

TRANSCRIPT

LEGISLATIVE COUNCIL ENVIRONMENT AND PLANNING COMMITTEE

Inquiry into the Health Impacts of Air Pollution in Victoria

Melbourne—Monday, 28 June 2021

(via videoconference)

MEMBERS

Ms Sonja Terpstra—Chair

Mr Clifford Hayes—Deputy Chair

Dr Matthew Bach

Ms Melina Bath

Dr Catherine Cumming

Mr Stuart Grimley

Mr Andy Meddick

Mr Cesar Melhem

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Ms Georgie Crozier

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Mrs Beverley McArthur

Mr Tim Quilty

WITNESSES

Ms Clare Walter, Honorary Research Fellow and PhD Candidate, Lung Health Research Centre,
Associate Professor Louis Irving, Clinical Director, Lung Health Research Centre,
Professor Gary Anderson, Director, Lung Health Research Centre, and
Associate Professor Robyn Schofield, Director, Environmental Science Hub, University of Melbourne.

The CHAIR: I declare open the Legislative Council Environment and Planning Committee's public hearing for the Inquiry into the Health Impacts of Air Pollution in Victoria. Please ensure that mobile phones have been switched to silent and that background noise is minimised.

I would like to begin this hearing by respectfully acknowledging the Aboriginal peoples, the traditional custodians of the various lands we are gathered on today, and pay my respects to their ancestors, elders and families. I particularly welcome any elders or community members who are here today to impart their knowledge of this issue to the committee or who are watching the broadcast of these proceedings. I would also like to welcome any members of the public who may be watching these proceedings via the live broadcast as well.

At this point I will just take the opportunity to introduce committee members to you. I am Sonja Terpstra, Chair of the Environment and Planning Committee. Also appearing with me via Zoom are Ms Nina Taylor, Dr Samantha Ratnam, Dr Catherine Cumming and Mr Cesar Melhem.

All evidence that is taken today is protected by parliamentary privilege as provided by the *Constitution Act 1975* and further subject to the provisions of the Legislative Council standing orders. Therefore the information you provide during the hearing is protected by law. You are protected against any action for what you say during this hearing, but if you go elsewhere and repeat the same things, those comments may not be protected by this privilege. Any deliberately false evidence or misleading of the committee may be considered a contempt of Parliament.

All evidence is being recorded, and you will be provided with a proof version of the transcript following the hearing. Transcripts will ultimately be made public and posted on the committee's website.

I might start with you, perhaps, Associate Professor Schofield. If you could just state your name and the organisation you are appearing on behalf of for the Hansard record, please.

Assoc. Prof. SCHOFIELD: I am Robyn Schofield, and I am from the University of Melbourne.

The CHAIR: Great. Thank you. And, Ms Walter, perhaps if I can get you and your other attendees there to state your names for the Hansard record as well, please.

Ms WALTER: My name is Clare Walter.

Prof. ANDERSON: I am Professor Gary Anderson, Director of the Lung Health Research Centre at the University of Melbourne.

Assoc. Prof. IRVING: Lou Irving, Director of Respiratory and Sleep Medicine at Royal Melbourne Hospital and Director of the lung tumour stream at the Peter MacCallum Cancer Centre.

The CHAIR: Great. Thank you very much for that. Look, with that, what we will do is I will hand over to you—and you can both do this separately—to give a 5- to 10-minute presentation, and then that will leave plenty of time for committee members to ask questions. I do not mind who wants to go first. If you can give me an indication of who would like to go first—does it matter? No.

Ms WALTER: I will do the presentation on behalf of our group, and then we will open it up for anyone in the group to answer the questions depending on whose expertise is aligned with the question that is asked.

The CHAIR: Fabulous. Okay. Thanks so much for that, Clare. I will hand over to you. Thank you.

Visual presentation.

Ms WALTER: I would just like to start first by thanking you for allowing us this opportunity to speak. We are a group of people that have been concerned for some time about the health impacts of air pollution in Australia and in our state, Victoria. I will just begin by doing a brief recap on some of the key points in our submission, which I know you have read, so I will not spend too long on that. But essentially I would just like to point out that children are particularly vulnerable, and people with underlying diseases, and that the health impacts disproportionately affect children, and in particular those from vehicle emissions. And I would like to point out that around the world there are a number of mitigation strategies that have very successfully reduced population exposure to air pollution, including traffic emissions. We would really like to see Australia head in that same direction, and we believe Victoria is the ideal state to lead the way on this.

It is really important, we believe, to filter point sources of air pollution, including coal-fired power stations. Not filtering them results in health and social inequities across the population. We think health risk assessments should incorporate a broader range of health end points that are relevant to the particular project. As an example, the West Gate project's health risk assessment did not include a specific assessment of children's asthma despite that area having a highest-rate incidence of hospital admissions for children and asthma, well above the national average and certainly the highest in Victoria.

In addition to including an appropriately broad range of health end points, we also think health risk assessments should account specifically for vulnerable groups—and that is in line with federal policy objectives stated by the NEPC—and should include a thorough analysis of the associated health costs. We think raising public awareness is probably the single most important action in terms of a mitigation strategy. We would also like to point out that we note unfortunately Melbourne has slipped recently in our livable city rankings, and clean air is obviously a key requirement and one of the factors that is used in judging these rankings. We think investing in green infrastructure is a win-win-win for economy, health and environment.

So there was a timely review that actually I authored along with some other people in my PhD team at the University of Queensland. Unfortunately it was published after the submissions were due for this hearing, so we did not get to include all of this review in our submission. I would just like to point out a couple of key findings from that review were that children are most vulnerable to traffic pollution and that their strongest associations were with nitrogen dioxide. That is important because the key source of nitrogen dioxide is vehicles, so we know from that association that vehicles are a key issue. Also a key finding of the review was that the size and the timing of various health impacts, along with key vulnerable groups, appear to differ depending on the source, so what that means is it is not necessarily the same, same, same between all your key sources of air pollution. They all have a range of impacts, but the magnitude of various vulnerable groups, say, from traffic versus bushfires, appears to differ.

Based on the review findings, we have chosen to focus in this presentation on children and traffic emissions for the following reasons. The year-round chronic pollution exposure contributes to over two-thirds of the overall burden of disease. The trajectory of population exposure to vehicle emissions in Melbourne is increasing. Both physiologically and socially children are less able to protect themselves. From a toxicological perspective, traffic pollution is particularly harmful, and it is a pollutant that is highly amenable to smart policy interventions. As I mentioned before, evidence shows that nitrogen dioxide has the most robust association with respiratory impacts and that nitrogen dioxide is predominantly from vehicles. Based on these reasons, it is our opinion that actions that focus on reducing children's exposure to traffic emissions will yield the largest health improvements, although I would also like to add that that also applies to people with underlying diseases and vulnerabilities and the broader population in general.

So applying some of this Australian evidence to pollution data that we have from Melbourne, what we got here is just your annual nitrogen dioxide concentration. From Footscray it is 10.4 ppb for 2019, and at the West Gate traffic project station number 4, which I understand is on Primula Avenue in Brooklyn, it is 15 ppb. Now if we apply the risk coefficient from the ACHAPS study—that is a large cross-sectional study of Australian child health and air pollution across 12 cities in Australia—an interquartile range increase of 4 ppb in annual nitrogen dioxide was associated with a 24 per cent increased chance or greater odds of current asthma. So what we have got here is actually more than a 4 ppb differential. We know it is nitrogen dioxide, so we know that the key source for this is vehicles.

I am guessing that you are already familiar with the pyramid of effects of air pollution from people's submissions that you have already had to this inquiry, but what I would like to point out is that most health risk

analyses in Australia focus on the really top end of this pyramid. In fact the guidelines that were recently published by Capon and Wright—Wright also did the West Gate project health risk analysis—suggest that what we should consider is the premature mortality from long-term PM_{2.5} exposure and that we base our risk assessments on that. That only captures a very tiny part of the population. It certainly does not capture children's asthma and hospital admissions.

Some risk assessments will go further down and include these measurable morbidity impacts, which include hospital admissions. We know from Australian data that even small increases in daily nitrogen dioxide, ranging from 2.81 to 9.5—it is from a range of Australian literature—were associated with a 3 to 14 per cent increase in asthma hospital attendances. That is happening at the hospital level, but if that is happening at the hospital level, what is happening at the next level down? Most people with asthma do not wind up in hospital; they just wind up home, sick, on medication. If it is a child, the parents are also taking that week off work to look after that child. That is not captured in our current risk assessment method. And in fact I think I mentioned in the review the cost to an asthma diagnosis was unintuitively low. I think it was around \$341 in the federal review of pollutants recently. A week's worth of wages, the hospital, the asthma medication—it all adds up to a lot more than that.

And if that is happening at this level, what is happening further down? The answer is: we do not really know definitively. We do know that in Brisbane a study showed that schoolchildren have raised biomarkers for systemic inflammation. Something called C-reactive protein was associated with the tiny ultrafine particles from traffic exhaust. If children have got these raised biomarkers, it is pretty indicative of long-term cumulative impacts. We do not definitively know exactly how bad they are, how long it will go, but the answer is not likely to be good. We are obliged to—or policy objectives say that we are supposed to—adopt a precautionary principle in our risk assessment methods. I do not believe that is currently what we are doing.

Back to the pyramid again but this time economics—I am not going to talk long on this, because I am not an economist—all I would say is current methods are to use the associated economics of premature deaths. We are not counting for any other risk to this permit in current Australian risk assessment methods, and as such we are severely underestimating the cost benefits. We are then pitting those against the cost of abatement measures—for example, putting in pollution barriers near a childcare centre or filtration at a point source of emission. When it is pitted against these minute costs, it does not win out in favour of public health, and it is not really an appropriate scientific way of doing things. In the US, with some of the healthcare benefits of the *Clean Air Act*, where they forced cars to improve their emissions, they rolled out anti-idling legislation and coal-fired power stations were forced to install filtration technology, the long-term benefits have exceeded a ratio of 30 to one, and that was conservative; the ratios have varied, from what I understand, from 30 to one to 90 to one.

So another quick application of evidence: the EPA—I am not sure of this committee is aware—recently published some data, a couple of weeks ago, from the corner of Francis Street and Williamstown Road, in Melbourne, where there is a proposed childcare centre to be built. These are two of our most polluted streets in Melbourne, and they are a freight route for trucks between the container yard and the port of Melbourne. The community acquired a KOALA monitor from QUT, up in Queensland. The EPA kindly analysed all the data and compared it to their own, and they came up with an annual average at this corner of 15 micrograms per cubic metre of PM_{2.5}; that is the fine particulate matter. Our objective or federal sort of annual threshold is 8. So here it is at 15; at Footscray it is 6.6. If we apply the risk coefficient from a large meta-analysis of traffic-related pollution and children, that risk coefficient is equivalent to a 60 per cent increase in the risk of childhood asthma. It does not take a genius to work out that this is really not a great place for a childcare centre to be built. The NEPM methodologies which we are supposed to use to guide us in these decisions do state—and this was back in 2011—that we should be giving particular attention to childhood asthma, because we have the world's highest prevalence of this disease in Australia.

The West Gate project risk assessment did not include children's respiratory health in their risk assessment, and they also concluded that—well, I cannot remember the exact wording—essentially there was no cause for concern about the health impacts of that project to the community. That said, we are very concerned. As a group of scientists and health professionals, we recently—about last year or the year before—came across this prevalence data for the inner west of Melbourne, and it paints a very, very concerning picture. To quickly talk you through, the boxes capture 95 per cent of the population. So if you are outside the box, you are outside the 95th percentile. The line across the box is the Victorian mean, I think. Lou?

Assoc. Prof. IRVING: Yes.

Ms WALTER: Yes, it is the mean. We have Maribyrnong as this black triangle. Now, in terms of the standard things that might contribute, obviously you cannot say a health outcome is directly related to air pollution—it could be underlying health, they could be smokers, it could be obesity; we know low socio-economic status plays into these roles—but for all these standard things that we call confounding factors, the City of Maribyrnong does not score particularly badly in comparison to the surrounding suburbs and also to Frankston, which we used as another comparator. But when it comes to health outcomes that are causally associated with traffic conditions, Maribyrnong is off the chart—it is off the 95th percentile—and it is not explained by the common underlying issues such as smoking or obesity. Not only that, but Maribyrnong has a very young population; the average age is much younger than the Australian average or the Victorian average. We are pretty concerned about this, and we think it does paint a picture of cumulative health impacts.

To finish, before I let you guys begin your questions, we know that Melbourne is slipping in terms of livability, we know that post COVID we need to encourage people to come to the city and we know that globally more and more people are aware of air pollution, transport and what sort of city they want to live in. Public health needs to be placed as a high priority when it comes to making policy. We understand that making policies does not rely solely on evidence—it also relies on political knowledge and practical knowledge—but we do think we need to put a little bit more emphasis on the public health side of this policymaking. The mitigation strategies that we outlined in our submission would demonstrably reduce the risk to public health but also have high returns in the long run in terms of making Melbourne a livable city and economic gain. Thanks.

The CHAIR: Great. Thank you very much for that presentation. We will hand over to questions now. Ms Taylor, I might start with you.

Ms TAYLOR: Thanks for your presentation. Children's health is obviously very, very important; there is no question. You did refer to the livability scale, and I note that it says that on average countries around the world dropped by seven points compared to pre-pandemic levels. Tokyo is higher on that level but has a pollution index different to ours, we might say. The only thing I would put to you is: would it be fair to say there are a number of factors that go into that livability scale and not just the one that you have itemised? Just for fairness—I am not saying that pollution does not matter, because it does. It absolutely does.

Ms WALTER: I actually did look them all up, and I think there were five key groupings.

Ms TAYLOR: Yes.

Ms WALTER: And of those, the points in our submission definitely align with two of those groupings and potentially a third grouping. It is also transport—

Ms TAYLOR: Yes, there are many factors.

Ms WALTER: Yes, green livability but also schools—there are a lot of things. I looked them up and they are grouped in five groupings, and two or three of those five groupings relate to what we are talking about in this inquiry.

Ms TAYLOR: Yes. I am just saying, broadly, when you are talking about livability as a whole, when you are looking at the survey they even look at things like vaccination rollouts and the like, so there are many—just to be fair for the point of the inquiry. Now, what do you think in terms of planning? It sounded like you were talking about a planning matter in terms of location of certain facilities. Is that what you are saying—planning controls?

Assoc. Prof. IRVING: Yes. This came about because we were concerned about the pollution levels in that particular area, and when we visited the site there was a vacant block. We said, 'Oh, what are they putting there?', because it used to be a petrol station, and they said, 'Well, we're putting a childcare centre'. And we thought, 'How could that be? Surely you don't put childcare centres on main roads'. And then we looked into it, and in Melbourne, in Victoria, we actively plan for childcare centres to be on main roads because, the logic was, if you have them in backstreets it reduces the amenity of the people living in the backstreets. So Clare then wrote the paper looking at the number of childcare centres on main roads—and you only need to drive down Punt Road/Hoddle Street or the Nepean Highway, and it is childcare centre after childcare centre. And we have done measurements showing that those childcare centres—these are ones that are actually built rather than the one on Francis Street, where there is a planning permit—actually have higher than average pollution levels.

In Europe there are 250 000 new cases of asthma in children a year, and once a child is asthmatic essentially the majority will remain asthmatic for the rest of their life to some degree. Now, what is happening in Melbourne is that we are generating new asthmatics in pockets of Melbourne where the air quality is very poor. And the difficulty with comparing us to Europe is that we all think of parts of Eastern Europe as being very polluted and we think of Melbourne as being clean and fresh, but within areas of Melbourne there are these pockets of high pollution that we have only just discovered, because no-one has been metering these areas. Up until five years ago we only had one air quality measurement in Melbourne—only one. And it was only after the Latrobe Valley fires that the EPA started looking at different areas.

So it is a mixed blessing in Melbourne. Most of us breathe clean air, but there are some groups of people who are exposed to dangerously high levels. I think that is a challenge for your committee. And then it extends to equity, justice et cetera because of this disproportionate exposure of some people to bad air.

Prof. ANDERSON: If I could comment, I mean, I always think it is like minimal art with air pollution—less makes it much more valuable; less is more. I do a test myself. I take a clean rag and just run it over a smooth surface, and if it is coming up black, that is microparticulates in the air that will kill you, quite literally. It comes home to roost when you do that near where you live and think, ‘Oh, my goodness, the air’s really dirty here’, and when you have your children going to a school that is being built on—

My daughter is going to Fitzroy High School, which is being built on Alexandra Parade now—very sensible for access, but it is right on the worst air pollution in the city. I would not ride my bike down that street.

So we here in the lung centre, we get it. Part of good health is prosperity. We need to be wealthy as a city and we need to be able to disperse that economic benefit fairly, but we could also use science to help people who are exposed by reducing exposure—and the more you reduce, the better the outcomes. There is no safe limit. We cannot give you the magic number, but less is more.

Ms WALTER: I would just add, you know, for children from 0 to 4, the risks are fixed at twofold to threefold higher in this age group. A lot of Melbourne’s children in that age group attend childcare centres. A lot of women are going back to work. The proportion of two parents working is rising. We are putting our children into childcare centres. More than 10 per cent of the childcare centres in Melbourne are built within 60 metres of a major road. It is extremely counterintuitive. And you look at California—they banned this practice 20 years ago. They insist on buffer zones—300 metres from major freight routes and 150 metres from a major road. Now, one thing you may say is, ‘Yes, but surely their major roads take a higher volume of cars compared to our major roads’, which is absolutely correct. But when you factor in the vehicle emission standards of their cars versus the vehicle emission standards of our cars, the overall amount of pollutants from the average Californian car is much, much less than the average Victorian car. Our fleets are very different to the Californian fleets. They did not follow the diesel route in terms of their cars. Most of their cars are either electric hybrid or petrol, whereas we have over 25 per cent diesel, which means we only need about a quarter of their numbers to have the equivalent emissions.

Prof. ANDERSON: Yes, and I think it is really important for the committee to understand that we used to think of things like COPD, emphysema, as being a cigarette-smoking disease—but now with poor air quality, more than 30 per cent of that is due to early life exposures that set you up for low lung growth, and then as you age you become critically ill as your lungs fail. That will be a huge problem. In Professor Irving’s clinic, he was telling me last week, 30 per cent of the patients now with lung cancer were never smokers, and that is air quality. That is happening now. But we can use science to reduce that. It is just good planning. Less is more. We can use our science to reduce that. We can just make this one of the best cities in the world. It is one of the best cities in the world—but an even better city, an even brighter diamond.

The CHAIR: Thanks. Sorry, did you have something else you wanted to add there before I move on to other questions from committee members?

Assoc. Prof. IRVING: There are low-flying solutions, and one of them, particularly in this high pollution area of Brooklyn, is to limit when diesel trucks can move around the side streets, because children are in bed inside at home at night; they are not out playing in the rooftop childcare centre. So it is just reducing the amount of truck pollution at certain times of the day, when the children are trying to breathe outside air, that would make a benefit. Clare’s submission about preventing idling, parents idling their cars, in front of schools and childcare centres would make a difference. Having retaining walls would make a difference. But I will hand over—

Prof. ANDERSON: Associate Professor Schofield.

The CHAIR: Yes, Associate Professor Schofield has got a hand up there. What did you want to add there?

Assoc. Prof. SCHOFIELD: Just to reinforce those comments. So for nitrogen dioxide, diesel is really key—so targeting that—and diesel is obviously growing in our mix. We do not have emission controls on our cars. Like, we do not have catalytic converters as standard, and our petrol is of the mix where even if we do have those technologies, the sulphur content in our petrol will poison those catalytic converters and make them ineffectual. So we are in a situation where we really have to tackle what is causing the nitrogen dioxide.

My second point is that we know that with our cities, over the entire year, particularly Melbourne and Sydney, ozone production is under nitrogen dioxide or nitrogen oxide control, which means all measures to reduce nitrogen oxides will have the benefit of also decreasing the ozone, and that goes towards our food security. But also ozone in summer will become more of a problem as we move into warmer temperatures and with climate change.

Ms TAYLOR: Thank you. And the only reason I had said from the outset that it is a planning matter is, as a former councillor as well, I know that ultimately they are carrying out policies pursuant to like what you were saying about people not wanting traffic in their smaller streets. But I am not arguing against the premise that you are putting forward, and science is often a good motivator for change. So I just wanted to be clear about that. It was more that there would have to be pragmatic ramifications of that. That is all.

Prof. ANDERSON: We know how much people care about their children. As people are better educated about the risks of bad air to their children—the public outcry. We saw this in London when the mothers organised to change traffic because their children were exposed on the way to school, and it became a big political issue. No-one wants to have children with emphysema or cancer, and we can avoid it.

Assoc. Prof. IRVING: In California, because they have done it 20 years ago, they have been able to show that children born now have bigger lungs than they did 20 years ago at the same age. And that is allowing for, you know, the diet and other issues.

Ms WALTER: Demographics issues.

Assoc. Prof. IRVING: So it is extraordinary. You know, California are leading the way, and they really verify, as both Clare and Gary have said, that the cleaner the air you breathe, the better.

Prof. ANDERSON: And it is important to know scientifically. If you ask, ‘What is the single most important contributor or cause of mortality?’, you might think it is cardiovascular; it is your lung function. The FEV1 measure of lung function is the single biggest contributor to all causes of mortality for everyone.

The CHAIR: Great. Thank you very much for that. We will go to some other questions from other committee members. So thank you for that very fulsome answer. Dr Cumming, a question from you.

Dr CUMMING: Thank you so much for presenting today. This has been a topic of my passion for over 20 years. From growing up in the western suburbs we as now adults have always known that we have been surrounded by air pollution. From many years ago, from Coode Island to all the factories that were about, and then knowing that people keep moving out of these suburbs because they realise quite quickly. They move onto Francis Street, and then you have just got someone else newly coming in and being exposed to the pollution. And I must say, on one of the things that I would hope that you might support, when I brought this inquiry to Parliament I believed it is not just an environmental issue. It is a planning issue, it is a health issue. It touches all the departments, all the ministers, and there need to be in this inquiry some recommendations across so that it is not just in a silo and sitting in an environmental portfolio. I am actually quite disturbed to find out more of the childcare centres are being built on main roads, but I guess if you expanded your research, you would realise that under planning we are encouraging more and more development along railway lines, which are big diesel contributors. As someone who lives in Yarraville just off the railway line, I can wipe the black soot off every day, and growing up in Footscray that was just a normal thing that we did, to wash our windowsills—

The CHAIR: Sorry, Dr Cumming, is there a question there?

Dr CUMMING: Yes, my question is this: do you believe that there needs to be more done in all the different ministerial portfolios, in the government portfolios, to understand that air pollution touches them all? And would you hope to actually see some planning changes, rather than everyone complaining about it and anecdotally knowing about it, and actually see some recommendations that would clearly point to how we could actually have better health outcomes for everyone under planning?

Prof. ANDERSON: Ask your colleagues in Parliament to take their mask on the way home in the car and run it across their windscreen and then have a look at that. That is their personal exposure to make it real to them. I grew up—

Dr CUMMING: I am sorry, Professor—people argue that that is just dirt and that is just dust, but it is not.

Prof. ANDERSON: No, it is not. It is the condensate that they are breathing in, and those microparticles are going into their blood and then into their deep tissues, into their brain, increasing their heart attack risk, their Alzheimer's and dementia risk. Their total lung deterioration is accelerated. Their general aging is accelerated by that, and that is an observable exposure. We get it though—the city needs to be prosperous, so it is a balance. But, again, science can help to get the solution right, get the balance optimised so that we can have prosperity and growth and all the industry we need and the jobs that we need and so that people who are disenfranchised and do not have voices can be protected from things that would harm them. It is a pretty smart city, Melbourne; it can do it.

Ms WALTER: But you are absolutely right in that it requires a joined-up or a whole-of-government approach. There has been rhetoric about that, and there was even rhetoric about that, for example, with the federal fuel standards, but their whole-of-government approach forgot to include the health department—and the key thing about it was the health impacts of fuel emissions. So it needs to be beyond the rhetoric. And there are some examples from the South Australian government with Health in All Policies. There are pros and cons. I touched on it in our submission. But, absolutely, there is no way we are going to have any improvement unless it is a whole-of-government approach. You need to have coordination, and you need to have an overarching team that plugs into all the various departments.

The CHAIR: Okay, so what we will—

Dr CUMMING: And, Clare, transport as well. Sorry, Chair.

The CHAIR: Sorry. I just want to make sure all the committee members get a question. I know Dr Ratnam has not had one. We will have more time. We will come back around. So, Dr Ratnam, a question?

Dr RATNAM: Thank you so much, Chair. Thank you so much, everyone, for your presentation and your absolute passionate care for better air quality and better health for us all. And I thank you also for your really thorough submission. It is really, really helpful, particularly at this stage of the inquiry, which is just beginning—we are getting our heads around these complex issues. A couple of areas I wanted to touch on—firstly, the need for this research. Like you highlighted, we did not know the nature of the problem until some of this particular research was done, so thank you very much for that. You alluded in your submission to some potential solutions being these buffer zones, and you have mentioned that as well in terms of the US example. Can you talk us through what that looks like? Do we have enough research to know, you know, 100, 200 metres gives us enough of a buffer as some sort of harm minimisation approach?

Assoc. Prof. IRVING: They work. The distances have been defined by the California EPA along with walls, and also vegetation actually sucks up particles and chemicals, and I will let Robyn talk about that. But they are proven, and you can actually measure the effect, and so it should be part of a new planning code.

Ms WALTER: Yes. And it also depends on the specific vegetation. If you want to do some further reading into it, there is a Professor Prashant Kumar who is based in the University of Surrey, and he leads a group called GCARE, and they do a lot of research into this across Europe—different-sized barriers, whether it is solid concrete, pitches, what type of vegetation and distances. And it is quite specific. You have got to be quite careful, depending on the actual road, on how you do it. Robyn, did you want to add anything?

Assoc. Prof. SCHOFIELD: That is right. So obviously source control is your number one, but if you were going to do a barrier, you do have to be careful. And for traffic, for example, with a barrier what can happen, as you know, is it can create eddies and actually make the air quality on the other side worse. Planting trees along a street can also trap and prevent natural ventilation, so you definitely need to have those urban meteorology

surveys so you know what the air is during. Particles might be taken up by your trees and vegetation, but the gases will not, so nitrogen oxides and the ozone definitely will damage the plants, and so do the particles as well. Yes, you have to be careful there. It is definitely a source control issue, and it is around our energy. So to the previous question about all of government, we definitely need all of government.

Dr RATNAM: Thank you so much. Go on.

Prof. ANDERSON: We do not need to go up the learning curve here. We can borrow from very smart other cities. I always think of Boston—you have Harvard, Yale, MIT. It has the best health in the United States because they use science to improve their air quality as one of the factors, and the experiment has been done. In California you have got the University of California, Berkeley. All the science was put into that, and those experiments have been done, so we can look at the objective evidence of what mitigations are most effective and then use local knowledge to adapt them to our local situations here for best outcomes. We do not have to do years and years of abstract science; it is all there. We just cherry-pick it and bring it back to the city, bring those cherries back to Melbourne and to our regional areas and Geelong.

Dr RATNAM: Fantastic. That is very, very good advice for us. One more question following up from a point you made in your written submission about coal-fired power stations. You say in your submission:

The unfiltered brown coal fired power stations in the Latrobe valley are the single largest source of Victoria's anthropogenic air pollution.

My question is: is filtering of these stations useful in reducing health impacts, and what do you think it would achieve if we actually filtered them properly?

Ms WALTER: So I think Robyn and I will be vying for this one. Do you want to go first, Robyn?

Assoc. Prof. SCHOFIELD: Yes, certainly. So filtration is one aspect. There is also the flue gas desulphurisation and those catalytic converters for the NO_x and things. There is no question they are our biggest source of pollution to those local areas there. For brown coal, it is wet, and the efficiency of filters is actually reduced because it is brown coal that is being burnt, but those fabric filters et cetera that they use in New South Wales are less efficient on those power stations on the whole. Should it be done? I absolutely think the gains in the air quality speak for themselves, and mercury obviously and those heavy metals that are coming out are then captured, but you only capture mercury through the desulphurisation process.

Ms WALTER: Yes. And I think when Robyn said they are less efficient they are still quite efficient compared to nothing. I mean, my understanding is they are about 90–95 per cent in other coal. Robyn, I am not sure how much it is, but we are still talking a lot—a big reduction—aren't we?

Assoc. Prof. SCHOFIELD: I can get those numbers, but I think for brown coal the numbers are around 50 or around there. They are really not as good for particulates.

The CHAIR: Thanks for that. Perhaps if I could have a question now. I just was looking at your submission and listening to the contribution, and I know you talked about this earlier. It was in regard to air monitoring and the discussion around exposures to people who live, work or attend schools near busy roads et cetera. Do you think that monitoring stations are put in the right place? Do think there should be more of them? Are there gaps in data with the information we are gathering? And of the data that we are gathering, is that then being used to respond or to formulate health responses to things or not, and could we improve that? It is a big question, but perhaps unpack it. You can see where I am going, though, with data and a connection to health responses. So if you could unpack that for me, that would be great.

Assoc. Prof. IRVING: One aspect is that the biggest bang for your money is to put it where the most vulnerable people are, and the easiest way to find the most vulnerable people is by either socio-economic status or age. So put it near young children or put it in areas where we know the socio-economic status is low. Now, interestingly that has been partly done in Melbourne, because Frankston and Brooklyn and Footscray were compared; they have similar socio-economic status, but one has got a much higher rate of asthma in young children related to air quality, not the socio-economic status. So I would combine risk factors. That is one aspect. I will pass on to others. Where else would you monitor?

Prof. ANDERSON: Well, I think the timing is important too because, you know, these things are not static. They go up and down with the cycle of the day, and we are talking about traffic flows and how just a bit of smart policy can minimise exposure for children around schools just by getting the timing right with what sort of things are driving past when. But the timing is very important, and the proximity to the children. It is great to get average values, and we can have satellites looking at the overall pattern in the city, but there are massive differences. For the London mothers on the street near the cars, the total is enormous, and then a few meters away it is much less. So proximity to the source—people close to source—is what we need to measure and understand the dynamics of. That can inform your choices on what is best for the city overall.

Ms WALTER: My understanding is historically they were placed in a position to capture pollution levels as far away as possible from pollution sources so they could then be used to compare. For example, there is one in the middle of a park in Alphington. I could be wrong but my understanding is historically it was placed there for comparison given complaints about the Alphington Paper Mill. They wanted to say, 'Well, you've done this much worse compared to that'. It is a reasonable placement for that purpose, but over time it just got used and extrapolated between Alphington and Footscray to capture the entire population exposure of 5 million people. From a health perspective it is completely bonkers.

The east–west link project used the Alphington level, which was 6.8 for the annual PM2.5, and they ascribed that to the entire project area in Collingwood, and that was our background level. But when we actually measured it it was 11.4. That is a massive difference in terms of lung cancer risk. You are talking about a 55 per cent increase in adenocarcinoma of the lung over a lifetime exposure of that amount. In terms of asthma I think it was a 35 per cent increase in risk for children. The whole project assessment was completely skewed from the beginning, because they were taking the wrong baseline and adding an increment and going, 'That's your risk'. I mean, it is just absolutely incorrect science.

Assoc. Prof. IRVING: It depends on what you want to use them for, but for example, in London the monitors now are cheap, and so they have them on lampposts at major intersections, and each day they print out levels for cyclists. They give a warning as to whether it is safe or not to come into London; they give a route by which you can come in more safely. We have even got colleagues who have got backpack ones that they wear when they ride, and you can use them to pick up local data. We have got a colleague at the university who is an expert on metadata—you know, big data—and you can combine all of this. So the sky is the limit to some extent.

The CHAIR: So just on that—sorry to interrupt—if they do that with all their data, then who kind of crunches the numbers and makes it all publicly available? Where does that data get fed into, who does it and how is it calibrated and assessed? Sorry, Robyn, you have got your hand up. Is there something you want to add there?

Assoc. Prof. SCHOFIELD: I can talk to this a little bit. The historical placement of the EPA stations—you know, the expensive equipment—they have moved them into areas where they are away from local road influence. They have to be 150 metres away from any local source. But we have moved into an era now where for population-weighted air quality that is simply not good enough. So we have those smart network city data possibilities. The question of who does it—that is a question I would put back on this group and the inquiry. It is not funded. It is not funded anywhere nationally or within local governments.

The CHAIR: But overseas? I guess my question was: who is doing it overseas?

Assoc. Prof. IRVING: In London it is the City of London and the health department. And one of the reasons they are doing it is it was assumed that poor air quality only had an effect over months, years and tens of years, but we now know that every time the PM2.5 level peaks there is an increase in call-outs for MICAs for people having heart attacks on the street. Melbourne has published two very powerful studies—you know, Melbourne with its clean air, Melbourne the most livable city—and this observation of the short-term effects on people who have got cardiovascular instability in their 50s causing coronary artery spasm related to inflammation has been verified around the world. To measure those effects you need short-term measurements of air quality, whereas in the old days the EPA were looking at annual averages over a whole city, away from point sources.

Prof. ANDERSON: Just from personal experience, my best collaborator in science was trapped in the tunnel on the way home, because there was a delay, and had a heart attack. Luckily he had the good sense to go immediately to a clinic and got three emergency stents, but he almost died. That is how quick it is. That was

half an hour of high exposure during a traffic stall in one of the underground tunnels. It can kill you—demonstrably kill you.

Ms WALTER: It does kill you.

The CHAIR: Wow, that is pretty scary.

Prof. ANDERSON: And they come back to you, because that is a best friend.

The CHAIR: Yes, it is very scary.

Ms WALTER: Can I just give a rather nice international example of where it works—the health department in Christchurch, New Zealand. Christchurch is a city very affected by wood smoke, and the health department collaborated with the University of Canterbury and put loads of tiny monitors across—blanketed—the city. They associated it with text messages for all of the COPD and respiratory patients at the hospital, and people with underlying vulnerabilities would get a text the minute that the air peaked over a certain amount, and it was a very fine grid within their neighbourhood so that they could then take evasive action—shut their windows and whatnot.

The CHAIR: Okay. Thanks. That is really interesting. So that was like a collaborative sort of project between universities and—

Ms WALTER: Yes, with an immediate message to the people who need it flipping up on their phone.

Assoc. Prof. IRVING: Actually, Robyn is doing this work with pollens for thunderstorm asthma. That is for a couple of weeks of the year, but we are talking about something that is present every day.

Prof. ANDERSON: Yes. You can see we are very passionate, and it does come back to hurt you personally, but our job is to give you science, really, not emotion, because you cannot make a policy on emotion. It is a motivator, but it is not rational. I think the important thing scientifically is that we have the monitoring systems to know where the exposures are, so we can take those learnings from the best cities overseas and measure what we need to do here, and we know the technologies and the simple things that you can do to improve the air easily. You do not have to invent that; that science exists already.

The CHAIR: Okay. Great. Thanks so much. We do have about 10 minutes left, so we will go around for a second round of questions. Dr Cumming, over to you for a question.

Dr CUMMING: Thank you, Chair. I guess to make this question brief, we are happy to have questions on notice as well as answers on notice, and it would be great to have a bit of a show bag of what you understand of what is best practice around the world.

The CHAIR: Sorry, Dr Cumming. Just to maybe clarify a bit, questions on notice are for if we run out of time or we have further questions. We can submit them through the secretariat and then they can respond. It is not a matter of expanding on; it is if we have other questions that arise from today. I just wanted to clarify that.

Prof. ANDERSON: We can provide you any information.

Dr CUMMING: My question is to all the professors and doctors that are here and presenting today. If you could give this inquiry a bit of a show bag of what you believe is best practice in the way of research and other learnings that we could possibly feed into recommendations for this committee and for the state. As well, if we could have further information about the monitors that you were talking about, because that could be something that would be a recommendation that we could look into—that kind of research or if it is something cheap that people could buy and put on their kids' backpacks. I am not quite sure, but I would love to have that further information.

Ms WALTER: If I could just input one recommendation, one take-home point—I mean, there are loads of them. We need more monitoring, we need filtration, we need heaps, but if you could just get one thing out of this meeting, it would be anti-idling legislation or policies. There is absolutely no cogent reason why it is okay for people to leave their cars idling outside childcare centres and outside schools. It does not butt against, you know, significant economic problems for the Victorian government to implement this. You are not having to

deal with energy issues or any of that sort of stuff, and children's biggest exposure to air pollution is at drop-off and pick-up time. What is causing that is the long line of parents in their SUVs idling in cars. It goes up almost 300 per cent, and it only takes a couple of minutes exposure to precipitate an asthma attack. So that is your easiest mitigation strategy, and it is the most obvious.

Dr CUMMING: And, Clare, can I add to that? When my German relatives came over and picked up my children from school, they were gobsmacked to see 450 parents there all at the same time with all their cars picking up their kids, because obviously in Germany they have buses that all the children would pile onto and they would be dropped off to their houses. We have an old system here in Australia that we think we all have to drive our cars to pick up our children rather than the school system actually picking them up and dropping them off at home.

The CHAIR: Sorry, Professor Scofield, you had your hand up there too.

Assoc. Prof. SCHOFIELD: Having done my drivers licence in Germany, you will fail if you do not turn your car off if you are stopped for more than 10 seconds. So that also contributes to the shock of the [inaudible].

Dr CUMMING: And, I mean, if public schools did that in the way of a bus system or anything like that, the things that need to would change—because we have culturally a very poor system of not looking after or understanding air quality for our children or air pollution exposure to our children.

The CHAIR: Thanks, Dr Cumming. Dr Ratnam, a question?

Dr RATNAM: Thanks very much. I have two quick questions. Firstly, in some of the areas you have identified as having particularly bad air pollution, so those really bad pockets, do you think it is bad enough that pedestrians and bike riders should be recommended to wear masks, for example?

And the second question is on a slightly different topic. You talked in your submission about the enforcement of emissions standards. So you talked about Victoria actually having good standards for particulate matter but they are not currently enforced and that being a significant problem. So could you expand on that—is it being enforced at all or is it just patchy? What do you think the issues with enforcement are, and what would be improved if we improved enforcement?

Ms WALTER: The issue is there is none. So put neatly and quickly, for industry they do have to meet licence standards, so there is some input there from the EPA, but, you know, if your neighbour is burning a wood fire or running a car outside the front of your house, what recourse for action do you have?

Prof. ANDERSON: Yes, and I think community spirit is very powerful. The Swiss have turned off their engines since the 70s. If you have your engine on, someone will tap on your car and tell you to turn your car off. They will do that—since the 70s. Even now the cars turn off automatically when you idle.

Ms WALTER: It is jail or a fine in America. In Utah you can go to jail for six months.

Prof. ANDERSON: It is easily done. People drive their kids to school because they want them to be safe in the car because they love them. That is their motivation.

The CHAIR: But also I think more modern vehicles are phasing out that style of vehicle. They are going to cut out as soon as your car stops, so if you are at lights, you hear that. That is a function of old technology, really, and these things are changing over time, but no doubt—

Ms WALTER: But we cannot rely on that change, because we are not seeing—

The CHAIR: No, I am not saying that. I am just saying that it sounds like we have not progressed from the 70s, where we have, so I am just trying to make sure we present a more holistic view about where we are going, because, as you all said earlier, things are not static. Things are changing. There are changes that are happening all over the place, but the reason why I have raised the vehicles is that is also a function of our federal government allowing old combustion vehicles to be dumped in the Australian market, so that is a function of federal government policy and I have said this before to other witnesses: there are only so many things that the Victorian government can influence, but when it comes to federal government policy there are things that are out of our reach.

Professor Schofield, you have got your hand up there.

Dr RATNAM: I think Robyn wanted to answer on the mask question if anybody wants to hear.

Assoc. Prof. SCHOFIELD: Yes, I was coming to the mask question. I think there are the low-emissions zones and some levers that you may have also, but masks are the last level of defence. If you can do anything to prevent the emissions, that would be an easier and better win, so low-emission zones and registration are probably levers that the Victorian government have to play with.

Dr CUMMING: Give us clean air.

Prof. ANDERSON: I could suggest to the committee, because we know where the problem areas are we can give you some examples of mitigation strategies that would be appropriate to those areas and summarise that information for the committee so that you do not have to trawl through. The literature is enormous and diffuse, but we can give you properly filtered information, so to speak, that would be useful.

Ms WALTER: I would be concerned from a psychosocial perspective about the masks, because I think in some ways it might have an unintentional effect of making more people use their car rather than active transport, which is the ultimate solution—that we cycle and walk more.

The CHAIR: Yes. Sure. Ms Taylor, there are 3 minutes left to go. Are there any other questions from you?

Ms TAYLOR: Well, just to your point about the pile-up of cars around schools, I was thinking that there is the health perspective of minimising the risk of kids getting knocked over as well with all those cars and people under a lot of stress, so I am just thinking: would you agree there are multiple levels of incentives, so to speak, to change behaviours around schools anyway?

Prof. ANDERSON: Definitely, just because people want their children to be safe, and once they understand what makes them safe they will act. As we have seen in other cities, once the mums know what to do, they change the legal structure to get what they need for their children.

Ms TAYLOR: Yes.

Assoc. Prof. IRVING: I mean, walking home is going to have great health benefits—providing the air is clean—walking home with mum or dad.

Prof. ANDERSON: Yes, I walk my kids to school.

The CHAIR: Great. All right, well, thank you all very much for your presentations and your evidence today. It has been really most insightful, so thank you again.

Witnesses withdrew.