



Science in Focus: COVID in the Lab

Staying ahead of the curve Panel Discussion

Disclaimer: The content of the video presentation and questions section should not be construed as medical advice. You should ensure that you meet current health orders and guidelines and refer to your medical practitioner for any matters of concern relating to your health.

Q1: When will Moderna vaccines be available in Australia?

A: Perhaps in time, but it does seem that there are any immediate plans.

Q2: What is preventing vaccination of children at the moment?

A: The clinical trials to investigate safety and effectiveness in children are not complete. In the USA the Pfizer vaccine can be used in children aged 12 and over.

Q3: I am concerned with the advice to vaccinate children since the WHO status says the trials are underway but they were not included in original trials due to the risk to adults and the elderly being the focus group. What has progressed recently to push the recommendation to vaccinate children if they want to?

A: A good way to think about this is the annual flu vaccinations - these are given to children. The initial push to vaccinate adults was because this is where severe disease was occurring and there was a shortage of vaccines.

Q4: When you say that COVID was new to us. I guess as a nation yes, however globally, the SARS-cov-1 virus itself has been around since 2002. How have we not learnt from these findings to somewhat understand today's problem?

A: SARS-CoV-1 and SARS-CoV-2 are different viruses, which have really different effects (50% death rate with SARS-CoV-1). Globally a lot was learned about viral diseases from SARS-CoV-1, but that doesn't mean that the mechanisms and treatments would be the same between the two viruses.



Q5: Transmission of the virus in airline crew has been comparatively less compared to others. What does that say about aerosolisation of the virus, especially in a floating metal box with circulated air?

A: Hard to know what this means, as airline crew should be wearing PPE, and in principle only COVID negative people would be flying. Of course this isn't always the case. Most aircraft are fitted with HEPA filters which remove airborne particles and microbes.

Q6: Will the current lockdown that we do be able to decrease the cases every day which seems to always increase, even though the vaccine capacity according to Australian benchmarking is very backward in delivery with other countries. Does using a mask guarantee to reduce the number of cases increasing, even though I often see people using masks not properly according to the procedure, which generally people use masks not completely covering both their nose and mouth, and often see them reduce their use of masks only to cover their mouths. It is often I see in supermarkets like Coles and Woolies things like this. Thank you for your answer.

A: Lockdowns are effective, the stricter the lockdown the greater the effectiveness. Masks do reduce the risk but do not make people invincible.

Q7: How are fabric/handmade masks in terms of protection?

A: In general they are reasonable, but scientific studies have shown that they are not as good as "medical" masks. However, there are now a wide variety of surgical masks on the market so it's likely that these will also differ in their effectiveness.

Q8: I wear a P2 made in Australia and it's actually a respirator. Can you comment?

A: There are so many types on the market it's hard to comment on one over another, and the fit testing should be done by people with specialised equipment. As a sort of rule of thumb if it's comfortable and you don't feel air escaping when you breathe out then it's probably a good fit. The N95 means that it has been tested to have good filtration.

Q9: How effective do you think masks are in a retail environment with the current Delta variant?

A: Masks in all situations reduce the spread of COVID. But they need to be used in conjunction with other measures as recommended or prescribed by health authorities.



Q10: It may be an idea to have Public service announcements on TV and social media teaching how to wear and use a mask safely.

A: We agree – here is some [advice from UTS about mask wearing](#).

Q11: Masks do not appear to work for people with beards due to it not forming a good seal. Any comments on that?

A: That’s correct. The problem is bigger for the N95 or P2 masks and even occurs when men have a six o’clock shadow. Surgical masks don't need such a good seal so they are probably better for people with a beard (but we don't know of any study which specifically shows this).

Q12: When will the Novavax vaccination be available in Australia?

A: A date had not been announced so far.

Q13: Does UV sterilisation in air handling systems destroy the virus?

A: Yes it does providing that the UV system is designed correctly (so just adding a bulb to an existing system might not be effective if for example the air flow is too fast).

Q14: I am curious as to how long the particles stay in the air - do we have much information about this? Is this related to dose? I.e. smaller particles that may linger in the air would have a smaller dose of the virus and be potentially less infectious?

A: This depends on a lot of different factors, most related to airflow in the local environment. In experimental conditions people have shown that it remains airborne for 3 hours.

Q15: I think there is a bit of misconception in that most people believe that a mask will protect them, but from what I understand, it's actually meant to protect others from you. Can you comment on this and what evidence exists for both types of protections?

A: There are different masks for different purposes. N95 or P2 protect both the wearer and other people (provided there is not an exhalation port), surgical masks offer protection in both ways too (the outer surface is designed to stop blood and other fluids from going into the surgeon's mouth), but are generally regarded as protecting others from the wearer. Here is some [advice from UTS about mask wearing](#).



Q16: What are your thoughts on an Antigen test being used over PCR to test for Covid19?

A: So far the PCR test has been proven to be superior as a diagnostic, but the antigen test is useful to see if you have mounted an immune response (i.e. have some level of immunity).

Q17: Is the Covid-19 virus mutating? How quickly and how many times so far?

A: All viruses mutate, but generally we don't pay such close attention. What we report now are the mutations which seem to change the nature of COVID, so those that make it more infectious or less infectious, or more likely to cause severe disease. There are around 7 significant strains of COVID, but it is likely that there have been thousands of mutations which so far have not changed the nature of the virus.

Q18: The hospital ventilation system example showed how architecture can facilitate virus spread, and presumably different lifestyles and cultural practices can also slow or speed up the spread. How do scientists and decision-makers take things like local culture and physical environment into account when researching the virus and responding to it?

A: Usually, multidisciplinary teams of experts are brought together to put several points of view across so that the best research and policy decisions can be made, rather than rely on a single point of view which may or may not be correct.

Q19: There were reports that SARS-COV-2 was able to survive on inanimate surfaces for hours. Has survival of the virus on these types of surfaces been studied, and can the virus infect people who touch these contaminated surfaces if the right viral load was present.

A: The survival of COVID on surfaces was a scientific experiment and they didn't test if people could be infected. From a scientific point of view transmission can occur via surfaces if the conditions are right. Regular hand washing with soap and water stops this, and wearing a mask helps to stop people self-inoculating (e.g. by touching their nose).

Q20: I am curious as to how long the particles stay in the air - do we have much information about this? Is this related to dose? I.e. smaller particles that may linger in the air would have a smaller dose of the virus and be potentially less infectious?

A: This depends on a lot of different factors, most related to airflow in the local environment. In experimental conditions people have shown that it remains airborne for 3 hours.

Q21: How does it impact on adult onset asthma?



A: So far it seems that people with asthma do not have any increased risks for COVID.

Q22: Why does smoking increase the ACE2 gene expression? Is it an epithelial defence mechanism in response to smoking?

A: ACE2 is higher on goblet cells and smoking increases the number of goblet cells.

Q23: These studies are pre delta variant aren't they?

A: Yes that is the case. New studies are currently being conducted with this variant.

Q24: Do you have any studies that compares the bushfire components of smoke having a similar effect to second hand smoke? For Cov-2

A: The answer is we do not know. We know that any pollution is bad for lung and general health, and people with chronic diseases have an increased risk of severe COVID.

Q25: In relation to smoking increasing the expressions in the ACE2 receptors is this directly related to nicotine itself? Would someone using nicotine products such as gum or patches but not smoking still be at higher risk?

A: This is thought to be due to the oxidative stress in the airways from smoke which increases the number of goblet cells which are high in ACE2. Therefore nicotine itself may not have an effect. However, the studies have not been done yet to confirm this.

Q26: To clarify on the increase in ACE2 receptors and smoking, would a history of passive smoking as a child then potentially make you more susceptible to Covid19?

A: The studies have not been done, but with passive smoking and other diseases the amount of passive smoking is important.

Q27: Does UV light kill COVID-19, because I saw that in Perth and Darwin there could also be Covid 19 Delta variants as well, because considering where they are located and they have tropical climates, I read that the Covid 19 virus will die when in hot areas and will not develop breed. In addition, is it true that vitamin D can also prevent the development of the Covid 19 Delta in the human body?

A: Yes to UV killing the virus. The data are inconclusive around vitamin D.

Q28: Have all positive cases been detected as the Delta variant, or are there multiple variants during our current outbreak in Sydney?

A: The positives from the current outbreak are all delta viruses, although as with all SARS isolates, there are variants within this delta group (lineage B.1.617.2)

Q29: Would vaping promote a response greater or less than that of smoking? As vaping is much more popular for younger age groups at the moment.



A: Anything that induces oxidative stress in the airways is thought to increase ACE2. However the studies have not been done for vaping yet.

Q30: Do you know technical details about how sewage detection is done? In particular, what are the quantitative bounds (upper and lower estimates of secreting individuals per population) when they say the test at a particular collector is positive?

A: The amount of virus is very small, and accurate quantitation is very difficult as there are multiple contributors to virus detection. Given the small quantities, the number of individuals is not easily determined.

Q31: We constantly keep hearing that schools are safe, yet no one seems to mention the staff of a school that consists of adults of all age groups and who generally come to work from various LGAs. Mostly they are working in quite cramped conditions. Are schools really safe, especially now with the Delta strain?

A: If COVID safe protocols are followed the risks are low and reduced, but outbreaks can occur anywhere.

Q32: Is there data on specificity/sensitivity of the current PCR methodology, including sampling error?

A: In general PCR for viruses has a sensitivity and specificity of over 99%.

Q33: Is it likely that Covid escaped from a laboratory?

A: You can read the [WHO's report into the origins of SARS-CoV2](#).

Q34: How did you determine the virus sequence given you (probably) didn't have amplicons to replicate the virus? Was it just trial and error? (Using previous SARS as a reference?)

A: The sequencing is done in an unbiased way such that you don't need to know what you are looking for at the start.

Q35: Does the sense of smell and taste ever come back after recovery from the virus?

A: In the majority of people it does.

Q36: How much worse is secondary 'vaping' than second hand tobacco smoke or cannabis smoke?

A: It depends upon the individual person's susceptibility - they are all bad.

Q37: What is it done with the material after testing? Particularly if there is Covid-19 virus replication?



A: Sample storage is as required under the NATA guidelines. The minimum is 7 days but we store for up to 10 days. The positive samples are stored indefinitely at -80°C. The issue of replication is not a problem, and in fact at -80°C the virus does not replicate/grow.

Q38: Are both asthma and smoking considered risk factors for COVID?

A: Uncontrolled asthma has been shown to increase risk and there is a link with current smoking and virus progression.

Q39: When having a covid swab, is it still necessary to swab both the nose and the throat - I've heard one Swabbing venue is now only swabbing the nose??

A: A nose/throat swab is the optimal sample type for PCR testing. The protocol for New South Wales Health Pathology venues is to collect a nose/throat swab.

Q40: Can the full batch 1 and 2 vaccine guarantee that people will not get positive from Covid 19 Delta variants or other variants as well. Because I read that a lot of people after getting the vaccine still have the possibility of getting the Covid 19 virus. What steps can you take to guarantee that people won't get the Covid 19 virus after the vaccine is fully available?

A: Re vaccination and COVID - in the UK being fully vaccinated proves to be about 95% effective at preventing severe COVID, while having only one dose is around 50% effective.

Q41: What method do you use to test wastewater?

A: There is a specific wastewater PCR that is very sensitive, and in house. We also do capture methods for determining the genome sequences and assess lineages where this is possible.

Q42: Are there any downsides in using PCR for diagnostic purposes?

A: Longer turnaround times compared to point-of-care platforms; collection of nose/throat swabs are uncomfortable for some people; cost is similar between PCR and some rapid tests, so minor differences only.

Q43: Any research on portable rapid testing with instant results - a little like a pregnancy test but obviously using saliva

A: These already exist and are based on PCR - they are called point-of-care diagnostics and can give a result back in 1 hour or less. [UTS scientists have used novel optical technology to design a highly sensitive saliva test for the SARS-CoV-2 virus](#) antigens, or viral protein fragments. The test can deliver a positive result in under 15 minutes.



Q44: Is NSW Health responsible for all confirmatory testing of positive results from private labs?

A: No, although there is a very close link and when private labs ask for confirmation at reference labs, or for assistance, that is undertaken. Similarly the private labs participate in many of the NSW Health and Health Pathology committees, and provide expertise in their areas of work in the current pandemic including molecular testing and antibody testing.

Q45: What makes the Delta variant more infectious?

A: This variant is thought to have a slightly different way of infecting cells making it more infectious.

Q46: What degree and experience do we need to be able to go into this type of research?

A: Generally a PhD in virology would be best. [Check out undergraduate and postgraduate study options at the UTS School of Life Sciences.](#)

Q47: The athletes that are attending the Olympic Games are being tested on arrival and the testing results are quite quick. Is this going to be available here in Australia?

A: It's the same test that we have, it's just that they have dedicated testing capabilities so can be much quicker.

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