



EXPERT REACTION: Victoria reports case of COVID-19 reinfection

Publicly released: Wed 21 Oct 2020 at 1230 AEDT | 1430 NZDT

Not peer-reviewed

[What does this mean?](#)



Not peer-reviewed: This work has not been scrutinised by independent experts, or the story does not contain research data to review (for example an opinion piece). If you are reporting on research that has yet to go through peer-review (eg. conference abstracts and preprints) be aware that the findings can change during the peer review process.

Victorian Premier Dan Andrews has this morning announced that a new case of COVID-19 announced yesterday is being treated as a reinfection. During a press conference, the Premier said a male patient first tested positive back in June, and following his more recent positive test, an expert panel reviewed his case and "concluded there wasn't enough evidence to say that the positive test presented viral shedding". If confirmed, this would be the first reported case of reinfection in Australia, with the world's first case (<https://www.scimex.org/newsfeed/expert-reaction-first-reported-case-of-covid-19-reinfection>) reported by Hong Kong researchers back in August and another more recently reported ([https://www.thelancet.com/journals/laninf/article/PIIS1473-3099\(20\)30764-7/fulltext](https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(20)30764-7/fulltext)) in the US. Below, Australian experts respond.

Organisation/s: Australian Science Media Centre, The Westmead Institute for Medical Research, Mater Research, Griffith University, La Trobe University, University of Sydney, University of Queensland, Walter and Eliza Hall

Institute of Medical Research, Hudson Institute of Medical Research, Australian National University, Murdoch University

Funder: N/A

Expert Reaction

These comments have been collated by the Science Media Centre to provide a variety of expert perspectives on this issue. Feel free to use these quotes in your stories. Views expressed are the personal opinions of the experts named. They do not represent the views of the SMC or any other organisation unless specifically stated.

Professor Sarah Palmer is the Co-Director of the Centre for Virus Research at The Westmead Institute for Medical Research and Professor in the Faculty of Medicine at the University of Sydney

"If this proves to be Australia's first case of reinfection, it will fit with a pattern seen elsewhere in the world. Other reinfection cases have turned up in Hong Kong and the United States, to name two examples. This tells us we still have much to learn about this virus and our bodies' immune response to it. In particular, as the virus continues to evolve and mutate, infection with one of its strains may not protect us from another strain.

These revelations of reinfections compose a big challenge for vaccine efforts as many vaccines were developed to be active against strains identified early in the progression of the pandemic. As more infections occur we will be in a race for vaccines to stay apace with the evolutionary curve of this virus."

Last updated: 21 Oct 2020 2:17pm

Declared conflicts of interest:

None declared.

Professor Nigel McMillan is the Director in Infectious Diseases and Immunology at Menzies Health Institute Queensland, Griffith University

"Today, Victoria announced our first case of SARS-CoV-2 reinfection. A few cases have been reported around the world where patients have tested positive and recovered from infection, only to test positive again some months later. It is unclear with these cases if this is truly re-infection or merely dead virus being shed. However, the idea of reinfection is not surprising as we know that antibody levels against SARS-CoV-2 virus drop rapidly in naturally-infected patients. Indeed, by two months, one in five people have no detectable antibodies to the virus. Indeed, our normal coronaviruses cause common colds every year as we know immunity drops off and that allows them to reinfect us. The hope is that vaccines will produce a much more long-lived immune response and this problem will be reduced, but it probably won't be eliminated."

Last updated: 21 Oct 2020 2:15pm

Declared conflicts of interest:

None declared.

Dr Larisa Labzin is an IMB Fellow and NHMRC CJ Martin Fellow at the Institute for Molecular Bioscience at the The University of Queensland. Larisa's research focuses on understanding how the innate immune system recognizes viruses.

"There are two scenarios for why someone can test positive twice for COVID-19. The first is that they have genuinely been re-exposed to COVID-19 and that they have caught it again. This can be determined by genetically sequencing the virus during the first and the second test and comparing the viral sequences. The virus accumulates enough small changes with time that we can distinguish a virus that was caught in July from a virus that was caught now (in October).

The alternative is that the person who caught COVID in July never truly cleared that original infection, in which case this wouldn't be a 'new' case of COVID-19. Actual re-infection that has been confirmed with genetic sequencing has now been reported in a few rare cases worldwide, indicating that it is indeed possible. For the sake of Victoria's accurate tracking of COVID-19 transmission, it is important for them to determine if this is indeed reinfection or a persistent original infection. It is important to note that after we clear an infection we are not necessarily protected from reinfection if we are re-exposed to the virus, but we anticipate that we are protected from developing severe disease."

Last updated: 21 Oct 2020 2:14pm

Declared conflicts of interest:

None declared.

Hassan Vally is an Associate Professor in Epidemiology at La Trobe University

"Although this is interesting and there is little detail to go on at this point regarding this Victorian case, it's really important not to attach too much weight to this finding. We do know that whilst infection by some viruses leads to lifelong immunity, there are others for which infection only leads to relatively short-term immunity.

Since we have only co-existed with SARS-CoV-2 for less than a year, it is not certain what the immunological characteristics of infection are yet. So far, however, there have been very few cases of reinfection reported. We also know about the law of truly large numbers, which says that with a large enough number of samples improbable events do occur. We have obviously seen a very large number of infections now around the world and so we will start to see unlikely events occur.

No doubt there will be more done to try and understand more completely what has happened in this case, with it being recognised that if we start to see more reinfections as time goes on - which points to immunity being short-term in some individuals - this has obvious implications for how effective a vaccine or vaccines will be."

Last updated: 21 Oct 2020 2:11pm

Declared conflicts of interest:

None declared.

Professor Marc Pellegrini is an Infectious disease physician at the Walter and Eliza Hall Institute of Medical Research (WEHI)

"It is important to differentiate between someone who has been reinfected with the virus and someone who has had 'shedding of viral remnants'. Shedding means someone could have genetic remnants of the virus from a previous infection without being infectious. As an analogy, if you find a balaclava and gloves in your house, does it still mean there's a criminal inside? Perhaps not – it could be just the remnants of their clothing that they've left behind.

It is possible, though, that someone could have been reinfected with the virus a second time. At this stage, we're not sure how long immunity to the virus might last but it could be as little as a few months, meaning people may be able to be reinfected with the virus. We're studying precisely that at WEHI, our **COVID PROFILE** (<https://smc.us7.list-manage.com/track/click?u=fdc5316d8cbd7a248ee94eae&id=0e482330b0&e=084c18375f>) study aims to understand how immunity to the disease develops, how long it lasts, and what happens when immunity is lost. This question is vital in informing vaccine development and public health measures in a 'COVID-normal' society. The study will follow people who have recovered from COVID-19 and their close contacts for 12 months. "

Last updated: 21 Oct 2020 2:10pm

Declared conflicts of interest:

Marc is involved in the oversight all COVID-19 research at WEHI, including the above mentioned COVID PROFILE study.

Professor Elizabeth Hartland is Director and CEO of the Hudson Institute of Medical Research

"Re-infection after COVID-19 appears to be rare but has been reported. A possible case of re-infection **was investigated** (<https://smc.us7.list-manage.com/track/click?u=fdc5316d8cbd7a248ee94eaeb&id=86416ed87f&e=084c18375f>) in a 25-year-old US man who tested positive for SARS-CoV-2 in April and then again several weeks later. On both occasions he was symptomatic, with the second infection being more severe. His symptomatic episodes were separated by two negative tests, suggesting the first SARS-CoV-2 infection had been cleared. Deeper analysis of virus genome extracted from the nasal swabs taken for testing suggested that he was infected with a different strain of the virus on each occasion. The time between infections was not long enough for this change in virus sequence to have occurred by short term evolution within the patient.

Importantly, this tells us that even after recovery from COVID-19, precautions against re-infection should be taken because immunity is not guaranteed."

Last updated: 21 Oct 2020 2:09pm

Declared conflicts of interest:

None declared.

Paul Griffin is Director of Infectious Diseases at Mater Health Services, Associate Professor of Medicine at the University of Queensland, and Medical Director and Principal Investigator at Q-Pharm, Nucleus Network

"The report of reinfection coming from Melbourne yesterday is not surprising. There have been a number of cases of confirmed reinfection reported elsewhere, including some confirmed by genetic sequencing such as a case in the USA reported in *The Lancet Infectious Diseases* earlier this month and a patient in Hong Kong reported in *Clinical Infectious Diseases* in August, as well as others.

While some previous reports have been put down to prolonged shedding following initial infection, and perhaps around the limit of detection of the assay used to test, so it occasionally returns negative results, it is clear that reinfection can occur and maybe even within months of the primary infection.

The implications of this include adding further weight to the argument that a herd immunity strategy based on allowing the infection to spread is fundamentally flawed and should not be considered as an option. Further, people should not assume they are protected following infection and should continue to employ mitigation strategies to reduce the chance of reinfection. While some have extrapolated this finding to suggest a vaccine will not be effective, this is not the case and there are a number of promising vaccine candidates progressing well through clinical trials."

Last updated: 21 Oct 2020 2:07pm

Declared conflicts of interest:

Paul is running a number of COVID-19 vaccine studies (Novavax and UQ).

Associate Professor Sanjaya Senanayake is a specialist in Infectious Diseases and Associate Professor of Medicine at The Australian National University

"Confirmed reinfection with COVID-19 is rare: so far, only six cases out of 40 million have been found; however, the true number might be much higher. If the Victorian case is reinfection, then it would represent the seventh worldwide and the first in Australia. The only way to truly confirm reinfection is to compare the genetic sequences from the virus with their first episode and his current episode and see if they are sufficiently different: it is not clear whether this has been done yet.

We know that people can shed the SARS-CoV-2 virus for a prolonged period after an infection, sometimes for over 100 days. This may yet be the case here; however, if they have a new illness now with a positive COVID-19 swab - even if the new illness eventually turns out to be due to another infection e.g. flu or another virus - it would still be prudent from a public health viewpoint to get them to self-isolate till that is determined. If, however, this turns out to be true reinfection with COVID-19, this will be an important case globally, especially to see if the second illness is milder than the first. Hopefully, they will get better soon."

Last updated: 21 Oct 2020 2:06pm

Declared conflicts of interest:

None declared.

Professor Jeremy Nicholson is Pro-Vice Chancellor for Health Sciences and Director of the Australian National Phenome Center at Murdoch University

"This is the latest of several cases of possible/probable SARS-CoV-2 reinfection that have been reported from around the world. Little information is currently available on this particular case, but there is evidence that SARS-CoV-2 reinfections can occur although these appear to be rare events. One possibility is that the initial infection had not fully resolved, and the virus was still lurking in the patient after so-called 'recovery', only to remerge later causing more symptoms. We still don't know if SARS-CoV-2 can do this, but many viruses can, including Herpes viruses (HSV-1 and HSV-2), which hide in nerves and never really go away, but these bugs have profoundly different biological effects to SARS-CoV-2 and cannot be easily compared.

Another possibility, and perhaps more likely, is that a new infection occurred with a different SARS-CoV-2 strain. There are a number of strains in global circulation as the virus is evolving. If that were the case, it would indicate either that the initial exposure did not confer broader immunity to other SARS-CoV-2 strains, and/or that any conferred immunity was lost rapidly - there has been much speculation about this in the scientific literature.

These latter possibilities pose questions about the practical long term effectiveness of any new vaccine. Influenza vaccines, as is well known, have to be regularly redeveloped to cope with the never-ending evolution of the virus and emergent strains. Direct proof that SARS-CoV-2 reinfection can occur would have to come from genetically-typing the virus in the first and second or subsequent episodes. If different strains of the virus were detected then they can be genuinely assigned to different infection events.

However, this level of detail of information would be uncommon for most patients. So, like many other facets of the COVID-19 enigma, the answer is that *we really don't know* and it will take more research to be able to answer these questions. We can only hope that reinfections are genuinely rare events and any new vaccine is safe, efficacious and reasonably robust to viral strain variation. Only time and a lot more science will tell!"

Last updated: 21 Oct 2020 2:05pm

Declared conflicts of interest:

None.

Dr Stuart Turville is Associate Professor in the Immunovirology and Pathogenesis Program at the Kirby Institute, UNSW Australia

"Whilst reinfection is listed as a rare event, it is important to note we do not truly know the frequency of reinfection, as to definitively state that this was a separate viral infection event is not easy. Ideally, to document a case of reinfection, we require clear diagnostics in the first case (detection of the virus by PCR and also serology as a backup). The full viral sequence is also helpful to demonstrate the patient was infected with that circulating strain at that point in time.

Fast forward to the second re-infection, and that is where the diagnosis via PCR but, more importantly, the sequence of the new viral infection becomes crucial. If the virus diverges from the first virus and is reflected in the community or from the likely contact source, the probability of reinfection is then considered very high. This also would rule out the patient still having residual virus from the first case of infection.

An important thing to also note is that a large majority of people have mild cases of the disease. This typically does not lead to a potent immune response and, as such, there may indeed be an increased probability of reinfection. We also need to understand that small changes to the virus are accumulating, so the virus you saw in July may be slightly different from the one that is now circulating in October. Sometimes changes to the virus are ones that enable them to evade a previous immune response that may have been mounted to an early circulating virus. A lot of the above still requires more study, and with large infection rates proceeding across Europe and the USA, the concept of immunity post-infection and the risk of reinfection will likely be documented in real-time."

Last updated: 21 Oct 2020 2:04pm

Declared conflicts of interest:

None declared.

Associate Professor Taghrid Istivan is Associate Professor of Microbiology and Senior Program Leader - Biosciences at RMIT University

"As immune responses to COVID-19 infections have not been thoroughly studied due to the very recent emergence of the SARS-CoV-2 virus, it is rarely documented that reinfection with this virus may happen shortly after recovery in some cases. But, it is less likely that an infected person will still be shedding viral particles after months of recovery.

A similar case of COVID-19 reinfection was reported in July in Hong Kong following a random test, as the reinfected person was asymptomatic or may have displayed very weak symptoms. There could be many more unreported cases too, due to the asymptomatic nature of the second infection. Furthermore, individuals may produce different levels of immune responses towards the same strain/variant of the virus, depending on their own genetic traits. Hence, for a similar viral load, some individuals can be asymptomatic while others may endure severe symptoms. And that can be true with the reinfection case, depending on the level of the immune responses.

It is quite possible, like with other cold and flu infections, that this virus does not produce long-lasting immune responses after a single infection. Recent trials on COVID-19 vaccines reported that giving a second dose of the vaccine to volunteers improved their immune responses and produced higher levels of antibody counts, which is an indication of the nature of the immune responses generated against the virus. Hence, it is likely that a single vaccine shot against SARS-CoV-2 will not be sufficient to generate long-lasting immune responses against COVID-19 infections."

(mailto:Subject=scimex.org-
:RT REACTION: Victoria reports case
COVID-19
action&body=https://www.scimex.org
newsfeed/expert-reaction-victoria-
Last updated: 21 Oct 2020 2:02pm
ts-case-of-covid-19-reinfection)

News for: **Declared conflicts of interest:** Australia

None declared.

- NSW
- VIC
- QLD
- WA
- ACT

Professor Brian Oliver leads the Respiratory Molecular Pathogenesis Group at the University of Technology Sydney and the Woolcock Institute.

Media contact details for this story are only visible to registered journalists.

"This is not the first case of reinfection globally, but is the first case in Australia. What we know from other cases of reinfection is that the second infection is very mild, and sometimes occurs without causing any symptoms at all. I don't think that we need to be worried about the possibility of reinfection. When we are vaccinated it doesn't mean that an infection will not occur, it just means that our body is primed to deal with the infection and so the effects of the infection are reduced.

With COVID-19 reinfection, this also seems to be happening with the second infection being very mild. However we do not know the clinical details of the Victorian that has been reinfected, and we hope that s/he will also follow this pattern of a mild second infection and that they do not have any underlying disorders which might make the second infection severe."

Last updated: 21 Oct 2020 2:02pm

Declared conflicts of interest:

None declared.
