposed reasons for higher mortality in second wave
    - more likely older cases, admissions
    - more likely female admissions, deaths
    - less likely Black and Indian, more likely Coloured admissions
    - less likely people with comorbidities admitted
- In Second wave patients more likely to present within 7 days than first wave
- Data not clear but there appears to be a trend towards greater use of oxygen and steroids in second wave
- HCW infections
    - Similar numbers of HCW admissions first and second wave
    - Lower numbers of deaths in second wave
    - Most HCW admissions Gauteng, KZN

There is a need for more detailed clinical data to better evaluate clinical outcomes at unit level. Health care workers raise issues of being overworked and are thus not able to capture detailed patient clinical information for analysis.

Recommendations

- All three MACs to work together for a co-ordinated response to the third wave initiative.
- Methods for increased guideline (IPC & clinical management) distribution and uptake need to be explored and should extensively involve existing DoH systems at all levels.
- Consider a separate urgent advisory on IPC issues related to vaccination
- Clinical guidelines to be promptly updated as new clinical evidence emerges
- Review of the contact time used in defining at-risk contacts (e.g., for contact tracing)
- There needs to be better and clearer co-ordination of clinical care at all levels with enhanced communication among health care workers at the respective levels.
- The review of all relevant MAC advisories to take place with consideration for relevance to the third wave.
- There is a need to enhance collection of detailed clinical data at unit level.

Part 4 – Communications to Prepare for a Third Wave

Communication strategy

- Use “Entertainment Education” to offset COVID fatigue and include tailored hotspot communication through both conventional and newer media platforms.
- Consider community norms of the specific hotspots and align with tailored messaging (avoid one-size fits all approach).
- Messages should increase health literacy on key terms e.g. quarantine and isolation.
- Communication strategies and content of messages should be evidence-based as far as possible.

Communication values

- Messaging should emphasise collective action, benefits and efficacy – individual actions benefit the community/country e.g. through ongoing commitment to NPIs, restricting gatherings and movement - households, workplaces, recreational spaces and community settings – even if allowed under current lockdown rules.
- The public has the agency to control the timing and severity of the third wave.
- Reinforce the idea of "community care" (Mohan Dutta), voluntary family lockdowns (during Easter and school holidays), encourage personal responsibility for community health even during eased Government regulations permitting greater freedom of movement).
- Personal sacrifices will help our communities and our country.

Priority media topics, in descending order of priority

1. Ongoing Non-Pharmaceutical Interventions (NPI) adherence (even during vaccine rollout)

What message (Key messages)

Emphasise importance of sustained public health interventions (PHI): Mask (nose AND mouth), hand sanitising, social distance, indoor/vehicle ventilation, avoidance of crowds and reduce duration of gatherings. Increased ventilation for all indoor gatherings. Should be based on research (E.G. HSRC) to address community perceptions of risk. NB: This will be required even as vaccines roll out. NPI/COVID fatigue should be acknowledged, recognising everyone's frustrated needs for normal social contact. Emphasize that responsible individual behaviour will have a direct impact on 'the common good'. Youth focus: Youth are more likely to have asymptomatic COVID-19 infection, are more mobile and interactive than the elderly and need to adhere to avoid spread to vulnerable family and community members. Messaging should include thanks to the public for effective adherence efforts during waves 1 and 2 (**both waves could have been much worse without public adherence to NPIs**). Create a culture of polite interpersonal reminding of NPI compliance. Where possible mention known motives of

nonadherence - e.g., COVID-19 denial; Fatigue, Rebellion (political or subcultural), youth beliefs of invincibility, lack of health information, fake news, low case rate/exposure in some settings, no access to resources/masks). Emphasize that we are all in this together, including leaders, scientists, HCWs etc.

To whom (Audiences)

General public (to be tailored for sectors, settings, ages, households, and behavioural trends). Secondary schools while learners are still attending. With SA now in level 1: bar, shebeen (and restaurant owners); Church leaders and Faith Based Organisations (FBOs); funeral directors.

How Part A (Responsible message initiators and media to be used)

DoH Comms Team/GCIS, Solidarity Fund. Should use local community radio and social media (Facebook, Instagram, WhatsApp) in various languages, visual and more interactive formats. Knowledge comms are important but need a more nuanced take for sustained effect. Make the message personal. Radio & TV. Community (physically distant) dialogues. Posters in social welfare institutions (various languages). Access data on community perceptions of NPIs. Community health workers also NB. Use/invite other NGOs with strong media campaigns (TAG etc).

How Part B (What type of messenger delivers the message)

Should be based on research (HSRC?) to address community perceptions NB; Should use local community radio and social media (Facebook, Instagram, WhatsApp) in various languages; visual and more interactive formats. Data from Ask Afrika suggest that science/clinical speakers are attended to more than celebrities/influencers. Knowledge remains important but needs to be nuanced and tailored for sustained effect. Make the message personal. Radio & TV. Community (physically distant) dialogues. Posters in social welfare institutions (various languages). Access data on community perceptions of NPIs. Community health workers also NB. Voices of nurses and doctors and other HCW who experienced the pressure and clinical tragedies in the 2nd wave. Prevention investment can prevent costs of clinical care and mortality.

By whom (Implementers)

1. Responsible agency: DOH (above the line); GCIS (below the line); CBOs and NGOs; Churches and Traditional Leadership. Schools. Scientists. Community Health Workers

2. Budget needs to be allocated by DOH, GCIS and Solidarity Fund. DoH/GCIS/Solidarity fund.

When/Urgency

ASAP

2. Travel/Easter

What message (Key messages)

Travel implications of third wave – limited cautious or cancelled travel will help prevent a third wave or moderate it if it has started by the Easter holiday period. Just because Easter travel is allowed everyone should try to have a new socially distant type of Easter as a way of caring for self, community and country. Take the higher ground. Avoid travel over high-risk Easter weekend - spread travel over off-peak days where possible (= fewer MVAs). Religious gatherings must comply with current lockdown rules and numbers are capped for indoors and outdoors. Singing in closed groups is a spreading risk. Restaurants to comply with numbers/distance guidelines. Voluntary lockdown within families to be strongly encouraged. Just because travel is allowed and small gatherings are allowed, we are still not in a 'business as usual' safe zone. Better to be safe than sorry. Do the "harder thing" = "voluntary lockdown" for your family, your community, and your country. (See also MAC Xmas 2020 advisories). Limit alcohol use.

To whom (Audiences)

General public (tailored for sectors). Transport Industry, Taxi Associations, Passenger service industry, Airlines (ideas for innovative messaging: a) active voluntary lock down over busy holiday periods. b) List 5 things families can do together at home (example: 4-day holiday plan for rural, urban, informal settlements). Religious leaders and FBOs.

How Part A (Responsible message initiators and media to be used)

DoH Comms Team/GCIS Localised community communication through scientific and local (e.g.) religious leaders. Make the message personal. NGOs, CBOs, Community Radio & TV. Responsible agency: DOH (above the line); GCIS (below the line); CBOs and NGOs; Churches and Traditional Leadership. Schools. Scientists. Community Health Workers Budget needs to be allocated by DoH, GCIS and Solidarity Fund in the interests of third wave prevention and moderation - i.e. as a public health intervention. Prevention investment can prevent costs of clinical care and mortality.

How Part B (What type of messenger delivers the message)

Localised community communication through scientific and local (e.g.) religious leaders. Implementers: Role models aligned to each of these sectors (social cognitive theory). Dependant on channel. Make the message personal. Radio & TV localised community communication and through religious leaders. Make the message personal.

By whom (Implementers)

DoH Include NGOs like TAC, People's Health Movement, Red Cross, UNICEF (good materials), GCIS, Solidarity Fund comms team, traditional leaders, community health workers.

When/Urgency

ASAP (second most important after NPIs)
When modelling is released.

Specific issues

Increase in travel and social gathering over Easter.

3. Vaccine rollout plan (Shared with MAC on Vaccines)

NOTE: there is a separate MAC vaccine hesitancy working group developing an advisory for late March 2021.

What message (Key messages)

Collab for content/key messages with MAC Vaccines Group and MAC Vaccines Hesitancy Group; what are post J&J vaccine Implementation Study plans...? Updates on overall stratified vaccine rollout plan. News on SA vaccine licensure with SAHPRA as and when. Information on implementation study. Trust the science. Explain Health workers - special phase 3b post-efficacy implementation study vaccine roll-out. Messages need to be simplified for public. Include actual timelines for vaccine roll-out if possible. Normalise rational self-protective hesitancy and encourage information-seeking from reliable sources. Explain that Vaccines do not eliminate need for NPIs in the short term. Do not repeat vaccine denialist theories and do not attempt to dissuade denialists (literature suggests this is futile) - a focus on hesitancy is much more in the population's best interests. Suggest and promote reliable vaccine information portals. What will be done with the AstraZeneca vaccine? Is it better than 'no vaccine' = current standard of prevention? Will it go to waste (harms credibility of DoH) - public wants answers to improve DoH credibility (Must align with new DoH vaccines message https://www.gcis.gov.za/vaccine-guideline 8 March 2021)

To whom (Audiences)

General public (tailored for sectors).

How Part A (Responsible message initiators and media to be used)

DoH Comms Team/GCIS/Solidarity Fund. Should be based on research (HSRC?) to address community perceptions NB; Should use local community radio and social media (Facebook, Instagram, WhatsApp) in various languages; visual and more interactive formats. Knowledge is important but needs a more nuanced take for sustained effect. Make the message personal, use scientific/clinical speakers rather than only community leaders/influencers. Radio & TV. Community dialogues (physically distant). Posters in clinical and social welfare institutions (various languages).

How Part B (What type of messenger delivers the message)

Heath expert/health leadership, recent vaccinee.

By whom (Implementers)

DoH Include NGOs like TAC, People's Health Movement, Red Cross, UNICEF (good materials), GCIS, Solidarity Fund, traditional leaders, scientists.

When/Urgency

ASAP – timing to depend on when J&J implementation study concludes and stratified community vaccine roll-out begins.

Specific issues

Targeted communication for phase 1 of actual vaccine roll out.

4. Epi/Modelling forecasts

What message (Key messages)

Messages to come from MAC EPI/Modelling group. Likely pattern and timing of 3rd wave. Forecasting if possible on specific target groups, hotspots and importance of NPIs and voluntary lockdowns.

To whom (Audiences)

General public (can be tailored for hot spot sectors)

How Part A (Responsible message initiators and media to be used)

DoH Comms Team/GCIS. Knowledge comms thus important but need a more nuanced take for sustained effect. Radio & TV.

How Part B (What type of messenger delivers the message)

Scientific and health leadership

By whom (Implementers)

1. Responsible agency: DoH
2. Implementors: Scientists. Community health workers (mobilised in various municipalities). Celebrities and role models from all domains of life, including scientists, nurses, religious, business and sports leaders. Lived experience of COVID survivors - personal story from community.

When/Urgency

When modelling is released.

Specific issues

Modelling forecast for hotspots.

5. New Variant likelihood

What message (Key messages)

Updates on SA variant will come from MAC and Epi/modelling TWG. Nature of variant -more/less infectious? Virulent? Typical clinical presentation/onset/course? Can those who had COVID before, get re-infected with new variant? Will J&J vaccine work with another potential new variant? To not panic - to encourage citizens to see themselves as OWNING the knowledge on how to keep safe (public has agency!) It is a matter of PRACTICE and RESPONSIBILITY (in other words reaffirm that we all have have the self and collective efficacy to protect themselves). Emphasise positive and negative lessons learned from 2nd wave.

To whom (Audiences)

General Public: Can be tailored for sectors.

How Part A (Responsible message initiators and media to be used)

DoH Comms Team/GCIS/Solidarity Fund. Knowledge is NB but needs a more nuanced and positive emphasis for sustained effect. Emphasise power of each person and NPIs. Radio & TV. Role models who survived the new variant - success stories (what did they do? Lived experiences / emotional) - hope is important.

How Part B (What type of messenger delivers the message)

Scientific and health leadership; supplemented by personal narratives from survivors?

By whom (Implementers)

DoH, Solidarity Fund, Scientists directly from their own work.

When/Urgency

As soon as data are known.

Specific issues

1. What have we learnt from first two waves?
2. How can we plan better?

6. Clinical Readiness: Public and Private sectors

What message (Key messages)

Info to be obtained from the Health System Preparation TWG. Early warning from MAC on likelihood and characteristics of 3rd wave. Signposting a culture of health and wellbeing around COVID-19 ahead of the third wave.

Public and Private institutions must provide counselling/mental health support for frontline HCWs. Importance of all IPC (Infection Prevention and Control) training refreshers for all HCWs.

To whom (Audiences)

Health care sectors:
Public:
Private:

How Part A (Responsible message initiators and media to be used)

DoH Comms Team/GCIS Internal communications NB in public and private sectors. Voices of nurses and doctors and other HCW who experienced the pressure and clinical tragedies in the 2nd wave.

How Part B (What type of messenger delivers the message)

Responsible institutional authority. Voices of nurses and doctors and other HCW who experienced the pressure and clinical tragedies in the 2nd wave.
Perhaps a voice from a mental health care service provider who supported first and second wave HCWs.

By whom (Implementers)

Internal institutional/sector communications NB

When/Urgency

As soon as known.

Specific issues

Internally driven.

7. When to seek care

What message (Key messages)

Requires Expert review: Info from Clinicians on main MAC and evidence-based best practice guidelines.
Take control of own life, protecting family, community, and country - ubuntu (like some HIV messaging).
1. Adults over 60 and people with comorbidities - more likely to develop more serious symptoms and should be referred to health facility if symptomatic, preferably cared for at a health facility
2. Patients under 60 with mild symptoms (fever, cough, headache, tiredness) may be managed at home.
3. If symptoms worsen or severe symptoms are experienced, contact the nearest health facility e.g., difficulty breathing, shortness of breath, chest pain or pressure, new confusion or loss of

speech or movement, inability to wake or stay awake, bluish lips or face https://sacoronavirus.co.za/2021/01/11/home-based-care-reference-guide-for-covid-19-english/ (see page 7 and 8)

To whom (Audiences)

General public (tailored for sectors). Emphasize clear pathways to local care.

How Part A (Responsible message initiators and media to be used)

DoH all media, Solidarity Fund, Community training, district level, Early community local engagement required.

How Part B (What type of messenger delivers the message)

Voices of nurses and doctors and other HCW who experienced the pressure and clinical tragedies in the 2nd wave. Survivor testimonies

By whom (Implementers)

DoH Include NGOs like TAC, People's Health Movement, Red Cross, UNICEF (good materials), GCIS, traditional leaders, scientists.

When/Urgency

Ongoing

Specific issues

Encourage use of the COVID ALERT App COVID Alert South Africa - Apps on Google Play

8. Best practices for isolation and quarantine

What message (Key messages)

Get updated evidence-based info from MAC clinicians and scientists and best practice clinical guidelines. Clarify terms of isolation and quarantine. Update if length of time for each has changed. Emphasise NPIs and avoidance of social gatherings if sick (any symptoms, COVID status not known). How to manage in households where it is not possible to isolate and quarantine (e.g. few rooms and many people living in one space). Tools already available. Make the message personal. See existing DoH guidance docs.
1. Contacts should be quarantined for 14 days from last day or exposure
2. Patients with symptoms should isolate for 10 days after symptom onset (plus 3 days without symptoms)
3. Patients without symptoms but tested positive should isolate for 10 days after testing positive
https://sacoronavirus.co.za/2021/01/11/home-based-care-reference-guide-for-covid-19-english/ (see page 12)

To whom (Audiences)

General public (tailored for sectors). See 2nd wave "coalface advisory" (on file)

How Part A (Responsible message initiators and media to be used)

DoH, all media, Community training, district level. Knowledge comm’s thus stay important but need a more nuanced take for sustained effect. Radio & TV

How Part B (What type of messenger delivers the message)

Voices of nurses and doctors and other HCW who experienced the pressure and clinical tragedies in the 2nd wave. Survivor testimonies.

By whom (Implementers)

DoH Include NGOs like TAC, People's Health Movement, Red Cross, UNICEF (good materials), GCIS, traditional leaders, scientists.

When/Urgency

Ongoing
Important but not yet urgent

Specific issues

Reinforcing period of isolation and quarantine: isolate and quarantine days from first symptom or diagnosis

References

1. Ministerial Advisory Committee Technical Working Group on the Second Wave. *Epidemiological Assessment of the Likelihood of a Second COVID-19 Wave, and Recommendations Regarding COVID-19 Surveillance and Response Activities*. Ministerial Advisory Committee on COVID-19 (South African National Department of Health); 2020. Accessed March 10, 2021. https://sacoronavirus.co.za/wp-content/uploads/2020/12/Secondwave-Appendix.pdf

2. Update On Covid-19 (18th March 2021) - SA Corona Virus Online Portal. SA Corona Virus Online Portal. Accessed March 19, 2021. https://sacoronavirus.co.za/2021/03/18/update-on-covid-19-18th-march-2021/

3. Moultrie T, Dorrington R, Laubscher R, Groenewald P, Bradshaw D. CORRELATION OF EXCESS NATURAL DEATHS WITH OTHER MEASURES OF THE COVID-19 PANDEMIC IN SOUTH AFRICA. :15.

4. SACMC Epidemic Explorer - Open Access. Accessed March 19, 2021. https://sacmcepidemicexplorer.co.za/

5. Jassat W, Cohen C, Mudara C, Blumberg L. *MULTIVARIABLE ANALYSIS COMPARING IN-HOSPITAL MORTALITY IN THE FIRST AND SECOND WAVE OF COVID-19 IN THREE DISTRICTS OF SOUTH AFRICA*. National Institute of Communicable DIseases; :24. https://www.nicd.ac.za/wp-content/uploads/2021/01/COVID-19-SPECIAL-PUBLIC-HEALTH-SURVEILLANCE-BULLETIN-Volume-6-V5.pdf

6. Jassat W, Mudara C, Ozougwu L, et al. *Increased Mortality among Individuals Hospitalised with COVID-19 during the Second Wave in South Africa*. Public and Global Health; 2021. doi:10.1101/2021.03.09.21253184

7. Sykes W, Mhlanga L, Swanevelder R, et al. *Prevalence of Anti-SARS-CoV-2 Antibodies among Blood Donors in Northern Cape, KwaZulu-Natal, Eastern Cape, and Free State Provinces of South Africa in January 2021.*; 2021. doi:10.21203/rs.3.rs-233375/v1

8. Aitken S, Yun J, Fellows T, et al. *COVID-19 Seroprevalence during the Second Wave of the Pandemic in Three Districts of South Africa - Preliminary Findings*. National Institute of Communicable DIseases; 2021. https://www.nicd.ac.za/wp-content/uploads/2021/03/COVID-19-Special-Public-Health-Surveillance-Bulletin-9-12-March-2021..pdf

9. Shaw JA, Meiring M, Cummins T, et al. Higher SARS-CoV-2 seroprevalence in workers with lower socioeconomic status in Cape Town, South Africa. Musuka G, ed. *PLOS ONE*. 2021;16(2):e0247852. doi:10.1371/journal.pone.0247852

10. Human Sciences Research Council. South Africa conducts National COVID-19 Antibody Survey (NCAS). Human Sciences Research Council. Published December 9, 2020. Accessed March 19, 2021. http://www.hsrc.ac.za/en/media-briefs/general/covid19-antibody-survey

11. Tegally H, Wilkinson E, Giovanetti M, et al. Emergence of a SARS-CoV-2 variant of concern with mutations in spike glycoprotein. *Nature*. Published online March 9, 2021. doi:10.1038/s41586-021-03402-9

12. Pearson C, Russell T, Davies N, et al. *Estimates of Severity and Transmissibility of Novel SARS-CoV-2 Variant 501Y.V2 in South Africa*.; 2021. Accessed March 10, 2021. https://cmmid.github.io/topics/covid19/sa-novel-variant.html

13. Abdel Latif A, Gangavarapu K, Mullen JL, et al. *B.1.351 Lineage Report*.; 2021. Accessed March 19, 2021. https://outbreak.info/situation-reports?pango=B.1.351&selected=ZAF&loc=ZAF&loc=USA&loc=USA_US-CA

14. *SARS-CoV-2 Variants of Concern and Variants under Investigation in England - Technical Briefing 6*. Public Health England; 2021. Accessed March 19, 2021. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/961299/Variants_of_Concern_VOC_Technical_Briefing_6_England-1.pdf

15. *SARS-CoV-2 Variants of Concern and Variants under Investigation in England - Technical Briefing 7*. Public Health England; 2021. Accessed March 19, 2021. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/968581/Variants_of_Concern_VOC_Technical_Briefing_7_England.pdf

16. Challen R, Brooks-Pollock E, Read JM, Dyson L, Tsaneva-Atanasova K, Danon L. Risk of mortality in patients infected with SARS-CoV-2 variant of concern 202012/1: matched cohort study. *BMJ*. 2021;372:n579. doi:10.1136/bmj.n579

17. *Investigation of Novel SARS-CoV-2 Variant - Variant of Concern 202012/01*. Public Health England; 2020. Accessed March 19, 2021. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/959360/Variant_of_Concern_VOC_202012_01_Technical_Briefing_3.pdf

18. Abdel Latif A, Gangavarapu K, Mullen JL, et al. *B.1.1.7 Lineage Report*.; 2021. Accessed March 19, 2021. https://outbreak.info/situation-reports?pango=B.1.1.7&loc=GBR&loc=USA&loc=USA_US-CA&selected=GBR

19. Abdel Latif A, Gangavarapu K, Mullen JL, et al. *P.1 Lineage Report*.; 2021. Accessed March 19, 2021. https://outbreak.info/situation-reports?pango=P.1&selected=BRA&loc=BRA&loc=USA&loc=USA_US-CA

20. Bugembe DL, Phan MVT, Ssewanyana I, et al. A SARS-CoV-2 lineage A variant (A.23.1) with altered spike has emerged and is dominating the current Uganda epidemic. *medRxiv*. Published online February 11, 2021:2021.02.08.21251393. doi:10.1101/2021.02.08.21251393

21. Abdel Latif A, Gangavarapu K, Mullen JL, et al. *B.1.427 Lineage Report*.; 2021. Accessed March 19, 2021. https://outbreak.info/situation-reports?pango=B.1.427&loc=USA&loc=USA_US-CA&selected=USA_US-CA

22. Abdel Latif A, Gangavarapu K, Mullen JL, et al. *B.1.429 Lineage Report*.; 2021. Accessed March 19, 2021. https://outbreak.info/situation-reports?pango=B.1.429&loc=USA&loc=USA_US-CA&selected=USA_US-CA

23. Abdel Latif A, Gangavarapu K, Mullen JL, et al. *B.1.526 Lineage Report*.; 2021. Accessed March 19, 2021. https://outbreak.info/situation-reports?pango=B.1.526&loc=USA&loc=USA_US-NY&selected=USA_US-NY

24. Griver S. Israel's cabinet approves three-week lockdown. *Globes*. https://en.globes.co.il/en/article-israels-cabinet-approves-three-week-lockdown-1001342554. Published September 13, 2020. Accessed March 3, 2021.

25. Jaffe-Hoffman M. Lockdown extended until Sunday at midnight - Gantz and Netanyahu agree - The Jerusalem Post. Accessed March 3, 2021. https://www.jpost.com/health-science/will-israel-exit-lockdown-coronavirus-cabinet-to-convene-tuesday-645539

26. The Government of Serbia. COVID-19 News. Accessed March 9, 2021. https://www.srbija.gov.rs/sekcija/en/151926/covid-19.php

27. Baker RE, Yang W, Vecchi GA, Metcalf CJE, Grenfell BT. Susceptible supply limits the role of climate in the early SARS-CoV-2 pandemic. *Science*. Published online May 18, 2020:eabc2535. doi:10.1126/science.abc2535

28. Edridge AW, Kaczorowska JM, Hoste AC, et al. *Coronavirus Protective Immunity Is Short-Lasting*. Infectious Diseases (except HIV/AIDS); 2020. doi:10.1101/2020.05.11.20086439

29. Abu-Raddad LJ, Chemaitelly H, Coyle P, et al. *SARS-CoV-2 Reinfection in a Cohort of 43,000 Antibody-Positive Individuals Followed for up to 35 Weeks*. Epidemiology; 2021. doi:10.1101/2021.01.15.21249731

30. Hansen CH, Michlmayr D, Gubbels SM, Mølbak K, Ethelberg S. Assessment of protection against reinfection with SARS-CoV-2 among 4 million PCR-tested individuals in Denmark in 2020: a population-level observational study. *The Lancet*. Published online March 2021:S0140673621005754. doi:10.1016/S0140-6736(21)00575-4

31. Harvey RA, Rassen JA, Kabelac CA, et al. Association of SARS-CoV-2 Seropositive Antibody Test With Risk of Future Infection. *JAMA Intern Med*. Published online February 24, 2021. doi:10.1001/jamainternmed.2021.0366

32. Dan JM, Mateus J, Kato Y, et al. Immunological memory to SARS-CoV-2 assessed for up to 8 months after infection. *Science*. 2021;371(6529):eabf4063. doi:10.1126/science.abf4063

33. Kissler SM, Tedijanto C, Goldstein E, Grad YH, Lipsitch M. Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period. *Science*. 2020;368(6493):860-868. doi:10.1126/science.abb5793

34. Dushoff J, Plotkin JB, Levin SA, Earn DJD. Dynamical resonance can account for seasonality of influenza epidemics. *Proc Natl Acad Sci*. 2004;101(48):16915-16916. doi:10.1073/pnas.0407293101

35. Lavine JS, Bjornstad ON, Antia R. Immunological characteristics govern the transition of COVID-19 to endemicity. *Science*. 2021;371(6530):741-745. doi:10.1126/science.abe6522