Strategic COVID-19 Public Health Advisory Group

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Hon Dr Ayesha Verrall
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Parliament Buildings
Wellington

Dear Minister

Phased Re-opening of Borders

In this report we address two questions you have posed:

Is a target for the percentage of population vaccinated helpful for making decisions on re-opening borders (or for driving vaccine uptake)?

How do we stage a phased re-opening of New Zealand's borders, taking account of vaccination coverage and the possibility of vaccine-resistant mutants?

1. Vaccination against an infectious agent such as SARS-CoV-2 provides two kinds of benefit. First, vaccination protects *individuals*, by making it (a) less likely that they will be infected, and (b) less likely that they will become seriously ill if they are infected. Secondly, vaccination protects both *the whānau and the wider community*, by making it less likely that the virus will spread through the population.

2. The second benefit, which may be called *community protection*, is related to the concept of *herd immunity*. Unfortunately this term, which has become very popular during the pandemic, carries a variety of meanings. Most often, people are using it to refer to a state in which an infection largely stops spreading through a population because a sufficient proportion of people have become immune. Such immunity could be conferred by vaccination or by natural infection. The proportion of people who need to be immune is sometimes called the "herd immunity threshold".

3. This concept of a simple threshold is oversimplified, because there is always heterogeneity among groups in the population in the extent to which people are at risk of encountering the virus. For example, Pasifika people in South Auckland often live in crowded housing and they may attend large family gatherings and church services, where the risk of transmission during an outbreak is enhanced. As a result, their herd immunity threshold will be higher than for the population at large. In other words, a greater proportion of people in that community would need to be vaccinated in order to achieve community protection.

4. As well as heterogeneity in the underlying risk of different groups in New Zealand, there is bound to be heterogeneity in the extent to which groups achieve high vaccination coverage. Thus there are likely to be geographic, ethnic, occupational, and social groups that have lower levels of immune protection, providing opportunities for the virus to spread more rapidly in certain communities.

5. Even though the problem of heterogeneity is normally not accounted for, mathematical modelling – both in New Zealand and overseas – suggests that plausible levels of vaccination coverage are unlikely to cross a herd immunity threshold. One factor is that children are not being vaccinated in most countries at present. Vaccines such as the Pfizer vaccine have been approved for use in children by some regulatory authorities, but there is still international debate about the role they should play.

6. Most modelling studies have assumed a reproduction number (R) characteristic of either the original virus that spread from Wuhan, or the Alpha variant, first identified in the United Kingdom. In recent weeks it has become clear that the Delta variant, first identified in India, is much more easily transmitted. This explains why the Delta variant has quickly become dominant in the United Kingdom (accounting for about 90% of cases), and it has also been responsible for the recent outbreak in Melbourne. The emergence of more transmissible variants (with higher R-values) means that the prospect of achieving herd immunity is even more elusive.

7. While the public needs to know that we will not achieve some magical state of herd immunity, it is also vital that everyone is aware that the degree of community protection provided by the vaccine depends on the level of coverage that is achieved. When New Zealand starts to re-open its borders, there will inevitably be outbreaks of infection. If a consistently high proportion of adults were fully vaccinated with two doses of the Pfizer vaccine, those outbreaks would be easier to stamp out with public health measures such as testing and contact tracing. If the vaccine coverage were lower and with appreciable heterogeneity, there would be much larger outbreaks, with more hospital admissions and deaths, and various forms of lockdown would be required to bring them under control. It is vitally important that we try to achieve the highest possible level of vaccination coverage, and that every effort is made to ensure that particular groups in the community are not left with lower levels of immune protection.

8. The modelling studies have to be interpreted with caution and they need to adapt to changing parameters in real time. For example, they have assumed very high vaccination coverage and values of R which are now too low for recent variants that are likely to enter New Zealand in the future. But even if these studies are taken at face value, they indicate that allowing infected people to cross our borders will lead to clusters of infection and some large outbreaks. For reasons we will discuss below, our group does not believe that

border restrictions should be relaxed significantly (beyond current "bubble" arrangements, as with Australia and the Cook Islands) until the vaccination programme has been fully rolled out. So setting a target for the percentage of the population vaccinated would not help in deciding when to start further re-opening.

9. The other part of the first question is whether setting a target would be helpful for driving vaccine uptake. This is probably better answered by behavioural scientists and experts in social marketing than by our group. Our advice would be merely to explain to the community that getting as near as possible towards 100% of all adults vaccinated (without particular groups being neglected) will enable New Zealand to reconnect with the world with the least disruption, illness and death toll from COVID-19. Clearly a small minority of people will refuse the vaccine, and there is misinformation that threatens some people's confidence in vaccination. But we hope the great majority of New Zealanders will regard being vaccinated as a civic duty that will protect not only themselves, but also their families and the communities they live in. It is likely that some people who decline vaccination, during this campaign, will seek it later when the re-opening of borders commences and outbreaks of COVID-19 start occurring.

Phased re-opening

10. Whereas at present nearly all travellers arriving in New Zealand must enter the MIQ process, there are quarantine-free entry (QFE) arrangements with Australia and the Cook Islands. Such arrangements could be expanded to include other countries that pose no more risk than Australians to our partially vaccinated population. Regrettably, the deteriorating pandemic situation in many parts of the world means that there are very few places that would meet that criterion.

11. We recommend that, once vaccination programmes in Australia, New Zealand, and the Cook Islands are well advanced, travel between such "bubble" countries should be restricted to adults who have been fully vaccinated (and their children accompanying them). This would reduce the risk of the virus being carried from one country to another.

12. We have been surprised by suggestions that New Zealand could start to permit QFE for individuals and cohorts from other countries before the vaccination programme is completed. Even with the most rigorous precautions (which we will discuss below), it would be inevitable that people carrying the virus would enter New Zealand on a regular basis. Citizens could justifiably feel aggrieved, if they were exposed to this infection before being given the opportunity to be protected by vaccination. Furthermore, with only a partially vaccinated population, the resulting clusters and outbreaks of infection might well be too large for our public health units to extinguish by testing, rapid tracing and isolation of contacts. This limited capacity would be

a problem even under normal circumstances, but at present many of the staff are busy supporting the vaccination programme. Overloading these staff could impede the vaccine roll-out. Raising of alert levels might become a recurrent necessity, which would cause not only economic and community disruption, but also progressive damage to the social licence that enables lockdowns to be successful. (This is important, because raised alert levels may still be needed occasionally in the future, even after we achieve peak vaccination and start to re-open our borders.) Treatment services would probably also be stretched beyond capacity.

13. Once vaccination has been offered to all of the eligible population, we assume that border restrictions will start to be relaxed. No doubt a section of the community would prefer that we wait until there is no risk of causing outbreaks of COVID-19, but sadly that day may never come. The main purpose of maintaining closed borders since early 2020 has been to protect the population until vaccines had been developed and made available to our people. Provided that a high level of vaccination coverage is achieved, the elimination strategy can be maintained by vigorously stamping out clusters of COVID-19 as they occur. As we pointed out in our previous report, this should put New Zealand in a more favourable position than the great majority of countries, which will have to cope with endemic SARS-CoV-2 infection for the foreseeable future.

14. The challenge of dealing with regular importations of the virus through our borders should not be underestimated. Vaccination will protect the majority of adults, but like most other countries we will not have "herd immunity", so there will still be the potential for large outbreaks causing many hospitalisations and deaths. Without adequate safeguards, such outbreaks could overload the health system and disrupt social and economic life, in ways similar to those experienced by other countries over the past year. Groups in the community with lower levels of immune protection through vaccination would be especially vulnerable. Hence we support the idea that re-opening of the borders in 2022 should start in a carefully planned, phased way – with continuous monitoring and adjustments as needed.

15. Many of the details of this phased re-opening cannot be decided more than six months in advance, because the global pandemic is changing so rapidly. The situation in most countries is still unpredictable, and the virus has been mutating in more significant ways than scientists were predicting a year ago. As already mentioned, the Delta variant is highly transmissible; it may also cause more infected people to experience severe illness requiring admission to hospital. The Beta variant, first identified in South Africa, appears to be resistant to the Oxford-AstraZeneca vaccine. There may also be milder resistance to the Pfizer-BioNTech vaccine, but so far this vaccine has held up well against all the variants that have been studied. Nevertheless, it is possible that a variant resistant to the vaccine could emerge before we are ready to open our borders.

Precautions that will be required

16. While the ultimate aim will be for as many travellers as possible to have QFE, it is likely that initially some categories of traveller may be granted an intermediate option – such as MIQ for a shorter period, or part (or all) of the quarantine period to be spent at home. The details of such arrangements would have to be determined in the light of information about the behaviour of the variants of the virus that are dominant at the time.

17. It is already possible to list some of the precautions that will be needed, when we start to admit more travellers without the requirement to spend 14 days in MIQ:

a. Initially QFE (or reduced time in MIQ) will probably be restricted to suitable individuals from countries where the pandemic is well controlled, and where there are not known to be variants circulating that would cause us particular concern.

b. Candidates for QFE (or reduced time in MIQ) will need to provide evidence that they have been fully vaccinated. Obtaining reliable evidence of vaccination will be a challenge, but there is work under way internationally on vaccine certification. The issue of which vaccines should be accepted is discussed below (paragraph 18).

c. People who report having recovered from COVID-19 should still be required to be vaccinated, because vaccination provides stronger immune protection than natural infection.

d. Children (if not eligible for vaccination at the time) who are travelling with vaccinated adults would not be required to be vaccinated.

e. All travellers, including children, should be required to have evidence of a negative PCR test shortly before departure.

f. A rapid test should also be required at the airport on arrival in New Zealand. The choice of test should be based on advice from an expert committee (see paragraph 20 below). People who fail this test, together with their close travelling companions (i.e. their "bubble"), would have to enter the MIQ system.

g. The possibility of a further compulsory test (say after 3 days), or more than one test, should also be considered. Tests on or before day 2, and on or after day 8, are required in England for travellers from "amber list" countries, which include most of those in Western Europe at present.

h. People granted QFE (or reduced time in MIQ) should consent to special measures to assist contact tracing. Apart from consistent scanning of QR

codes, these could include mobile phone tracking and possibly use of EFTPOS transactions.

i. Greater vigilance will be essential throughout New Zealand, and the strengthening of public health and social measures is discussed below (paragraph 23).

18. While this discussion is framed for the great majority of travellers, who arrive by air, similar arrangements will be needed for travellers who enter New Zealand through sea ports. Further work is required on most of the precautions listed. For example, there will be a need to decide whether vaccination with any COVID-19 vaccine approved by the World Health Organization will be accepted, or whether some vaccines will be determined as not providing the required protection from transmission. It is likely that most vaccines provide better protection against serious illness and death from COVID-19, than against asymptomatic infection and transmission of the virus to other people. At present there is not nearly enough evidence about these questions, but we expect additional studies will be completed before the end of the year. The selection and provision of laboratory tests is discussed in the following paragraphs.

Work needed now

19. It is fortunate that New Zealand still has at least six months to prepare for reducing border restrictions, because considerable preparatory work is required. For example, decisions need to be made about arrangements for obtaining reliable evidence of PCR testing in the country of departure. There will also have to be careful consideration of which type of rapid test to use for screening travellers when they arrive at a New Zealand airport. A myriad of such tests, both rapid PCR tests and antigen tests, have been implemented around the world, but New Zealand has little experience of these. Their reliability, sensitivity, specificity, and convenience vary markedly. The testing system selected will need to be piloted and up-and-running before the first travellers seeking QFE arrive.

20. We recommend that the Government should establish very soon an expert committee to advise on the many laboratory testing issues that will arise over the next 18 months at least. This advisory group should comprise medical laboratory scientists, clinical microbiologists, and an epidemiologist with expertise in assessing the validity of clinical tests. Such a group could assist in ensuring that New Zealand is ready to roll out testing as soon as QFE is approved for some travellers. The committee will need to be open to innovative approaches to testing, as well as having a good understanding of operational issues in the New Zealand context.

21. This committee should also be asked to review testing capacity for SARS-CoV-2 within the country. Because of the closure of borders, New Zealand has had virtually no influenza since 2019, and several other respiratory illnesses are

still occurring less frequently. When travellers start entering New Zealand without quarantine, these conditions will become more common again. In the winter of 2022, there could be a need for very large numbers of tests to identify which people with respiratory symptoms have COVID-19.

22. Because of the certainty that more clusters and outbreaks of COVID-19 will occur, the contact tracing capacity of public health units needs to be reviewed again and probably strengthened. In future, outbreaks will be liable to occur in any part of the country, rather than mainly in Auckland as has been the case recently.

23. Consideration needs to be given as to how we can strengthen other public health and social measures that will assist in stamping out clusters of COVID-19. For example, contact tracing could be enhanced if people consistently scanned QR codes, but at present the support for this is abysmal. We recommend that the scanning of QR codes should be mandated at some types of venue. We understand the argument that such a requirement could not be enforced, but most citizens want to comply with the law. In several Australian states, checking in at various types of venue is mandatory. Although the Australians must have the same issue about enforcement, New Zealanders who have visited Australia recently have been struck by the high degree of compliance.

24. There needs to be a review of health system capacity and management systems for dealing with possible large outbreaks of COVID-19. This should include consideration of primary health care responses, medical ward capacity, equipment for non-invasive ventilation, and intensive care facilities. Our hospitals have often been dangerously stretched, even by routine winter outbreaks of influenza. In the winter of 2022 or 2023, a region in New Zealand could experience a large outbreak of COVID-19, at the same time as influenza is leading to many hospital admissions. An example of the kind of facility needed would be dedicated areas for the safe transit of patients who may have COVID-19.

A suggested first step

25. The staging of a phased re-opening of New Zealand's borders, once the vaccination roll-out is completed, cannot be specified in detail yet. Too much will change over the next six months or longer, and no doubt any plan will be modified in the light of experience. But we recommend that the process could start with QFE (or reduced time in MIQ) for fully vaccinated New Zealand citizens or residents, who have gone overseas for a short trip and are returning to this country. There will be reliable evidence from the immunisation register as to whether such people have been fully immunised with the Pfizer vaccine, and they should be highly motivated to co-operate in keeping the virus out of New Zealand. Admitting this group first would assist in getting all the necessary procedures, such as rapid testing at airports, well

established before wider groups of travellers are admitted without quarantine.

Conclusions

26. We have recommended that further significant re-opening of New Zealand's borders should not commence before early 2022, when as many New Zealanders as possible have been vaccinated. Much work needs to be started soon, to ensure that we will be well prepared to begin a phased re-opening.

27. The successful implementation of New Zealand's elimination strategy has prevented many thousands of deaths, as well as much serious illness, and our economy and community life have fared better than in nearly every other country. We have suggested in our previous report that this strategic approach will still be viable and, indeed, optimal as international travel resumes. Continuing to stamp out clusters of COVID-19 as they arise, owing to incursions of the virus, will be a major challenge. Failure to achieve such elimination would lead to a much larger burden of illness and death, as well as disruption of our economy and way of life.

28. The probability of success will be greatly enhanced if we can fully vaccinate a very high proportion of the eligible population over the coming months.

Yours sincerely

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