REPORT ON PROCEEDINGS BEFORE

PORTFOLIO COMMITTEE NO. 2 - HEALTH

INQUIRY INTO CLEAN INDOOR AIR

CORRECTED

At Jubilee Room, Parliament House, Sydney on Thursday 19 February 2026

The Committee met at 9:15 am

PRESENT

Dr Amanda Cohn (Chair)

The Hon. Greg Donnelly
The Hon. Emily Suvaal

PRESENT VIA VIDEOCONFERENCE

The Hon. Scott Barrett
The Hon. Mark Buttigieg

* Please note:

[inaudible] is used when audio words cannot be deciphered.
[audio malfunction] is used when words are lost due to a technical malfunction.
[disorder] is used when members or witnesses speak over one another.

CORRECTED

The CHAIR: Good morning. Welcome to the first hearing of the Committee's inquiry into clean indoor air. I acknowledge the Gadigal people of the Eora nation, the traditional custodians of the lands on which we're meeting today. I pay my respects to Elders past and present, and celebrate the diversity of Aboriginal peoples and their ongoing cultures and connections to the lands and waters of New South Wales. I also acknowledge and pay my respects to any Aboriginal and Torres Strait Islander people joining us today. My name is Amanda Cohn, and I'm Chair of the Committee.

I ask everyone in the room to please turn their mobile phones to silent. Parliamentary privilege applies to witnesses appearing from New South Wales in relation to the evidence they give today. However, it does not apply to what witnesses say outside of the hearing. I urge witnesses to be careful about making comments to the media or to others after completing their evidence. For witnesses appearing today from interstate, the protections with respect to the evidence they give are more limited. I urge witnesses to be careful about the comments they make during their evidence and to avoid making adverse reflections about others. In addition, the Legislative Council has adopted rules to provide procedural fairness for inquiry participants. I encourage Committee members and witnesses to be mindful of these procedures. Just for the information of people in the room, we have a number of our Committee members participating remotely via videoconference today, so they might appear on the screen to ask questions.

Associate Professor SUMAN MAJUMDAR, Chief Health Officer, Burnet Institute, affirmed and examined

Ms CHRISTABELLE ADJOYAN, Project Director, Pathway to Clean Indoor Air, Burnet Institute, before the Committee via videoconference, affirmed and examined

The CHAIR: Welcome, and thank you for making the time to give evidence today. Would you like to start by making a short opening statement?

SUMAN MAJUMDAR: I would, thank you, Chair. Thank you for the opportunity to appear today as a witness. I'm appearing on behalf of the Burnet, an independent not-for-profit research and public health institute, to provide an evidence-based public health perspective on indoor air quality and its role in protecting health, promoting productivity and strengthening community resilience in New South Wales. Across the world, extraordinary progress has been made in making our water safe to drink, our food safe to eat and our outdoor environment cleaner and healthier. These advances are underpinned by rigorous science and supported by national and international agreements and legislative frameworks, aiming to reduce harms and hazards and build strong frameworks that hold industries accountable. Yet there is one area that remains critically under-addressed: the air we breathe indoors. Australians spend 90 per cent of our lives indoors. Every person in this room breathes approximately 11,000 litres of air each day, the vast majority of it indoors—in schools, in our workplaces, in healthcare settings, in public buildings and in homes.

But while clean water and food are recognised basic rights and outdoor air pollution is treated as a global health priority, indoor air is largely unregulated, poorly monitored and too often ignored. So why is action on indoor air important? The consequences of inaction are profound and have been under-recognised to date. Indoor air plays a clear role in the spread of respiratory or airborne infections. Most notably, we learnt this in COVID-19, but also existing threats such as influenza and respiratory syncytial virus, or RSV. It also influences long-term health through exposure to fine particulate matter called PM2.5, which we'll refer to, volatile organic compounds—mould, allergens—which contribute to asthma, heart disease and lung disease, impair cognitive function, and can lead to poor performance and productivity. These impacts translate directly into economic costs, including lost school and work days, diminished productivity and higher healthcare expenditures.

The COVID-19 pandemic showed us that the virus spread in poorly ventilated indoor spaces, fuelling outbreaks in the very settings where people gather and work, and increasing the risks of chronic effects or long COVID. The pandemic underscored a simple truth that extends beyond infectious disease: that safe indoor air is as essential to public health as vaccines, clean drinking water or sanitation. Clean indoor air underpins learning outcomes, workforce participation, infection prevention and resilience to climate-driven smoke events. The costs of inaction in lost productivity, healthcare burden and educational disruption are well documented and do outweigh the costs of implementation.

Hospitals and care settings, such as residential and disability care, are priority areas, where people living within these settings have increased risk and vulnerability to illness and poor indoor air. Health-associated airborne infections result in preventable death, illness, increased length of stay, workforce illness and service disruption. For example, in 2023, New South Wales data showed 14 per cent of all COVID cases were acquired in hospital. This is about 6,000 patients and, of those, around 300 died. Bushfire smoke adds another dimension. We know that from recent events and most summers in Australia. There's a growing and compounding air quality challenge. We're seeing more frequent and severe events from bushfire smoke, increasing exposure to airborne hazards. There's a large stock of ageing buildings that were not designed for today's climate risks or health expectations.

Outdoor air pollution receives appropriate attention from a global public health perspective, with agreed standards, guidelines and mechanisms for monitoring—for example, through environmental protection agencies—but the consequences of air pollution indoors and pathogens indoors remain a blind spot. An example: During a bushfire smoke event, a child who spends most of the day in a poorly ventilated classroom will inhale more smoke indoors than outside. In those circumstances, indoor air is the critical pathway for exposure and for risks. Climate change means these challenges are not going away. They'll become more frequent and severe. Indoor air is fundamentally an equity issue. People living in poorly ventilated housing or relying on unsafe heating sources face greater risks. People who live in shared accommodation, such as these residential care settings, have a higher risk of outbreaks, compounded by a greater risk of getting sick.

So what are the solutions? The science is clear. There are simple interventions that work to make indoor air safe. Ventilation moves fresh air in by opening doors and windows, or ventilation devices. Cleaning the air using air purifiers, cleaning filters and disinfecting using ultraviolet light are all important intervention modalities. These engineering solutions operate in the background without a reliance on human behaviour, and they are a key prevention strategy. There's now a strong and consistent body of evidence demonstrating these interventions of

ventilation and air-cleaning technologies are effective and safe. They work together to reduce exposure to airborne pollutants and hazards, including fine particulate matter, reducing carbon dioxide and infectious aerosols.

Just as we do not ask people to bring their own clean water into public buildings, we should not expect them to manage unsafe air on their own. To move forward, it's not a single one-off technology or intervention. It requires a systems-based approach to clean indoor air, underpinned by government leadership and action, that requires standards, monitoring of the air and shared responsibility, that provides a practical and scalable response to a growing public health challenge. Through monitoring the air using sensors, we can measure the levels of pollutants and pathogen risk. We can apply targeted engineering controls and we can optimise systems to reduce these risks and harms. Government does not need to deliver every solution, but it does need to fund, it does need to lead and coordinate, and set clear direction.

If this inquiry is to genuinely address the clean air challenge, it's important to be clear where this responsibility lies. It does sit with building owners, operators, regulators and also with governments. The community needs to be brought along, communication needs to be emphasised and be clear to bring the community members along. Based on our research and grounded in the implementation of some of the work that we are doing, we have recommendations that are listed in our report to this inquiry, but they fall under three broad themes. The first one is government stewardship and accountability. Indoor air quality is a public asset and a public good. It's not just a building issue. It requires stewardship, bringing together responsibility that is fragmented across various government departments, and leadership. We're recommending the development of a New South Wales indoor air quality strategy and a ministerial advisory council with experts.

The second is to support feasible and achievable improvements which can be done now. This includes implementing routine monitoring, starting with carbon dioxide in high-occupancy public buildings and settings, including educational settings and schools; issuing clear health-based ventilation and air-cleaning guidance; and funding targeted retrofit programs in existing public health buildings. Our third area is building the evidence and capability needed to support scale and innovation. There is a rapidly developing field; these solutions are advancing each month and year. That's why we recommend dedicated funding for innovation and medical research and indoor air quality. This enables local evidence generation, evaluating emerging technologies and also investing in our own growing research and manufacturing industries in this State and in Australia.

Finally, there's a need to coordinate nationally with other States and at the Commonwealth level. At present, this responsibility is shifted downstream, often to individuals, to take on measures to mitigate and manage their own risk. A critical gap in the policy framework is the absence of such an overarching strategy and policy frame, overseeing the air quality and providing guidance on what standards are acceptable. This starts with setting cross-jurisdictional accountabilities and guidance on what safe air quality means. Europe, North America and parts of Asia have started on this journey, and have started implementing and putting forward standards into building operation and also in occupational health and infection control.

To end with our own work at the Burnet, since 2023, the Burnet Institute has undertaken applied policy-relevant work on indoor air quality with a focus on implementation, embedding research with real-world action. This includes a significant suite of investments from the Victorian State Government in two large projects: the pathway to clean indoor air that tests ventilation and filtration solutions in schools and public buildings, and the ELUCIDAR clinical trial in residential aged care that evaluates upper room ultraviolet disinfection. And we also have other work underway, more at the lab and basic level, that generates evidence to guide the safe deployment of air cleaning technologies. We welcome the Committee's questions. Thank you.

The CHAIR: Thank you very much. I'll start with a couple of my own questions, and then I'll go to other members of the Committee. My first one is—I suppose it's a jurisdictional question—a complex problem like this sounds like it probably needs action across all three levels of government in Australia and probably internationally as well. For us as a State government level, are you able to point to other State jurisdictions that have taken action on this that we should look to?

SUMAN MAJUMDAR: I do acknowledge the point that it requires action at all levels—local, State, national as well as international. Those movements are happening. In Australia, there has been a long history of people working on indoor air quality. It's not a new issue; however, the COVID pandemic did give it focus and urgency because that's where we saw most of the harms, i.e. indoor environments. During the pandemic, I had a role at that point in time for a number of years, initially at the Commonwealth Government, but then with the State Government in Victoria as the deputy chief health officer, working on our ventilation work. I note that the Victorian Government did provide significant leadership on this issue, starting with ventilation and public health guidance; and secondly, large investments.

That started with the formation of a whole-of-government or cross-departmental program that brought together key departments around ventilation and conducted baseline assessments across 22 settings, and then made

recommendations for action and improvement of ventilation. This was all geared at managing COVID risk, but it has the same implications for all other indoor air harms from other pollutants as well. Next, there was an investment from Victoria in schools and education settings, again with policy and guidance and the deployment of air-cleaning technologies.

Finally, there's been an investment in innovation and research, of which we are a key partner, working with colleagues who you will hear from today, including the Queensland University of Technology (Thrive), the University of Melbourne, Monash University and the CSIRO. As a research and scientific community, we are all galvanised in what needs to be done. There is a need to generate some evidence to optimise implementation, but there is certainly enough evidence to take action at the moment. I've mentioned Victoria but other States have also taken action. New South Wales and Western Australia had ventilation guidance targeted for COVID. Now, with the pandemic risks subsiding, there is a need to learn those lessons and apply them into pandemic areas and not just for respiratory pathogens, but also for other indoor air pollutants and harms.

The CHAIR: In your written submission, you identified schools and workplaces as particular priority settings for action. Could you explain why those settings?

SUMAN MAJUMDAR: Yes. In the school and workplace settings, they are priority areas for action. So the overarching priority areas are community and public spaces where people gather, and where people live and work are the main areas. In terms of residential settings, to take the counterfactual, that's not a priority area really for government intervention, because they are people's homes. You can influence building code at that level, but where people congregate in schools and workplaces is what we saw in COVID, a major hotspot for transmission interaction and also risks from things such as pollutants, bushfire, smoke et cetera. Interventions can be applied there.

What we know from a vast body of research, for example in schools, is that twofold, from the performance side—this is an important economic point for governments to note—breathing air out results in carbon dioxide. Carbon dioxide is not clean air, and when that accumulates it can affect performance and learning. Studies have clearly shown that higher levels of carbon dioxide are correlated with poorer performance on tests and learning scores for students, and lower workforce productivity. So in addition to the health benefits of reducing transmission of pathogens, there's an important gain in these settings in terms of improving performance and therefore having a productivity benefit for the State.

The Hon. GREG DONNELLY: Thanks to both witnesses for coming and participating today, and thank you for the submission. It contains some very helpful information. I'm not quite sure who might be in the best position to answer the question, but I'll bowl up. The matter of identifying what are currently understood to be, or in fact legally are, national legislative or regulatory standards with respect to indoor air quality, can you help explain what they are and if there aren't specific standards, legal standards and regulations, what's acting as the de facto arrangement at the moment for what's being understood as standards for indoor clean air?

SUMAN MAJUMDAR: Thank you, Mr Donnelly. Chair, if I can answer and then pass to my colleague Christabelle, that would be appreciated. To answer simply, there is no legislative framework that exists for very clear indoor air quality standards. There are a number of mechanisms, and our current work is to provide recommendations to the Victorian Government on a pathway to standards. The first level would be guidance, and that's something that can be done now, particularly from a public health point of view. Recommendations have been made around what safe indoor air might be for community settings, for healthcare settings.

The Hon. GREG DONNELLY: Sorry, by who?

SUMAN MAJUMDAR: By a health department.

The Hon. GREG DONNELLY: Sorry to interrupt. I'm trying to just grasp the national position, at least for the moment. What is the national position?

SUMAN MAJUMDAR: Thank you. So, to reiterate, currently there is no legislation in place, and that is a goal that we should get towards. The pathway to get there would be, firstly, there is a national position where the new Australian Centre for Disease Control does have indoor air quality as a priority. There's an extensive website that has health information. There is work underway through the CDC to drive forward this issue. It is a new emerging issue. It does require cross-departmental work, and that is one of the challenges: which department takes a lead. It does require working between Health, Environment, Industry. Hence, we strongly recommend that there is a cross-departmental whole-of-government approach to this issue, because it does not neatly just sit with Health. Health can make health advice, but then you have building codes and you have the need to work with industry, et cetera.

There are proposed standards, and my colleague Professor Morawska will talk to the work that she and colleagues have done and put forward in the literature for a proposal for air quality standards. What we are in the process of doing is looking at the feasibility of implementing those. We know that can be done. Our early work has demonstrated that it is feasible to have standards, and monitor and work against them. So the first step, I'll reiterate, is to put forward advice and guidance on what acceptable air quality is. That can be done at national and State level.

The Hon. GREG DONNELLY: In terms of doing this—and perhaps to give some context, I do appreciate the nature of a Federation, and individual States can be either ahead of, at the point of being consistent with or, in fact, lagging behind what is emerging as a new area that's looking to be regulated and standardised—do you advance the argument that States should go it alone on a case-by-case basis and that over time some standard will emerge? Or is your primary argument that we need to focus on getting a national standard so we can have comity between the States?

SUMAN MAJUMDAR: Thank you, Mr Donnelly. Chair, I might ask my colleague Christabelle to go first, then I'll respond.

The CHAIR: No problem.

CHRISTABELLE ADJOYAN: Thanks, Mr Donnelly. I think you pose some really important questions, and certainly ones that we are thinking through and grappling with at the moment in Victoria. Let me talk to you, I guess, through what potentially happens at the moment in terms of national standards relating to air quality, particularly indoor air quality. As my colleague Professor Majumdar mentioned, there aren't any legal frameworks that currently exist in Australia or across other States that provide specific mandates in relation to what indoor air quality should be, beyond recommendations that deal with chemical-borne hazards in the air, so predominantly for industry-based standards in relation to volatile organic compounds or different types of particulate matter across different industries. That sort of extends to issues around asbestos and silicosis and various other standards.

What we've got at a national level here is the model work health and safety laws, and they're developed by Safe Work Australia. Those establish a duty of care for workplaces. They don't speak to CO2 standards in relation to ventilation levels, and certainly not in relation to what we would consider to be a level that would be significantly impacting respiratory disease transmission. We've also got things like the National Construction Code, and they obviously set minimum requirements for building design and construction. As Suman discussed earlier, they do put some requirements in place for new builds, particularly for homes. So they do provide some design recommendations to help improve ventilation in buildings but, again, they don't set performance standards in relation to CO2 levels.

We've also got the workplace exposure standards, but they don't include any reference to airborne pathogens. They predominantly deal with chemical risk and hazardous materials, which is what I was alluding to before. So that's currently what the state of national affairs looks like. In relation to your question as to whether we need something at a national level or at jurisdictional level, I say that national standards would be the most consistent way forward. Having said that, a national standard would impact the way all jurisdictions would need to enforce compliance, and so this would need to be something that would be preferably led by the national Commonwealth Government but in conjunction with State and Territory governments, as they would be the primary mechanism for helping ensure compliance.

SUMAN MAJUMDAR: May I just summarise there? To answer your question specifically, yes, national coordination is required. I will be clear, though, that if expert committees are convened, there will not be disagreement around recommendations for standards. We would be recommending CO2 levels of 800 to 1,000 indoors. PM2.5 is clear. These can be put forward as standards. The initial ask, though, is monitoring. The important role of the State is one, health guidance, but two, implementation in settings such as education and schools, or the settings which State governments are responsible for. The answer is both are needed, but they can be done in concert through the national bodies such as the CDC, where there is a subcommittee called the Environmental Health Committee that has an air quality expert task force. They are the coordinating body. There's been a lot of work nationally over the past three years particularly on this issue, including engagement with Ministers and the Prime Minister on this issue.

The Hon. GREG DONNELLY: I've got more questions, but back to the Chair.

The CHAIR: That's all right. I might go online, if Mr Buttigieg or Mr. Barrett have a question for us.

The Hon. SCOTT BARRETT: [Audio malfunction].

The CHAIR: Sorry, Mr Barrett, your connection is shocking. That came through very garbled. Perhaps in the interest of time, Mr Donnelly, I'm happy for you to ask a follow-up question and we can try to get Mr Barrett's question in writing. I can read it out for him.

The Hon. GREG DONNELLY: I'm happy for any other members that want to—

The CHAIR: Mr Buttigieg, have you got a question?

The Hon. MARK BUTTIGIEG: No, I'm fine, thank you, Amanda.

The Hon. GREG DONNELLY: Thanks, Chair. I'll just jump in. Going back to the matter of—and, once again, just trying to ensure comity over time, so we don't end up with variances which are significant and perhaps negative in some cases compared to what might be best that could be achieved, best practice. With respect to those Commonwealth departments—you've referred to the CDC and the work that it's now doing, three years of work, which is starting to move things along, which is good. Could you just reiterate those Commonwealth departments again, just so we're clear? I don't think the environment was mentioned and I don't know whether that should be part of this overarching coordination, given that, at least in part, there is the issue of the environmental pollutions that may impact on indoor air quality.

SUMAN MAJUMDAR: Thanks, Mr Donnelly. Yes, environment should absolutely be part of it. There are probably two elements to that response. There's a role for a strategy that includes outdoor and indoor air, and colleagues will speak to that later today, from the Centre for Safe Air, and Thrive. But from an implementation point of view, the request we've all made through submissions to the Commonwealth is that, similarly, there requires a responsible Minister with coordination for this portfolio across multiple departments. Whether that's a health-led or a environment-led, that's another issue.

The Hon. GREG DONNELLY: But you did say industry as well. I'm just trying in my mind to understand what's the scope of what you believe are the overarching portfolio areas which really need to be part of this conversation?

SUMAN MAJUMDAR: I might ask my colleague Christabelle to answer that.

CHRISTABELLE ADJOYAN: I think this demonstrates the complexity of the challenge that we're working with at the moment, and certainly extends to why this area of policy has taken quite a long time to get government traction and interest. I think it's really difficult when we are trying to manage policy areas that sit across the Commonwealth Department of Health, which has got Health and Aged Care, which have got significant responsibilities in relation to the public health outcomes for people. We've also got, obviously, the Department of Climate Change, Energy, the Environment and Water, and they obviously play a very critical role in being able to link outdoor air quality and indoor air quality standards. They will play a critical role, obviously, in shaping that. But similarly, we will need input from industry and a whole range of other government departments. So what I think we are calling for across the board is some clear stewardship and ownership across an Australian Government Minister that owns this work and is able to coordinate a complex area that brings together various government departments, both nationally and in different jurisdictions, and is able to put forward a cohesive framework that we can all input into.

The CHAIR: Mr. Barrett, do you want to have another crack?

The Hon. SCOTT BARRETT: I do, but I think we're sort of covered it there. My question was about that ownership, because if we don't clearly identify whose saddlebag this goes in, it's going to get left behind. Acknowledging the complexities around it from Federal level, are there any jurisdictions that have done it well, that do have a clear ownership of who it is that we could be looking to, to sort of model our system on?

SUMAN MAJUMDAR: I can start. Again, going back to the Victorian example, currently the lead is actually the department of Treasury because the focus was really around the economic benefit and an investment case for future work. That department is working very closely with health, working closely with the department that oversees housing, the departments that oversee building codes, the departments that also oversee social housing, education, clearly as a key player. So there's about six departments, for example, on that. During the pandemic, this was, as I said, across all major departments around what can each department do, including transport, including environment as well. So environment is also part of the work in Victoria. It's not our role to really put forward a recommendation as to who leads—that really is a matter for government—but there needs to be an accountable Minister that coordinates. I think the clear recommendation is that it needs to be interdepartmental action. Health may well lead it, but there needs to be a mechanism within government where these departments actually work together on this issue.

The CHAIR: If I could follow up with a question of my own, I think this discussion about responsibility and standards is a very important question for the Committee to consider. But in the interim, would there be

benefit from direct implementation or action, for example, in schools and hospitals, which are directly within the purview of the New South Wales Government? Do we need to wait for further research or the development of standards, or is there enough evidence now to say we should be intervening in settings like schools?

SUMAN MAJUMDAR: Thank you, Dr Cohn. As per our submission and my previous comments, there is absolutely enough evidence to act now and action is being taken now, and that should be enhanced and improved. Following the lead from Victoria, we urge the New South Wales Government to commence work. This would include implementing monitoring and interventions, i.e. upgrading ventilation filtration, picking some settings—for example education and health and care settings—as priorities, as we've discussed. The guidance there exists internationally and from other areas to pick up. It's a case of implementing.

The second layer to that is that evaluation is needed for a local context. In any issue the science is never fully completed and research never ends. You always evaluate as you go, you generate new evidence and you understand how to best apply. The question for indoor air quality is not does it work or not? It clearly works. We know from strong evidence that interventions such as ventilation filtration devices I've mentioned remove these particles from the air. The question is how do we scale it up. So there's very specific engineering questions around what devices to use, at what rate, how are they energy efficient et cetera for optimising the implementation. We call this area implementation research, and it needs to be done during scale up. It's not a case where you need to wait for a trial or some hard end point before doing anything.

The CHAIR: In your opening statement you touched in passing on the cost effectiveness of some of those interventions. I don't want to misquote you, but you said that there were some of them that would actually pay for themselves. Could you speak to some of that evidence?

SUMAN MAJUMDAR: Thank you, Dr Cohn. This is an important issue, and I think it's one where current evidence internationally and estimates from Australia, from colleagues who will speak to the details later today, do show, firstly, significant costs of inaction. Figures, for example, include $12 billion national costs for Australia as estimates. If you take that at a population level for New South Wales, that's a $3.8 billion annual cost for poor indoor air quality to the State. There is a gap in detailed economic modelling on this and that's something we are working on, for example, at the State level in New South Wales. So commissioning analyses, which does require specific data from buildings, would be helpful.

Broad, large cost-benefit analyses on this issue from international and, as I said, nationally have indicated comprehensively that there is cost benefit in improving indoor air quality because you tackle outcomes that include reducing infection risk, reducing risk from airborne particles, improving cognitive performance, and if you project those costs forward, there will be benefit. The key issue around the economic and the scale-up issue is what is the upfront cost of investment, particularly around retrofit and building stock. That is a strong barrier to action for many jurisdictions. There is an up-front cost issue. But our recommendation is these things can be—we need to start, we need to scale, we need to do and learn, and then improve as we go.

The Hon. GREG DONNELLY: Just to return to your primary submission on this matter of moving forward with legislative and/or regulatory standards for New South Wales, perhaps I'll sort of declare this position: I'm not a big fan of just photocopying what Victoria does and applying it in New South Wales. New South Wales is the largest State in the Commonwealth in terms of population, State GDP, and you can go on and on and on. It's a much larger State in terms of its geography. Have I misunderstood you by essentially putting the proposition to us that we adopt what Victoria is doing? Because New South Wales will never do that. I'm a humble backbencher. I don't speak for the Government. But there's no way in the world that our Treasurer will ring the Victorian Treasurer and say, "Can you just email up what you do because we want to simply implement it?" I think we just need to be realistic. Is your primary submission that we should just lock, stock and barrel pick up Victoria, or are you saying something else?

SUMAN MAJUMDAR: Thank you, Mr. Donnelly. No, we're saying something else. We're saying that New South Wales needs to take State-based leadership on this matter through formation of a portfolio on indoor air quality with a ministerial lead, with cross-departmental action. It needs to be very much State based. Departments are different, accountabilities are different. Public health leadership is needed from the Chief Health Officer and the health department and, absolutely, local evidence needs to be generated for those lessons. So we absolutely acknowledge that point. We're not saying that. Our point was to illustrate that there is action. It's not a case of this is all too complex and nothing's happening around the country. There's significant $26 million current investment from Victoria to pilot and implement this work. That actually allows national coordination and national action to happen if various States are moving together and moving forward. I might go to my colleague Christabelle to see if there's any additional points on this or the previous question.

CHRISTABELLE ADJOYAN: Nothing great to add other than to say that I think what Victoria can provide in this case is some core learnings and facilitate access to information and evidence that we are gathering,

similar to other work that's been done by colleagues in Queensland and in other States as well—not to say that Victoria is the only place doing this work.

The Hon. GREG DONNELLY: Sorry to interrupt. Just to help complete the picture, which other jurisdictions?

CHRISTABELLE ADJOYAN: You might hear from Professor Lidia Morawska after this, and not to pre-empt what she might be talking about, but she may well talk about the work that her team's leading in Queensland, Queensland being the other State that is predominantly leading on this work. Certainly the University of New South Wales as well is also leading on small-scale trials in school settings, in shopping centres as well. There are key researchers that are working across different States, and we are working all very collaboratively and sharing our learnings across the board so that we can actually learn the lessons of our own individual pieces of work. What we can offer is core learnings, core evidence, and I'm sure New South Wales will work through what works best for its own industries and sectors.

The Hon. GREG DONNELLY: Just in terms of gathering the scope of work that is currently underway in New South Wales, even if it's at its early stage of implementation—it might be a trial or whatever the case may be—what would be your suggestion about how the Government would go out and pull that all together? Obviously, NSW Health is the lead agency in this area, one would imagine—I'm not saying the only one—and I'm sure they will have a submission to this inquiry and bring some evidence forward. But in terms of what NSW Health may not know in detail—for example, what might be going on in an institution like UNSW or, say, a building and construction company, a multistorey office building that really has very high standards. How do we pull this all together in New South Wales? Would you have a view about that?

SUMAN MAJUMDAR: Yes. To reiterate, from the Government perspective, again, as you've outlined, there needs to be a lead agency as well as cross-departmental coordination. I think the key message is what has worked a number of times at the Victorian level is—these mechanisms don't normally exist, right, for departments to actually work together perhaps at a director or executive level, to share information in a program. One major enabler, which you'll hear today, is as a community of advocates, researchers and implementers working on indoor air quality, we are all united nationally.

There is a strong momentum of community action experts all working together, coordinated through major national institutions such as the Australian Academy of Science, who have led submissions to the Australian Government on this issue. The expertise is significant. Australia is punching well above our weight on this issue. We haven't spoken to the international work at the United Nations that has come through. It's noted in our submission. To answer your questions, these are all very solvable implementation questions around how to do this and how to coordinate. We've got a lot of expertise, a lot of momentum. We've got advice ready to go on how to do this. The missing piece is government leadership and action to commence.

CHRISTABELLE ADJOYAN: One of our core recommendations is a ministerial advisory council that we are seeking to recommend. That is certainly one way you can bring together voices, as part of that process. Just as an aside that you might be interested in, the company that we in Victoria hired to conduct our installations for our work is actually a New South Wales based company, so there is certainly the skills and expertise. New South Wales is definitely leading on this work. It's one of the leading companies providing heat-recovery ventilation units in Australia imported from Europe, so certainly New South Wales has got a growing industry and skills market in relation to this work.

The Hon. GREG DONNELLY: Thank you. Just to be clear, I'm being a bit of a devil's advocate here, to try and just push the argument forward, because I do appreciate that in various policy areas States move at a different pace, and at a national level. It operates—essentially, if you take the area of work health and safety, there's got to be basically consent between the Commonwealth and the States and Territories, and that has its own added complexity. I'm not arguing against the need to move things along but trying to pull together the best of what's going on, and particularly, say, for example, already in New South Wales, I think it would be very useful information to help us look at this matter in New South Wales.

The CHAIR: Thanks so much for taking the time to give evidence today. If there are supplementary questions from the Committee, the secretariat will be in contact about this.

(The witnesses withdrew.)

Distinguished Professor LIDIA MORAWSKA, Director of the ARC Training Centre for Advanced Building Systems Against Airborne Infection Transmission (Thrive), affirmed and examined

Associate Professor WENDY MILLER, ARC Training Centre for Advanced Building Systems Against Airborne Infection Transmission (Thrive), sworn and examined

Professor FAY JOHNSTON, Director of the Centre for Safe Air; Professor of Public and Environmental Epidemiology at the University of Tasmania's Menzies Institute for Medical Research; and Public Health Physician, Tasmanian Department of Health, before the Committee via videoconference, affirmed and examined

Professor SOTIRIS VARDOULAKIS, Director of the Healthy Environments and Lives (HEAL) National Research Network; and Professor of Environmental Public Health at the University of Canberra Health Research Institute, before the Committee via videoconference, affirmed and examined

The CHAIR: Good morning and welcome. Thank you so much for taking the time to give evidence today. Would you like to start by making a short opening statement?

LIDIA MORAWSKA: Just a few points, which probably have been discussed here. First of all, when we talk about the impact of air, it's much bigger than anything else. We take air 12 times a minute into our lungs. We do this most of the time indoors; 90 per cent, it is indoors. This indoor air contains pollutants emitted indoors as well as outdoors, including pathogens, and this is the main reason of infection transmission around the world. It has huge impact on all range of diseases. Basically, there's no organ in our body which is not affected by air pollution. It also impacts cognition, impacts performance.

It has cost. The cost has been quantified in many different ways. Even so, it's quite difficult to do this. We have technological and scientific answers, solutions, to this, and the complexity of this is nowhere near the complexity of other areas where we need solutions. The problem, or part of the problem, is that air is not visible and doesn't impact us immediately right now here, so we may not recognise this. The other problem is that it is multi-portfolio—schools belong to different areas and so on—so it always provides the complexity. But as society, we are well equipped to address this, and this would be a huge benefit to every single one of us. Thank you.

SOTIRIS VARDOULAKIS: Air pollution is the most significant environmental risk factor in Australia, with around 3,600 deaths attributable to outdoor air pollution nationally every year. Approximately one-third of these deaths are in New South Wales. Air pollution also exacerbates many chronic health conditions, including heart and lung disease, such as asthma, and increases hospital admissions and medication use in susceptible individuals. We spend over 90 per cent of our time indoors, but we don't know with the same degree of certainty the specific impact of indoor air pollution on mortality and morbidity in Australia, although this is expected to be very significant.

Indoor air in our homes is affected by many sources of air pollution, including infiltration of outdoor pollutants and emissions from wood heaters, gas cookers, tobacco smoking and household chemicals. Climate change, bushfires and future pandemics are expected to deteriorate indoor air quality in Australia unless action is taken. Many of the proposed actions in our submission will improve health and wellbeing, as well as improving indoor air quality and energy efficiency in buildings. These interventions include improved mechanical ventilation, electrification of cooking and heating, and air filtration in domestic properties as well as public buildings.

We are a coalition of research centres, including the Healthy Environments and Lives—or HEAL—National Research Network, the Centre for Safe Air, and Thrive, led by Professor Lidia Morawska, Professor Fay Johnston and myself. We're proposing holistic interventions that will improve indoor air quality and health in New South Wales and nationally. These interventions include initiating indoor air quality monitoring in New South Wales Government buildings, specifically focusing on schools, healthcare settings and aged-care buildings initially; initiating awareness-raising and training targeted to building managers and teachers; upgrading the ventilation systems and providing air filtration in underperforming public buildings; establishing a multidisciplinary advisory panel on indoor air quality; advocating for coordinated national leadership of clean indoor air; and supporting and funding research on indoor air quality and health, mainly focusing on holistic interventions in buildings.

The CHAIR: I know this was addressed in your written submission and the attached summary of the State of Indoor Air report, but can you talk the Committee through the key pollutants and pathogens that are impacting our health and that improvements to air quality would actually address?

WENDY MILLER: I'll address that. Our State of Indoor Air report that we released in October last year was based on the State of the Environment reports that Australia and each State have been producing for a

long time. But we've never tried to quantify what is the actual quality of air inside buildings. We did a literature search. We were looking specifically at scientific, peer-reviewed publications that had measured indoor air pollutants in Australian buildings. Whilst there are many pollutants, we had to limit it to a set of eight for this initial report. It was CO2, carbon monoxide, particulate matter of various sizes, nitrogen dioxide, VOCs et cetera.

What we were looking for was what studies have been done in the last 20 years, or since 2000, that have actually measured indoor pollutants in Australian buildings. Less than 0.03 per cent of Australian buildings have had any measurement reported in a scientific publication about indoor air—in New South Wales, very few of those. We had about 106 papers; only 22 of those related to buildings within New South Wales. Of those, very few publications about schools—for example, 22 classrooms out of over 3,000 schools that you have here in New South Wales.

The limitation of our indoor air quality report is that most of those papers that have been published have been done by a university study that might have looked at one or two rooms within a house or an office building or a school. It wasn't all spaces within any particular building, and it wasn't over a long period of time. Some of the studies are only several days. Some might be several weeks. Some might be a season. Very few were even one year. The findings of the report can't say that this is indicative of particular types of buildings or air quality as it exists now; it can only give snapshots in time. Those snapshots are enough to give us concern about the types of things that can be measured. For example, pollutants that are related to burning fossil fuels in houses and/or in schools. Gas appliances, for example—significantly high levels of those have been reported in several studies.

There is a whole range of things. I don't know to what extent you—but, in essence, there's sufficient evidence to show that high levels of pollutants have been reported in multiple different types of buildings in the past. We don't know the extent of that problem or how many buildings. Health problems are related to exposure levels, so not only the concentration of the air quality pollutants but also how long you are exposed to those things for. We don't know enough yet, which is one of the reasons why having more monitoring helps in that sense.

The CHAIR: In terms of addressing those particular pollutants, should the Committee be looking separately at each of those pollutants that you've gone through in your report, or is there a holistic way to try to address the health impacts of poor air quality?

WENDY MILLER: I might ask Lidia to address that.

LIDIA MORAWSKA: We cannot address this holistically. There were ideas about making an indicator, but an indicator doesn't really apply to buildings. We need to measure some numbers of pollutants. If we measure, let's say, particulate matter—PM2.5—it has different impacts and comes usually from different sources. Usually in the cities it comes from outside—for example, during bushfires. However, CO2 comes from human emissions inside and leads to infection and is an indicator of infection transmission. So we could have a situation that PM2.5 is very low because air outside is clean. However, there's no ventilation here, so CO2 is high. Therefore, the interdisciplinary group which I led two years ago proposed in our paper, published in *Science*, that the three pollutants, PM2.5, CO, CO2, and the ventilation rate in mechanical buildings is monitored in every building, and information is provided about these pollutants, not an integrated indicator. If I may say, how easy it is. I already monitor, here, CO2.

The Hon. GREG DONNELLY: We've got a monitor up here, too.

LIDIA MORAWSKA: That's a sensor. It's like a smoke alarm, in a way. Of course, it's reporting the data differently than a smoke alarm, but technologically it is this. And it's very good here.

WENDY MILLER: I think one of the reasons for—I mean, you could monitor all types of pollutants. But, having low-cost sensors and the ability to monitor things, start with the things that are affordable and achievable now with the most benefit.

The CHAIR: I have plenty more questions, but I will go to my colleagues.

The Hon. GREG DONNELLY: Thank you very much for coming today and for your submissions. The comprehensive and detailed references at the back of your submissions are very helpful. There is a very helpful table in submission No. 19. It's on the third page. Are you familiar with that table?

LIDIA MORAWSKA: Yes.

The Hon. GREG DONNELLY: In terms of trying to predict, looking ahead as we advance forward with this, does this become very fundamental—that is, reaching an agreed position or a settled position on building classes? In other words, if there are fundamental blocks, some cornerstones that will be put into place as we're looking at buildings and air quality inside buildings, we need a rigorous classification, do we not, of all buildings? Unless we have a rigorous classification of all buildings, we have probably already got some gaps in there anyway.

That's my first question. The second question is related to that, which is what is the classification structure at the moment? Is it reasonable or does it need some significant upgrading to enable this to move forward?

WENDY MILLER: I'll answer that. In our state of indoor air report, we actually classified all the information according to the building types that are already existing under the National Construction Code, which has been adapted by each State and Territory, including New South Wales. All buildings in Australia already have a classification based on what their primary use is. Residential buildings are class 1 and class 2. The difference between 1 and 2 is whether they're, in essence, standalone houses or apartment buildings. Understanding the problem by different classifications really helps to understand what the pollutants might be in those buildings, what people might operate within those buildings and what their exposure rates will be. The problems and the solutions for residential buildings are going to be completely different to office buildings, completely different to shopping centres, to factories et cetera. I think understanding issues by building class is a really helpful way of determining what actions can be taken in specific classes.

New South Wales is already the manager of the National Australian Built Environment Rating System. Whilst their energy rating is now part of Federal Government requirements, mandatory reporting, they also have an indoor environment rating scheme. We analysed all of their data as well. It's quite feasible, I think, that that existing scheme, for example, could be used within New South Wales office buildings to implement, for example, mandatory reporting of CO2, ventilation rates et cetera, to help the indoor air quality issues relating to that. Our fuller report that we didn't send to you makes some suggestions regarding how NABERS might be able to be used as a catalyst for office buildings, for example, in implementing some mandatory monitoring and reporting requirements.

The Hon. GREG DONNELLY: On notice, and subject to your agreement, would you be able to provide the full report to the Committee?

WENDY MILLER: Sure. I think we provided a link to the full report. It's available online, but we can also send you—

The Hon. GREG DONNELLY: Sorry, if it's been done, it's been done. Am I to understand what you've said is, as far as you're concerned, you believe that the classification structure is sufficient and robust enough to be a building block—so to speak, no pun intended—to start to move forward from what's there? The reason I ask that is because if there's any fundamental issues with it, that becomes almost a threshold question. But what you're saying is, in your assessment, it's in pretty good shape.

WENDY MILLER: Yes. My assessment is that the classification of buildings already exists. It's used widely in all States and jurisdictions to describe things, but also that the National Construction Code, as adopted by each State and by New South Wales, already requires buildings to provide safe air. The mandatory performance requirement of the National Construction Code is that the air quality must be adequate and that no harm should be done to occupants.

The Hon. GREG DONNELLY: That's reassuring, isn't it?

WENDY MILLER: Yes. The other classification method that should be used at the same time is workplace health and safety. Apart from class 1 and 2 buildings, which are residential buildings, all other building classifications are workplaces—and, in some instances, residential buildings are as well—therefore they are covered under Safe Work Australia already, which require that no harm be done by what happens.

The Hon. GREG DONNELLY: It's a duty of care by the employer.

WENDY MILLER: It's a duty of care already. So in my mind, both the building classifications and the workplace requirements already provide a foundation on which to build whatever we go forward.

The Hon. GREG DONNELLY: That's a very good point. This might sound a bit trite—in the table, running down the left-hand column of "Building classes", for some reason there's no class 4 there. Is that because there is no class 4, or it's just not relevant to the purpose of this table?

WENDY MILLER: Class 4 buildings are—let's say that you have a caretaker's office above a warehouse or something like that. It's in essence irrelevant, but it does exist.

The Hon. GREG DONNELLY: I just thought skipping from five to six that must be so.

The Hon. SCOTT BARRETT: I have one question, but it might have a complex answer. I wonder if anyone's picked up whether there are any discrepancies in indoor air quality based on geography particularly? If we look at our western areas, are the issues they're facing different to what might be faced in some of the more humid areas up the far North Coast or for some of the alpine areas down south?

LIDIA MORAWSKA: I can answer this question. Yes, some pollutants relate to geography. In particular mould is a bigger problem in humid areas, particularly in the north. Some pollutants, like those generated inside, if there's no ventilation, reach the same high level. So if there's no ventilation, whether it's in Darwin or in Sydney, CO2 concentration will reach similarly high levels in similar type environments. So, yes, there is a climate and geography impact, but also some that are not related to geography.

WENDY MILLER: The climate can often dictate how a building is ventilated, whether people open windows or whether they have a closed system and whether you have central ventilation systems or whether you have—as in Queensland, for example, where we typically have window box sort of air conditioning systems as opposed to central systems. So geography in terms of what the building culture is, as well as in terms of what is the climate and what is being used to control the indoor environment can have a big impact on what pollutants—as well as how close particular buildings are to industrial sources of pollutants. For example, if you're at Mount Isa or Gladstone or the Hunter Valley, you might get different pollutants than what you would get here.

SOTIRIS VARDOULAKIS: As Dr Miller said, proximity to pollution sources is important because a significant amount of indoor air pollution comes from infiltration of outdoor pollutants. We know that the major sources of outdoor air pollution in New South Wales, for example, are road traffic and wood heaters. So if households are close to heavy traffic sources, then there is a high likelihood of high indoor air pollution because of penetration of other pollutants, especially in older buildings, which are less airtight. The same applies to households in places affected by wood heater smoke in winter. We see higher indoor air pollution because of the infiltration of smoke including PM2.5 from outdoors, especially in the leakier households, in places where wood heating is very prevalent.

LIDIA MORAWSKA: If I can add to this, some of those aspects don't really relate to climate or to any specific aspects of the control of the building but, in a way, culture. Last year we ran a forum in Brisbane on air quality in schools. What came up from this forum—which will be published hopefully soon; it's under review right now—is that in many schools, in particular in Queensland, at the time when climate is perfect, you can open the windows. There's nothing around the school, but they're closed for other reasons—for example, the windows are being used by the teachers to hang something, such as kids arts, or if the windows are open, there is more turbulence and wind in the classroom, affecting the decoration in the classroom. There was a lot of evidence like this provided as well, which links to the lack of awareness and lack of overall structure of how the building should be operated to provide clean air and has nothing to do with the geography, climate or any other aspect.

The Hon. SCOTT BARRETT: I wonder if that then creates difficulties—as far as building codes—to say you must have this system in place, which might be unnecessary in some areas but desperately necessary in others, so we need to have more of an outcome focus on the air quality rather than "you must have this system in place." I'm sorry if that's a very simplistic way to talk to some very smart people, but hopefully you understand what I'm trying to tease out.

LIDIA MORAWSKA: That very much is what we proposed—that we must have mandated indoor air quality standards. In this way, we know what the objective is, and that objective could be achieved in different ways in different places. But that's what we must do. This is not unlike what we have for outdoor air. For outdoor air, we have regulations. Each State has a network of monitoring stations. You can go to the website and check exactly what the air quality is here and there and what the forecast is. If there's back-burning, you are warned about it. So we already have systems in place for outdoor air. A system like this, with quantitative, mandated standards, must be introduced for indoor air as well, according to our recommendations.

The CHAIR: I have a question that has been sent through from Ms Suvaal online, who also has some connection issues. This is her question: What are the most practical and affordable suggestions for us to recommend to improve indoor air quality?

LIDIA MORAWSKA: I would say monitoring. Without monitoring, you don't know whether there's a problem or whether you need to improve something. The example I'd give is the assessment we did at a university in Australia—which was published last year as well—across multiple buildings and 1,400 spaces, where measurements were conducted of CO2 using very similar to this type of sensor. We found out that 85 per cent of the spaces had CO2 concentrations below our recommended level of 800 parts per million. So the majority already didn't have a problem, which means no action needed to be taken. In the remaining 15 per cent, we were not able to do a complete assessment of the problems. But for some fraction of this we identified that the problem was that the room was overcrowded over what was the design capacity—it's very easy to fix that with just a sign on the door that the room is only for three people and not for 10 people—or there was no maintenance conducted, so some part of the ventilation system didn't work. Again, this is not something which is costly. In a way, that's the first step: measure and measure. Based on measurements, you will find out if there is a problem, and then you can find out what the problem is and what needs to be done.

WENDY MILLER: A similar thing can be applied to schools. One of the problems that Queensland and New South Wales have had with their cool schools program and air conditioning every space is that there's a low level of understanding in the general population about how air conditioners work. In most cases, the types of air conditioners that New South Wales and Queensland implement in schools don't do anything about air. They're just cooling the air. They're not providing fresh air. Teachers, parents and students don't understand that when they have an air conditioner put on in their room—they close all the windows, from an energy-efficiency thing, as they're required to do, but unless you actually have a monitor in the room to say that we haven't had any outside clean air or any fresh air in this room, without the monitoring, you don't know whether it's producing a problem or not.

Monitoring is really easy, and the solution might simply be for the students and/or teachers in rooms to be able to say that, at the moment this monitor gets over 800 or 1,000, we need to open up some windows or do something in order to reduce the CO2. It might also put into place in the building codes for schools, for example, that if they put in air conditioning there does actually need to be a ventilation system of some sort as well. But air conditioning and ventilation are different things, and they're not always implemented in a holistic solution.

FAY JOHNSTON: I was just going to briefly add to that. The question was relating about what can be done, and I see that falling into three categories. Monitoring is crucial to know the problem, and then what can be done needs to be tailored to the problem. The categories are building design, which takes expertise, but the knowledge is generally there—it's bringing it and implementing it. Education is hugely important, of policymakers, people in classrooms and parents in homes. And portable air cleaners are a very simple, widely available solution that can be implemented long before we redesign or rebuild our buildings. I see them as falling into three groups.

SOTIRIS VARDOULAKIS: Can I add to this? I fully agree. I would like to add that electrification of heating and cooking is also a solution which can bring multiple benefits to indoor air quality as well as energy efficiency and thermal comfort. If we electrify the household, that can provide multiple benefits for health and the environment if the electricity comes from renewable energy sources. Eliminating, removing or phasing out wood heaters, unflued gas heaters and gas cooking—all of this will reduce sources of indoor air pollution.

The CHAIR: I wanted to ask a relatively unrelated question. Most of the discussion so far this morning has centred on particular pollutants, and I know the written submission and many of our submissions to this inquiry talk about airborne pathogens. Could you perhaps speak to some of the impacts that you are aware of from your research on transmission of airborne illnesses and, I suppose, even what those are, for the benefit of the Committee?

LIDIA MORAWSKA: Transmission of airborne diseases—it's, in a way, very simple, I'd say, physics behind this. The pathogens are in our lungs. When we are talking about respiratory infections—that is flu, it is COVID, it is RSV and many other respiratory—they are in our respiratory system. When we breathe, when we speak or when we shout, there are always particles. At any point in time, there are particles emitted and, if we are infected, these pathogens are in these particles. They are in the air. With them being in the air, with the airflow, they are distributed around the whole room, and other people who are in the room inhale those particles. If they inhale enough of these particles—that's the exposure—then they get infected. This is the principle of infection transmission. It is a very well-established principle.

Therefore, while we cannot fully control—we cannot control people, in terms of how people infected shouldn't be in the room, but we sometimes don't know whether we are infected. We could be asymptomatic, for example, and so the pathogens are emitted. In that sense, control of people as sources is not the same as control of a heater or something we can control. We can't fully control it so, in this way, we have to provide conditions such that these particles with the pathogens are removed from the room air as quickly as possible. That's the principle of infection transmission and control.

The CHAIR: We have had submissions—and I'm sure later we'll end up hearing from witnesses who are involved in industry and are putting forward various solutions. But are there broad categories of solutions here? What can we put into buildings to address the circulation of those airborne pathogens?

LIDIA MORAWSKA: We can go into a complex discussion about the building design. Most of the buildings are designed in a so-called mixing ventilation. I don't know about this building because it's a historical building. Mixing ventilation means that air is provided from one place and then removed from the other, so it is mixed around the room. In that way, everything which is emitted is mixed. A better system would be displacement ventilation, which is delivered from the bottom and it rises, which is more complex from the design point of view, but it's also possible. We are investigating this now. In terms of solutions for this, they are somewhat different, but one important point is that the air is removed sufficiently fast in relation to what's emitted, such that the exposure is limited. We've got risk assessment models, which we can apply to different types of pathogens, which

would quantify how much clean air should be provided such that the infection risk is below one, which means that the infection doesn't expand—if that was the question?

WENDY MILLER: A key component of that is how many people are in the room, because the infection is coming from people. If this room had 100 people in it, the infection risk would be completely different to the number of people that are here now. In simple terms, the more people there are in a room, the harder the ventilation system should be working to displace what we're all breathing out. One of the strategies for reducing risk, as was applied in COVID, is to reduce the number of people in a room to more closely match what the room's ventilation rate is.

The CHAIR: My next question might be a difficult one, because I know many of you are based interstate in terms of your research. I think it was touched on, in passing, in the opening statements. It is about the burden of poor air quality, particularly for New South Wales. I was hoping you could speak to that in more detail.

SOTIRIS VARDOULAKIS: I can say a few things on this point. Fay, do you want to go first?

WENDY MILLER: I was just going to say we know very little about the actual air pollutants measured in New South Wales buildings because very few buildings have actually measured and reported on the measurements. I know that there are several companies in New South Wales that have measured pollutants in schools, for example, in New South Wales but, similar to Queensland, that data is not publicly available and not available for research purposes either, for a whole range of reasons. The available data about what's actually happening in New South Wales buildings is very limited.

The CHAIR: Just to clarify, the question was more about health impacts and burden of disease rather than necessarily about measurable pollutants. But I think your colleagues on video conference wanted to answer.

FAY JOHNSTON: There have been a lot of studies done on the burden of illness and death from outdoor air pollution, and there's very good data for outdoor air pollutants in New South Wales. We know that outdoor pollutants are one of the most important drivers of indoor air pollution. They're not the only one, of course, because indoor sources are incredibly important as well. I don't have details specifically, but I invite Sotiris to make further comment.

SOTIRIS VARDOULAKIS: I think one of the key issues, as it was highlighted in the previous statement, is that indoor air quality/indoor air pollution is much less well characterised than outdoor air pollution. We have a very good picture of outdoor air pollution nationally, in different States in Australia. There is a detailed air quality monitoring network which covers most urban locations, most cities in Australia. This data can be used to estimate exposure and calculate the health burden. As I mentioned earlier, studies published by the Centre for Safe Air indicate that this burden of disease in Australia is around 3,600 deaths annually attributable to outdoor air pollution, based on the data we have from monitoring stations and also from models. In New South Wales the burden of outdoor air pollution is around 1,200 deaths annually.

To do this calculation for indoor air quality we need much better coverage, much better characterisation, of indoor pollution levels. This is what we're advocating for. We're advocating for better and more comprehensive monitoring of indoor air quality in buildings, starting from public buildings but also expanding to domestic properties. This doesn't have to be done in every property, but if you have monitoring in a representative number of households and public buildings then we can develop models that will give us a good picture of indoor air pollution exposure in New South Wales and in Australia.

WENDY MILLER: I think part of the answer or part of the information that will go to answering your question can be addressed, again, with the example of schools. In the UK the Royal College of Paediatricians did a report, just after COVID, about the impacts of poor air quality on schoolchildren. We know that poor air quality can impact on their respiratory system and on their skin, and also on behavioural and cognitive things. So not talking about the burden of disease in the sense of number of deaths per year, but if you think of the implications when a child gets sick with asthma—I've forgotten what the rates of asthma are in Australia; they're quite high—the parent also has to take time off work. If children are impacted cognitively and behaviourally by poor air quality, that affects the behaviour of children in schools, which affects the education level that they're achieving. It also affects teachers in terms of their turnover et cetera. The impacts of addressing air quality in schools is a health impact, but also a very strong economic impact for the workers and for the children and for teachers, and for the efficiency with which we deliver education outcomes.

The Hon. EMILY SUVAAL: Apologies that I'm not there in person as yet. I want to ask a follow-up question to the one that the Chair asked on my behalf earlier. A couple of you talked about air monitoring. I would be interested to hear your suggestions in terms of how that would take place or if there's any best practice around that. I imagine that the use of equipment varies greatly in terms of what's available. I'd be interested to hear whether or not you have any further thoughts around that.

LIDIA MORAWSKA: I can speak to this. First of all, we cannot monitor all possible pollutants in indoor air, just like we don't monitor all possible pollutants in outdoor air. Pragmatically, we can only monitor those pollutants with low-cost sensors because we cannot have huge instruments in every room. We must monitor in every room because we cannot predict concentrations in this room based on what's in the room next door. We are talking about local sensors. In terms of local sensors, as I mentioned before, we have sensors available of quality which can be used for compliance monitoring of CO2, CO and PM2.5. CO2 is, in fact, already monitored in basically all modern buildings. They don't use the data for controlling air quality but air flow in the buildings. But it is already being done, which means it's just a case of extending the number of those monitors and placing them such that they reply to every room.

In terms of PM2.5 sensors, there have been lots of publications on what sensors are available, what monitors are available and how to do it. There are also best-practice voluntary systems like WELL and Fitwel. They already require buildings to monitor PM2.5, so there are already precedents for this. In Queensland—this was mentioned in the session before—we have a model project called P Block. It's in one of the university buildings, which is to be the first building in the world to meet the proposed indoor air quality standards and to document everything and make it available online to everybody as a best practice. This is funded by a philanthropist and the university. If anyone wants to already start monitoring, there's enough know-how about it and how to do it. But still, it is important to gather—what we proposed in our submission, and I think it was also in one of the other submissions, is that we establish a panel of experts to help with this. We don't just go online and say, "Okay, I'll buy this and this," but have a panel of experts who have done things like this to help with the process.

The Hon. GREG DONNELLY: I want to spend a little bit of time, if we could, on the matter of international creation and enhancements of standards. We're very fortunate to have people on the panel who have international experience. I acknowledge that. Thank you for coming today so we can question you about this. If we look at the World Health Organization and the CDC in the United States of America, just to use those two examples, they and, I presume, other peak health bodies—I use that in a generic sense—are working away at this issue. It's a matter that some of these bodies have been involved in over a long period of time. Are we, in Australia, in a position where, through the work that we're doing now, such as it is, we're able to almost have a clearing house of drawing in the best of what we need to know from overseas, which has an influence on our thinking and considerations?

LIDIA MORAWSKA: I can answer this question. There are two levels of international organisations. You mentioned the WHO. We cannot put the WHO and bodies like the US EPA on the same level. The WHO works only from the perspective of health—so nothing else but health and studies about health, whether toxicological or epidemiological. WHO guidelines are health guidelines, without taking into consideration any other aspects—practical and so on. It is, from the health point of view, that concentration should be kept at this level or below this level to protect health. And then from this, national bodies—like the US EPA and the Australian bodies—take this and say, "Okay, that would be the best." But in setting national standards, be it outdoor standards or indoor standards, all kinds of other considerations have to be taken into account, including economic consideration and all kinds of other specific things, including monitoring. There could be WHO or health recommendations for particular volatile organic compounds, but we cannot easily monitor this. If we can't monitor, we cannot put a mandatory compliance. This is the next level.

In terms of concentrations—and I'm speaking now about outdoor air quality standards—Australian standards actually are not very far from the WHO recommendations. Before the WHO guidelines, which were published in 2021—and I had the privilege to be a co-chair of this activity—in terms of particulate matter, Australian standards were even more conservative than the WHO. The new WHO standard guidelines lower this, so we are a little bit above. Now there's a conversation about lowering this because Australia effectively already can meet the current PM2.5 standard. We don't necessarily have to look at what other governments are doing, because other governments and other situations in other countries could be completely different than the situation in Australia. We look at what is best for health, and we look at can we apply it here pragmatically. If it cannot be mandated for whatever reason, we set the Australian standards a bit higher. That's what happens in many countries. This is the legislative process in setting national or State standards.

The Hon. GREG DONNELLY: Thank you for that. That's very helpful. You'd agree with the statement, then, that we in Australia, even though we are somewhat behind on this matter of indoor air quality—if I can make that general statement—have the capacity, the resources and the well-qualified people to help us get our act together. In other words, we have a critical mass here of qualified people in conjunction with being able to access knowledge from overseas and work through our layers of government to be able to progress this. We don't actually have to be looking overseas to see what they're doing first before we do it. We can actually progress the matter.

LIDIA MORAWSKA: Absolutely. We are an example to the rest of the world. Australia is one of the most developed countries in the world in terms of the building stock. Our buildings are much better than other buildings in many other countries. We have a framework of legislation already in place. We have very good outdoor air quality, apart from times of bushfires, which is not going to get easier but worse, because of the climate. But we know what it is doing. We are really one step away from actually doing this.

The Hon. GREG DONNELLY: Would anyone else like to contribute?

FAY JOHNSTON: May I just add something to that? I agree wholeheartedly. I also want to make the point that we know, from numerous studies on the effects of air pollution and on the cost effectiveness of addressing it, that we in Australia, despite all our advantages, have a huge amount to gain by acting on this. We know there's no safe lower levels of many pollutants. Even improving it by a percentage or a margin is highly cost effective, because it will reduce presentations to hospital with chronic diseases. It will improve educational outcomes. It will reduce childhood asthma. We're in a good position to show leadership here, and we will have an enormous economic pay-off if we coordinate what we already know and use our existing expertise to act on this.

SOTIRIS VARDOULAKIS: I would like to add to this that I fully agree. We have world-leading expertise on not only air quality but also epidemiology—environmental epidemiology and air pollution epidemiology—and health studies. In Australia, we have a particular problem with the building stock, which is very leaky. Modern buildings are generally very good in terms of energy efficiency and provide good shelter and protection from outdoor sources of air pollution. There are also many older houses which are very leaky. So outdoor air pollution from bushfires, from dust, from pollen and from smoke can easily penetrate into the indoor environment and cause higher air pollution levels indoors and exacerbate illness—respiratory illness and asthma. This is a preventable aspect of the health burden of air pollution. Just to summarise, what we're saying here is that we have leading expertise in both air quality and health. There is a need to take leadership and provide solutions which are specific and tailored to the challenges we're facing in Australia in terms of indoor air quality.

The CHAIR: I have perhaps a cheeky question for Professor Morawska. I know scientists are often very humble about their work. I know from media reporting that you won the 2025 Prime Minister's Prize for Science. What was that for?

LIDIA MORAWSKA: It was for the entirety of my work on air quality and its impacts. My career has spanned many different aspects of air pollution. From my background as a nuclear physicist, I moved to environmental radioactivity and radon impact—which is a particular problem indoors—and then moved to the area of particulate matter, specifically ultrafine particles, which now, due to our work, is for the first time recognised in the WHO air quality guidelines. This expanded to particles from human respiratory activities during SARS 1 and led to the research which was the foundation for convincing the WHO, at the beginning of the pandemic, that the virus was airborne and what protection was needed, like masks and ventilation. That was the entirety of my work on this. It was always fascination in science, but solutions, because otherwise it's science without purpose, and solutions wouldn't be complete for me.

The CHAIR: Congratulations. We have only got a few minutes left but, to all of you, was there anything in particular that you were really hoping to raise today that we haven't given you the opportunity to?

WENDY MILLER: I think something that Sotiris and Fay raised just in their last discussion, and tying back to your question before about the classes of buildings and is that a good way to do it—within the classes of building, it's also worth considering the age of buildings within the classes. If you had to implement something over time, you'd tackle the worst buildings at a time. If I was to tackle, for example, indoor air quality in residential buildings, you would be looking at families, first of all, that have respiratory illnesses. Can something be done regarding their houses in order to reduce their exposure to respiratory illnesses, whether that's removing gas appliances or wood appliances, or whether it's improving the energy efficiency by reducing the leakiness of the building, for example.

By understanding the nature of the buildings within each of those classes you can also help determine different strategies to get the most benefit in the shortest time for those who are actually having illness-related problems. I would love it if GPs, for example, would ask their patients, "Do you have gas appliances at home? Can we do something about reducing your exposure to combustion appliances?" Making a better link at a practical level between health impacts and the built environment that might be exacerbating those health impacts.

LIDIA MORAWSKA: One point which we touched upon before is the evidence to quantify the costs of this impact on health. Such epidemiological studies on the impacts are extremely complex, are long and take time. Economic analyses are even more complex, because it's easy to calculate how much it would cost to build a new school, for example, with a proper ventilation system, but how much it would cost to retrofit individual

schools is very different—or how much absentees cost. On the other hand, there is enough of a body of evidence that there are huge problems and huge benefits to doing this.

I often compare this to—we don't need to reinvent the wheel. From the physics point of view, if I let this sensor go, the gravity will take it down. It will take it down here, take it down in Brisbane and take it down in New York. We don't need to prove that gravity works, therefore we don't need to prove again that it would be a huge benefit. Even so, we don't quite benefit. Whether it be the ratio of one to four or one to five, it will be a huge benefit from any angle. That is why I think we should work towards resolving this and not towards fully quantifying this.

FAY JOHNSTON: I'll make one brief, final comment, and that is the need for interagency cooperation and leadership. We know largely what to do, and we also know it doesn't fall within the remit of any one government department. That has been a barrier to action over the years. To take this forward, we strongly advocate for interagency leadership—a clear leadership role being allocated to a particular group to take it forwards and to liaise with all the other key stakeholders on the issue.

SOTIRIS VARDOULAKIS: I would like to also highlight that many of the interventions we discussed today are feasible and cost effective, as was pointed out already. These interventions are to improve air quality monitoring, increase air quality monitoring in households and public buildings. The electrification of cooking and heating, energy efficiency measures, improved ventilation and filtration—all these interventions are based on known technology. In many cases, these technologies are becoming more affordable. These intervention could be cost effective based on studies which have been carried out internationally.

The CHAIR: I think that brings us to the end of the session. Thank you all so much for taking the time to share your expertise with us today. If there are supplementary questions from members of the Committee, the secretariat will be in touch with those. The Committee will now break for morning tea.

(The witnesses withdrew.)

(Short adjournment)

CORRECTED

Ms ANITA DESSAIX, Vice-President, NSW Branch Executive Committee, Public Health Association of Australia, affirmed and examined

Dr ALEXANDER JAMES BROWN, Committee Member, NSW Branch Executive Committee, Public Health Association of Australia, affirmed and examined

Dr FIONA FOO, Cardiologist and Deputy Co-Chair of Doctors for the Environment Australia, NSW, affirmed and examined

Dr ANTHONY HULL, Anaesthetist and Deputy Co-Chair of Doctors for the Environment Australia, NSW, before the Committee via videoconference, sworn and examined

Dr BEN EWALD, General Practitioner, Medical Epidemiologist and Chair of the Air Pollution Special Interest Group, Doctors for the Environment Australia, before the Committee via videoconference, sworn and examined

The CHAIR: Welcome back, everyone. I will declare my own conflict of interest. I was formerly a member of both the Public Health Association of Australia and Doctors for the Environment Australia for many years prior to my election to Parliament.

ANITA DESSAIX: I acknowledge my employed role at Cancer Council NSW as director of cancer prevention and advocacy.

ALEXANDER JAMES BROWN: I am employed in the field of health promotion as the asthma programs coordinator at Healthy Cities Australia.

ANTHONY HULL: I am a past net zero lead working with the Ministry of Health in their climate risk unit.

BEN EWALD: I've been an academic in epidemiology and public health over many years. I have published some peer-reviewed research on health solution questions.

The CHAIR: Would anyone like to start with a short opening statement?

ANITA DESSAIX: Good morning, Chair and Committee members. I would like to acknowledge the traditional custodians of these lands, the Gadigal people of the Eora Nation. I pay my respects to Elders past and present. Thank you for the opportunity to appear today. We thank the Committee on behalf of the Public Health Association of Australia NSW Branch. Indoor air pollution is a significant cause of cancer. Exposure to a range of indoor pollutants, including second-hand smoke and those in workplace settings—including asbestos, silica dust and welding—can cause cancer. Indoor air quality is also affected by outdoor air pollution where there is a large number of known cancer-causing substances, including PM2.5.

Second-hand tobacco smoke is a known cause of cancer, cardiovascular disease, and respiratory illness, containing over 7,000 chemicals with no safe level of exposure. Due to current exemptions for private gaming at The Star casino and Crown casino, indoor smoking is permitted in indoor gaming areas. Additionally, covered outdoor areas at pubs, bars and clubs may be up to 75 per cent enclosed, yet still be classified as outdoor where smoking is permitted. This exposes workers and patrons to harmful smoke and poor air quality that cannot be eliminated by ventilation or air filtration. Amendments to both the Casino Control Act and the Smoke-free Environment Act to remove exemptions and strengthen definitions of enclosed and outdoor public places could ensure consistent protection for workers and patrons from exposure to second-hand tobacco smoke.

Workplace exposure to silica dust can lead to the development of silicosis, lung cancer, kidney disease and chronic obstructive pulmonary disease. Workplace exposure to asbestos increases the risk of developing cancers of the lung, ovary and larynx; as well as mesothelioma, cancer of the lining of the lung. Welding activities produce many hazards, through the production of contaminants in welding fumes and UV radiation in the welding arc. Employers have a duty of care to ensure their staff is not put at risk with these workplace exposures and that all workplaces have safe and clean indoor air. Increasing reporting standards and education resources for employers and employees who may be at risk of exposure will further support the work already being undertaken by SafeWork NSW and help to protect workers at risk. We draw the Committee's attention to the recommendations outlined in our PHAA submission. I'm happy to answer any questions from the Committee.

ALEXANDER JAMES BROWN: Thank you very much to the Committee for inviting me here today to represent PHAA. As the burden of complex chronic disease grows, our current approach focusing on sickness care is failing. We need to look beyond the sick individual to the social and environmental determinants of health. This is the most effective and least expensive way to improve population health. Air pollution is one of the main environmental determinants of health and a leading risk factor for death and disease. We now have an

overwhelming body of scientific evidence that the often invisible pollutants and pathogens in the air around us are making us sick. In my work as a health promotion officer in the childhood asthma prevention area, I've read the scientific evidence and heard stories from families and healthcare practitioners about how poor indoor air quality exacerbates asthma symptoms. Asthma affects 2.8 million Australians, including 713,800 people in the State of New South Wales. It's a leading cause of emergency department presentations and hospitalisation in our State. Indoor air quality is a significant risk factor for asthma, yet we know that current building design and maintenance standards do not deliver clean air.

Furthermore, there's a lot of potential because a lot of the worst areas are the responsibility of the New South Wales Government directly. For example, New South Wales public schools currently rely almost entirely on unscientific and ineffective natural ventilation strategies—opening the windows—to clean the air. We also know that some 1,402 New South Wales public schools still have unflued gas heaters in the classroom. These heaters are known to cause respiratory symptoms in children. Many social housing properties owned by the New South Wales Government are poorly maintained and fitted with unsafe gas-powered cooking and heating appliances. One asthma specialist nurse related to me her long advocacy battle for one of her patients living in public housing, and how after the mould and indoor air quality issues were addressed, she saw the improvement in the patient's symptoms and the family saw a healthier child.

Cleaner indoor air can be delivered by strengthening building design and maintenance standards, ensuring accurate, real-time monitoring and reducing sources of pollution. We need our standards to be accompanied by transparent monitoring systems to share air quality data with building users to make sure indoor air quality is being addressed. The technology already exists to do this, including mechanical ventilation and air cleaning at a relatively low cost. The people of New South Wales have a right to expect clean indoor air, providing it will reduce growing healthcare system costs and improve our quality of life.

ANTHONY HULL: Thanks for this opportunity to contribute to what is a vital issue. We're representing Doctors for the Environment Australia this morning; however, the bulk of our evidence and opinion today is aligned with Australian medical bodies and also significant high-profile medical bodies internationally. We note that people spend the majority of their lives indoors—certain groups more than others, such as children—and that air pollution is the second leading cause of death worldwide, more than cigarette smoking. This is the case for children less than five years old. Indoor air pollution arises from indoor and outdoor sources, including gas appliances indoors and motor vehicle exhaust from outside. It is not regulated or measured but is proven to cause significant health harms, even at low levels, and to have large economic consequences. There is no safe level of exposure to indoor air pollution. The director-general of the World Health Organization has labelled air pollution "a silent public health emergency". Some groups display even more vulnerability to air pollution, such as children, pregnant mothers, the unborn, elderly and those with chronic disease. Acute exposures when young or in utero have long-term health consequences.

We would strongly advocate for the following. There should be no gas connections to new residential buildings, homes and government facilities and many commercial developments, and the current use of gas in residential buildings should be phased out, with a focus on low-socioeconomic and renting members of the community. We recommend a phase-out of wood heaters and acceleration of the New South Wales process of electrification in government agencies and facilities, especially schools. This should include removal of all gas heaters from classrooms and gas cooking facilities in these premises. We recommend the establishment of indoor, robust air quality standards, and we support the PHAA this morning on this. This would include measurement and monitoring in certain situations. We also recommend that the public are educated about the health hazards and costs of indoor gas appliance use, and about precautions they may take to enable informed decisions regarding swapping out gas for electrification in their homes. Also, we would advocate that gas appliances come with mandatory health warnings.

We advocate that measures be implemented with regards to traffic-related air pollution at air pollution hotspots, such as no-idling zones at pick-up and drop-off areas outside schools, and planning guidance be established for schools and childcare centres such that they are suitably distant from busy roads. Also, the idle-off and low-emission zones should be considered and established more widely, such as in CBDs, public recreation areas, indoor car parks, hospitals and covered train stations. Also, the transition to electric vehicles should be accelerated, especially trucks, buses, light commercial vehicles, specifically prioritising electric bus services for schools. My last point is that we would advocate for adequate air pollutant monitoring, establishment and rollout at areas that are at high risk such as for carbon monoxide, nitrogen dioxide and PM2.5, and that air purification methodologies and standards are established and used when indicated, such as during bushfires, viral outbreaks or pollution hotspots.

The CHAIR: Thank you very much. To Doctors for the Environment, many of your recommendations relate to indoor gas appliances. I think many people probably listening to this would be shocked, or might only

hearing for the first time about the now strong evidence linking indoor gas appliances to health harms. Could you talk us through that evidence?

FIONA FOO: There are several pollutants that come out from burning gas in your home. Nitrogen dioxide, carbon monoxide, benzene and formaldehyde are just some of them. Nitrogen dioxide is the main one that's been linked to a lot of the respiratory—it's a respiratory irritant. It significantly increases the risk of asthma. There have been studies that show that the risk of a child having asthma is 30 to 40 per cent greater if they have a gas stove, and it accounts for about 12 per cent of childhood asthma cases in Australia, which is very similar to cigarette smoking inside your house—second-hand cigarette smoke. That's a huge problem with childhood asthma, but it also increases the risk of worsening patients' existing asthma—in adults, older people—as well as increasing risk of pneumonia and bronchitis or other respiratory illnesses. That's just the nitrogen dioxide.

Then you've got other things. Carbon monoxide poisoning can be fatal. We've had fatal carbon monoxide poisoning even in the last few years. In Victoria two kids died of carbon monoxide poisoning a few years ago from a gas heater in their home. Last year there was a restaurant where someone also died, and I think it was from carbon monoxide poisoning, and several people had to go to hospital with possible carbon monoxide poisoning as well. That's with the high levels of carbon monoxide poisoning. But the one problem with carbon monoxide poisoning is that even low levels—first of all, it causes symptoms that may be very vague, so they don't know that they have it. Chronic low levels can also cause problems with cognition and behavioural disturbances. It can also cause headaches. In one study it showed as well that it was a big cause of presentation of headaches in the ED.

You've got two other things which are carcinogens: one is benzene and one is formaldehyde. These can linger for hours after you've been using the gas stove. These are potent carcinogens. Formaldehyde is also a respiratory irritant. Those are the main ones that are released when you're burning the gas, and the gas itself is methane. That is a potent greenhouse gas. It often leaks in between uses. It has been linked to explosions. Again, we've seen that as well. Those are the gas issues. There's also particulate matter, which we'll go into later. In terms of domestic gas use, those are the main pollutants. I'll let Ben butt in here, because he's the epidemiologist, to add more.

BEN EWALD: I think there's a couple of interesting points around this. One is that the nitrogen dioxide is produced in the bright blue part of the flame. It depends on flame temperature. In the proposals to switch over domestic gas to hydrogen, the flame from hydrogen is even higher temperature, so that would produce more nitrogen dioxide than the current methane flame. Hydrogen has been proposed on climate grounds as a way of making zero carbon gas, but it would not affect this indoor air quality problem. I'd also like to reflect on the two presentations from PHA. We heard about asthma risks, which affected 2.8 million people across the country, and also about carcinogenic risks. It's interesting to think about the scale of those two problems.

Asthma is a very common problem. Every classroom of kids will have half a dozen who've had asthma, where the cancer outcomes are really very rare and there's a small risk increase from exposure. In terms of the available health gains, the really big gains are in preventing nitrogen dioxide exposure and respiratory outcomes rather than the somewhat more theoretical cancer outcomes that would be available through improving air quality.

The CHAIR: I also want to come back to the PHAA in relation to your opening statement. You talked about some of the potential gaps in current regulation of cigarette smoking indoors. I think this is something that Australia really prides itself on having been world leading on. Are there particular recommendations you'd make to us for changes in that respect?

ANITA DESSAIX: Yes, we have made incredibly strong progress as it relates to tobacco control efforts in New South Wales. Our submission did highlight in particular where there are what I would call a few loopholes and what I would describe as, quite frankly, quick wins. I draw the Committee's attention to second-hand smoke and where we are seeing continuing and ongoing exposures in particular areas. New South Wales is quite unique in that it has a unique definition in what we describe to be an enclosed or outdoor area in pubs, clubs and casinos. Covered outdoor areas may be up to 75 per cent enclosed yet still classified as outdoor. This definition means that we do know both patrons and particular workers who are servicing those particular areas are still being exposed to second-hand smoke. I think that is one area in particular.

The other area to call out in particular is where we do have prolonged patron and worker exposure in areas where we have the high-roller, high-gaming rooms in casino areas. While we've seen a voluntary movement by the casinos to move away from allowing smoking to occur in those environments, again, it could be tightened up and mandated through changes to the Smoke-free Environment Act as well as the Casino Control Act.

The CHAIR: Are there other Australian jurisdictions that are doing that better than New South Wales?

ANITA DESSAIX: I would certainly point to Queensland, in particular. Part of the issue does lie in the way that the New South Wales regulation has defined what is considered an enclosed and outdoor area. It would

warrant revisiting that definition in particular. But I would draw attention to Queensland's approach, which has been particularly good.

The Hon. GREG DONNELLY: Thank you all for coming along. I appreciate that, and your submissions. The submission from Doctors for the Environment Australia on page 7, under the heading "Solutions to improve indoor air quality", references at the first dot point that Australia needs "national and State indoor air quality strategies". I was pressing some of the witnesses earlier today about how we progress this to get, to the extent that we can, consistency across Australia for best practice standards. Of course, we've got the challenge of having the Federation—where we've got six States, two Territories and the Commonwealth—and work is being done at both levels, including with the Commonwealth. This is from evidence from witnesses earlier today. There's work starting and momentum is developing.

At the State and Territory level, you've got some States that have made further progress than New South Wales—if that's the evidence to the inquiry and if it's correct. Do you see and anticipate that we've got potential troubles in getting out of sync with each other—the States, Territories and Commonwealth—as has been the case in other examples over time, be it with taxation or what have you, and how do we mitigate against that, to the extent that we can?

FIONA FOO: I think it depends on who is setting the standards. Ultimately, the WHO sets the standard in terms of air quality. If you're getting all the evidence, that is the standard that most people should be going to. That's the international standard. That is what we all should be looking at.

BEN EWALD: I've been involved in the revision of the outdoor air quality standards. The process has generally been that it's a negotiation between all the State EPAs, with one State leading the development, and then all the States adopting it in sync. That avoids the problem of different States ending up with different standards. But now there is a Federal EPA, newly minted, and it hasn't done much yet. But this should be on their agenda to lead the development of indoor air quality standards. We haven't had a Federal EPA in the past, but we expect that one of their jobs would be leading this development. There's a lot of important work to be done because, having developed the standards, there are then questions of where could they be enforceable? I can't imagine standards being enforceable in private residences, but they certainly could be enforceable in public buildings. Deciding on which topics are going to be of most concern—of course, there are infectious disease considerations for indoor air quality standards as well as indoor air pollution, which has been most of the discussion so far.

The Hon. GREG DONNELLY: Just to follow up, in evidence from some witnesses earlier today, they made the point that in working and progressing forward with standards, with respect to law and regulation, it would require multiple inputs from a range of departments and agencies at a State and Federal level. In other words, it would be hard to—if I could take that example—apportion to the Federal EPA the responsibility for pulling this off, or tasking them to do it, without a range of other Commonwealth departments, including health. It was put that industry would be another one that would need to be in the basket, so to speak. Do you agree that there needs to be a group or an agreed set of government departments or agencies that need to be in the basket, so to speak, to bring about that bind and move this forward? That's the only way to do it. You can't apportion it to a single one?

FIONA FOO: I would agree with that, and you can ask the other members as well, partly because—we're talking about the health effects but, to improve those health effects, you need to work on the infrastructure. You need to work on the buildings. That's a different department.

The Hon. GREG DONNELLY: Correct, building codes.

FIONA FOO: Yes. If we talk about the outdoor air pollution coming in from motor vehicle exhaust, that's Roads and Transport. It is that overarching collaboration between other departments. But I don't think you can say, "Okay, Health, you do that." How are they going to influence the building sector? This is why it needs to come overarching from the Government.

The Hon. GREG DONNELLY: Of course, at the State level, it's analogous that—theoretically, as there's the EPA in New South Wales, you can say, "EPA, this is your task." But that's just not going to fly. There's a threshold task, really, of assembling a clear understanding of who's in the boat—I said "basket" previously—so to speak, to be progressing us forward.

FIONA FOO: In terms of what we're asking for, I suppose, there are different sections that you can take. For example, one of the thoughts was with removing all new gas connections. That is something that the building industry and building standards could take into their basket. The public health awareness is a Health thing. With public heath, the health department should be doing it. Then there's the motor vehicle thing. It is tying in all these different things, but you can divide it up with the overall idea, "This is your goal."

The Hon. GREG DONNELLY: Having that commitment to progress is almost the starting point.

FIONA FOO: Correct, "This is what we want, and this is how we're going to do it, involving these different departments."

The Hon. SCOTT BARRETT: My question—or comment to get a response to—comes around the suggestion of building standards and codes, and engineering standards. Given some earlier evidence we heard, my concern is that if the idea is to put standards on the building of public buildings, we're going to put unnecessary and also unattainable standards on buildings in some areas to meet what is needed in other areas. I'm talking, for instance, a school that might be within a couple of hundred metres of the M4 and probably needs higher standards than a school classroom out at Rankins Springs. I just wonder how we avoid putting those unnecessary standards on regional or less affected public buildings.

FIONA FOO: Ben or Anthony, do you want to take that?

ANTHONY HULL: Yes, I'll make a comment with regards to that. You're right. I mean, you don't want to have everyone bogged down in too many standards. My opinion is that it's getting the right balance such that you have a pragmatic standard that can be enforced. I think, though, that perhaps with regards to indoor air pollution, it is a standard that probably needs to be fairly systematised and [audio malfunction] across the board. The reason I say that is that we're talking about health impacts, particularly—to use your example—schools and an at-risk group being children. A lot of the health impacts actually occur at very low levels of air pollution exposure. The dose-response curve, if you will, is quite steep. Even rural areas can actually have schools that are still having children at risk of significant health impacts, even though they're not 100 metres from the M4.

At the same time, this does relate a little bit to woodfire smoke, as another example. If we're talking about controlling woodfire smoke or having other standards or phasing it out, do we just talk about urban areas or rural areas? Paradoxically, it's probably just as important that that is controlled in rural areas, because often these areas are areas where a lot of people are relying on wood to burn for warmth et cetera. That pollution ends up in the outdoors as well and transgresses all homes and goes into the indoors of all those other homes. Evidence—studies in recent times have shown there is significant mortality risk and morbidity risk from woodfire smoke being breathed in by people outside of the homes as well as the people inside of the home. I think it's important, as far as possible, to have standards that are across the board so that it's simple and so that we recognise that people can have health impacts very early on in their exposure to air pollution.

BEN EWALD: I think there's a distinction between setting a standard, which is the limit on what should be the expected exposure, and how a building would meet that standard, which would very well be different from place to place. It may well be different in northern Australia compared to Victoria, and it may be different if it's close to a busy road or far away. I think having an air quality standard is about the air, and how you reach that standard is a building and engineering problem that will be different from place to place.

FIONA FOO: To add to that, part of what we're saying is that when you're planning and building, for example, a school, you don't build it on a busy road. That's just a planning thing. Obviously there are places that you need to build a school, but if you can avoid building a school, or child care, in front of a busy road—when you're building that, that would be another important way of trying to reduce the risk to the people in that school.

The Hon. SCOTT BARRETT: Are the standards we are talking about then—

BEN EWALD: There is case law supporting that.

The Hon. SCOTT BARRETT: Sorry, I'm probably simplifying it a little bit. Are the standards we're talking about then saying, "You must build a building that delivers this level of air quality," rather than saying, "You must build a building that has this device on the outside to reduce air quality"?

BEN EWALD: I think that's the idea.

The Hon. SCOTT BARRETT: Sorry, I did cut someone off earlier. I do apologise.

BEN EWALD: I was just going to relate the story that there was a proposal for a childcare centre to be built on Silverwater Road out near Ryde that was knocked back in the Land and Environment Court because it would expose the kids to too high levels of traffic air pollution. There is a legal precedent for that to happen, but it hasn't been codified into planning controls as yet. There's work to be done there about what is an appropriate distance from really busy roads for locating institutions with vulnerable people.

The Hon. EMILY SUVAAL: Thank you to you all for your evidence and for appearing today. I want to start off with a very broad question. If you had a wish list, what would be top of that in terms of the most practical and affordable change that you would recommend to us to recommend that the State Government makes in terms of improving outcomes?

ALEXANDER JAMES BROWN: I can address that, I think. I think that's right—I mean, the discussion about the standards is an important one, and there is some complexity there, but I think it's also important not to over-complexify it. We know some of the key sources of indoor air pollution, and the reality is that there is a crossover. Because the building envelope is penetrated by outdoor air, there's a lot of crossover there. PM2.5 is a thing we've really got to think about addressing. That is the one we have very clear evidence for a large number of deaths directly associated with it. Reducing the source is the number one approach. Yes, we want to control, ventilate and clean, but if we can reduce the source of the pollutant in the air in the first place—the simplest engineering solution is don't have it at all.

Wood heaters are a significant issue, and they're obviously a culturally sensitive issue. People love their—who doesn't love sitting around the fire and all that? But times have moved on, and the scientific evidence is now so clear that wood heaters are extremely toxic to our health. We're quite lucky—in Australia we don't have a lot of other solid fuel burners inside homes, but internationally the amount of PM2.5-related deaths and harm from solid fuel burning is enormous. But it's still a significant problem here. For this Committee to look at how we could practically start to reduce the number of wood burners in New South Wales, that could look like buyback schemes, as are being piloted at the moment in Armidale, I think.

It could be around basically making it more difficult to install them, and certainly there should be no place for them in a place like Sydney. We're a very built-up area. We have extremely effective non-polluting heating technologies available. There's some quite good evidence around the impact of PM2.5 from wood heaters in Sydney. It's significantly higher, for example, than bushfire smoke. Then that brings to the issue of gas. The New South Wales Government has got a responsibility for New South Wales public schools. A simple recommendation that this Committee could make is to deal with that problem which has been acknowledged by the health department and the education department. It's about 20 years ago that those heaters should not be in school classrooms. There is a cost, and that cost needs to be paid.

Again, thinking about it from a health-economics point of view, the saving in terms of ED presentations, hospitalisations and overall things like absenteeism from respiratory infection will outweigh the cost of that. We could do the economic modelling. That would definitely be something that the Committee should consider recommending, is to do some more economic modelling around how effective that would be. Yes, there's a long-term and an important set of standard setting, but let's cut the sources. There's a lot of public housing and social housing properties that are owned by the State Government—they may be managed by community housing providers, but they are still owned by the State Government—that have got gas appliances. Let's make a plan to phase those out at end of life. Just replace them with a non-gas appliance.

That's a reasonable, cost-effective approach. It can't just be left to the community housing providers. At the moment, they can receive a 50 per cent subsidy to conduct some of those upgrades under SHEPI—CHEPI are the programs involved—but then they're footing the bill for the rest of those thermal upgrade costs out of rents from public housing tenants, which are obviously not sufficient. Let's fully fund that and think about that as a cost saving on the health budget. Those are some of the things I think could be a priority. Thank you.

BEN EWALD: A couple of other low hanging fruit—if I can join in there—on the particulars. Traffic pollution is not evenly distributed across vehicles. There are a small number of very highly polluting vehicles, particularly old trucks, blowing out black smoke. While the type of truck has to meet a standard when it's first brought into the country—meeting the Euro 4 or the Euro 6 exhaust standards—but once they're in operation, there's no way of getting an old polluting truck off the road. In other countries, there are exhausts check requirements each year for an annual registration check.

That is something that should be brought in in Australia as a way of getting these old, highly polluting trucks off the road. It's only a small number of them, but they do contribute greatly to urban PM2.5 which infiltrates into indoor air pollution. That's one on the list. The other one is that New South Wales could follow the example of Victoria and ACT in not allowing new gas connections to new residential properties, because that's creating a problem that looks very difficult to deal with in the future. I certainly agree with the suggestions about getting gas out of public schools and public housing, but stopping making the problem worse by no longer creating new gas connections is also part of that.

FIONA FOO: Yes, number one on our wish list is for no new gas connections in new builds. The other thing with that would also be the public health awareness for people who do have existing gas and simple ways that they can actually reduce their exposure, including just changing over to a portable induction stove if you don't have that opportunity for renters and things like that, or making sure you do have adequate ventilation if you can't change over. But just the actual awareness. So many people know about smoking but not many people know about the harms of gas. Just getting back to the motor vehicle air pollution, as you know, there's very simple things. No idling zones—you may or may not know, around the world there are so many. It is actually enforced in the UK.

In New York City they have no idling zones or low emission zones as well. That's a very simple way of reducing emissions from unnecessary motor vehicle emissions. Again, it's simple. It's not going to—what's the word? That's not hard to do.

The Hon. EMILY SUVAAL: In terms of the education piece, which you mentioned, there was an earlier witness that suggested that some of that education, or at least questioning, would be ideally done by a GP interrogating symptom management or, if a child presents with asthma, having that conversation about, "Do you have gas appliances at home, wood heaters?"—all that sort of stuff. I wanted to get your thoughts on that suggestion, but also whether you have a view about who would be, or what would be, the best way to roll out more of an education piece.

FIONA FOO: I think GPs, they do know about it but how many—60, I don't know. Anyway, there's a lot of GPs around, but not everyone does it. I'm a cardiologist—

The Hon. EMILY SUVAAL: There's also an enormous load on GPs, which is why I asked the question.

FIONA FOO: Exactly. They don't always have time to see it. I'm a cardiologist and I ask everyone who has asthma whether they have a gas stove. The number of people who do, and the number of people that it correlates with, "Oh, yes, that's when my asthma got worse"—it is surprising. The more you ask, the more you know about it. I don't think it is on the onus—we educate GPs, right? In general, that is part of the thing. But as you correctly point out, they have to think about a million other things as well. I think you almost have an obligation to let the public know. There was a lady who was talking about how she found out about it. She had a son who kept presenting to hospital with asthma exacerbations.

I don't know where she figured out all of this. It wasn't the GP. It wasn't the ED. No-one had told her about gas. Stopped the gas stove, changed to electric, and she's never had any problems with her asthma for her child since then. She's been advocating for, "Why aren't the public told about this issue when the asthma is such a big problem?" It cost $28 billion back in 2015. It's probably worse now. We've done quit smoking campaigns. People are aware of asbestos, they're aware of skin cancer, they're aware of alcohol harms, but no one knows about gas harms or indoor air pollution as well—PM2.5.

Just on that note, to digress a little bit, PM2.5 is a huge problem. This is one of the biggest risk factors for disease worldwide—second biggest risk factor, and it's more than smoking. This is a risk factor that's more than smoking for deaths worldwide. From a heart point of view, it's a big risk factor for heart attacks. Heart attacks are the leading cause of death in Australia. It's a big risk factor for stroke, heart failure and rhythm problems as well. This is on top of the lung issues, on top of cancer and endocrine issues. It is a big problem. As Alex said, we need to get to the source of the problem of the particulate matter, air pollution as well.

ANITA DESSAIX: Can I just briefly comment and add our support for resourcing for public education. The role of GPs is vitally important, but we wouldn't want to put that sort of pressure on GPs. Public education campaigns have been vitally important in terms of improving public awareness around a range of issues. I would just add to that a particular mention for information and education needs for culturally and linguistically diverse communities when it comes to some of the issues that we've been speaking about, but also new migrant communities. There is additional resourcing and additional education resources that could be put in place there, because we can imagine awareness would be significantly lower amongst those communities.

FIONA FOO: One of the communities is—I'm from Malaysia, so South-East Asian. As you can imagine, a lot of Asian communities are used to the whole gas—my mum included—wok and all that kind of thing. Some of the things that we do is just, you can cook just as well with an induction stove as all of these gas appliances. I agree with her. It is that cultural thing. They're used to these flames and stir-fries.

BEN EWALD: Just on that question of education, I work in general practice. I've been asking parents of kids with asthma about indoor exposures. I always do it in the context of other exposures, so it's about dust mites and indoor cigarette smoke as well as gas. That's quite well received by parents. They are very interested in this material. I had various families where they have noticed that they travel off to see the grandparents in Sydney and the kid's asthma gets worse, and they come back to Newcastle and it gets better. Gas exposure at grandparents' house but not at their home in Newcastle. I hear stories like that fairly often. Of course, not everybody's asthma is due to their gas stove. There are plenty of other causes, but it's one that is addressable, and something can be done about it. It's well received by patients when you bring it up. I did some make some measures to educate GPs by reviewing the health effects of indoor gas appliances in the *Australian Journal of General Practice*, December about two years ago now. So that information is relatively easy for GPs to get, if they want to get it.

The CHAIR: Dr Hull, did you have a final comment before we finish?

CORRECTED

ANTHONY HULL: I just want to reiterate and add a little bit, too. One of my picks with regard to the questioning is having idle-off strategies, awareness and education at all schools throughout the State. It's an activity that I'm involved in at my local school where my children go. There are a few things about it I can say. It's very cheap. In fact, it almost costs nothing. The evidence is there and that's corroborated with the fact that multiple jurisdictions around the world have implemented idle-off programs very aggressively. I won't go into any of the evidence for that. But at the same time, I think in terms of public awareness you're getting in very early if you're in the education system with something like the awareness around the harms of vehicle idling, which makes its way into classrooms. In fact they say that up to 75 per cent of indoor classroom pollution is from motor vehicle pollution just out of the school gate. This goes up by about 300 per cent each time there's pick-up and drop-off time at schools.

The thing is that you're also in this process creating public awareness for children, for parents and for teachers. It's a public awareness campaign that doesn't necessarily end up having to cost a lot, but it can have a great impact into the future because the children are actually learning at the same time. When it comes to idling, you don't just necessarily idle off when you go to a school. Once you have a bare-bones awareness around the problems you can stop idling elsewhere. Just a couple of quick examples from the last few days that I've come across, yesterday I went past a lady who was buckling her infant into the back seat of her car with the doors open and the motor vehicle idling.

I can smell the pollution when I run past. I certainly know it's there, but it's invisible, as we all know. At that age group, while you're strenuously trying to put a baby into a car, that's a significant exposure moment. Multiply that by thousands upon thousands around the school communities that we have and you're going to start to see significant benefits. Then I saw another person just recently in a car park sleeping. He must have felt a bit warm because he had his car engine running to run the air conditioning. This was in a covered car park. As we all know, the air pollution levels in there become sky high. That would be one of my picks.

The CHAIR: We are out of time. Thank you all so much again for sharing your time and your expertise with us this morning. If there are additional supplementary questions from Committee members the secretariat will be in touch about those.

(The witnesses withdrew.)

Dr BRONWYN KING, AO, Co-Founder, Air Club, before the Committee via videoconference, affirmed and examined

The CHAIR: I have to declare a conflict of interest again. I think Air Club is more of a collective than an actual organisation, but I will state for the record that I'm a member of it.

The Hon. GREG DONNELLY: I was wondering what the membership fees are. If it's cheap enough, I'll join. Only joking.

BRONWYN KING: We'd love you to join.

The CHAIR: Do you have a short opening statement?

BRONWYN KING: Indoor air quality, as we've heard from others today, is an invisible problem. We can't see it, feel it, hear it or taste it, but it shapes our health every minute of the day. Most of us spend 90 per cent of our lives indoors, and for some context, for those in the room who might be say 40 years old, that's 36 years of your life that you have spent indoors. So indoor air quality isn't a side issue, it's absolutely central to a healthy life. The alarming truth is that when we measure indoor air it's often terrible. It contains pathogens, all the bugs that cause airborne diseases; pollutants, like wildfire smoke and vehicle emissions; and microplastics. A peer-reviewed journal run by a French group[1] last year estimated that humans inhale an average of tens of thousands of microplastics every single day. This cocktail harms us yet we have no standards to protect us, which reveals a major gap in public health frameworks.

Surprisingly even hospitals aren't safe. In Australia in the past three years, including in New South Wales, thousands of patients have caught COVID, just one airborne disease, while seeking care for something else in hospital. Of those patients, five to 10 per cent of them died from the COVID they got in hospital when they were seeking care for something else. Indoor air failed them. That must be addressed. Last year Safe Work Australia published a new model code of practice for the health and social assistance industry, obliging healthcare services to protect employees from biological hazards, including airborne diseases. That language is new and most hospitals around Australia are yet to implement changes to adhere to that new obligation. It's not controversial to expect safe air in hospitals, schools, trains or in offices, but today these spaces seem to have a free pass to make people sick, and that must change. As for the economics, we've already heard for every dollar invested substantial returns are delivered: better health, better attendance, better thinking and uplift in productivity.

Good indoor air quality is like having an extra 10 per cent of staff on your team. So what's the barrier? It's not the science. It's not the technology. It's not the cost. I tuned in earlier and I heard Mr Donnelly ask, "Do we have everything in Australia we need to get our act together?" My answer is an emphatic yes. The barrier is simply awareness and leadership. I co-convened a major event at the United Nations last year led by four organisations, two of them Australian: the Burnet Institute and the Australian Academy of Science. Four of the 22 speakers at the event were Australians. During the event, we launched the global pledge for healthy indoor air. France and Montenegro have signed—the first two countries to do that—alongside a growing number of health groups, schools, universities, advocacy organisations and aligned businesses from over 25 countries. We're now up to 244 pledged signatories and we're currently working with over 20 countries to encourage more signatories at that country level.

The pledge outlines six key reasons why indoor air quality must be prioritised. The first is health. Clean indoor air reduces lung disease, heart disease, stroke, dementia, even cancer and all forms of airborne infectious diseases. There's no health downside. The second reason is human rights. In 2022 the UN affirmed access to clean air as a fundamental human right alongside access to clean water. Then there's pandemic preparedness. The next pandemic is inevitable, yet our buildings are not ready. Climate resilience: As heat and wildfires intensify, people will increasingly seek refuge indoors. Those indoor spaces must be safe. Work health safety: Employers already must protect workers from hazards. Last year the International Labour Organisation adopted a convention that requires employers to protect workers from biological hazards, including airborne diseases. That's really new language showing that safe air is a foundational element of workplace safety. And finally, accessibility. The very young, the elderly, people with asthma, cancer, diabetes or immune conditions should all be able to enter buildings without risking their health. Access to safe air is the next frontier of truly inclusive societies.

My recommendations for New South Wales, which align with the experts you've already heard from today and I'm sure you'll hear from following, are to establish a governance process to oversee a transformation

[1] In correspondence to the committee received 27 February 2026, Dr Bronwyn King, Co-Founder, Air Club, provided a clarification to her evidence.

to indoor air quality; monitor indoor air quality across public spaces; uplift indoor air quality with ventilation and air cleaning; advocate for coordinated national action; and launch a public education campaign to really bring the community along. In New South Wales in particular, fund and support NABERS, the National Australian Built Environment Rating System, to enable them to update their existing indoor environment quality ratings and make them fit for purpose for the world we now live in. Finally, we'd invite New South Wales to sign the Global Pledge for Healthy Indoor Air to signal commitment and leadership. Clean indoor air is not only achievable; it's inevitable, and it will benefit everyone.

The Hon. EMILY SUVAAL: Thank you so much, Dr King, for appearing and giving us your valuable time and the evidence in your opening statement. You touched on awareness and leadership as being two key recommendations or factors. What would you suggest if you had infinite resources and power at your will? What are the things that you would recommend we, as the Committee, suggest the State Government or otherwise do in order to improve in those two areas?

BRONWYN KING: My recommendations really align with filling both of those gaps. I think establishing a ministerial advisory council and developing a New South Wales indoor air quality strategy really will help awareness at all levels. I think it has to come from the top. At the moment, we've sort of got a community of experts in indoor air quality and advocates in indoor air quality out there really working from the bottom up. But what we need to see is this leadership from the top down. We need governments at the highest levels to put this on the agenda. For example, signing the Global Pledge for Healthy Indoor Air is a really symbolic step to say we recognise this is an important issue and we will act on it.

Setting up a governance mechanism—as was discussed earlier today, it's tricky because indoor air quality doesn't just fit neatly into one group. We need the scientists. We need the health Minister involved. We need climate change people involved. We need science and technology innovation. We definitely need the schools involved. Health and aged care, disability services—it's really a very broad sweep of ministerial portfolios that need to be there. The idea of this council is really important so you've got everyone brought in from the very start and then map out that journey. What is the strategy in New South Wales? Which are the areas you're going to prioritise first? Hopefully that would be hospitals and schools, which are really very tricky areas.

And leadership—I think that ideally, if I've got my little wand here, I would anoint one Minister for indoor air quality to oversee this whole coordination challenge. There are many ways it can be done. I don't think anyone has done it particularly well or perfectly so far. But if there was a senior Minister that would take that on as a specific category, I think it would be a lot easier and a lot more coordinated. There are other things in terms of leadership and awareness. Again, I love that you've given me a wand. I'm going to get going here. I would probably choose some famous sports stars or advocates to have in the education campaign—some famous people who kids like and look up to and who can talk about why everyone has some skin in the game with this particular topic and we can all make a difference.

So really simple things. Once you get some monitors—first of all, we must monitor. You can use whatever monitor you like. There are very scientific ones but there are super fun ones like this, as well, that could go into schools. Wonderful, right? This is a canary. When the air quality gets bad, the canary dies. He goes down like this and he dies. There are fun things. It doesn't have to be all boring. But if you can get some great iconic Australians involved, I think that would be terrific. We've done so well in Australia with Slip, Slop, Slap campaigns, with tobacco control campaigns, with traffic accident campaigns. We really need to lean into the learnings from those, noting that this will be an issue like that. It's not going to be something that we're going to fix this year or next year. This is going to be something that will take a period of time.

There will be a range of different public education campaigns that will resonate with different people, but I think we just need to get started on the journey. Not just in Australia but all around the world, every conversation I have with leaders is one where they remain genuinely surprised that they don't know about the issue. They're surprised that indoor air quality standards don't already exist, and they're quite interested and keen to do something. They just don't really know what to do. We need to fill that gap and provide guidance along the way.

The Hon. EMILY SUVAAL: That leads me to my next question, which is around what those interventions could be. It's one thing to identify the problem with the canary in the classroom, as it were—not the coalmine—but how do we then ensure that people are aware of the right things to do in order to address the problem?

BRONWYN KING: There is a range of things. For right now, without anything else, if we only had monitors in schools, what we could do is encourage people to open doors and windows. As one of the earlier witnesses explained, you can also encourage people to reduce the number of people in a room. You can get kids to go outside and you can flush the room for five minutes, then they can come back inside. There are simple things

that can be done that are almost no cost, once you know what's going on with the air quality. But, overall, we need to be on a journey where access to clean air is done automatically behind the scenes without individual children or teachers or people having to do a specific thing themselves, in the same way that when you go and turn on your tap and get water out of it, you don't quickly test if it's got bacteria in it and, if it does, then you quickly boil it up. We just expect that that's clean. We don't think about it. We don't do anything.

It's the same when we go dining in a restaurant. I don't bring my microscope to check if there's bacteria in my fish. We have international hygiene standards for our food, and it guarantees that our food is safe. We need to get to a place where air is automatically safe without anybody having to do anything. That requires an infrastructure to be built. We need mechanical ventilation in our buildings. That infrastructure, ideally, will be automated infrastructure. There are already programs that can detect when, say, the schoolteacher walks in the room and the air systems get going, but then 25 children come in, so the air systems boost up substantially because the requirements are substantially different at that time. Ultimately, we want to work towards that, but we need to be pragmatic and have sensible steps that we can take along the way.

The CHAIR: I was very interested to hear about the work that you did at an international level at the United Nations. Can you tell us about that event and that experience?

BRONWYN KING: It was an incredible experience. It's quite something to put on an event at the UN. It requires an enormous amount of work. But I collaborated with a brilliant woman, Dr Georgia Lagoudas, from Washington, DC. She had worked with the Biden Administration and had convened the 2022 White House Summit on Indoor Air Quality. That was a couple of years before I met her. I had my eye on that event, but I was very pleased to meet the person who actually convened it. The two of us got together and thought, "It's time to put this on the world stage because we require leadership at the highest possible levels."

You need to have two countries to formally support your event to enable you to have it at the UN headquarters in New York during the UN General Assembly. Montenegro and France are both doing excellent work on indoor air quality, and are very committed to it. They both co-sponsored the event, which we were able to then have during the UN General Assembly. It turned out it was, as far as we're aware, the largest and most well-attended event of all the side events held during the 2025 UN General Assembly. We had 330 people in the room. It was definitely the topic of the moment. People were in the room from dozens of different countries, representing all sorts of different health groups, businesses, universities and schools.

On stage, we invited experts from all over the world to share either their technical expertise or case studies of fantastic things that were happening around the world. Some that might resonate with the group today—we had the head of the Boston schools program for indoor air quality. In 2023 they began a program to uplift indoor air quality throughout every single classroom, hallway and nursing station throughout every single one of their 126 schools in Boston. They have live monitoring—you can even go on the website now; it's live, transparent monitoring in every room—and they have air purifiers in every single room. That was one case study we heard from.

We also heard from UN leaders. We had representatives there from the UN Environment Programme. The executive director of the UN Environment Programme talked about the crucial importance of indoor air quality and environmental considerations, especially with climate change creating more challenging conditions. We heard from a representative of the International Labour Organization and the importance of workers' rights and clean air. We heard from the World Health Organization talking about how indoor air quality had been somewhat overlooked, but now it had really risen to the top of the priority list. We heard from many world experts.

We also then launched Air Club. We've got members all around the world. Since that time, with Dr Georgia Lagoudas, we have had a meeting with Dr Tedros, the head of the World Health Organization, who is committed to championing this issue. We are currently engaged in discussion, very positive dialogue with over 20 different countries around the world who are considering signing that pledge as well. It's obviously fantastic to see leadership at that very high level and also the building of a movement, which, yes, already existed many years ago, but it's got an awful lot bigger in the last few years, bringing in advocates and health groups that perhaps hadn't been part of this conversation for a long time. Now it's great that we all belong to this very collaborative, good-spirited global movement.

The CHAIR: There's been a lot of discussion this morning with other witnesses about the differences between Australian jurisdictions and things we might learn from other States that have taken various actions. I'm particularly interested in your example from the US, but also France, Montenegro and other places. Are there other international jurisdictions that you would point to for examples of best practice that we should look at?

BRONWYN KING: Yes, there are. I've got a whole list here. I can read out some, but I can also, if you would like, prepare a document. I could do this on notice, so you've got a nice document. I'll read out some

examples. For example in 2023, in Ireland the Health and Safety Authority published a code of practice for indoor air quality applying to all places of work. In France in 2023, indoor air quality monitoring and limits requiring action were embedded in the French environmental code, focusing on schools and child care; that's now expanding to elderly care and nursing facilities. In Belgium in 2022, the government introduced a new legal framework to improve indoor air quality in all enclosed areas to the public. In the Netherlands, legislation governing ventilation in schools and workplaces came into force in 2023.

In schooling, there's lots of action all over the world, in Germany, Italy, Latvia—a huge number of schools. In Latvia 14,000 classrooms across 900 Latvian schools have now got indoor air quality monitoring and air purification, and in Germany and Italy. South Korea was the first country in the world to have an indoor air quality Act way back in 2005. They updated it during the pandemic, to make sure it was fit for purpose. In Taiwan, there is indoor air quality certification required, which has been in place since 2021. The UAE introduced indoor air quality requirements for all buildings about 14 months ago. And I don't want to forget—obviously Montenegro is doing amazing things. The president and the prime minister of Montenegro are very enthusiastic about indoor air quality and have committed to improving indoor air quality in every single Montenegrin school.

One other example—it's not just public buildings. The business sector is moving ahead in leaps and bounds as well. JP Morgan just this year opened their brand-new building. It's a 60-storey skyscraper; its headquarters at 270 Park Avenue in New York. That was built with health principles embedded from the start. It has extremely high air quality. They didn't do that because it was a "nice to have". They did it because they wanted their workers to be healthy, safe and productive. There are lots of fantastic examples from all around the world. I'm happy to put something together so that you've got it in a neater form.

The CHAIR: I think we'd all really appreciate that list in writing. My last follow-up question is what is the response from the Australian Government to that event and this pledge so far?

BRONWYN KING: We're still working on that. I've been pleased to have an opportunity to brief the Prime Minister on this issue. We're still in dialogue with his office. We certainly hope that the Australian Government will sign the pledge. It's a symbolic pledge. There are no legal or mandatory requirements. It's really about recognising the importance of indoor air quality and committing to sharing information, collaborating and being part of this global movement. As you can imagine, if we all around the world are aligned as we bring in standards and bring in techniques, it will get there much faster if we share our mistakes as well as the things that we're doing well. Those conversations are ongoing, as they are at a State level in other States as well.

The CHAIR: Thanks so much again for taking the time to share your expertise with us. You've already taken that one question on notice. If there are supplementary questions from Committee members, the secretariat will be in touch with you about those.

(The witness withdrew.)

(Luncheon adjournment)

CORRECTED

Mrs PLUM STONE, Founder, The Safer Air Project, affirmed and examined

Miss KAYLA ASMARA HILL, Students Representative Council Disabilities Officer, University of Sydney, affirmed and examined

Miss SARAH HUFFMAN, Sydney University Postgraduate Representative Association Disabilities Officer, University of Sydney, affirmed and examined

The CHAIR: Welcome back to the inquiry into clean indoor air. We had experts and academics this morning, and this afternoon we are hearing from people who are directly impacted by indoor air quality. Would any of you like to start by making a short opening statement?

PLUM STONE: Thank you, Chair and members of the Committee. Thank you for the opportunity to appear here today. I'm Plum Stone, founder of the Safer Air Project, and I'm here today because something as simple as breathing in shared indoor spaces has become a barrier to accessibility and inclusion for millions of people. It's time to change that. At the start of the pandemic, my family was infected. My 3½-year-old daughter suffered a prolonged status seizure and was hospitalised, and I developed long COVID. Adding to our family risk, my husband also is severely immunocompromised and needs to have a transplant, and my son has an auto-inflammatory condition. We're all in the trenches.

My academic and professional background meant that I was immediately looking for policy solutions. When I learned that airborne pathogen transmission predominantly occurs indoors in poorly ventilated spaces, I realised that simply breathing in a shared indoor space now poses a significant risk to our health. As you know, people living with chronic health conditions face a disproportionate risk of harm from exposure to airborne pathogens and pollutants, like dust, pollen, mould and chemicals. In Australia, one in two people—that is 12.6 million Australians—lives with at least one chronic health condition increasing their risks. That means millions of people with chronic conditions are being put at risk or quietly excluded from full participation in society because clean indoor air has not been treated as a fundamental human right. Knowing that, and knowing that my family is among them, I founded the Safer Air Project with a mission to get indoor air quality recognised as a critical accessibility and inclusion issue.

Our submission addresses the impact of poor indoor air quality in multiple settings, including health care, aged care and workplaces, and the existing legislation that already covers these, like workplace health and safety—as we've heard this morning—and disability discrimination. But in my opening remarks today, I just want to briefly highlight schools. We have a duty of care to ensure that every child has a safe learning environment. My children are at a primary school in the North Shore of Sydney today, and the reality is that the air they are breathing isn't guaranteed to be safe. In New South Wales, we have relied on natural ventilation in our classrooms, and if it's too hot, too cold, too windy or too smoky, or the teacher simply doesn't think about opening the windows, they remain closed, meaning there is, effectively, no ventilation. Evidence shows that classrooms with properly designed mechanical ventilation can reduce infection risk and exposure to pollutants by at least 80 per cent, when compared with natural ventilation alone.

We've heard that portable air cleaners can further reduce transmission and exposure to pollutants. Yet, without mandated performance standards, implementation is inconsistent, and children like mine are left to protect themselves alone, wearing respirators and facing bullying and exclusion. We would not expect a child to boil their own water to make it safe to drink, and we should not expect them to manage the safety of the air they breathe in the classroom. We have the tools. What we need now is to mandate indoor air quality performance standards and make real-time data visible for all, because everyone deserves to breathe safely indoors.

KAYLA HILL: Hello, everyone. I am one of the disabilities officers at the University of Sydney Students' Representative Council, also known as the SRC. The SRC is the peak representative body for undergraduate students at the University of Sydney and exists to defend and advance the interests of students. A key area of concern for myself, as a disabilities officer, has been the state of indoor air at the university. Poor indoor air in university settings is a concerning issue for all students' health, but it specifically carries distinct impacts for disabled students whose vulnerability to poor indoor air exacerbates already inequitable access to education. I am one such student who has been affected by long COVID, and it has been this experience that has inspired or necessitated my involvement in the disabilities collective at the University of Sydney.

Universities should not be a place where people are at risk of developing or exacerbating disability. In the backdrop of stripped COVID measures, cultural apathy towards airborne disease, increasingly inaccessible free health care as well as extremely low rates of tertiary level education attainment among people with disabilities, proactive measures to ensure clean indoor air are crucial. These conditions make participation in university mentally distressing for students—to have to be vigilant of these risks, let alone the detrimental impacts

on mental health and wellbeing of these risks being realised. The facilitation of safe access to clean indoor air in university settings should not be the responsibility of disabled students themselves and our organisations. Universities ought to be proactively engaged in air monitoring, air quality standards and air purification measures. Equitable access to university is compromised by numerous factors and is exacerbated by poor indoor air. Policy and initiatives toward clean indoor air will be one step further to justice for disabled students and all students at university.

SARAH HUFFMAN: That was very well put. I guess one thing we'd just like to clarify, moving forward, is that the evidence that we give today is going to be in a generalised manner, and it will include anecdotal evidence as well as our own personal experiences as well as general information from our organisations. And this is done primarily to preserve the anonymity and confidentiality of students who have spoken to us, as well as organisational staff who've spoken with us, as well as not to damage the reputation of third parties.

The CHAIR: I have an opening question, particularly for Mrs Stone and Ms Hill, who are directly at risk of adverse outcomes from airborne infections, and who I imagine have also spoken to many people in preparing to appear today. What are the sorts of things that people are having to do to keep themselves safe to participate in public life or to attend uni?

PLUM STONE: There's something very obvious that both Kayla and I are doing, which is wearing respirators, which is a very visible symbol of our invisible disabilities. I spoke in my opening statement about the experience of being a parent of high-risk children in a high-risk family. For the last four years, I have been advocating at school for our children to have the best possible natural ventilation, because natural ventilation is the only thing that is available to them in a New South Wales public school. In 2022 I started advocating, "Can I please donate an air purifier?" "No, you may not. The air we have here is very good." In 2023, I kept going, "Could I please donate an air purifier?" "No, you may not."

My experience changed once I started talking about this as an accessibility issue. I said to the principal, "If my child was in a wheelchair, you would make school accessible. You would make the excursions accessible. This is the same thing. But the problem is, the disability is invisible and the threat is invisible." That was a light-bulb moment for him, at which point he very generously enabled me to donate an air purifier. But I still wasn't allowed to donate air quality monitors. I was only able to do that in 2025. I got those in, including the birdie, the canary, that we saw Dr King show earlier, so I do know that there is a public school in New South Wales that has those. But that is because I have not given up. I have kept going. At the start of every year, the start of every term, I go and spend time with the principal, with the new staff, teachers, setting up the air purifiers, talking about our risks, talking about why it matters not just from an infection perspective but also about how if they do these things, if they open the windows, the CO2 will go down, cognitive performance will increase, learning outcomes will improve, children's behaviour will improve—the multiple benefits.

But I'm having to take that on individually. I'm obviously not alone in that experience; I'm sure that Kayla will talk to similar experiences and there are many families who've spoken to us at The Safer Air Project who've had similar experiences. It shouldn't be on individual families to have to put themselves out there, to make a nuisance of themselves to the school. It shouldn't be on individual children to have to say, "Hey, could we open the windows?" My children are still wearing respirators, because they have no choice. The air quality in the classroom isn't good enough; the risks are too great. We need a systems-level approach, because it cannot be on individual children to do this.

KAYLA HILL: Yes, I can speak to a similar sentiment. In terms of my personal experience, it has been extremely hard participating in university having long COVID. I have had to drop out of studies due to really strict requirements. Even having a disability academic plan, which allows me to have accommodations and assessment adjustments, these plans are not able to account for attendance difficulties, which are very common when you have a fluctuating chronic illness like long COVID, and do not allow for extensions in group settings, which are often mandatory for classes that are fully focused on group-based projects. In terms of stuff that we have tried to implement to counteract these difficulties, the SRC adopted a mask bloc, which is a distribution program where we give out masks to anyone in the University of Sydney community. That has been extremely well received. I believe, as per our submission, within six months we had 90 requests for masks.

Another thing that we have started to do is look into implementing air purifiers around campus to make it more accessible for students. We've also had to invest a lot of educational efforts into actually getting other students and staff on board with the work that we are doing. I, for example, spoke at a plenary at the National Union of Students Diversity Conference to discuss the importance of sickness prevention methods like mask blocs and air purifiers. But overall, it is extremely mentally isolating to have decreased inclusion as a result of wearing a mask because there is such cultural apathy and misunderstanding about why we must wear a mask, as well as

physically being unable to participate in the university community. I can also speak to some responses from a survey that we conducted, completed by both students with and without disabilities. One respondent said:

> A lot of my classes are in basement rooms or rooms with poor air ventilation, or super old buildings. I can smell mould and sometimes I feel like I cannot breathe deeply. I struggle with an anxiety disorder that often makes me feel breathless and lightheaded. This lack of air circulation often incites or reminds my body of feelings of anxiety for me, affecting my focus in class.

Another student responded:

> I'm immunocompromised. I have already had to delay my degree by a year due to my disability developed from a virus. I feel very unsafe attending university because students and staff still come when they are sick. There is such poor ventilation on campus and cultural apathy around sickness-prevention that my mask is the only means of protection from further sickness and disability.

Overall, there is a very common experience of distress when it comes to sickness and, in general, poor indoor air. I also speak to that in the *Honi Soit* article, which has been tabled, I believe.

The Hon. GREG DONNELLY: Thank you for your submissions. I'm just wanting to give a full perspective to this. Issues to do with poor or deficient air quality indoors affect all people who are indoors. With respect to your submission, is it for and on behalf of all students, or a certain class of students, or certain students? If it's for a certain cohort of students, is the other cohort taking this up and understanding the importance of what is effectively a campaign to become more aware of this and see if we can move the dial forward? I'm sure you've read the other submissions and heard the oral evidence given this morning identifying this as an issue that government, along with its agencies et cetera, should be making more of a priority.

KAYLA HILL: As the Disabilities Officer part of my role is to represent, specifically, students with disabilities. But a lot of our work broadly advocates for the welfare of all people. For example, we organised an influenza vaccination drive, which is for the welfare of all students. In terms of the work we've done around indoor air quality and the uptake on that, the mask bloc, as well as the *Honi Soit* article, as well as other educational efforts, have very much been taken up by people without disabilities and also people just generally not involved and aware about our work in the student union. It's definitely been well received and people empathise with and understand the work we are doing.

The Hon. GREG DONNELLY: Are those other groups and organisations synchronising with what you're doing? Is the cooperation there?

KAYLA HILL: Yes, there has definitely been a lot of people who have been interested in and engaged with our mask bloc, in particular, and tried to expand that beyond the scope of simply students with disabilities but also to their collectives and their broader non-political communities.

The Hon. GREG DONNELLY: Finally, in terms of the actual university governance or management—the institution itself—are they alive to this work that you're doing? If so, are they showing any signs of positive support or endorsement, perhaps even making some positive steps to make some changes at the university?

SARAH HUFFMAN: Yes, so sort of in relation to a generalised area that we're seeing in a university space, one of the biggest issues is that university doesn't seem to be taking a proactive approach to these issues of indoor air quality. Sort of a consistent theme came in the form of managing asbestos or also construction. There have been examples where buildings had asbestos in them, there wasn't really much work done around that and then it became a bit of an urgency issue where students were taken out of a building. They had to move everything and one of the knock-on effects of this is that a student lost some research samples. They were mis-stored in the process of having it moved, and that delayed the student's progress in their studies as well as their funding for those studies.

Another issue is happening is that organisation at a university would request information about air filtration in their office and this information was not readily supplied. The response from the university was that the air filtration was sufficient. It became almost this situation where they kept requesting information, the information was not being readily provided and then, essentially, the organisation didn't have the capacity to continue following up on it and decided, inside that organisation, to get their own air purifier. To summarise is that there seems to be stalling work when it comes to ensuring indoor air quality, and then also when indoor air quality becomes an issue, it then becomes sort of this urgency matter.

And we also have a couple of stories that have been shared by students but I'd just like to read one. So a student was in an open-plan office, and they worked with other people in that open space. They complained about the smell in that space, and people were having respiratory issues. And the student who actually submitted this information to me also noted that they had bronchitis when they were working in this open-space office. And so eventually the air quality was tested and it was deemed to be uninhabitable. And people were taken out of that area and were told they no longer had an office. And then lobbying from staff and students, they were finally able to have the carpet replaced and install air-conditioning unit instead.

So I think this comes back to the point that has already been made that it ends up being individuals who are directly affected by it. Oftentimes, that comes down to people who have disabilities, who were much more keenly aware, as a community—disabled people with accessibility issues. And as a result, we have to often advocate for ourselves, instead of institutions that we're a part of taking active steps to help preserve accessibility and our own health and wellbeing. So those are some generalised issues.

And yes, we are specifically representing a subsection of a population but, as noted in the inquiry that Miss Hill and I submitted, when we have poor indoor air quality, not only does it exacerbate disability but it can also lead to the development of disability. And we see already in Australia, although there have been great strides towards improving access for people with disability, our community is consistently underemployed or unemployed. We definitely have long-term health issues. There can also be issues of risk of poverty. So at the end of the day, I think as a community and also governmental institutions have an obligation to try to remove these accessibility issues and also take proactive steps to prevent the worsening of disability or the creation of disability by proactive measures.

The Hon. GREG DONNELLY: I have one final comment. I'd make an observation about the university and its buildings. The buildings are a workplace for so many people who work at the university. There is that work health and safety dimension to it as well. Students can often co-share those facilities, but they are workplaces, aren't they?

SARAH HUFFMAN: Yes and so actually to answer that in a bit more detail, I would say that I have done brief reading about workplace health and safety in New South Wales though it isn't an area of my expertise but sort of the intersection between faculty and students is that we often see students will take up casual faculty positions. So I myself am a casual worker within the university. We also have particularly PhD students who are employed by the university to do teaching, specifically. For a very long time, PhDs were treated almost as junior faculty members, which is actually one of the reasons why SUPRA was founded. But to talk about general health and safety issues that we will see in a university context, I actually have a little list. One of the issues is, if you have heritage buildings in a university space, because of building regulations around these areas and the need to preserve the cultural heritage of the building, it can be very hard to either repair or add accommodations to a building, so such as an air-conditioning unit air-purification unit.

Another issue we have is we can have damp in buildings. So this is the case in older buildings. I've been in a university space where there was significant water damage at the top of the building, where it was connected to the roof. You could see it on the wall. There was a huge damp spot and paint was peeling off. Students were actively in classes while this was the case. We've also had reports that a student is in an office that has periodic flooding. And when this was the case, they got a big extraction fan in, but there was still an older air-conditioning unit, no air purification. We have also had a student report that they have periodic flooding in classrooms in which they're teaching and the solution was to provide extraction fans, but you could still smell the damp in the carpet.

This is more of a potential issue that I'll speak to more of in a hypothetical sense, because we don't have strict data on this one, but if you have an older building or perhaps a heritage building, preservation against vermin might not be as strong. So you could perhaps have rats and mice living within the walls of that building, and that can cause exposure of dried faecal matter to students and then that could be an issue that would exacerbate allergies. Another issue that we've talked to beforehand, when I mentioned the risk of asbestos is that—this is actually a really concerning situation—is that a student account gave that asbestos was found in a university building on one floor and removalists were brought in to remove the asbestos one room at a time while everyone was still working in that building, and also on the same floor that the asbestos was found. So there's that issue of how that is then being put out into the generalised environment.

Another issue is that—again, this is more sort of not exactly a hypothetical issue but something we can't directly speak to data of, but it is a concern—is that if you have older buildings that have been painted before the 1970s, there was a high risk of lead in the paint then even if you have repainting over the original lead paint, if you start having flaking of the lead paint that can have lead being entered into the air. And also, you can have dust that collects that has lead in it. So people are then at risk then of breathing in lead particles. So then another issue is that we often have issues with air ventilation. I've been personally in two experiences where I was in a small room, there was limited ventilation, there was windows but there's issues with the windows opening, and as a result you're in a small classroom with a bunch of students in there, there's all breathing and there's not proper ventilation. The students in the class with me were sharing this, but this is also another issue a student had brought to my attention as well.

Another issue is that we mentioned a bit in the submission about the risk of exposure to formaldehyde when it comes to construction, demolition, repair works and also just generalised building materials. One other issue that we can have in a university context with formaldehyde is that students working—and this is also an

issue you see in morgues as well—is that people are, students especially, are working in a wet lab. If they're in a medical school, they might be dealing with human remains and cadavers and as a result, they're being regularly exposed to formalin, which contains formaldehyde. Generalised construction at university setting can also have students exposed to paint fumes. You also have construction going on while students are actively in the classroom setting, so it's not waiting until students are off campus and, once more, generalised issues that come with construction work, as detailed in the submission.

There's other issues where there's inconsistent air conditioning across buildings. So parts of a building might not be air-conditioned, or a whole building might not be air-conditioned. We also have had issues with indoor air pollutants, especially smoke becoming indoor air pollutants. So an example of this is that adjoining our university is public land in the form of a public park and there was a campfire being burned in that public park, and a university building that was directly adjoining the public park constantly could smell smoke fumes coming in. And it was even the case, I was running a panel event, and we all had to stop and think, "Is there a fire going on?", because the smoke was so heavy.

Another issue is that smoke from bushfires can enter into an indoor environment. Another area we have is, this is information I've already mentioned about the stalling when it came to knowing about the filtration with the organisation that I previously mentioned. Another issue that could easily be resolved by just getting more information, but it is something that should be taken into consideration, is that it's unclear what cleaning products are being used in a university space. I did a sort of informal polling of students and asked, "Do you know what cleaning products are being used?" And they were like, "No." But, as I said, an obvious solution with that is just to ask cleaning staff and ask the university what cleaning products are being used. But the reason I bring this up is that various cleaning products can go into the indoor air quality and can involve various chemical compounds that could exacerbate indoor air quality, making it more poor.

The other thing that one student mentioned to me—this isn't directly in the university setting, but this is their personal experience from attending bar environments or restaurant environments—is that sometimes people who are cleaning a table will come up directly while the person is sitting there, squirt the cleaning solution on and clean it, so then the cleaning solution is going into the surrounding air and being inhaled by the person. The other sort of issue that was brought to our attention is that there was once a situation in one of the buildings where there was construction work being done, and they were constantly having the fire alarm set off because of dust. And what ended up happening is that instead of the university taking proactive steps in that building to improve indoor air quality, they set up two people to watch the fire alarm, and every time it went off, they would check if there was actually a fire and if there wasn't actually a fire, they'd just turn off the fire alarm.

The Hon. GREG DONNELLY: That's very comprehensive.

SARAH HUFFMAN: I think my colleague also has some other information that was presented to their organisation as well.

KAYLA HILL: Yes. I'll shortly just mention an issue for students who are living in an accommodation that housed multiple students. There was an inability to open windows or effectively ventilate rooms that are impacted as a consequence of the building work surrounding the accommodation, and this included breathing in paint dust and associated construction fumes, which is in breach of safety legislation. Some windows within this accommodation, such as those in balcony rooms, were duct taped shut by builders. Duct tape is not sufficient to use as a preventative measure for whichever fumes are trying to be kept out of the rooms and also obviously poses a very serious fire risk, and the inability to keep out the weather and external smells in rooms with false walls.

Another issue within this was that the extent of construction was not adequately communicated to students. The extent of the construction and the true impact on living conditions were not addressed or well communicated to residents before entering into a contract with the organisation that owned the accommodation and construction building, leading to really significant and unexpected disruptions for those residing in that building. I can speak to three specific students who spoke to us about this. For one student, there was dust from construction covered in their room and construction done right in front of an open window.

SARAH HUFFMAN: And I'll just add that this was the student's own open window and the student had the window open and then the construction was going on right in front of them.

KAYLA HILL: Secondly, another student was dealing with mould.

SARAH HUFFMAN: Sorry, that's actually a typo on my part. Similarly, in the same accommodation building a student found construction dust in their room and they couldn't open their window, and then another student complained of strong smells of paint in the room. I also want to speak generally on sort of situations like this. One of the problems that students can have in these situations is that they're unclear what their rights are as tenants, whether they would fall under rights as boarders versus the rights as tenants. And then it sort of becomes

this merry-go-round of trying to figure out what legal redress they have or if they can go to NCAT on this, or where they should go to get support.

We can also talk a little bit about mould. In our submission we talked about psychosocial hazards, but generally this is one of the main complaints we've had from students about housing. So we had a student who had quite severe mould in their housing environment. It was a rental space. They tried to get support from the landlord, and they were continually delayed with getting the support. The student who was experiencing this, they tried to get the repairs done. Individuals who were responsible for the repair work cited continual issues, like the property manager being sick and difficulty with handyman being available, even though this mould issue constituted an urgent repair. There was delay in getting actually the environment safe for students.

And the student directly noted that they had difficulties obtaining a lease after that, and their personal belief was that they felt, and I'm going to quote here, "Feel like it is possible I've been blacklisted being so insistent on the repairs, which is why, as I know, health impact of black mould exposure."[2] And the student also then explained the psychosocial outcomes that this experience had. They found this to be "a stressful experience" and "I'm fortunate that I'm able to rely on my partner and stay with him for the meantime. However, this means I have prolonged travel time on placement. Considering placement is full-time and I have to study and go CV extracurriculars in my personal time, extended travel time means I have less time for this, which is a significant impact on my grades, future knowledge and skills, career opportunities and mental health and overall wellbeing, as I become less able to do things such as exercise regularly and eat healthy home-cooked meals."[3]

Another student noted that they experienced—

The CHAIR: Could I perhaps interrupt, just in the interests of time? I think these anecdotes are very compelling answers to the question that's been asked, but perhaps could you provide them on notice, just in case there are other questions, because we're nearly out of time.

SARAH HUFFMAN: Yes, okay.

The CHAIR: Thank you, I appreciate it. I might come back to Mrs Stone with the Safer Air Project. You've been able to bring together people from, I understand, a variety of backgrounds who are all impacted by indoor air quality in different ways. Could you perhaps speak to the breadth of those conditions or backgrounds, or list the various reasons why people have approached you or taken an interest in this?

PLUM STONE: Yes, absolutely, and many of them are covered in our submission. The submission, you'll forgive me, was a lift from our 2024 report that we published in Federal Parliament, and I provided it as our submission. Indoor air quality affects people with multiple chronic health conditions. As I said in my opening statement, one in two Australians lives with a chronic health condition. This isn't a small minority of people, although people living with chronic health conditions have been largely—we imagine that they're just a small group. It's actually one in two of us, and we're all obviously only one day away from being diagnosed with a chronic health condition as well. I set out some of the stats that are available from the ABS and AIHW and others: Thirty-four per cent of people in Australia have a respiratory condition, one per cent of people have a chronic kidney disease and 11 per cent have asthma. We've heard some of the costs of asthma this morning.

In this report, which I can give you the full version of, there are the lived-experience stories of people who very kindly shared those with us to help make the arguments that we wanted to make in this report about why different settings—schools, health care, residential aged care and other residential settings and workplaces—all matter in terms of implementation. I'd be happy to share those. Two of those stories were included in the submission that I made, one of which is that of a young boy called Aaron—although his name has been changed—and the other on behalf of a father who died in residential aged care. The point to make is that when we think about priority settings and the implementation of standards, which we heard about this morning, and where to prioritise those, the thing that I would like to get everybody to think about is that people living with chronic health conditions aren't isolated. They're in every room, they're in every classroom and they're in every workplace. We need to make sure that all public spaces are safe for anybody who faces an increased risk.

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2 In correspondence to the committee received 20 March 2026, Miss Sarah Huffman, Sydney University Postgraduate Representative Association Disabilities Officer, provided a clarification to her evidence.

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Sometimes you might hear arguments like "We need to make the indoor air in health care safer than an architect's office." But actually, my husband—he's not an architect, but he could hypothetically be working in the architect's office, and he would still be at risk in that architect's office as he would be when he went to the GP. In order to make indoor air safe for everyone, we can't just assume that the most vulnerable only access vulnerable spaces. They access every single part of our community, and we should all be able to do so safely.

The CHAIR: I don't think there are any questions from the members online, so perhaps just a last question from me in closing. I suppose in your imagined utopian future, where this is all well regulated and implemented and indoor air is guaranteed to be safe in every context, how would your life, or the lives of the people you're representing, be different day to day?

PLUM STONE: Again, I'll answer this as a mum. My children would not have to be different and not have to go to school and be bullied because they're wearing a mask: "Why are you wearing a mask?" "You know why I'm wearing a mask. I've been wearing a mask for four years." But they are still getting questions about being different. There's nothing wrong with being different. But when you're six, seven, eight, nine and you get questioned about it a lot—"Why does your mum drive you to the excursion?" Because I don't let my children go on buses because the ventilation on buses is really bad—these questions for children are very difficult. These questions for us as adults are very difficult. It would be nice not to have to always think about something that we do 12 times a minute, and whether or not that one breath is going to be the thing that puts us in hospital or puts my husband to the top of the transplant list. It shouldn't be something that we have to think about. I guess I would sleep well—that would be the first thing—just knowing that everybody's breathing safely.

KAYLA HILL: In the university setting, universal clean air would be very much ideal. Implementing air quality standards, as well as standards for air monitoring in policy, would be very beneficial, as would, more broadly, better access to bulk-billed health care, which is really difficult for students, especially international students, as well as broader access to respirator masks in healthcare settings and in university settings.

SARAH HUFFMAN: And just briefly, similarly to answer that question, students with disabilities would be able to better meet requirements for attendance, especially immunosuppressed students. As well as they would be able to attend various experiments, dissections or similar areas where they're not going to be at risk of being exposed to various animal-borne pathogens. And I'd like just to also state that accessibility is part of everything, and it's very easy to get caught up in a specific idea—that we only have to provide this much accessibility. But accessibility benefits everyone. And I think from a sort of value-based place is that, humans are naturally altruistic. We are here as a shared community to help everyone. And as a result, we should come together and ensure that our environments are as accessible as they possibly can be.

The CHAIR: Thank you. We're out of time for today. Thank you again to all of you for making the time to share your experiences with us today. It's been really valuable. If the Committee has supplementary questions for you, the secretariat will be in touch with those.

(The witnesses withdrew.)

Ms ARABELLA DANIEL, Community Advocate, and Founder, Clean Air Communities, before the Committee via videoconference, affirmed and examined

Ms KATE FORSTER, Community Advocate, and Member, Clean Air Communities, before the Committee via videoconference, affirmed and examined

Mr JORDAN CRANE, Member and Social Media Coordinator, Cleaner Air Collective, before the Committee via videoconference, affirmed and examined

Mr PETER VOGEL, Legal Advocate, Cleaner Air Collective, before the Committee via videoconference, affirmed and examined

Ms SUE JENNINGS, Co-Founder, Cleaner Air Collective, before the Committee via videoconference, affirmed and examined

The CHAIR: Our witnesses are attending by videoconference for this next session. Welcome to all of you. Thank you so much for making time to give evidence to the Committee today. Would you like to start with a short opening statement, perhaps starting with Clean Air Communities?

ARABELLA DANIEL: Good afternoon, Chair, and Committee members. Thank you for the opportunity to appear today. I am speaking on behalf of Clean Air Communities, alongside Kate Forster. We are a community-led group, focused on reducing exposure to indoor and neighbourhood air pollution through evidence-based policy and shared lived experience. At its core, our submission asks the Committee to recognise clean indoor air as an essential public need comparable to clean drinking water. Just as we would never accept contaminated water flowing through taps, we should not accept polluted air circulating through our classrooms, workplaces or homes.

Clean indoor air cannot exist without clean outdoor air. Natural ventilation depends on the quality of the air outside. When outdoor air pollution from wood smoke, fire pits, busy roads or bushfire smoke is present, it directly compromises indoor environments. This is why indoor and outdoor air quality must be addressed together. The WHO has linked air pollution to a wide range of health impacts, with hazardous fine particle pollution—PM2.5—causing cardiovascular diseases with increasing risks of heart attack and stroke, lung cancer, diabetes and cognitive decline. There is no safe level of exposure. Impacts begin before birth, affect lung and brain development, influence learning outcomes, and increase risks of hospitalisation. Children are especially vulnerable. In classrooms, high occupancy quickly leads to elevated carbon dioxide and airborne particles. Without adequate ventilation and filtration, students are breathing stale air that affects concentration, cognitive performance and risk of infection. Improving classroom air quality is therefore both a benefit for education and a public health intervention.

Local Monitoring is essential. Community-based monitoring using reliable low-cost sensors such as PurpleAir shows that significant local pollution—including neighbourhood wood smoke—is missed by regulatory monitoring. Implementing indoor and outdoor monitoring enables transparent, data-driven decision-making. Poor air quality increases emergency department visits and adds pressure to already overstretched hospital and ambulance systems. Investment in clean air—through emissions reduction, filtration, ventilation, and standards—can reduce community health care and premature death costs while improving childhood development, productivity and community wellbeing outcomes.

The recommendations in our submission are practical and achievable, reduce unnecessary combustion sources in built-up environments, implement fragrance-free policies in public buildings, mandate air filtration as essential infrastructure in schools and healthcare, and establish enforceable indoor air quality standards supported by monitoring and continuous improvement. We commend the New South Wales Parliament for holding this important inquiry, which provides the Government with an opportunity to demonstrate leadership by recognising clean indoor air as fundamental public health infrastructure. Thank you, and we welcome your questions.

SUE JENNINGS: Thank you for the opportunity to speak, with Jordan Crane and Peter Vogel on behalf of Cleaner Air Collective, and add our voices to this important conversation. We are a grassroots community advocacy group founded in 2022 with around 400 volunteers Australia-wide, working to improve public understanding and policy on cleaner indoor air and mitigating airborne infections. Many of our members live with chronic illness, disability, long COVID, or have high-risk family members. Most access health care regularly. We're backed by a large cohort of everyday Australians participating in our advocacy campaigns, with tens of thousands signing petitions, using our letter templates and phone scripts to contact State and Federal MPs, and writing submissions to public consultations.

Indoor air quality matters to more New South Wales residents than you may think. We need action. The evidence is clear and we need to get started. We've been waiting for action since the Federal long COVID inquiry recommended indoor air quality standards in April 2023. The best time for action was actually then; the next best time is now. Lack of equitable access to public indoor spaces due to poor indoor air quality has had a profound impact on our members. Today we focus forward. We need indoor air quality standards based on health, not adequacy, not a bare minimum. We need transparent indoor air quality monitoring. As Harvard Professor Joseph Allen says, "What gets measured, gets managed." We need updated public health messaging and education about indoor air quality and airborne transmission. We need the right to clean indoor air embedded in building codes, in workplace health and safety, in healthcare protocols, disability discrimination frameworks and pandemic preparedness.

Our working parent members offer a strong message: please start with schools. They are notorious transmission hubs with poor indoor air quality and children stuck on an airborne infectious merry-go-round—flu, colds, measles, COVID-19, RSV, TB, chicken pox et cetera. Working parents are frequently absent from work, looking after their sick children. Then they are often infected by their kids and absenteeism mounts. If you're concerned about the cost of action on indoor air quality, consider the compounding costs of inaction: increased healthcare costs, sick leave, temp staff costs and presenteeism, reduced productivity, economic output, GDP, disrupted service delivery, disrupted education, deteriorating test performances, workforce attrition due to chronic illness needing ongoing financial support, and widening health inequities. Act now and reap benefits in perpetuity or choose not to act and watch financial and social costs soar. Poor indoor air quality is dangerous to humans. The question is not whether it should be addressed, but how and how quickly.

Finally, a vision to share from Anna-Maria Arabia, head of the Australian Academy of Science: Imagine in 10 years new buildings monitoring carbon dioxide, carbon monoxide, PM2.5 and having ventilation rates of 14 litres per second per person because scientific evidence informed action and we have enforceable indoor air quality standards in all public buildings; natural and mechanical ventilation work in harmony; air quality displays automatically, triggering ventilation when needed; existing buildings are retrofitted, prioritising hospitals, schools, early childhood centres, aged care and workplaces; viral transmission has dropped significantly; absenteeism is at record lows; economic rewards are immense. In Australia, this would deliver $20 billion annually, in perpetuity, in improved health and productivity—a vision we can achieve. Thank you.

The CHAIR: Both groups being represented during this session are really enormous grassroots community advocacy groups. For members of your groups, who are they and what makes people take an interest in this issue? What are the reasons that people have decided to join your groups?

ARABELLA DANIEL: We have a very strong representation within our community regarding wood smoke exposure. It's one of those involuntary exposures that has a profound effect on quality of life. People are not able to have peaceful enjoyment of their property. They can't spend time out in their garden. The wood smoke infiltrates their homes which, in Australia, are mostly very leaky. There is another contingent within our group, for example, in the west of Melbourne that is exposed to very high truck pollution emissions. They have their own advocacy group that addresses that.

Clean Air Communities is focused on wood smoke pollution because there are no voices other than Asthma Australia that address this issue, and yet it is the dominant source of particle pollution in our urban, regional and rural settings. For example, in Melbourne over half of particle pollution in metro Melbourne—51 per cent—is from 10 per cent of homes that own a wood heater for a primary source of heating. That is greater than the emissions of all the vehicles on the road plus industry plus aviation combined. It has a profound effect on quality of life, and that's what we're hearing mostly. It's quite a traumatic experience for people to be subjected to smoke and not have the option for clean air.

SUE JENNINGS: Regarding Cleaner Air Collective, we have an amazingly diverse group with different backgrounds and professions. We have healthcare workers, teachers, engineers, economists, lawyers, disability advocates, academics, creatives, data specialists, retail workers and students. It's amazing to me—people from all walks of life, people of all ages, from the elderly down to students. I spoke before about a lot of us having a chronic illness background or an underlying condition background that makes us very interested in the best ways to be protected from poor outcomes from infections such as COVID.

We came together—we created a space basically for people to come and share letters that they've written to politicians so that other people could use them, and it has grown and grown. We didn't realise there was such a demand for action in this area and a desire for someone to raise a voice for people at home who couldn't raise their own. It has been one of the sad things of the advocacy to watch many amazing advocates drop by the wayside to chronic illness, to the point that they cannot participate any longer. So I'm more determined than ever, firstly, to stay healthy enough to do this and, secondly, to raise my voice on their behalf.

The Hon. EMILY SUVAAL: Hello, everyone. I just wanted to ask a quick question. I'll just throw it open to you all. Thank you to you both for your submissions. They were very detailed submissions. If there were one or two items of reform that you could suggest—both practical but also affordable—what would those two things be in terms of being the top of your wish list, if you like? One or two things.

PETER VOGEL: If I may chime in there, I'm a New South Wales solicitor and my specialty is civil litigation generally. Since the pandemic I've unfortunately spent more time than I wanted to looking at problems that members of the community have, particularly with schools and particularly with health facilities. There's been just countless people approach me who have got some intractable problem with either their children's school or they're in hospital or a relative of theirs is in hospital and being put into a poorly ventilated ward with other infected people. The question is always "What legal recourse do I have? How can I force them not to expose my child or not to expose my mother to these airborne hazards?" Sadly, there's very little. Really the only accessible lever is work health and safety laws. The work health and safety laws that we have at the moment are quite sufficient. The guidelines under Safe Work Australia and SafeWork NSW set out quite good policies on indoor air quality and refer to good overseas standards and best practices.

The hospitals and the health departments do actually have codes of conduct and best-practice documents that emphasise the importance of good ventilation and how to minimise spread of airborne pathogens, but the problem is enforcement. What I would like to say to the Committee is that all the submissions and the speakers that we've heard today have been absolutely spot on and excellent. Everyone speaks as one voice as to what needs to be done in terms of monitoring so that we can know there's a problem, establishing standards that can be enforced and then enforcing the standards. I'm sure that will happen, but I'm old enough to remember that it took 30 years for smoking to be banned in New South Wales indoor spaces. I fear that it may not take so long but it's going to be a number of years before we get to that point in New South Wales.

In the meantime, there is a current problem. There's a huge problem of airborne disease and illness caused by particulate matter from bushfire smoke and traffic and so on. It's a daily occurrence. Children are still going to school in dangerous places. Hospitals are still dangerous places to go to and there are still on average one person every day in New South Wales dying from an infection they caught in hospital. So they've gone in because they've fallen off their e-scooter and they've ended up dead. This is something that has to be addressed with urgency. There are really only two things you need to do. The agencies concerned have to be held to account. The education department and the department of health have to be made to admit the problems that they know about and tell the people of New South Wales what they're doing to address it.

What's actually happening is that there's gaslighting on an industrial scale. On a daily basis people contact me and they say, "There's this really obvious problem where my child is in a science lab at school and there's no windows and there's 30 people in this room. There are people coughing. The school is encouraging children to come to school even if they're sick. Teachers are being encouraged to come to work even if they're sick. What can I do about it?" The Department of Education simply denies that there's a problem. They say things like, "We are following world best practice, which says that natural ventilation is the best solution, and we're following WHO guidance." They simply lie about this. I don't think it can be just ignorance; it must be a deliberate policy. This goes back; for me personally this quest started—I had a child in primary school in 2021 when the lockdowns ended and the then education Minister announced that schools were being reopened and that we have tested the ventilation in every classroom, every one of 150,000 classrooms in New South Wales, and could assure the parents of New South Wales that every classroom is safe.

This was a red rag to a bull, and I spent the next three years through GIPAA getting the information to support that claim, that every classroom had been tested and was safe, and the information doesn't exist because it was never done. We were lied to. That hasn't changed. We are still in that situation today where every child who goes to school is going to a school where the ventilation is unknown, it hasn't been measured, and the safety of each classroom is in the hands of the teacher, who shouldn't have that responsibility, to remember to open windows. The Department of Education has spent $500 million of taxpayers' money on installing air conditioners, which do not ventilate the classroom. Yet they say this is making them safer.

I, again through a long legal process, managed to get the specification for these cooler air classroom installations and discovered it is written into the specification that the ventilation fans on these air conditioning systems must switch off if the temperature outside is below 18 degrees or above 28 degrees. That means that the ventilation automatically stops at the very time that doors and windows are most likely to be closed. I brought this to the attention of the Department of Education. They couldn't see a problem with it. They couldn't explain why it was so and nothing has been done about it.

I raised it with the NSW Ombudsman. They could see no problem with it. I approached ICAC and invited them to investigate whether we had been lied to by our members of Parliament and Ministers; ICAC wasn't

interested in looking into that. But the reality is that nothing has been done to improve the situation in schools. If we have another pandemic tomorrow, it will be even worse than the first time around because the department will be forearmed. It caught them a bit unawares last time, but now they'll be able to trot out all these bogus claims that they're doing the right thing when they aren't.

The Department of Health is in a similar situation in that there are guidelines for ventilation in hospitals. Those are purely aspirational. No-one ever checks the ventilation, and no-one is held accountable when someone dies as a result. Of course, we know that during the pandemic the majority of deaths were in aged care. Like schools, the vast majority of aged-care residences have split system air conditioners and rely on opening windows for ventilation. It was no surprise that that was a hub of death and continues to be a massive problem today. What I would suggest could be done immediately, and would be the low-hanging fruit here, is for the Parliament to bring the education department and the health department before it to explain what they are doing in the short term to rectify these problems.

I know that The Greens—it was David Shoebridge in 2022 who first raised this in a Senate estimates hearing and asked the education department to explain what it's doing about ventilation. They procrastinated and put off answering the question sufficiently long that he's no longer in State Parliament, so that problem went away. I saw Amanda Cohn raised the same thing last year, and she received the same run-around. She was told that there'd been a study and this study would be made available. That was six months ago, and it still isn't available. I applied for a copy of this study as a parent under GIPAA, and the education department said that I would have to pay $420 for them to do the work that is required to give me a copy of this study. This is what parents are faced with. As a solicitor, I can put up with this, but this is what the average parent of a child or person in hospital has to deal with on a daily basis.

The CHAIR: Mr Vogel, I'm sorry to interrupt you. Ms Daniel has been waiting patiently with her hand up for some time. I'll also note in my capacity as Chair that there was a fair bit of adverse mention in the evidence we've just heard. Under the procedural fairness guidelines, I anticipate that the Committee will provide those agencies an opportunity to respond to the comments that have been made. Ms Daniel?

ARABELLA DANIEL: Thank you for your question. In terms of two top reforms that we would like to see, I agree that we need enforceable indoor air quality standards supported by ventilation, filtration and monitoring. This is a really important opportunity, if we create standards, to educate people on the importance of air quality. Most Australians don't understand the implications of air quality on their health and mortality and on their children's development, and the widespread impacts on mental health and life quality outcomes. I'm trying to keep my responses concise.

The second reform we would absolutely love to see is a managed phase-out of unnecessary combustion sources. Burning solid fuels in residential environments creates the largest and most dominant particle pollution in our urban, rural and regional areas. There is very little education or health hazard warnings on this. We need to implement a phase-out alongside tobacco-style education. People have a complete disconnect on the alignment between tobacco, bushfire smoke and wood smoke. It's well understood that tobacco and bushfire smoke is hazardous, but people think that wood smoke is natural—pleasant even—and represents a cosy ambience. But, in fact, it is chemically and compositionally almost identical to tobacco smoke. Addressing these unnecessary sources of air pollution in residential areas is critical. We need to move to electrification to ensure the cleanest possible air to begin with, so that our indoor air has the best chance of being clean and healthy.

The Hon. GREG DONNELLY: Thank you all for joining us this afternoon and for your submissions. Going specifically to Clean Air Communities' submission at page 6, which is the executive summary page, point 3 says, "Mandating air filtration and purification in public and private buildings," and goes on to say "particularly schools, healthcare facilities" et cetera, most of which seem to be, as I read them, public facilities. I don't know who may answer this; I'll leave that for you to work out. What do you define as private building for the purposes of your submission?

ARABELLA DANIEL: Not all healthcare settings are publicly owned; it was in that sense that I said private. Really, every person should be able to walk into a healthcare setting, for example, or a private aged-care facility and expect clean air in those settings.

The Hon. GREG DONNELLY: Just to be clear, your specific meaning behind "private buildings" was privately run retirement, aged-care facilities. Is that what you're specifically trying to identify there?

ARABELLA DANIEL: Yes, and healthcare facilities, private medical clinics and that sort of thing. In terms of mandating, that is where that's pointed. But we would like to see in domestic settings, people understanding the importance of being able to create a clean air shelter in their home—therefore having a

well-sealed home, air purifiers and air quality monitors even in private residential settings. But, yes, that's what I meant by that. It's about creating legislation to cover all healthcare buildings, for example.

The Hon. GREG DONNELLY: Thank you for clarifying that. Could we then go to point 1, "Eliminating combustion sources indoors and outdoors, especially in dense urban areas". When you say dense urban areas, is that to be taken to mean metropolitan cities only—like Newcastle, Sydney, Wollongong—or have you got something else in mind there?

ARABELLA DANIEL: Ideally, we would address combustion wherever it is. When I say dense urban settings, even regional towns and rural towns have extremely high levels of wood smoke pollution in the cooler months of the year. Often we'll say it's okay for a rural property that's remotely located to have a wood heater, but I would argue that, given that a wood heater triples—or more—the indoor air pollution levels of a home, a child or a vulnerable person living in that property should have the right to clean air. I remember recently seeing an ABC report, which was very sad, about dementia in rural settings, and there was an aerial shot of a home where a lady had developed dementia, and there were three or four blackened chimneys on top of their property. That connection is never made. Air pollution has profound impacts on cognitive health and the development of dementia et cetera. We would argue that, really, everyone has the right to clean air, wherever they are. But it's especially important in more densely populated areas, and that does include regional and rural towns, as I mentioned.

The Hon. GREG DONNELLY: Just going to the same point as the first one—and I'm being a bit of a devil's advocate here—in terms of seeking to eliminate candles, incense and pizza ovens, do you think you're being quite aspirational with that, or you actually do mean that these should be banned from being able to be purchased and therefore used?

ARABELLA DANIEL: Could you point to the actual line?

The Hon. GREG DONNELLY: Yes, it's page 6. At about point 6 on the page, you've got points 1, 2, 3 and 4, and I'm specifically referring to point 1.

ARABELLA DANIEL: Yes. When I say eliminating, really, if people were aware of how polluting a single candle or an incense stick is in their home, if they had indoor air quality monitors, they would be horrified to see the levels shoot up to the equivalent of bushfire smoke in their area. We never use the word ban. We say "phased out" or, at the very least, have very clear health messaging and health hazard warning labels on items like that because they are profoundly polluting for indoors. They trigger migraines and all sorts of health impacts, especially in a very confined space.

The Hon. EMILY SUVAAL: I just have a follow-on from that. In terms of my own curiosities, you mentioned candles as being a contributor to poor indoor air quality, and I'd be interested—if it's not at your fingertips, perhaps on notice—if you've got any examples of that that we can point to, because it is concerning to hear. I also wonder whether you or any other members of the Committee have any expertise or understanding about some of the ameliorating impacts of plants.

ARABELLA DANIEL: I could answer that one. Yes, there have been numerous studies done on plants. There was a NASA study done once, and that was a very exceptional, unusual circumstance that doesn't have real-life application. The level of indoor pollution that you can create from candles or wood smoke ingress from your neighbour's wood heater or fire pit can never be combated by the use of plants. Their ability to purify at that level is not adequate. They have therapeutic effects, but they cannot clean the air in your room. You need a medical-grade, high-quality air purifier in a well-sealed environment to clean the level of air pollution that, say, a candle, incense stick or a wood heater would create. I can provide some data for you on that.

The Hon. GREG DONNELLY: The matter of educating the community at large about the effects of a number of these matters, like the smoke—I could go on and on. Do you have a particular view about how that education of the community at large can be best executed? Education, obviously, is a very powerful thing. If we can get people to move, through voluntary actions and through education, that's probably likely to get a number of people moving along as opposed to, dare I say—and I'm not reflecting on the submission—a more punitive approach. How would you think we go about educating? What would be the best strategy there?

KATE FORSTER: I'm happy to contribute to that. It's helpful to look at what's happened with smoking. It's really when restrictions came in, particularly finally recognising the impact on non-smokers nearby, that things really changed. The message is in how seriously the government authorities take things. When I go to my local supermarket, if I wanted to buy cigarettes—which I don't, but if I wanted to—I'd have to go to the counter. Your child couldn't buy them. There'd be restrictive costs, in taxes and so forth, and there's also very explicit messaging on the cigarette packs. Now, I've been down and picked up a plastic bag of wood that says nothing on it. My neighbour's seven-year-old can pick up one of those. There is no message whatsoever, and they sit around the

campfire at home thinking that's a good thing to do and it's a family thing to do without realising the systemic damage through the whole body, because that particulate pollution—the very finer parts—moves into the bloodstream, travels throughout the body and moves also into the brain.

They're not aware of those impacts, and the problem is that those impacts aren't visible. Eminent air pollution scientists Gary Fuller named his book *The Invisible Killer*. That's what it is. We're very good, as a community, at seeing the direct result. Black summer—33 deaths from fire. We can all visualise the horror of someone dying in fire, but the estimates are that around 417 to 445—and these would be very conservative estimates—people died from the smoke. Many of those people were quite a long way away. These are messages that we absolutely need. As Peter has pointed out, we need absolutely clear and honest community information, and that's not what we've been getting from our authorities, sadly. But, also, that needs to be tied with action because, when you look at the information that's there, it's not really communicating the seriousness. If it's serious, we have restrictions. We have pictures on the packs. We have advertisements telling us how bad it is.

Why would anybody—and I was one of these people—think there was any problem with wood smoke and some other pollution and that it's a significant issue when I'm not getting any of those messages. Yet they're side by side. The message has to be in the action too, and I think we need to come back to this cost factor. That's not being readily made available to the community. There's billions estimated in health and premature death costs, and that's just what the epidemiologists find easy to do. There's a massive pyramid under that small number of deaths, of health, productivity, learning and development impacts which, for children, are for life. The impacts of premature birth due to air pollution can be really very significant and, frankly, catastrophic, in terms of their life outcomes. All of that's invisible to the community currently, pretty much, unless they go searching, and why would you need to search when the pack is available next to the cigarettes and it doesn't have any warnings?

The CHAIR: I'll just go back to Ms Daniel, who's been patiently waiting with her hand up.

ARABELLA DANIEL: I think Sue was waiting.

SUE JENNINGS: Thanks, Arabella. I have had my hand up, but I didn't know how to do the thing. I just wanted to say that, pragmatically, this is a really good educational tool. Individually, when I am walking around and getting this out to check on indoor air quality—thank you, Snap Air—people are fascinated by this. They are fascinated when you have a big number and then you open a window or you set the vehicle from recirculate to fresh air intake and suddenly the numbers change. People are really interested. They're not triggered by it; they're absolutely fascinated. Go to schools. Schools are whole communities. You can educate kids who will grow up understanding that the importance of breathing safe air is as important as drinking safe water and eating safe food. You can educate the teachers. You can educate the parents. It's a whole community. It's not everyone, but it's a really good start. And this is the key: making it visible.

The Hon. EMILY SUVAAL: You can't see it because it's out of shot, but the Chair has one of those lovely monitors in front of her, which I've been keeping an eye on throughout the hearing.

The CHAIR: Committee members are more than welcome to borrow it.

SUE JENNINGS: I bet it's good.

The Hon. EMILY SUVAAL: It's at 570 at the moment.

The CHAIR: It is. It's been pretty good in here all day; Parliament has quite good ventilation.

The Hon. GREG DONNELLY: Even though there's been a lot of hot air in here today, it's still very good.

The CHAIR: We're out of time for this session. Thank you all again so much for sharing your time and experiences with us today. There may be supplementary questions from Committee members. If that's the case, the secretariat will be in contact with you about those.

(The witnesses withdrew.)

(Short adjournment)

Ms VERONICA BLACK, Lead Professional Officer – WHS, NSW Nurses and Midwives' Association, affirmed and examined

Professor DEBORAH YATES, Senior Staff Specialist and Respiratory Physician, Australian Salaried Medical Officers' Federation (The Doctors Union), News South Wales branch, sworn and examined

The CHAIR: This is our final session for today's hearing for the inquiry into clean indoor air. Thank you so much for making the time to give evidence today. While we sort out some technical issues with Professor Yates, Ms Black, would you like to make a short opening statement?

VERONICA BLACK: Thanks for the opportunity to appear today. I work at the NSW Nurses and Midwives' Association. I've also served on the International Labour Organization's technical expert panel for the development and validation of international technical guidance on biological hazards and was involved in the development of the new ILO Convention on biological hazards over the past couple of years. I commend the Committee for recognising the importance of clean indoor air and for holding this inquiry. Indoor air quality has significant impacts on health, cognitive function and productivity, and the reality is that most Australians spend most of their time indoors. The COVID-19 pandemic made visible what healthcare workers have long experienced. Ventilation and indoor air quality are fundamental safety controls. Where indoor air is poorly managed, the risk of airborne transmission increases, staff illness rises and workforce capacity is directly affected. This in turn impacts patient care, service continuity and broader community health outcomes.

While reducing the transmission of infectious diseases is extremely important, it's important that our attention isn't limited to infectious diseases, as there are many other well-recognised indoor air hazards, including pollutants from outside of the indoor environment like bushfire smoke, vehicle exhaust, pollens et cetera, and pollutants that are related to the work that's being undertaken. In our sector, nurses and midwives work long shifts in enclosed clinical settings where they're routinely exposed to highly hazardous chemicals such as aerosolised medications, anaesthetic gases, formalin, cleaning chemicals and surgical plume. And then, of course, there are other biological hazards like mould. While employers have a broad general duty to ensure the provision and maintenance of a work environment without risks to health and safety, without indoor air quality standards it's unclear what this means exactly in the context of indoor air quality.

Additionally, while best practice for management of indoor air quality would see that managed in accordance with the hierarchy of controls—using isolation, substitution and engineering controls like ventilation, filtration, air exchange rates and fit-for-purpose building design as the most effective and reliable means of controlling airborne hazards, rather than relying on PPE—unfortunately, the hierarchy of controls in our legislation applies only to those hazards that are specifically mentioned in the regulations and so do not apply to indoor air quality, except for specific hazardous chemicals. What that means in practice is that controls like ventilation, filtration et cetera are inconsistent and are often treated as a facilities or maintenance issue rather than a core safety control. Outside of requirements to monitor certain high-risk airborne contaminants that have got mandated occupational exposure limits, there are no clear baseline standards for air quality, ventilation performance, monitoring of air quality, or airborne infection risk.

Importantly, while my focus is largely on worker safety, given my occupation, indoor air quality is not only a worker safety issue. In healthcare settings, poor ventilation places vulnerable patients and visitors, as well as staff, at greater risk. Safe indoor air is therefore a shared protective measure that supports both worker safety and patient safety simultaneously. In closing, indoor air quality must be recognised as both a core public health issue as well as a workplace health and safety issue, and it needs to be supported by clean indoor air quality standards, monitoring of air quality, stronger regulatory expectations and investment in engineering controls. In our health sector we need to improve our building standards through improvements to the Building Code of Australia and to the Australasian Health Facility Guidelines. We also need to make sure that funding is provided to retrofit those improved controls in existing ageing facilities. Thank you for your time. I welcome any questions.

The Hon. EMILY SUVAAL: I'll start with a disclosure. I'm obviously a financial member of the NSW Nurses and Midwives' Association. Ms Black, in your submission you very helpfully provide the Committee with a list of recommendations. I wanted to ask you specifically about your recommendation to embed stronger indoor air quality monitoring, ventilation and filtration standards in hospitals and residential care services by recommending changes to the Building Code of Australia, the Australasian Health Facility Guidelines and the NSW Health Engineering Services Guide. What changes would you suggest the Committee recommend be made to those documents to facilitate indoor air quality monitoring?

VERONICA BLACK: Those changes would be more about what the standards are for filtration, for ventilation and so on in terms of the physical build of the environment rather than the monitoring of conditions over time. The reason I've mentioned those is that those are the standards that are used when decisions are made

about constructing facilities in the first place but also when doing renovations or rebuilds. Those are the documents that set the standards. If we make the changes in those documents, then we will know that new facilities or renovated or refurbished facilities will be built with a higher standard of engineering controls in place than what they are currently.

The Hon. EMILY SUVAAL: In terms of those ventilation and filtration standards, do you have a model that you can point us to in terms of what that would look like—a best-practice, best-case scenario?

VERONICA BLACK: I think that we need to not put the cart before the horse. The first thing would be to identify what the relevant standards need to be and then we can work out what's required in order to meet those standards. I think the first stage is actually determining what our indoor air quality standards are and then we can work out what's needed in order to get there.

The Hon. EMILY SUVAAL: Sure. So perhaps an audit in the first instance?

VERONICA BLACK: Yes.

The Hon. EMILY SUVAAL: It's a question that I've asked all the witnesses that I've questioned today: If you were to recommend one or two of the most practical and affordable changes that this Committee could suggest that the State Government make to improve indoor air quality, what would those be?

VERONICA BLACK: I think we need to know what's happening with indoor air quality first. The first things would be that we need to have a system for monitoring what's happening with indoor air quality. There are going to be different options available to reach those standards, depending on the kind of place it is. In some instances, it needs to be about being able to open the window, for example. That's a pretty cost effective change. That's not going to work everywhere. That's not going to work in all situations. In the event of a major bushfire or pollen issues, you don't want to open the window because you're going to increase the problems with the indoor air quality. HEPA filters and having good air-conditioning systems in place make a significant difference.

There's also raising public awareness, so that people are aware of the issues associated with indoor air quality and can remove themselves from environments when they want to. I've seen that some places have started publicly displaying air-monitoring results, which allows people the opportunity to decide, "I don't want to be in this space right now. I'm going to take myself out of it." That, again, isn't going to work in all situations. If you're a patient in a hospital, you can't just walk out. You need to be able to stay there. It's going to be about monitoring, having proper air-conditioning systems, HEPA filters and the ability to open windows to improve ventilation. If we can get the new facilities right by changing those guidelines—the Building Code of Australia, the Australasian Health Facility Guidelines et cetera—it's not going to be an additional cost. It just means that you're building the right facilities in the first place.

The CHAIR: I might try—third time lucky—to reach Professor Yates. Can you hear me?

DEBORAH YATES: I'm very sorry. It's typical of what happens with these IT things, I'm afraid. I hope you can hear me.

The CHAIR: We can hear you. I'm glad you've been able to join us. Have you got a short opening statement you'd like to make?

DEBORAH YATES: I do. ASMOF welcomes the focus of this inquiry and also the State interest in improving indoor air quality. I am a research professional in occupational medicine and training, and I appear before this inquiry to provide evidence about the effects of poor indoor air, primarily on doctors' health, patient safety—for which we are very concerned—system productivity and climate resilience. A number of our members have expressed significant concerns about indoor air quality in their workplaces. As you know, many New South Wales hospitals are suffering from ageing infrastructure with bad ventilation and limited HVAC-type therapy.

We also need to be careful and aware of the fact that outdoor air pollution can actually affect indoor air quality, particularly in hospitals, which are public spaces open to others. With regard to the impact of poor air quality in hospitals, there are a number of issues that we would like to present. As you know, there are issues with airborne infection in overcrowded spaces, particularly in ED, in wards. With the high turnover of patients and with the extreme pressures, this is really a problem and a hazard for airborne infection, including things like tuberculosis [inaudible] as everybody knows, of HIV. We did a survey of our members, and there was a very high level of complaint about stuffy air, but also about overcrowded and shared spaces.

In addition to airborne infection, there are concerns with regard to perioperative and procedural exposure. As anybody in medicine and health will know, it's not just infections that can cause problems in the workplace but also surgical plume, which is produced when you [inaudible] but by human tissue, and you produce a smoke which is inhaled. This can carry often an infectious agent, but also various other things, including carcinogens.

The evacuation of this plume is inconsistent and not well done overall in all hospitals. This raises the risk of sensitisation, infection and also lung cancer. There is a range of cancers insurgence. Anaesthetic gas leaks also expose staff to quite a lot of hazards, including hazards to pregnant women and the newborn. It can sometimes result in symptoms such as eye and upper respiratory tract irritation, headaches and drowsiness. Temperature and humidity failures in theatres impact the safety of procedures and also that of staff. These are relatively common, I'm afraid.

The third risk is chemical and pharmaceutical airborne exposures. As you know, there's quite a lot of sterilisation required and cleaning [inaudible] and the hazards from drugs—chemotherapy [inaudible] agents and so on. And poor ventilation for all of these hazards can trigger allergies, asthma, upper airway problems, headaches, migraines and so on. These odour events are actually fairly frequent. Anybody who's been in a hospital ward will testify to the fact that you can get odour events from other causes, which I won't specify, but these sorts of events are often masked by sprays, which actually add to the hazard by adding irritants. People can get upper airway problems from that as well. They can also get problems through exposure to preservatives in things like formaldehyde, which, as you know, is a known carcinogen.

The fourth hazard is actually quite a problem at the moment in lots of hospitals, including new ones—and that is dampness and mould. Up to 45 per cent of members surveyed reported mould as a major issue. I myself am very aware of patients who have developed severe problems from this, including hypersensitivity pneumonitis. This is an entirely preventable risk. The risks are particularly high in oncology, haematology and transplant settings where one works with immunosuppressed patients. They can actually get very severe infections, and some die as a result. This is not something that can be neglected. And then the fifth hazard, which I have already touched on, is the risk of outdoor air pollution and the ingress, particularly from bushfire smoke, and the fact that a lot of HEPA filters are not necessarily changed as frequently as is needed.

We, in the medical community, are really keen on making sure that these issues are addressed urgently and appropriately on an evidence base. We have a number of potential solutions that we would like to suggest. The first one would be using retrofits and emerging technologies, such as using HEPA filters; making sure that we update the evidence-based guidelines on placement and maintenance of air cleaners; installing ultraviolet systems, where appropriate; and upgrading the filtration from local resources to [inaudible] the building. We also need to make sure that theatres are properly equipped and maintained—[inaudible], for example, are often not well-serviced and sometimes they don't work. But it is really unacceptable. They should be working all the time. If one has an emergency in the middle of the night, everything should always be in working order.

We need to increase the monitoring and the surveillance. We need to have transparent monitoring of the levels of the hazards and exposures. At the moment, there's no transparency at all. We don't know what the levels of CO2 or any of the potential hazards are. The other thing we need to do is improve the surveillance of the actual cases of disease which occur. Currently, there's a lot of dismissal of this [inaudible]. But now we do have a new mechanism in the Federal mechanisms, through the national Centre for Disease Control and the Occupational Respiratory Disease Register. We need that encouraged rather than discouraged. We need to support data-driven governance and evaluation of appropriate intervention.

We also need to be aware of climate resilience and pandemic preparedness. We're going to find that there will be more and more of these episodes in the future, and we need to have a really robust plan for dealing with them. Indoor air quality is absolutely crucial to the future pandemic response. We understand that there are air quality plans already produced, and we need to actually make sure that these are disseminated to staff appropriately.

In summary, we would like to recommend that we have a statewide assessment of hospital indoor air quality, and also clinics and other healthcare facilities, with transparent central reporting. We need trigger-based escalation and visible monitoring so that staff can actually see what is going on. That will give us an early response. We really need clinician and worker involvement in planning. Ideally, this would also be done through health and safety representatives. Nowadays, there are hardly any around. We need dedicated funding for training and good regulatory alignment. In addition to that, we need an aligned framework for both infectious and non-infectious [inaudible] hazards. This is a really important topic. Thank you very much for allowing me to come. Even with my hospital-based difficulty with IT access, I'd be very happy to answer any queries.

The CHAIR: That was very comprehensive. A question from myself to both of you: I know both of your written submissions and opening statements have been very broad and have gone beyond health care, and I acknowledge that. You've also got significant expertise, obviously, in healthcare settings. We heard some really concerning evidence earlier today about hospital-acquired infections, particularly COVID-19 and mortality rates from that. Are there particular things we should be looking at in those hospital settings, specifically around airborne viruses?

VERONICA BLACK: Yes. I might start, and I'll provide you with an example of a situation that occurred in a hospital that I was involved with. There was a situation a couple of years ago with a very large outbreak of tuberculosis. A patient who spent a very extended period of time in the emergency department on two separate presentations—emergency departments are crowded and busy environments—clearly had some quite nasty respiratory issues but was not put in an isolation room and was in the open emergency department. A number of staff contracted tuberculosis as a result of that exposure.

When they first did contact tracing, they only tested the nurses that had been providing direct care to the patient, but it ended up being a much larger group of nurses that had been exposed. Because of the delays in working out that there'd been this exposure, there were delays in treatment, and so we had at least two members that went on to develop full-blown TB, including one that was hospitalised as a result of that exposure. That really highlights the issues about what can occur when you've got those very overcrowded emergency department environments without sufficient access to isolation rooms and negative pressure spaces to be able to provide care for people who've got respiratory illnesses that may well be airborne diseases.

The CHAIR: As a follow-up question, do you have a ballpark sense of how many or what proportion of public emergency departments have an adequate isolation room, in particular one that's accessible when needed?

VERONICA BLACK: Not off the top of my head, I'm sorry. No.

The CHAIR: I'd be happy for you to take it on notice.

VERONICA BLACK: Yes, okay.

The CHAIR: Professor Yates, you're welcome to add to that if you'd like.

DEBORAH YATES: Yes. I would like to agree with that. I can firsthand tell you that the number of isolation rooms that are available in emergency departments, even in the most up-to-date hospitals, are totally inadequate and especially inadequate when we have a huge number of cases coming in who are very likely potentially infected. This is a really difficult problem to actually address really quickly. As you're probably aware, there were measures suggested in other places during the COVID pandemic, and one of those is actually opening up infectious diseases hospitals or else just sort of taking the whole of the hospital and using it as a potential infectious site. The other thing was actually taking patients out of that environment and sending them elsewhere. Until you get to that stage, you actually have to have a proper plan and you have to have more isolation rooms.

One of the difficulties is that you have a delay between patients presenting. In the case that was previously mentioned, [inaudible] patients and the most significant time for transmission of infection is within the first few hours when people are attending emergency departments. If one has an assumption of infection rather than the other way round, it's actually a lot safer. But at the moment it's not done because there is no room. If you have patients caught up in corridors, you've got people sitting very close to each other and coughing all over each other, then you will have a definite infection rate. We need to cure the bed block. We need to provide adequate space, and we need to provide adequate ventilation and appropriate PPE. Also we need to specify that anybody who actually comes in, including the relatives, who may have an infection needs to wear a mask. That's a very basic thing [inaudible].

The Hon. GREG DONNELLY: Thank you to both of you and your respective organisations for the great work you do for and on behalf of the citizens of New South Wales. I'd like to restrict my question to hospitals, notwithstanding the appreciation that the union has coverage beyond the hospital setting. But if we just talk about hospitals for a moment—and this question is to both witnesses—with respect to a hospital that's built now, so let's assume a hospital is being built and opens in X period of time, does that hospital currently have legislative or regulatory requirements in place that are quite specific to a hospital with respect to clean air? In other words, I'm trying to make some distinction, if there is, between, say, the matter of the air being breathed in a hospital compared to, say, the air being breathed if you work in, say, a bottle shop or a supermarket or a factory. I'm trying to understand if there is anything in place now which has a higher standard for hospitals because I just don't know the answer to the question.

VERONICA BLACK: There isn't.

The Hon. GREG DONNELLY: So it's the same as a bottle shop or a factory?

VERONICA BLACK: That's correct.

The Hon. GREG DONNELLY: Would it be true that there are certain parts of the hospital where there are particular high standards with respect to clean air because of the nature of that part of the hospital which might be dealing with some particular ailment or illness or condition?

VERONICA BLACK: Yes. To give you examples of things that are helpful when they're in place, I was talking before about isolation rooms. All of the hospitals should have appropriate what they call negative pressure isolation rooms for people who have infectious respiratory diseases. The negative pressure just means that when the door opens, air isn't coming rushing out but being pushed back into the room, and they usually have a double entry chamber so that the workers who are going in would enter into that chamber, put on the appropriate PPE before they enter into the space where the person is who has the infectious airborne disease, be able to provide that care, come out and doff the PPE in that space before they're back out into the sort of clean zone of the rest of the workplace. One of the problems is that there are insufficient numbers of those kinds of rooms available for people who've got infectious diseases in our hospital settings.

The Hon. GREG DONNELLY: So to be frank about it, taking that point that you've made, there are people who are infectious who are more broadly distributed in the hospital.

VERONICA BLACK: Of course.

The Hon. GREG DONNELLY: No, no, that's just trying to get the evidence. With respect to the matter of a standard and the creation of a standard that is appropriate for a hospital setting—and I raised this with some witnesses this morning—there's this tension about States and Territories going their own way and going down the path of creating such and ending up with differences between the two and whatever issues that may cause or not cause vis-a-vis, as you know, Safe Work Australia and what is a very lengthy and considered approach, which you'd be well familiar with, that's the time taken to create national standards. There's obviously a tension there. This is once again to both witnesses. Is there a view that it's appropriate to move in New South Wales ahead of something that may be developed nationally over time? If we decided to do that and if that was a decision of government, where does New South Wales look to get it right in terms of what the standards should be, and specifically in this case the standards inside hospitals?

VERONICA BLACK: There are many parts to that question.

The Hon. GREG DONNELLY: Yes, I'm sorry. I probably should have wrapped it all up.

VERONICA BLACK: I might start and then pass over to the ASMOF representative. I'm quite familiar with the processes with Safe Work Australia because I'm one of the two ACTU worker representatives on the Safe Work Australia significant issues work health and safety group, where we work on the development of that new content. I support, wherever possible, that that's where the work happens, partly because I find that the consultation is more considered and you have more robust outcomes generally through that process. It does take longer, but I generally find that the outcomes are better when that's possible.

In saying that, there's always been a bit of a push-pull situation with Safe Work Australia. We've got this harmonised system, but that doesn't mean that sometimes States don't go out ahead of what's happening nationally, and that can pull that along. Ideally, there would be an attempt to engage Safe Work Australia and identify where they're up to, if anywhere, in regard to these issues. If there was an opportunity to work in tandem and together, that would be the best outcome, I think. However, if it looked like that process was going to take too many years or wasn't part of the work plan in the near future, then it would be appropriate for New South Wales to undertake their own process and try and bring the rest of the country along with us afterwards.

The Hon. GREG DONNELLY: The second part of the question—it might have been the third, fourth or fifth; I don't know which part it was towards the end—was with respect to New South Wales. Where would New South Wales look to find what is considered, at least presently, best practice standards with respect to better clean air inside hospitals and related facilities? Do we look overseas to see what's done?

VERONICA BLACK: Yes, we'd need to look overseas and see what's done. I'm also aware that there are some consensus statements that have been published fairly recently looking at indoor air more generally. It's not specific to hospital environments, but I'd be looking at those and looking at what else is being done internationally. We should let our ASMOF colleague also contribute. It's hard when someone is not physically here. We have to make sure we don't forget her.

DEBORAH YATES: I'm sorry not to be with you in person. If I could comment on the first issue, which is with regard to the specific standards for hospitals. They don't exist. They certainly should exist because the hazards are proportionately greater. New South Wales would probably be in a good position to take the lead on that, being the most populous State. With regard to where else you'd look, you would definitely look internationally. The WHO just published a document on indoor air at the end of last year. It's evidence based. The WHO is under stress at the moment, as you could probably imagine, but there are excellent national and international collaborations which are ongoing. Really, this is the sort of situation where you can get excellent advice from across the world.

As such, it's better done through the national body based work. But it's something that you can't wait too long on because the potential for another infection and other issues is really high, so it would need to be moved fast on. I would like to suggest that we engage with the medical profession on this and also the research community. In Queensland, in particular, there's an institute where Lidia Morawska has been involved in setting indoor standards that has a lot of expertise in that. There's a lot of expertise in Australia that can be garnered which needs to be put forward, and there's no reason why New South Wales shouldn't be the first kid on the block, as it were.

The Hon. GREG DONNELLY: With respect to evidence earlier today, there's been reference made to Victoria and also Queensland. I don't think the witnesses, from memory, were able to go into a lot of detail, although one of the submissions did, about a movement that's taking place in those two jurisdictions dealing with the matter of improving and enhancing clean air in workplaces. Are you aware of any of those movements, either in Victoria or Queensland? If you are, could you comment on those?

VERONICA BLACK: I can't really contribute very much about that. Victoria, as you'd be aware, is not part of the model work health and safety regulatory system. They do things differently and separately, so I tend to be less across the detail of Victoria than I am other States.

The CHAIR: If haven't got any further specific questions, but are there any other aspects of your submission that you were hoping to speak to that members haven't asked about today?

VERONICA BLACK: I've got another story that I would quite like to share so that you understand the kinds of things that are occurring within our hospitals that are contributing to problems with unsafe air. I'm working with a group of members at the moment at a regional public hospital that recently had a new theatre built. Nurses working in theatres are exposed to formaldehyde as part of their job in the form of formalin. As specimens are cut from people, they're preserved in formalin and sent down to pathology. So there's high risk of aerosolisation of the formalin. There's decanting formalin. There are quite a few high-risk tasks associated. In their old theatre, the nurses had a hood that had good extraction for the purpose of making sure they're not breathing in the formalin. It also had a specific dispenser so that they weren't doing the decanting themselves. It would specially dispense the right amount of formalin into the container.

When they moved to the new theatre, there was a hood there that looked quite different from what they were used to. Each time they went to use it, it was alarming and setting off this alarm in the theatre. They had someone come in to have a look at it, only to find that the hood that had been put in was not to be used with formalin, which was the reason why it was alarming. So it was not built for that purpose. This is not the hazard that it was intended to control. The nurses had raised concerns about this because now they have no adequate controls to manage their risk of exposure, and the general manager has refused to purchase the appropriate equipment. It had got to the point where the ladies auxiliary at the hospital had said, "We will pay for the equipment," and the general manager has refused to accept the money from the ladies auxiliary to pay for the equipment.

We're now currently in a situation where the nurses that work in that theatre complex have announced to the general manager that they're refusing unsafe work and that they're not prepared to do any tasks involving the use of formalin, which means that the specimens are being sent dry to pathology, which runs the potential for the specimens to degrade. That's the whole reason why they're placed in the formalin in the first place. It's creating a few tensions with the pathology people because it's increasing their workload, because they need to then do that work when it comes down. But the nurses have been quite clear that they're not trying to offload the work and that they're still fighting to try to get the equipment that they need to be able to do that work safely. Thankfully, their pathology colleagues have been reasonably supportive at this time, and hopefully we can get it sorted out sooner rather than later.

But that's an example where even where we've got a new facility that should have all of the right equipment in place, there's no measuring or monitoring of what the levels of formaldehyde exposure are, even though it's one of the few chemicals that has a requirement for air monitoring if people may be exposed to more than the time-weighted average amounts. So there's no measuring, no monitoring and no appropriate equipment in place. It's just another example of how indoor air quality—we know that formaldehyde is a sensitising agent. It's also carcinogenic. So I'm pleased that the members there have stood their ground and are refusing unsafe work, but they shouldn't be in that situation in the first place.

The CHAIR: That was a compelling anecdote. Thank you for taking the opportunity to share that one with us. Professor Yates, are there things that you haven't had the opportunity to discuss today that you'd like to bring up?

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DEBORAH YATES: I would like to agree with that particular comment, but also to highlight that that is a demonstration of a really, really common occurrence, and that is the fact that we in the clinical space—I'm talking about all of us together—have very little in the way of information about what is going on with regard to health and safety. What needs to happen is that the information and the interest needs to be coming from the ground up—in other words, from those of us who are frontline workers—because we are the ones who will be able to actually find out where the problems are and react to it in order to stop it from getting worse.

I would really put, very strongly, the transparency of monitoring so that you can actually see what is going on and also designating health and safety representatives who can not only receive the early reports but also who have the expertise and the education and know the methods whereby to deal with problems early. Because it's when things are neglected, when maintenance is not properly done, and when you have really ongoing leaks for many years that you have a problem. I can tell you I have had a number of patients who have had mould exposures, who have been very sick and who have this completely neglected by not just one hospital but by a variety of different hospitals. These are preventable things which we need to be able to address urgently.

I won't give you any more answers because I'm running out of time, but it is actually really important that we address these at once rather than waiting for the reaction time of those who aren't necessarily there at four o'clock in the morning when we are. Thank you for taking an interest in this really important area. Hospitals are different. They are different and we do need to have a perfect infection control plan, particularly given the fact that we are being entrusted with more patients and we will be negligent because we're actually looking at the risk of transmission and measuring the numbers for that to occur.

VERONICA BLACK: I would just like to concur with what Deborah was saying then in relation to the need for more health and safety representatives and worker engagement and involvement. Hospitals are very dynamic and ever-changing environments. You don't have static issues going on. Things change and your patients come in who are unwell. There are spills and there are changes to environments et cetera, so it's really important that there are people who are there on the ground, on the spot, who know that this is a health and safety problem and have ideas about, or understand, how to escalate those concerns.

Health is a very large sector. It's extremely under-represented when it comes to health and safety representatives, and the level of overall health and safety knowledge and understanding is quite poor across the industry. There is a great deal of focus on patients' safety, but minimal focus on worker health and safety. I absolutely support what our last speaker was saying about the need for more HSRs in hospitals who can assist in addressing issues as they arise.

The CHAIR: If there are no further questions from Committee members, I will thank you both again for taking the time to share your expertise with us today. There may well be further questions from Committee members following the hearing. The secretariat will be in contact with you about those.

(The witnesses withdrew.)

The Committee adjourned at 16:00.