Briefing

Response to request for advice on the use of a 'test to release' option for COVID-19 self-isolation – update to H2023023924

Date due to MO:	9 May 2023	**Action required by:**	NA
Security level:	IN CONFIDENCE	**Health Report number:**	H2023024700
To:	Hon Dr Ayesha Verrall, Minister of Health		
Copy to:	Rt Hon Chris Hipkins, Prime Minister		
Consulted:	Health New Zealand: ☐ Māori Health Authority: ☐		

Contact for telephone discussion

Name	Position	Telephone
Dr Andrew Old	Deputy Director-General, Public Health Agency	s 9(2)(a)
Dr Nicholas Jones	Director of Public Health, Public Health Agency	s 9(2)(a)

Minister's office to complete:

☐ Approved	☐ Decline	☐ Noted
☐ Needs change	☐ Seen	☐ Overtaken by events
☐ See Minister's Notes	☐ Withdrawn	

Comment:

Response to request for advice on the use of a 'test to release' option for COVID-19 self-isolation

Security level:	IN CONFIDENCE	**Date:**	9 May 2023
To:	Hon Dr Ayesha Verrall, Minister of Health		

Purpose of report

1. Following a request from the Prime Minister on 17 April 2022, you have requested further advice on a test to release scheme that allows people who have tested positive for COVID-19 to end their isolation early following testing negative on a rapid antigen test (RAT). You have requested that this advice include:
    a. public health advice on test to release
    b. options for test to release settings, including different release days
    c. a timeline for possible implementation dates, taking a phased approach over time.
2. This report is an update to an earlier Health Report provided on 28 April 2023 (H2023023924). The two main differences are that this report:
    a. contains updated modelling from COVID-19 Modelling Aotearoa (CMA) – as indicated in the earlier report
    b. uses a 'no mandate' scenario as the base scenario for comparison purposes – as requested by your office (on behalf of the Office of the Prime Minister) on 1 May 2023.
3. This report discloses all relevant information and implications.

Summary

Public health advice on test to release

4. Test to release schemes provide a way for COVID-19 cases to be released from isolation following one or more negative rapid antigen tests (RATs). The key potential benefit is enabling individuals who are less likely to be infectious (based on a negative RAT) to be released earlier than they would otherwise have been.
5. In New Zealand, test to return (a variation on test to release) has been used as part of the healthcare worker return to work programme since March 2022. This has allowed healthcare workers to return to work from day 5 if they are asymptomatic, feel well and have had two negative RATs. Internationally, test to release models are currently used in Taiwan in healthcare settings, and Italy.

6. Current public health advice is that 7-day mandatory isolation remains the preferred option. This advice will be reviewed on 22 May, as part of the regular review cycle involving a public health risk assessment (PHRA), advice from the Director-General of Health to the Minister of Health, and agency consultation, followed by development of a Cabinet paper on COVID-19 measures.

Options for test-to-release

7. Test to release policies entail a number of parameters that can be varied in terms of what is required to exit isolation. The most common parameters are the number of negative RATs that are required; the minimum and/or maximum number of days of isolation that the person must complete; and whether the person is also required to be asymptomatic on release.

A timeline for possible implementation dates, taking a phrased approach over time

8. s 9(2)(h) [redacted]

9. s 9(2)(h) [redacted]

10. This planning is currently underway in relation to potential changes to the remaining public health measures enabled by orders, with the timing for any such changes to be considered as part of the next PHRA on 22 May 2023.

Next steps

11. It was not possible to obtain a full breakdown of all scenarios by ethnicity in time to be included in this briefing. This information will be included as part of the next PHRA on 22 May 2022, along with the standard set of information provided to support each review cycle.

12. Following the PHRA, the Director-General of Health will provide advice to the Minister of Health, agency consultation will occur, and then a paper will be developed for discussion at the Cabinet Social Wellbeing Committee (SWC) on 21 June 2023, and by Cabinet on 26 June 2023.

Recommendations

We recommend you:

a)	**Note** that the key benefits of a test-to-release or test-to-return policy are that they potentially enable people who are less likely to be infectious to leave isolation earlier than they otherwise would have	**Noted**
b)	**Note** that following the last PHRA on 16 March 2023, the recommendation from the Director-General of Health was that COVID-19 cases continue to be required to isolate for 7 days	**Noted**
c)	s 9(2)(h) [redacted]	**Noted**

d) **Note** that planning for scenarios (including a scenario where mandates may be removed) has commenced in relation to the remaining COVID-19 requirements — **Noted**

e) **Note** that the next Public Health Risk Assessment will be held on 22 May 2023, followed by development of a Cabinet paper to be considered by SWC on 21 June 2023 and by Cabinet on 26 June 2023. — **Noted**

Dr Diana Sarfati
Director-General of Health
Te Tumu Whakarae mō te Hauora
Date: 09/05/2023

Hon Dr Ayesha Verrall
Minister of Health
Date:

Dr Andrew Old
Deputy Director-General
Public Health Agency
Date: 9/5/23

Response to request for advice on the use of a 'test to release' option for COVID-19 isolation

Background

13. Section 8 of the COVID-19 Public Health Response Act (the Act) provides three alternative pre-requisites for making and amending COVID-19 orders:

    a. while an epidemic notice under section 5 of the Epidemic Preparedness Act 2006 is in force for COVID-19; or

    b. while a state of emergency or transition period in respect of COVID-19 under the Civil Defence Emergency Management Act 2002 is in force; or

    c. if the Prime Minister, by notice in the *Gazette*, after being satisfied that there is a risk of an outbreak or the spread of COVID-19, has authorised the use of COVID-19 orders (either generally or specifically) and the authorisation is in force.

14. s 9(2)(h) [redacted]

15. On 27 February 2023, the Prime Minister authorised the use of COVID-19 orders under the Act in relation to self-isolation requirements for COVID-19 cases and mask requirements in health service premises for the period 28 February to 28 April 2023. On 14 April 2023, the Prime Minister agreed to renew the authorisation made under section 8(c) of the Act from 28 April 2023 to 30 June 2023 [H2023022067 refers].

16. s 9(2)(h) [redacted]

17. On 11 April 2023, Cabinet agreed to retain the current settings in relation to both self-isolation requirements for cases, and mask requirements in health service premises. Cabinet agreed to revoke the COVID-19 Public Health Response (Point-of-care Tests) Order 2021.

18. Provided that one of the alternative prerequisites outlined in section 8 of the Act are met, decisions in relation to orders sit with the Minister of Health (provided the requirements in section 9 are met). As has been the case to date, your office has indicated that you have a preference and intention to use Cabinet as a mechanism to consult with your colleagues (as permitted under section 9(1)(c)(ii)) prior to making decisions in relation to COVID-19 orders.

Context

Current setting

19. Under the COVID-19 Public Health Response (Self-isolation Requirements) Order 2022 ('the Order'), people who test positive for COVID-19 are required to isolate for 7 days from the earlier of the date their symptoms began, or the date they tested positive.

Neither testing for COVID-19 upon the occurrence of symptoms nor reporting of results are required under the Order.

20. Isolation requirements have been reduced over the course of the pandemic from an initial 14 days, to 10 days and then to the current 7-day requirement. The Director-General has previously provided advice that 7 days is considered the minimum threshold for self-isolation of symptomatic cases to remain an effective intervention. 5-day isolation is considered less effective, as many people may still be infectious on release at day 5. The infectivity of cases may be changing over time with hybrid immunity increasing within the population. Infectivity is not a binary phenomenon with even those remaining infectious at day 5 generally being less infectious than they would have been at day 1 or 2.

How do 'test to release' and 'test to return' work?

21. Test to release and test to return are mechanisms that enable a person isolating with COVID-19 to exit isolation (test to release) or return to work or study (test to return) upon testing negative on a RAT.

22. Under either mechanism, there are further possible variations in terms of what is required to exit isolation. The most common parameters are:

    a. whether the person is required to test negative once or twice

    b. whether there is a minimum number of days the person must complete in isolation before being able to test to exit

    c. whether there is a maximum number of days a person is required to isolate for

    d. whether the person is required to be asymptomatic on release.

When and where have these approaches been used?

New Zealand

23. In New Zealand, test to return has been used as part of the healthcare worker return to work programme since March 2022. This has allowed healthcare workers to return to work from day 5 if they are asymptomatic, feel well and have had two negative RATs.

24. A test to return pathway has been used by District Health Boards since March 2022, although it did not result in many staff members returning to work prior to completing a 7-day isolation period. For example, at Canterbury DHB so few healthcare workers were both asymptomatic and tested negative (estimated to be 1 in 15 or 20 healthcare workers) that they stopped trying to utilise an early release pathway.

25. Extensive guidance was developed to ensure this pathway was well understood and to protect the wellbeing of affected staff members.[1]

Other jurisdictions

26. In other jurisdictions, these models have been used in different ways over the course of the pandemic – as legally required national mandates, as requirements from employers

[1] https://www.tewhatuora.govt.nz/for-the-health-sector/covid-19-information-for-health-professionals/covid-19-information-for-all-health-professionals/guidance-for-critical-health-services-during-an-omicron-outbreak/

as part of responding to their health and safety responsibilities (and to reduce legal risk), and as national guidance.

27. Currently several jurisdictions use some form of test to release (for example, Taiwan in healthcare settings and in Italy).

28. Typically, 'test to release' tends to be associated with national isolation mandates or guidance, and 'test to return' tends to be more commonly associated as a requirement that employers or educational facilities place on their employees or students.

Public health advice on test-to-release

What is the rationale for using either a test to release or test to return model?

29. The core rationale behind test to release or test to return is to enable people who are less likely to be infectious to exit isolation, and/or return to work or education.

30. Requiring a negative RAT to exit greatly reduces the likelihood that the person will be infectious on release. Based on modelling provided by CMA on 3 May 2023:

    a. approximately 1 in 5 (19%) people are likely to still be infectious on release under the current policy of mandatory isolation for 7 days

    b. if the policy changed to allow people to leave isolation after 5 days and a negative RAT, this proportion was modelled to increase to an estimated 22% (a 16% increase from the status quo)

    c. if mandatory isolation was reduced to 5 days with no test to release, approximately 36% of people would likely still be infectious on release (an 89% increase from the status quo).

    d. As noted in paragraph 20, infectivity is not a binary phenomenon. Even those remaining infectious at day 5 are likely to be less infectious than they would have been earlier in their infection.

31. A negative RAT towards the end of an infection is a reasonable predictor that the person is unlikely to be infectious:

    a. while use of RATs early in an infection may miss some cases, RATs are a good predictor of infectiousness for people towards the end of their infectious stage (days 5-10)

    b. by contrast, as Polymerase Chain Reaction (PCR) testing is neither a practical nor effective way to identify if someone is infectious, as a person may test positive on a PCR for weeks or months after their infection, but historical cases such as these are unlikely to be infectious.

    c. Being asymptomatic is not a good predictor of infectiousness on its own. Although studies have tended to support greater transmission from symptomatic cases, the results are mixed and asymptomatic transmission is well documented.[2]

32. As outlined above, RATs are useful predictors of infectiousness, but if an individual is actively symptomatic (eg coughing and sneezing), this is likely to increase the likelihood of transmission, and therefore the potential risk. For this reason, test to release policies

[2] https://www.gov.uk/government/publications/covid-19-omicron-variant-infectious-period-and-asymptomatic-and-symptomatic-transmission

typically include a requirement that the individual is asymptomatic on release, in addition to having a negative RAT.

33. If test to release was considered in Aotearoa New Zealand, our advice is that it should include requirements for both a negative RAT and an absence of symptoms.

    a. This is consistent with current advice that states: "If you are still sick at the end of your self-isolation period, stay home until you are well and for 24 hours after you no longer have symptoms."[3]

34. Appendix 1 contains further details on the scientific evidence in relation to test to release.

Why is test-to-release not currently recommended?

35. Throughout the COVID-19 response, requirements in relation to COVID-19 mandated measures have balanced a desire to adequately manage risk, with a desire to ensure that measures are able to be easily communicated, understood, and acted upon by the public.

36. While there may be some benefits of test to release from a theoretical perspective, in terms of reduced time in isolation, the approach is not currently recommended as the potential benefits are modest (an estimated average reduction of time in isolation of 1.3 days), and the implementation challenges significant in terms of changes to the legislative framework, and the development of communication materials and guidance for the public. Further, the misinterpretation of any changes (such as reduced compliance with isolation) could increase transmission risk beyond that modelled.

37. Specifically, there are concerns that:

    a. a partial change creates uncertainty for the public on when to isolate, and people might interpret the isolation period as having reduced to 5 days creating additional transmission risk

    b. test to release adds complexity to public messaging – when the model was used for healthcare workers, very extensive guidance was developed to explain the change

    c. the approach may only result in marginal gain – based on data from Canterbury healthcare workers, approximately 1 in 15-20 workers were both asymptomatic and had a negative RAT at day 5

    d. while the relaxing of settings may reduce the time spent in isolation it will increase the number of infectious people in the community, seeding further cases so the net effect will be lessened.

    e. in the context of winter and an expected increase in cases, any actions that increase transmission will also increase hospitalisations, placing further burden on the system.

Options for test-to-release settings, including different release days

[3] https://covid19.govt.nz/testing-and-isolation/if-you-have-covid-19/#finish-your-self-isolation

38. As outlined in paragraph 22 there are a number of options in terms of the parameters of test-to-release (from isolation) or test to return (to work or school). These parameters include:

    a. whether the person is required to test negative once or twice

    b. whether there is a minimum number of days the person must or is recommended to complete in isolation before being able to test to exit

    c. whether there is a maximum number of days a person is recommended or required to isolate for

    d. whether the person is required to be asymptomatic on release.

39. As shown by modelling provided by CMA, different variations in the model result in different levels of people who are infectious on release, and differences in average time spent in isolation. The assumptions used in the modelling are based on studies available at the time the modelling was commissioned.

Updated modelling from COVID-19 Modelling Aotearoa (CMA)

40. CMA has provided updated modelling on the impact of a range of scenarios on cases, hospitalisations, and mortality – both in the short term (7 weeks from 15 May) and longer term (26 weeks from 15 May). In addition, CMA provided results under three different assumptions regarding the possible impact of winter – no seasonality, weak seasonality, and strong seasonality. This has resulted in ranges that are wider than previously modelled.

41. Overall, the modelling results indicate:

    a. There is still a **high degree of uncertainty** around how key indicators will track over both the short and longer term. Modelling simply provides a range of possible outcomes based on different assumptions and inputs.

    b. Modelling of scenarios based on **guidance results in considerably higher level of infections, hospitalisations, deaths, and peak hospital occupancy in the short-term than scenarios based on mandates**. As an example, using an assumption of weak seasonality, this leads to between 525k and 587k infections in the short-term for guidance scenarios, compared to between 439k and 472k infections under mandate scenarios.

    c. As outlined in paragraph 40, **the extent to which transmission increases over winter is a key variable** – and generally affects results to a greater extent than which scenario is chosen.

42. A summary of these results, along with further context around each option is provided in Table 1 below.

Table 1: Summary of options for isolation guidance if mandates were to be no longer available

Scenario	**% of people infectious on release** [95% confidence interval]
No mandate – low compliance with guidance (transmission increase of 10-15%) (base case[4])	Not available
No mandate – high compliance with guidance (transmission increase of 5-10%)	Not available
Mandate for 5 days isolation	36% [28%, 45%]
Mandate for minimum 5 days isolation, followed by test to release to a maximum of 7 days isolation	22% [16%, 30%]
Mandate for 7 days isolation (status quo)	19% [13%, 25%]
Mandate for minimum 5 days isolation, followed by test to release to a maximum of 10 days isolation	13% [9.3%, 17%]

Timeline for possible implementation dates, taking a phased approach over time

43. Under the current legislative framework:

    a. The health advice provided by the Director-General of Health covers the legislative requirements as outlined in section 9(1)(a) of the Act: the risks of the outbreak or spread of COVID-19, and the nature and extent of measures (whether voluntary or enforceable) that are appropriate to address those risks

    b. Under section 9(1)(a) of the Act, the Minister is not required to follow this advice, but must have regard to it.

    c. The ability to revoke or revise mandated measures is built into the current legislative framework in several ways:

        i. The Minister must ensure that provisions required in section 9 of the Act are met

        ii. s 9(2)(h) [redacted]

44. The indicative timetable for the above process for the remainder of 2023 is provided in Table 2 below.

[4] Note that base case is not the same as status quo, It refers to the lowest level of restriction and compliance which the other scenarios are then noted in reference to.

Table 2: Indicative timeframes for review of COVID-19 measures for the remainder of 2023

Review	Activity	Date
May/June review	PHRA	22 May 2023
	Director-General to provide advice to Minister of Health	2 June 2023
	SWC	21 June 2023
	Cabinet	26 June 2023
	Expiry of section 8(c)	28 June 2023
	Pre-election period begins	14 July 2023
July/Aug review	PHRA	14 July 2023
	Director-General to provide advice to Minister of Health	21 July 2023
	SWC	2 August 2023
	Cabinet	7 August 2023
	[Potential expiry of section 8(c) – if extended in June]	28 August 2023
Sept/Oct review	PHRA	11 August 2023
	Director-General to provide advice to Minister of Health	18 August 2023
	SWC	30 August 2023
	Cabinet	4 September 2023
	[Potential expiry of section 8(c) – if extended in August]	28 October 2023
	General Election	14 October 2023
Nov/Dec review	PHRA	15 November 2023
	Director-General to provide advice to Minister of Health	[TBC]
	SWC	[TBC]
	Cabinet	[TBC]
	[Potential expiry of section 8(c) – if extended in October]	[TBC]

Impact of pre-election period

45. As the general election will be held on 14 October 2023, the pre-election period begins on 14 July 2023.

46. s 9(2)(h) [redacted]

47. s 9(2)(h) [redacted]

It is challenging to describe a phased approach to step-down over time

48. The Prime Minister has signalled that he expects that by the end of winter, isolation for COVID-19 cases may no longer be legally mandated.[6]

49. s 9(2)(h) [redacted]

50. s 9(2)(h) [redacted]

[5] https://www.dpmc.govt.nz/our-business-units/cabinet-office/supporting-work-cabinet/cabinet-manual/6-elections-transitions-1#para-6.9

[6] https://www.beehive.govt.nz/sites/default/files/2023-04/Press%20Conference%2011%20April%202023.pdf

s 9(2)(h) [redacted]

51. On 5 May 2023, the World Health Organization (WHO) announced that the COVID-19 "is now an established and ongoing health issue which no longer constitutes a public health emergency of international concern (PHEIC)"[7]. Following this announcement, there may be increased public or media interest in New Zealand's COVID-19 settings. Within this context, there may be increased scrutiny concerning the retention of the remaining restrictions. The WHO announcement is an important international development, but not a key input into our local decision-making, which is focused on the New Zealand context.

From a system perspective, removing mandates prior to winter would likely place additional pressure on the health system

52. When the requirement for cases to isolate was removed in other countries, it has often been followed by an increase in hospitalisations, which then settles into a new baseline over time. However, it is not possible to attribute these increases to the policy change given the cyclical nature of COVID-19 waves. Figure 1 shows COVID-19 hospital inpatients per capita in the UK (mandatory isolation removed 24 February 2022); figure 2 shows COVID-19 hospital inpatients per capita in Australia (mandatory isolation removed 14 October 2022).

53. Actions that focus on reducing transmission to groups more likely to be hospitalised, such as requiring testing of cases prior to visiting aged residential care, could help mitigate the increased risk.

Figure 1: Number of COVID-19 patients in hospital per million people from 1 Jan 2022 – United Kingdom

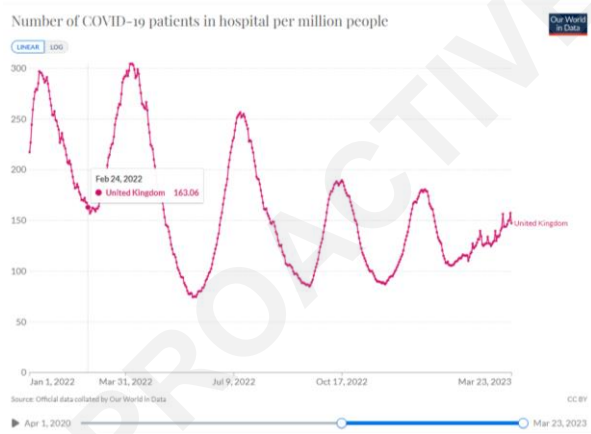
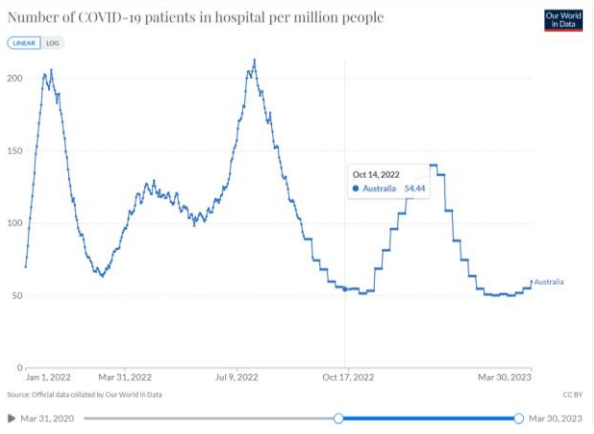


Figure 2: Number of COVID-19 patients in hospital per million people from 1 Jan 2022 – Australia



Indicative planning for a scenario where the isolation mandate may no longer be in place

54. As requested, advice is currently being developed on a pathway for the removal of remaining restrictions. This advice will be considered as part of the forthcoming PHRA

[7] https://www.who.int/news/item/05-05-2023-statement-on-the-fifteenth-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-coronavirus-disease-(covid-19)-pandemic

and will form advice to Cabinet when the existing COVID-19 settings are considered again in June 2023.

55. The Director-General of Health has provided advice recommending that mandatory isolation be retained, and advice on measures if the requirement is removed (for example, if the test in section 8(c) of the COVID-19 Public Health Response Act 2020 cannot be met). These recommended measures include:

    a. Provide clear guidance that cases should isolate for 7 days.

    b. Maintain guidance and functionality to report COVID-19 test results – this information (even if not capturing all cases), still provides important information on case trends to assist health service planning and is also the main mechanism for identifying and connecting people with support and/or those who are eligible for antivirals.

    c. Establish a mechanism to ensure cases are aware of the recommended isolation period including advice that they may be directed to isolate by a Medical Officer of Health should a failure to isolate place vulnerable persons at risk (under the Health Act 1956).

    d. Continue to provide financial support to people who are unable to access sick leave from their employer – building on the success of the Leave Support Scheme (LSS) – potentially in a more targeted form as has been used in other jurisdictions.[8] This would support people who might otherwise find it difficult to isolate to do so.

    e. Strengthen effective public health measures that do not involve limitations on individual rights – for example, systemic improvements to ventilation in high-risk settings.

    f. Review eligibility for antivirals.

56. The options above have been simplified, but there could be a more nuanced approach to isolation if it is no longer mandated. For example, a likely minimum period recommended and potentially a test to release advice for the general public, and discretion for a Medical Officer of Health to manage high risk settings such as aged residential care (ARC) facilities differently (for example, test to release up to 10 days which would allow for longer periods of separation of infected residents from uninfected residents).

Operational considerations and implications

57. Further information on operational implications includes:

    a. Te Whatu Ora holds approximately 45 million RATs, which is sufficient to supply until January 2024. For the remaining 8 months through to the end of January, this is enough for an average of 5.5 million distributed per month. This is more than double the existing distribution rate (currently 2.7 million).

    b. There has been stability in isolation requirements since phase 3 of the Omicron response. A change to the isolation requirements to implement a Test to Release

[8] For example, in Australia the High-Risk Settings Pandemic Payment is a lump sum paid directly to people who test positive for COVID-19 who work in aged care, home care, disability care, Aboriginal healthcare, hospital care, ambulance and patient transport. The person is only eligible if they are a casual employee or have no appropriate paid leave available.

policy would be a large operational change to manage. Once clarity has been achieved on the parameters of the change and the secondary impacts to initiatives, e.g. whether proactive follow up of cases is required under a test to release policy, changes would need to be made across technology platforms, training for telehealth providers, and updates to guidance documents for the public and the health and disability sector. We estimate that a lead-time of at least 4-6 weeks is required at a minimum.

c. When changes are made to initiatives across COVID-19, broader and targeted communications efforts are required alongside guidance to support the public and the health and disability sector. For context, the communication campaigns in support of the introduction of bivalent vaccines and winter preparedness cost approximately $4 million.

d. Operationally there is substantive work to ensure the changes are well-understood by the sector and that services (primary care, ARC, and telehealth) are equipped to provide advice. Clarity is required on the expectations on the health system for a case in a TTR model, and whether proactive follow up for priority cases is still expected alongside any change. We currently follow up with priority cases, which also supports access to antivirals for those who are eligible. As an example, Te Whatu Ora does not expect to support the provision of advice and guidance to the business sector and employers & manufacturers or education agencies.

e. Te Whatu Ora anticipates increased demand on Public Health Services, with them likely needing to be more involved with some cases.

f. The COVID-19 infrastructure is absorbing as much of the pressure as is within tolerances and remit. Te Whatu Ora would likely see higher requests for supports and information through National Telehealth Services and Care in the Community alongside the potential for Employers seeking confirmation of "fit for work" certification – which is not a costed model in primary care COVID-19. Further work would be required to consider the interaction with workplace health and safety requirements.

g. As part of funding working, Te Whatu Ora has signalled further wind down of some testing sites and RAT collection sites with a lead-time of 8 weeks-3 months, however this may require further consideration alongside TTR.

Views of other agencies

Te Aka Whai Ora

58. Te Aka Whai concurs with the Public Health Agency view outlined in this paper that the introduction of a test-to-release scheme is not justified on public health grounds. There is not a strong case on public health grounds to make any changes to the isolation requirements for COVID-19 cases just prior to the beginning of winter. The restrictions continue to reduce the burden of disease, protect those most at risk of serious illness and death, and reduce the burden on the health system more broadly to enable it to continue to provide other care.

59. In particular, Te Aka Whai Ora is concerned about the disproportionate and inequitable risk posed by these changes to Māori. For example, there is a risk that this change will lead to workers in low-paid and precarious employment who have little power in the

employment relationship (among whom Māori are over-represented) being pressured to return to work earlier as a result of the change in requirements. This would have consequences for communities as a whole, if this affected the overall rate of transmission of COVID-19 among Māori or the rate of transmission in specific areas or communities.

60. Te Aka Whai Ora understands that modelling including a breakdown of cases, hospitalisations and deaths from COVID-19 by ethnicity has been commissioned by Manatū Hauora, and will be available ahead of the next Public Health Risk Assessment. This modelling, once available, will help to quantity the scale the risk posed by potential changes to public health restrictions to Māori, alongside expert qualitative assessment. It will be important that the limitations of modelling outputs are made clear to decision makers, particularly where there may be a higher risk of uncertainty for particular scenarios.

61. However, given the structural disadvantage faced by Māori and their consequent greater vulnerability to serious illness or death from contracting COVID-19, we already know that the effect of lifting restrictions which protect communities will be to impose an inequitable burden on Māori (and other groups that are more at risk of harm from COVID-19, like Pacific peoples).

62. Te Aka Whai Ora therefore recommends that no changes are made to mandatory COVID-19 public health measures at this time.

Whaikaha

63. From Whaikaha's perspective, based on feedback from the disability community and the data below, which indicates the additional risks for disabled people who contract Covid, there is the need to maintain a cautious approach on "Test to Release" practices.

64. The cautious approach is based on the disproportionate risk experienced by some disabled people if the "Test to Release" settings were relaxed too quickly.

65. The preferred approach would be that before a change to the "Test to Release" settings are made, there should be further data collation(s) (matching infection rates, hospitalisation rates and mortality rates to the disability support services (DSS) population) to demonstrate the trend to lower risk or otherwise for disabled people.

Table 3: COVID-19 outcomes for DSS clients compared to the rest of the New Zealand population over the period 1 January – 16 November 2022

	COVID-19 positive	**Admitted to hospital with COVID-19[9]**	**Died of or with COVID-19**
All DSS Clients (approx. 43,000)	9% less likely (13,879 people)	4.2 times more likely (409 people)	13 times more likely (27 people)
Non-residential support	16% less likely (10,818 people)	3.5 times more likely (281 people)	7 times more likely (11 people)
Residential support	19% more likely (3,061 people)	8 times more likely (128 people)	47 times more likely (16 people)

[9] To be included as a COVID-19 hospitalisation, COVID-19 must have been a contributing reason for their hospital stay. A hospitalisation must also have been for a period of at least three hours to be counted.

Treasury

66. The Treasury supports shifting to a test-to-release (TTR) policy at a minimum. A TTR policy would have economic and social benefits by reducing excess time in isolation, meaning that people could return to work, school, and other activities sooner. Being able to return to work sooner would help to ease workforce shortages faced by businesses in the persistently tight labour market. The benefits of reduced isolation days would likely be most acutely felt by small businesses and sole traders, as these businesses have fewer staff available to cover sick leave. Previous Cabinet papers on COVID-19 settings have highlighted the impact isolation settings are having on specific sectors of the economy, such as contributing to the significant pressure that workforce shortages are putting on the aviation sector.

67. Workers would be required to use fewer sick leave days, meaning that they could save sick leave provisions for when they were unwell/infectious in future, which would support people staying home when unwell.

68. Based on the modelling, shifting to a 5 minimum, 7 day maximum TTR policy could reduce the average time in isolation by 1.2 days compared to the status quo, with a small increase in infections (+0.3 to +0.7%) and hospitalisations (+0.4 to 0.5%) and no change in peak hospital occupancy.

69. These estimates are based on historical observations of things such as propensities and abilities to work from home for different industries. As business and employment practices evolve, these propensities will be subject to change. The modelling uses an estimated range of compliance with isolation requirements of 33-50%. We use this range for the confidence intervals and have calculated the central figure using the midpoint of the compliance range (41.5% of infections isolate). These estimates are based on the mean time from 'day 0' to the end of the isolation. A variety of unknown factors, for example people needing more time off to recover after their isolation period has ended, could alter the actual labour market impact.

Table 4: Estimated labour market impacts of modelled isolation policies

Policy (using the 'no seasonality' scenarios)	**Mean time from 'day 0' to end of isolation period**	**Hours lost per week** (values in brackets are calculated using the 95% confidence intervals for modelled case numbers and a compliance range of 33-50%)	**Total lost hours** (Over 26 week period)	**Quarterly cost from loss in hours worked (reduction in nominal GDP)**	**Difference from baseline (7 days no TTR)**	
					Hours lost per week	**Quarterly cost**
7 days no TTR	7.5 days (assuming that people test positive/experience symptoms part way through 'day 0')	249,632 [124,441, 370,594]	6,490,432 [3,235,466, 9,635,444]	$75m [$38m, $112m]	N/A	N/A
5 days no TTR	5.5 days (assuming that people test positive/experience symptoms part way through 'day 0')	188,633 [93,355, 280,951]	4,904,458 [2,427,230, 7,304,726]	$57m [$28m, $85m]	-60,999 [-31,087, -89,642]	-$18m [-$9m, -$27m]

5-7 days TTR	6.3 days	210,362 [104,798, 312,512]	5,469,412 [2,724,748, 8,125,312]	$64m [$32m, $94m]	-39,270 [-19,644, -58,081]	-$12m [-$6m, -$18m]
5-10 days TTR	6.9 days	227,271 [111,416, 339,617]	5,909,046 [2,896,816, 8,830,042]	$69m [$34m, $103m]	-22,361 [-13,026, -30,977]	-$7m [-$4m, -$9m]

Note: differences may not appear accurate due to rounding.

Equity

70. COVID-19 continues to affect some population groups significantly more than others. Specifically, older people, Māori, Pacific Peoples, and disabled people are at higher risk of severe outcomes.

71. The Crown's obligations to Māori under Te Tiriti o Waitangi requires a commitment to partnership that includes good faith engagement with and appropriate knowledge of the views of iwi and Māori communities. The active protection principle obliges the Crown to take all steps practicable to protect Māori health and wellbeing, and to support and resource Māori to protect their own health and wellbeing. This includes efforts to counteract inequitable health outcomes and prevent the impact of COVID-19 from falling disproportionately on Māori. In assessing proportionality, it is important to recognise that due to Te Tiriti o Waitangi more restrictive measures may be required to achieve these objectives.

72. This obligation has been affirmed by the Waitangi Tribunal in its 2021 report Haumaru: the COVID-19 Priority Report. In particular, the Tribunal:

    a. found that the Crown was not collecting sufficient data to accurately and equitably inform key decisions relating to the pandemic response for Māori

    b. recommended that the Crown "strengthen its monitoring regime to enable it to identify, in as close to real time as possible, whether or not its policy settings in relation to Māori are working as expected, so as to enable the Crown to change those settings to achieve the desired and intended results, and remain accountable to its Treaty partner".

73. In this context, retaining the mandatory requirements for cases to isolate and for visitors to health service settings to wear masks remains necessary – in addition to non-mandatory measures – to continue to suppress transmission, to protect people at greater risk of serious illness, and to protect the health system. These measures continue to play a critical role to help keep the COVID-19 outbreak manageable.

Next steps

74. The next PHRA is scheduled to be held in on 22 May. This will be followed by development of a Cabinet paper providing further details on scenario planning for a situation where mandates were no longer in place. The paper will be considered by SWC on 21 June 2023, and by Cabinet on 26 June 2023.

Appendix 1: Efficacy of test to release

1. The purpose of this Appendix is to provide evidence for the efficacy of Rapid Antigen Tests (RATs) in a "Test to Release" schedule.

2. The current period of isolation is a fixed period of 7 days from the date of onset of symptoms, or diagnosis, whichever is earlier. A test to release schedule uses a combination of a lower and upper fixed period of time for isolation combined with release form isolation if an individual tests negative between these dates. The rationale is that RATs are able to predict infectiousness with sufficient accuracy to ensure infectious individuals are isolated, while non-infectious individuals are released from isolation.

3. The ability of RATs to identify infectious individuals in a "Test to Release Schedule" does not need to be 100% accurate for this method to be used to determine the period of isolation. Instead, the evidence should provide sufficient basis to conclude that a "Test to Release Schedule" is superior to a "Fixed Isolation Period" of 7 (or some other number of) days. In this setting, superiority would be inferred, if there was evidence that a "Test to Release" schedule resulted in fewer infectious individuals being released into the community without a significant increase in non-infectious individuals being isolated or a similar proportion of individuals being released with a significantly deceased period of isolation in non-infectious individuals.

Summary

4. The performance of test to release strategy primarily depends upon the ability of rapid antigen tests to differentiate between those who are infectious and those who are not infectious. As the cohort of individuals isolating have already been diagnosed using RATs, the subsequent test performance is expected to be high, as those who have a false negative RAT will not be captured by either strategy.

5. Infectiousness is not directly measurable. The current most reliable measure of infectiousness is the ability to culture live virus. Culture of virus is not possible to use in a clinical setting as the tests are too expensive and time consuming to use on a large scale. An individual who is "culture negative" is very unlikely to be infectious. An individual who is "culture positive" is potentially infectious.

6. It is well recognised that infectiousness is not evenly distributed throughout those individuals who test positive. Both biological and behavioural factors will influence this variation in infectiousness. Some individuals are substantially more infectious than others. It has been estimated that the majority of transmission occurs from a minority of individuals. This observation indicates that individuals who are highly infectious are also highly likely to return a positive RAT test.

7. It is well recognised that infectiousness varies markedly over time. As RATs measure viral antigens, not intact virions, it is likely that the relationship between a positive RAT and infectiousness will also decrease over time.

8. The current evidence would support the assumption that within the first week of infection, a positive RAT is strongly correlated with culturable virus and that the individual is infectious. However, a negative RAT early in the course of disease (before day 5) does not guarantee an individual will not be infectious.

9. The current evidence would support the assumption that after the first week of infection, a negative RAT is strongly correlated with non-culturable virus and that

the individual is unlikely to be infectious. A positive RAT is correlated with infectiousness, but not as strongly as within the first week. At more than 14 days either a positive RAT or culturable virus are uncommon.

10. The transmissibility of Omicron variant is markedly increased compared to the original Wuhan or later Delta variants. Much of this is due to immune evasion, but there is also an element of increased infectiousness. Data regarding the rates or risks of infectiousness from previous variants must be interpreted with caution for the current outbreak.

The relationship between PCR Ct value and culture positivity

11. There is a clear relationship between the Ct value and Culture positivity. Culture positivity decreases as the Ct value rises, which is assumed to be due to a decreasing viral load. Virus is almost always culturable at a Ct value of 25 or less, decreasing to less than 10% at a Ct value of 35 or more (Figs 1&2) (1) (2). However, there is a stronger relationship between culture positivity and time since the beginning of infection, indicating that the relationship between CT value and culture positivity will vary over the course of an infection.

Fig 1. Relationship between RT-PCR Ct value time since infection and culture positivity.

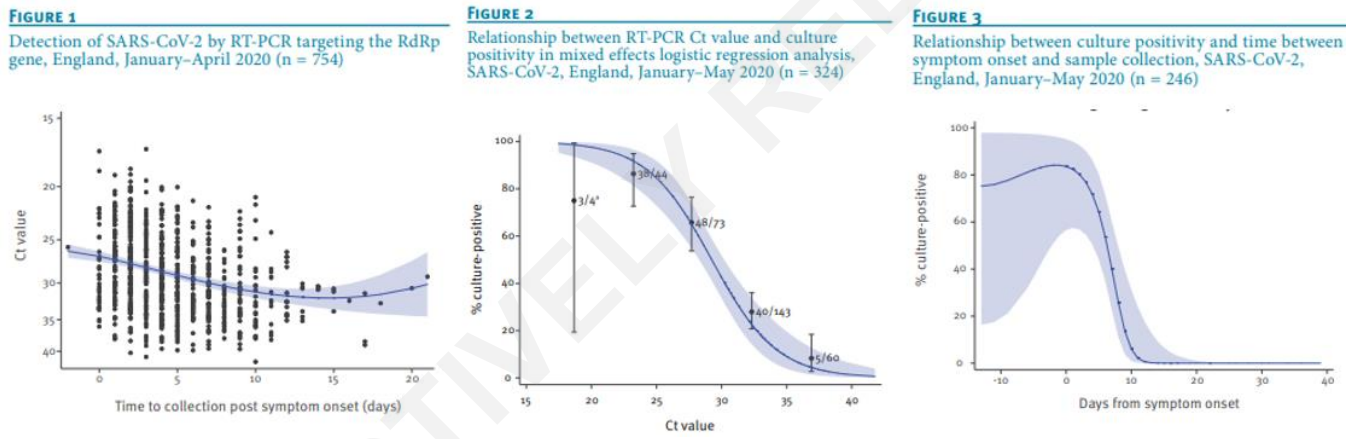


Fig 2 Relationship between culture and PCR Ct values

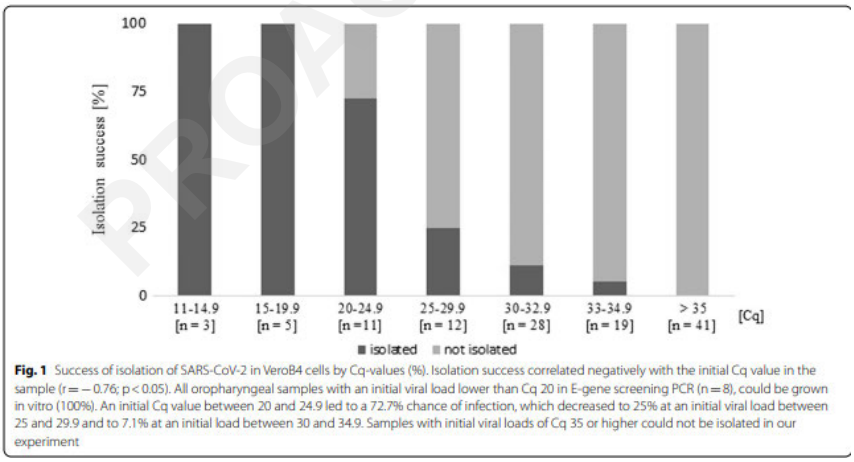
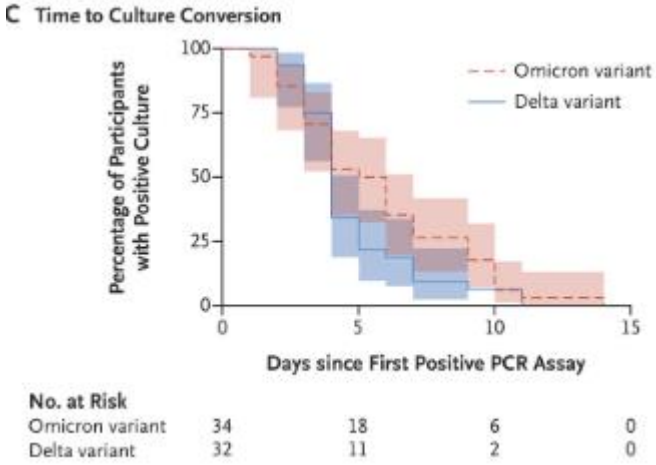


Fig. 1 Success of isolation of SARS-CoV-2 in VeroB4 cells by Cq-values (%). Isolation success correlated negatively with the initial Cq value in the sample ($r = -0.76$; $p < 0.05$). All oropharyngeal samples with an initial viral load lower than Cq 20 in E-gene screening PCR (n = 8), could be grown in vitro (100%). An initial Cq value between 20 and 24.9 led to a 72.7% chance of infection, which decreased to 25% at an initial viral load between 25 and 29.9 and to 7.1% at an initial load between 30 and 34.9. Samples with initial viral loads of Cq 35 or higher could not be isolated in our experiment

Omicron

12. A study analysing differences in the duration of shedding of the Omicron and Delta variants reported that the time to culture conversion was greater for Omicron than Delta

(3). For Omicron, the proportion that are still shedding culturable virus at day 10 was 25%, while for Delta, the proportion was 6%. Culturable virus was not recovered after day 14.



13. A rapid review undertaken by the United Kingdom Health Security Agency (UKHSA) found that of 53 studies measuring time to viral clearance, there were substantial differences in viral clearance times between cases and populations. The majority of studies in the general population estimated viral clearance to take around 7 to 11 days, and most studies of hospitalised, immunodeficient, and other high-risk cases estimated viral clearance to take around 10 to 15 days. Whilst detectable viral load does not provide direct evidence on the risk of transmission, it does indicate potential infectivity.[1]

14. In the same UKHSA rapid review, of the three studies that evaluated when transmission events occurred, an estimated 80-100% of transmission occurred around symptom onset up to 5 days. Testing positive is likely longer than the period when transmission events occur as this is a 'higher bar' than testing positive.

15. Studies that observed when one person infected another during their infectious period are arguably the most valuable, because they observe transmission events which are of interest per se, ie. They do not require proxies for transmission of infection such as live viral load or total viral load. In general, transmission studies, by observing actual transmission events (usually using detailed contact tracing data), they tend to incorporate all the varying factors that are required before one person can transmit to another

16. However, there are weaknesses to transmission studies. For example, it can be unclear when the transmission event occurred in any contact tracing system. However, these studies included only the transmission events from index to secondary cases that could be attributed to the index case, and then estimated the likely transmission date.

17. Transmission studies can be triangulated with laboratory-based studies, such as those used to evaluate the duration of live virus, and total viral load (less relevant for infectiousness but easier to study than transmission or duration of live virus).

18. All together the data suggest:

    a. Transmission is much more likely to occur early on in an infection. In the transmission studies, 80-100% of transmission events occurred between 0-5 days [based on 3 studies]

b. The peak for live viral load occurs about 2 days after infection (median) with a mean of 5 days, given that infectiousness metrics have a 'long tail' (based on 10 studies).

c. The data from the transmission studies are consistent with the laboratory data on the duration of live virus: people are most infectious early in their infection. The duration of test positivity – whether that is RAT, PCR or live viral load -- is longer than the period when transmission events occur as 'achieving' a transmission event is a 'higher bar' than testing positive

The relationship between RATs, PCR Ct and positive cultures

19. The Human Challenge Trial assessed the relationship between infection and culturable virus and reported that the RAT sensitivity for culturable virus exceeded 80%, once a positive PCR test had been obtained. The study also reported that a negative RAT was a reliable indicator of a negative viral culture (4).

20. A study undertaken in unvaccinated individuals prior to the Omicron wave in the United States reported a median [interquartile range] time from COVID-19 symptom onset to first negative test result was 9 [5] days, 13 [6] days, 11 [4] days, and >19 days for S antigen, N antigen, viral culture growth, and viral RNA by RT-PCR, respectively. Beyond two weeks, viral cultures and N antigen titres were rarely positive (5).

21. A systematic review of the performance of Rapid Antigen Tests (RATs) reported that assays shown to meet appropriate criteria, such as WHO's priority target product profiles for COVID-19 diagnostics ('acceptable' sensitivity ≥ 80% and specificity ≥ 97%), can be considered as a replacement for laboratory-based RT-PCR when immediate decisions about patient care must be made, or where RT-PCR cannot be delivered in a timely manner (6). However, this review also states that "Test accuracy studies cannot adequately assess the ability of antigen tests to differentiate those who are infectious and require isolation from those who pose no risk, as there is no reference standard for infectiousness". A review of the performance of 14 RATs reported substantial variability in the limit of detection measured against the Ct value of paired samples, from 26.8 to 34.7. This encompasses the range of results which occur for many individuals over the entire course of an illness. However, the most effective RATs demonstrated a true positive rate compared to paired samples from PCR for values of 99.1% for a Ct value of ≤30 and 90.9% for a Ct value of ≤33 (7).

22. All RATs used in New Zealand have undergone a rigorous assessment to ensure that the test has a sensitivity of at least 80% overall and >90% for CT values <25. RATs are also assessed for usability which has been uniformly high.

23. Similar results have been reported by other studies (3, 8, 9).

The relationship between Culture and Infectiousness

24. The ability to culture virus does not automatically indicate infectiousness. The minimum infectious dose for Omicron, or any other variant is still unknown, but the higher the viral load of intact virus, the greater the risk of infection. The relationship between dose and infection will be sigmoid, with a very low rate of infection at low doses, rising to a very high rate of infection as the dose increases. It has been estimated that a sample with 108 RNA copies per ml, a positive culture rate of approximately 50% will be achieved (10).

25. Therefore, it is clear that not all individuals from whom culturable virus can be obtained will produce enough virus to infect other in the majority of exposure events. Indeed an argument can be made that as the majority of infections are caused by a minority of highly infectious individuals. Two epidemiological parameters often characterise the transmissibility of infectious diseases: the basic reproductive number (R0) and the dispersion parameter (k). R0 describes, on average, how many individuals in a susceptible population will be infected by someone with that disease, and k details the variation in individual infectiousness. The smaller the k value, the greater the variation. That is, fewer cases cause the majority of infections, and a greater proportion of infections tend to be linked to large clusters via superspreading events. (11) During the COVID-19 pandemic, transmission of SARS-CoV-2 has been highly overdispersed, as 60–75% of cases infect no one and, propelled by superspreading events, 10–20% of cases cause 80% of secondary infections (12-14)

26. Modelling studies have reported that the number of super-emitters of SARS-CoV-2 has increased progressively so that for the WT, one in 1,000 infected persons was a super-emitter; for Delta one in 30; and for Omicron one in 20 or one in 10, depending on the viral load estimate used 2 . The infectivity-strengthening mutations N440K, T478K, and N501Y enhance infectiousness. Among them, T478K is one of two RBD mutations in the Delta variant, while N501Y is presented on many prevailing variants (15).

27. The conclusion is that it is not necessary to identify all of the individuals who are infectious to have an impact on the rate of transmission, but to identify those who are superspreaders, who are most likely to have the highest viral load and be RAT positive.

The relationship between culturable virus and symptoms

28. The UKHSA rapid review referred to earlier found:

    a. *"Three studies compared household secondary attack rates (SAR) of asymptomatic and symptomatic index cases, with 2 studies suggesting more transmission from symptomatic than asymptomatic index cases, and one study suggesting no clear difference.*

    b. *Five studies compared viral loads (usually using Ct values) between asymptomatic and symptomatic cases, with 3 studies suggesting similar viral loads, and 2 studies suggesting higher viral loads in symptomatic compared with asymptomatic cases.*

    c. *Overall, the evidence on differences in transmission from people with asymptomatic compared with symptomatic COVID-19 Omicron variant was mixed, with some studies suggesting that symptomatic cases were more likely to transmit infection than asymptomatic."*[3]

Real world studies of test to release

29. Although several countries or States have implemented test to release policies, there is no reliable analysis of the success of these policies. Changes in regulations have often comprised a package of alterations to interventions, which, in addition to the natural variation in case numbers, results in difficulty in ascribing a causal relationship to changes in the duration of isolation.

Modelling studies of test to release

30. Modelling of test to release have been published. Two of the key components of the model include the sensitivity of the RAT test in predicting infectiousness and the distribution of infectious cases over time (3). For a RAT sensitivity of between 0.7 and 0.8 and a model which predicts a 16% risk of infectiousness at day 7, an isolation schedule of at least 7 days would result in 15.8% of released individuals being infectious for a mean excess isolation per person of 76.8 hours. A test to release schedule would reduce the proportion of infectious cases released to 9.2% for no significant change in the mean excess isolation per person of 79.2 hours.

31. A model assessing the ability of two consecutive day negative RATs reported that the number of infectious days in the community can be reduced to almost zero (16). The model was based on data relating viral load to test positivity over time so maybe less dependent on assumptions about test performance at different points in time. Testing was just as efficient if commenced on day 3 or day 5. This model assumed that the infection kinetics for Omicron are similar to those for pre-Omicron variants.

Conclusion

32. The aim of isolation is to decrease the risk of individuals who are infectious, being released from isolation. However, infectiousness is not a binary (yes or no) state and there is ample evidence to support the observations that individuals who are highly infectious, are the primary drivers of community spread. Therefore the identification of infectiousness does not need to be perfect but to identify those who are the most infectious. These individuals are likely to within the cohort identified by a positive RAT and to remain positive until the viral load has substantially reduced. This time will be variable and for the most infectious likely to be more than 7 days. RATs may be unreliable at less than 5 days after infection, and be unnecessary more than 10 days after diagnosis or symptom onset.

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