These are questions from the webinar "Questions for COVID-19 control: schools, airborne transmission, health worker PPE and vaccination strategies" on 1 September 2020. Professor Raina MacIntyre has taken the time to answer some of the questions that we couldn't get to in the webinar.

These are the personal views of Professor MacIntyre. Research papers and resources used by Professor MacIntyre can be found here. Watch the webinar here.

General

What do we know about COVID-19 in August, that we did not know in February or March 2020?

Number one, we know that there is massive asymptomatic transmission, that wasn't even accepted back then. We thought it was only transmitted from people who are showing symptoms. So you can easily identify who's infected. That's the most important thing that we know now that we didn't know then. The second thing we know is it can be spread through the aerosol airborne route. The third thing is, we know that it's a massively vascular disease. A lot of the pathologies in the blood vessels, even in the lungs, and we know that there are really strange and chronic complications, and it's still an unfolding picture. But we know that things like Kawasaki syndrome, or the multi system inflammatory thing, we wouldn't have known about back then. We didn't know that people can be left with cognitive deficits with chronic fatigue, and all kinds of long-term effects.

What are your thoughts on the theory that previous immunisations may have a protective effect for people?

There are no previous immunisations for COVID, however exposure to seasonal coronaviruses seems to be important. It's estimated about 30% of people have cross reactive antibodies that have been generated from exposure to the cold and flu virus, coronaviruses. Whether or not they are protective or associated with antibody dependent enhancement, we don't know yet. That's still a little bit of uncertainty around that, so I think a lot more research is needed on the role of pre-existing antibodies.

Why is the second wave more severe in Melbourne?

The first wave was largely travel-related cases, with very little community transmission. The second wave was largely community transmission, and it showed us what happens when the epidemic grows silently in the community.

Is there any evidence that sending council workers to wipe down numerous surfaces repeatedly (including during rain) is a sensible, cost effective means of reducing cross-infection?

In closed, poorly ventilated settings, it would be important because of aerosol deposition on surfaces. Deposited particles could be touched or inhaled from secondary aerosolisation.

Are there any studies on pregnant women with COVID-19 infection and the effects on the unborn baby?
Yes, there are. At the end of my slides, I had a link to some resources that I've collected and you can go in there and have a look. There's a few studies on pregnant women. There have been infants that have been infected from their mother. Whether it happened during the birth process or vertically is uncertain. But the outcomes for the mother themselves, in some studies, don't seem to be worse than if they weren't pregnant, because they tend to be young women.

Can dogs detect the virus? Could they be used for screening unless they develop anosmia?
Dogs are being used, but we're not sure how effective they are. In terms of screening, maybe – the jury is out.

Any thoughts on when international flights will re-open?
Not this year. I would imagine full opening of international borders will be after people are vaccinated. They may need a vaccine stamp on your passport, like for Yellow Fever.

Any data regarding the gender of health care workers who are infected – proportion of women compared to men?
It has been mostly women (and mostly nurses, who are predominantly a female workforce).

Do you think the building infrastructure has had more of an effect in aged care than recognised?
Yes, definitely. See: Morawska L, Tang JW, Bahnfleth W, Bluyssen PM, Boerstra A, Buonanno G, et al. How can airborne transmission of COVID-19 indoors be minimised? Environment International. 2020;142:105832.

Vaccines, treatments and reinfection

What percentage of the population do think needs to get the vaccine and how effective must the vaccine be to be able to go back to normal/open borders?
If the vaccine is 100% effective, about 70% need to be vaccinated. If 50% effective, herd immunity may not be possible and we will have to live with the virus. However, a vaccine may reduce the risk of death and severe disease, even if it does not prevent infection.

How much do we know about the risk of getting reinfected?
So we know that there's been several reports of reinfection. There were right from the beginning, but some of the early reports were probably just persistent viral shedding from people from their first infection. We know that it's possible with seasonal coronaviruses. There have been studies with seasonal coronaviruses that show that you can definitely get reinfected. But the second time round, in that case, you tend to not get

symptoms, so it definitely reduces the severity. I think it's just too early and there's not enough studies to really know what it's going to mean for COVID-19.

Considering the reinfection cases scientifically documented recently, do you think that the optimism around vaccines is shaken?
Not really. So far, vaccines seem to induce more robust immune reaction than infection itself.

GPs have had an uptake by patients for flu vaccine this year that has tested capacity to do more. It can be done but requires MBS support and vaccine storage capacity increase. How can we anticipate this and plan for it?
Good question – it needs a lot of planning. We will need nurse vaccinators, and special vaccination clinics too, I suspect

Can a combination of exposure and vaccines achieve a herd immunity? E.g. allowing contact amongst the low risk group community, lower risk than say the common flu.
Probably not because infection may not result in a strong immune response, especially if symptoms are mild or asymptomatic.

Schools and children

Why do children have a higher mortality rate from seasonal influenza than COVID?
We do not know why, but it could be that exposure to seasonal coronaviruses is giving them some immunity, plus the fact that the child respiratory tract is fully susceptible to flu, but less to COVID because they have fewer ACE2 receptors than adults.

What are your thoughts on effective strategies for safely returning to school in Victoria?
Masks and distancing until vaccination is possible.

What evidence is there for child to adult transmission in children under 10?
Some – including the study I showed in the presentation.

Would you consider children in settings that have poor hygiene measures generally to be more at risk of cases? E.g. Indigenous populations, or in the Pacific.
We do not know yet, but it would be plausible, especially if malnutrition is present.

Has there been peer-reviewed research on musical instruments such as clarinets, trumpets, etc. in groups? School bands have been stopped in NSW – is this supported by evidence?
There is a study that's being done in the US showing that there is quite a lot of aerosalisation from brass instruments particularly. Anything where there's a lot of blowing and force of blowing. We've got a paper that's coming out in Clinical Infectious Diseases on singing, which has some of those visualisation experiments done on the

singing. So unfortunately yes, I think there is some evidence that the brass instruments. I would expect woodwind as well, but I haven't seen anything on that.

Is there any data for school children comparing COVID-19 death rate compared to the common flu death rates?
I have not seen the data but it is an interesting point.

Given the high rate of asthmatic children in Australia, are these children at greater risk of having severe cases?
Asthma is an unknown. Many studies suggest it is not a risk factor, but some suggest it is.

Are universities doing enough to stop on-campus spread, particularly with so many young adults living in colleges, how can these settings be safe if the virus enters the college?
These are a high risk setting for outbreaks – universities opened in the US in August and there have been several large outbreaks on campuses.

Transmission

Since droplets can travel more than 2 metres, should the distancing guidelines be revised and physical distancing increased?
The Lancet meta analysis that I mentioned on the masks and respirators, also looked at distance and basically 1 metre of distance will protect you, substantially. But every meter thereafter will double your protection, so any distance between you is good. If you can only manage one depending on what the setting is, that's better than none. If you can manage 2 metres or even further, that's even better.

Is the virus detected in faeces viable? Is this a transmission route for the virus?
If the test is a Polymerase Chain Reaction (PCR), you cannot tell if the virus is viable.

Is the virus detectable in urine?
It has been found in urine.

How about water borne risks from swimming in public pools?
An outbreak in a pool has been described – although this is probably due to close contact.

Given the virus lives on surfaces for extended periods of time, is it necessary to sanitise groceries and parcels?
I think it depends on the amount of community transmission. In Melbourne, at the peak of the epidemic, probably yes. If you're in WA, probably not.

Do we know how long surface-based virus is viable for?
Hours in some studies. Up to 7 days on a mask.

Is public transport a reservoir for the virus due to the constant circulation of the same air?
Yes, it is. We've been told that there's been upgrading of ventilation, etc. on buses, but like I said, there was a hospital ward where they had 12 air changes an hour and they still had huge amounts of viral virus everywhere. A bus is a very small environment, there might be lots of people on it, so the risk is quite high on a bus.

Masks

Should mandatory mask usage be considered in NSW?
I think it should be. It's not like you're asking people to take some dangerous drug. It's a simple, cheap, effective safe intervention. As you saw from the video with the aerosols, it'll make a huge difference and with any non-pharmaceutical intervention, or even a pharmaceutical intervention. The earlier you do it, the more impact it will have. In most countries that have mandated masks, they've waited till after the peak of the epidemic. In Victoria, in New York, they brought in the mandate quite late in the piece. If it's brought in early, you'll end up with a smaller epidemic.

Is there any rational explanation as to why mask were not encouraged or forced on us from early days? Ie. from late February–early March?
No

In Victoria, the DHHS advises a " face covering " rather than "face mask." It states that face masks are recommended but face shields are an alternative. Increasingly, people are just wearing face shields in public. Could you please comment on this?
There's been some data coming out from Switzerland, and a couple of other places, where in settings where people have had a choice between wearing a face shield and a face mask, only the people wearing a face shield have got infected. Which again tells you that a lot of the transmission is aerosol airborne. The face shield has a gap at the bottom there.

So when you breathe in, the air has to flow down through underneath the face shield and you breathe it straight in without any filtration. So that a face shield really should only be used in adjunct to a mask.

Do we know why masks are more effective in filtering coronaviruses, as opposed to influenza or rhinoviruses?
No.

What is your opinion on the spread from sporting activities, should masks be worn during sport or should something else be done?
At this stage, yes. Although, outdoor events are lower risk.