Supporting evidence of efficacy of RATs and deployment options

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HEALTH CRISIS MANAGEMENT + OPERATIONS

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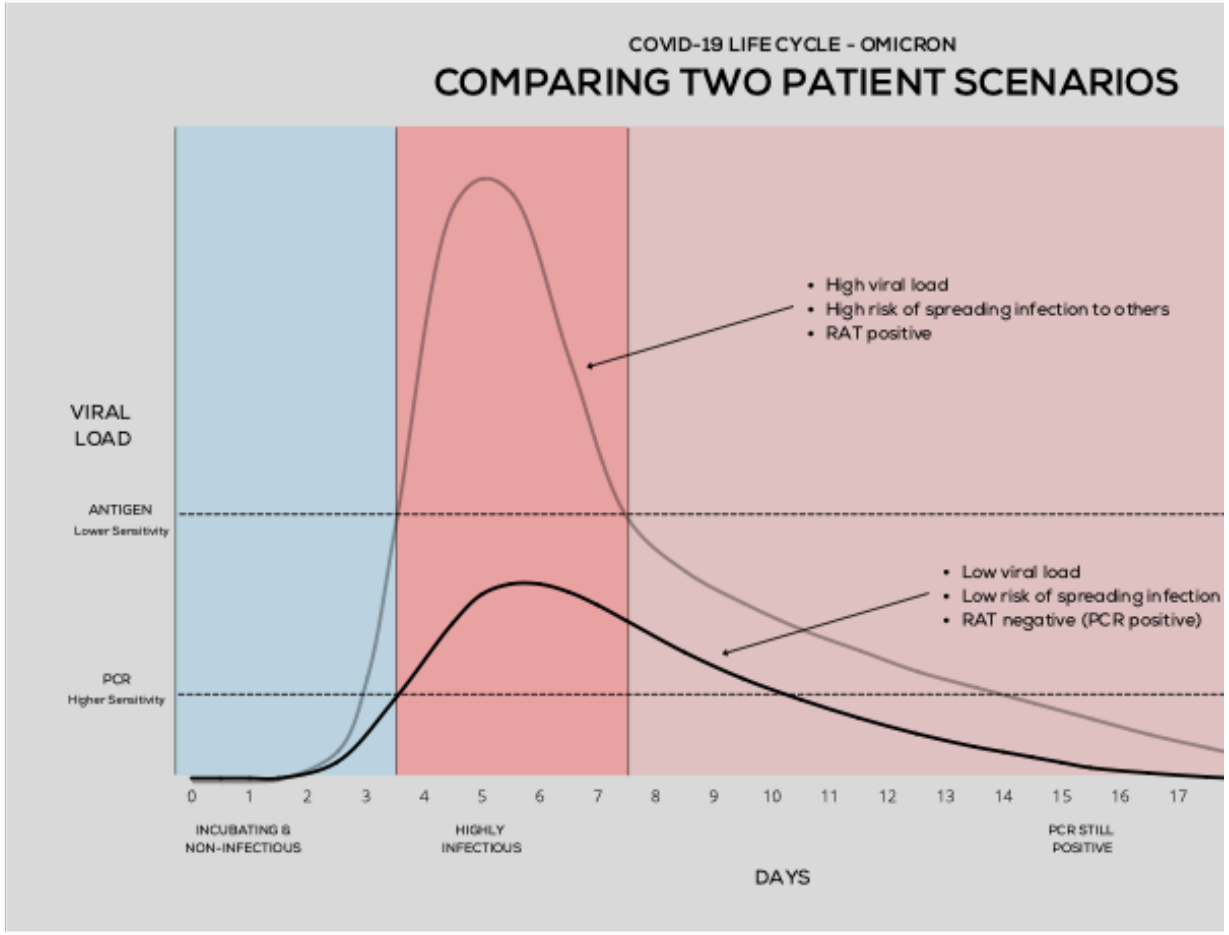
Evidence based

- Rapid antigen tests are an effective public health mitigation tool as they are effective in detecting individuals while in their infectious phase (days 1-7) and often before symptom onset (Brummer, et al., 2021)
- Validation studies in Australia have shown RATs to be useful in detecting everyone with a high viral load (i.e., “super spreaders”), but less useful in those with low viral loads (who may not be as effective in spreading the disease). Most RAT tests do not register positive in patients with CT values above 27-30. While CT values of <24 are generally considered highly infectious, publications differ on advice about what upper limit of CT value signify a non-infectious person, ranging from 27 to 30+.
- RATs are shown to correlate better than PCR in detecting people who are actively infective to others (a study done by Kirby et al showed RATs correlated closely to viral culture, whereas PCR remained positive for many days after someone was no longer infectious (Kirby, et al., 2021).
- RATs have shown sensitivity to pick up positive tests even when an individual is in their asymptomatic phase; a study done on the Abbott Panbio RAT reported a sensitivity of 81.82% in asymptomatic individuals and a specificity above 90.91% for identifying pre-symptomatic and early SARS-CoV-2 infection (Winkel, et al., 2020).

The science and profile of RATs

- The current omicron variant is the most heavily mutated variant compared to the other variants, making it highly transmissible with a short incubation period of three days (Araf, et al., 2022; Jansen, et al., 2021).
- The infectious period of the omicron variant is between the days 1 – 7(post infection), with highest viral loads at day 5 (CT values <30) and decreases by day 11 (cut value >30) (Hey, et al., 2022).
- The figure on the right shows the infectious period and when RATs would be most effective.

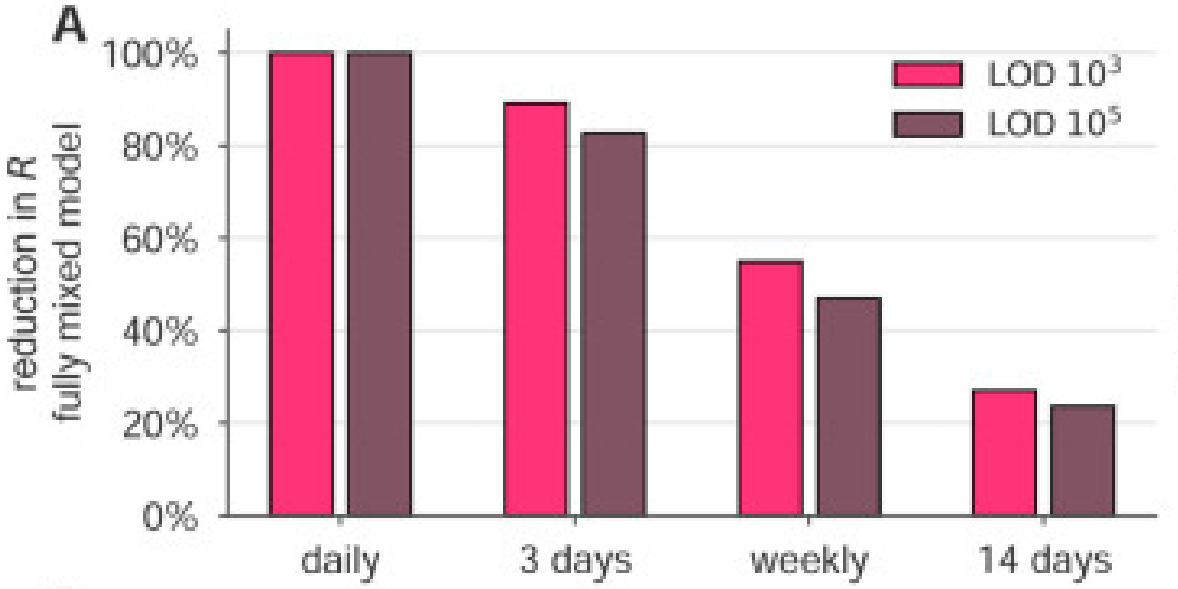


The science and profile of RATs

- Articles published in the New England Journal of Medicine note that high frequency testing, every 3-4 days, at worksites with high-risk cohorts and can bring risks to near zero even in areas of high community transmission (Mina, Parker, & Larremore, 2020).
- A modelling study done in the UK found that conducting surveillance screening 3 days a week (in a population of 25,000) reduced the severity of an outbreak, especially with a highly transmissible variant like Omicron (Enright, Hil, Stage, & Bolton, 2021). This aligns with another modelling study that was done in the states where it concluded that testing regime needed to be increased from 2 days per week to 3 days per week at the beginning of the semester (this included both vaccinated and unvaccinated students) (Frazier, et al., 2021). Although they also recommended that for universities with high vaccination rates testing once per week was sufficient in limiting infections (considering this was done in the context of Delta).
- These papers argue that frequent testing using cheaper and slightly less sensitive tests (antigen tests) that concentrate on the period of highest infectivity (days 1-7) with results available in minutes, are more useful than more sensitive tests where results are not available for 24-48hours (Mina, Parker, & Larremore, 2020; Larremore, et al., 2020).

The science and profile of RATs

- The graph on the right from an article from the US National Institute of Health (NIH) shows how daily and twice weekly testing have a high likelihood of preventing transmission, while weekly or fortnightly testing sees a dramatic drop in efficacy of testing regimes due to the incubation period for COVID-19 being less than the frequency of the test (2-3) (Larremore, et al., 2020).
- New advice to adapt RAT screening according to the shorter incubation period of Omicron is now emerging. In Australia, Victoria was the first Health Department in Australia to recommend RAT screening every 48 hours rather than every 72 hours for high-risk workers. Supply constraints have tempered the reaction by other states and organisations in changing to a higher frequency of testing for Omicron.



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This document was developed with the support of Dr Ian Norton and Respond Global, who have been providing expert advice and operational support to a range of private, social and governmental organizations and businesses in Australia and New Zealand in implementing Rapid Antigen Tests for almost a over a year.

Respond Global initially supplied RATs to the Centre for National Resilience at Howard Springs in early 2021, in addition to the protocols about how to implement a testing regime to compliment the use of PCR testing at the time.

Since then, we have supported various businesses across a number of industries, including meat processing, providing expert and operational advice to ensure safe ongoing supply of meat products to retailers; the cruise sector, providing peace of mind to guest travellers and to the professional service clients assisting them in transitioning staff back to the office. In New Zealand, we are providing similar support to the various private and government organisations to develop an appropriate approach to RAT that is relevant for each businesses, allowing them to remain operational as case numbers continue to increase.

Currently we are supporting the Australian Federal government by providing virtual training, plans and protocols and clinical support in the use of RATs, to thousands of staff at residential aged care facilities, disability support services and general practice clinics nationwide.

Our wealth of experience in managing responses to past disease outbreaks such as Ebola, Diphtheria, Measles and Latterly COVID-19, has given us unique insights into how best to implement risk mitigation and management frameworks including recommendations on RAT test approaches and regimes that allow businesses to stay in control and guide their operations as the infectious disease risk changes over time.