REPORT ON PROCEEDINGS BEFORE

PORTFOLIO COMMITTEE NO. 2 - HEALTH

USE OF PRIMATES AND OTHER ANIMALS IN MEDICAL RESEARCH IN NEW SOUTH WALES

CORRECTED

At 814-815, Parliament House, Sydney, on Wednesday 1 June 2022

The Committee met at 9:15

PRESENT

The Hon. Greg Donnelly (Chair)

Ms Abigail Boyd
The Hon. Wes Fang
The Hon. Emma Hurst (Deputy Chair)
The Hon. Chris Rath

PRESENT VIA VIDEOCONFERENCE

The Hon. Lou Amato

* 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: Welcome to the second hearing of the Portfolio Committee No. 2 inquiry into the use of primates and other animals for medical research in New South Wales. My name is Greg Donnelly and I am the Chair of the Committee. I acknowledge the Gadigal people of the Eora nation, the traditional custodians of the land on which we are meeting today. I pay my respects to Aboriginals past, present and emerging. I also acknowledge and pay my respects to any Aboriginals or Torres Strait Islanders who may be joining us today, particularly over the internet.

Today we are hearing from a number of stakeholders, including evidence from the New South Wales Government. I thank everyone for making the time to give evidence to this important inquiry. While we have many witnesses with us in person, some will be appearing via videoconference today. I ask for everyone's patience through any technical difficulties we may encounter over the course of the day. If participants for one reason or another lose their internet connection and are disconnected from the hearing, they are asked to rejoin the hearing using the same link as provided by the Committee secretariat.

Before I commence I make some brief comments about the procedures for today's hearing. Today's hearing is being broadcast live via the Parliament's website. A transcript of today's hearing will be placed on the Committee's website when it becomes available. In accordance with the broadcasting guidelines media representatives are reminded that they must take responsibility for what they publish about the Committee's proceedings. While parliamentary privilege does apply to witnesses giving evidence today, it does not apply to what witnesses say outside of their evidence at the hearing. I therefore urge witnesses to be careful about comments they may make to the media or to others after they have completed their evidence today. Committee hearings are not a forum for people to make adverse reflections about others under the protection of parliamentary privilege. In that regard it is important that witnesses focus on the issues raised by the inquiry's terms of reference and avoid naming individuals unnecessarily. All witnesses have a right to procedural fairness according to the procedural fairness resolution adopted by the House in 2018.

If witnesses are unable to answer a question today and want more time to respond, they can take a question on notice. Written answers to questions taken on notice are to be provided within 21 days. If witnesses wish to hand up documents, they should do so through the Committee secretariat. For those participating in today's hearing via videoconference I ask them to state their name when they begin to speak, to speak directly into the microphone and to mute their microphones when they are not speaking. With respect to the audibility of today's hearing, I remind both Committee members and witnesses to speak into the microphone. Finally, could everyone please turn their mobile phones to silent for the duration of the hearing.

CORRECTED

Professor KEVIN DUNN, Pro Vice-Chancellor Research, Western Sydney University, sworn and examined

Professor WAYNE HAWTHORNE, Chair, Animal Ethics Committee, Western Sydney Local Health District, affirmed and examined

Dr SARAH TOOLE, Animal Welfare Officer & Veterinarian, University of Wollongong, before the Committee via videoconference, affirmed and examined

The CHAIR: We welcome our first witnesses. Thank you very much for joining us today. We know that you're all very busy, and we appreciate you carving out the time to be available today. I will ask each of you, if you wish to do so, to make an opening statement. I note for the record that submission 233 from Western Sydney Local Health District has been received, processed and uploaded to the inquiry's webpage. Submission 212 from Professor Dunn from Western Sydney University has also been processed and uploaded to the webpage for the inquiry. We don't have a submission from Dr Toole, but we very much welcome you here today to provide some insights into the work being done at the University of Wollongong. With that brief introduction, I will start opening statements with Professor Hawthorne.

WAYNE HAWTHORNE: My name is Professor Wayne Hawthorne. I am professor of transplantation at the University of Sydney, and I'm the director of the National Pancreas and Islet Transplant Laboratories at Westmead Hospital as well. I run the xenotransplant and surgical research unit at the Westmead research institutes. I'm currently elected the world president of the International Xenotransplantation Association. I'm also the President of the Australasian College of Biomedical Scientists. I'm here to provide support for animal research. My views and opinions are my own from some 30 years of experience in clinical and experimental research work.

As an active researcher, I have seen our research translated from basic laboratory research to become federally funded clinical transplant programs. We've successfully transplanted now more than 600 patients with kidney-pancreas transplants. We've transplanted patients with type 1 diabetes—more than 300 islet cell isolations—and more recently transplanted 13 patients with severe hypoglycaemic unawareness and severe pancreatitis. Our animal ethics committee oversees and provides counsel on all animal ethics matters relating to research utilising non-human primates and other animals across the Westmead campus. We oversight and promote the ethical, humane and responsible care and use of animals for scientific purposes on all active animal research projects for the many research staff on our campus. As legislated by the Animal Research Act and the animal research regulations, we work to the Australian code for the care of and use of animals for scientific purposes.

As part of my role, what we offer at the Westmead campus for all students and researchers that attend the campus—we provide a workshop as an introduction to research. A fundamental part of this is their understanding that medical research in the future will undertake research to investigate ways for them to diagnose, evaluate, elucidate, treat, cure or prevent various diseases or conditions. We do not do animal testing. We do not undertake LD50 tests or Draize tests, nor do we test pharmaceuticals or cosmetics, nor has our animal ethics committee ever had any researcher approach us to do so. We undertake our research to treat our sick and dying patients, to improve their quality of life and to improve their overall health. We look at them very holistically and we do this and question the best ways to improve their health care to save them from dying or undergoing problems with their health. We want to improve their lives for them, their families and the local community. Thank you.

The CHAIR: Thank you, Professor. I appreciate the opening statement. Professor Dunn?

KEVIN DUNN: Thanks, Greg. My name is Kevin Dunn. I'm a professor of geography and urban studies but substantively Pro Vice-Chancellor (Research) at Western Sydney University. Thanks for the invitation to participate in this important hearing. I do so on behalf Western Sydney University. As we stated in our submission, Western Sydney University welcomes the opportunity to assist the Committee here today. In summary I'd like to make a few key points. Obviously, everyone has had access to our submission but the five points I'd stress are: first, that Western asserts the importance of research involving animals in advancing medical knowledge and innovation and that the current Western Sydney University approved medical research projects have significantly improved human health.

My second point would be that the current competitive research and government grant funding processes do ensure scientific rigour through independent peer review. We feel that funding body processes, though, could perhaps lift their attention to ethical considerations so that, when researchers are seeking funding, the visibility and importance of animal ethics perhaps could be raised, as well as the costs associated with both the work involving animals and maintaining their welfare. That's our comment in regard to funding. We also would submit—and you would see it in our submission—that we regret the notable lack of funding in New South Wales and Australia to support innovation in the three Rs. We are of the view that, in contrast to other countries where they have nationally established bodies such as the National Centre for the Replacement, Refinement and

Reduction of Animals in Research in the United Kingdom—they provide research and resources for innovation to encourage researchers to adopt more proactive and innovative projects to directly address the three Rs. We would recommend the same in Australia.

The fourth point is that the integrity of the research efforts in this area is governed by legislation, including the Animal Research Act 1985 and the Australian Code for the Care and Use of Animals for Scientific Purposes, which we believe are working very well. We have, I think, world's best practice in animal research as a consequence. Respect for animals underpins all of the decisions and actions involved in the use of animals for research, as I perceive it, in this State. The code and the Act provide a robust regulatory framework to oversee and authorise animal research in Australia. That would be our position. The fifth point is that internationally the regulation of medical research involving animals is an ever-evolving space, and we should be dynamic and innovative. We recognise that there is a current debate around sentience. We support the continued intellectual debate around that, and we think that that is part of an important step forward again in the welfare of animals. But we are of the view that some level of consensus should be reached on the definition of sentience before it can be effectively operationalised in legislation, in codes et cetera. But we look forward to that occurring, and I look forward to further discussion today.

The CHAIR: Thank you very much, Professor. Dr Toole, I invite you to make an opening statement.

SARAH TOOLE: My name is Sarah Toole. I am the animal welfare officer at the University of Wollongong. I am a registered veterinary surgeon in New South Wales. I also hold a postgraduate certificate in laboratory animal medicine from the University of Guelph, Canada. UOW has one biomedical animal facility with housing for rats and mice which supports researchers at the university and the Illawarra Health and Medical Research Institute. UOW animals are sourced primarily from the ABR and the ARC. Any research-specific genetically modified lines are generally held and bred at ABR. As such, we have limited surplus animals, many of which have been rehomed through the Liberty Foundation. We established a small grants system in 2018 to support three Rs research. The small amount of funding that is available is insufficient to support any major initiatives. Further funding for refinement, reduction and replacement models is urgently required in Australia.

I am the only veterinarian employed at the university and have been here on a part-time basis since October 2015. I am responsible for the program of veterinary care. I have oversight of all training, and I conduct formal competency assessments prior to researchers commencing work with experimental animals. I closely monitor the welfare of the animals as well as compliance with AEC approvals and the code. I work closely with the researchers and the technical staff to create descriptive monitoring and intervention sheets for projects, which are regularly reviewed and refined. I attend the AEC meetings and advise the AEC on the welfare impact of proposals and any areas that I feel could be modified to improve animal welfare and standards. The chair of our AEC is external to UOW and is a veterinary pathologist and consultant in laboratory animal care and management. In addition, our two category A veterinary members, category C welfare and category D lay members are external. Our three category B scientific members are all UOW research staff.

UOW has been audited twice since I commenced in 2015. The 2017 ARRP audit resulted in a number of commendations and some recommendations. In 2021 ARRP was unable to conduct our audit due to resourcing shortages but approved an arrangement whereby we audited another institution and members of that institution audited UOW. Whilst we believe both institutions conducted the audits with the required rigour of an independent audit, we feel that additional funding and resources should be directed towards the regulator so that it can conduct this important process. UOW is embracing openness and has provided details of our animal use, including numbers and types of animals and categories of use on our public-facing website. We will be expanding on the information that we provide as time and resources permit. We would like to thank the Committee for the opportunity to appear at this inquiry and welcome any further questions that you may have.

The CHAIR: Thank you very much, Dr Toole.

The Hon. EMMA HURST: I'd like to start with some questions to Dr Toole. The University of Wollongong stated in a survey that it had determined two years ago that forced swim tests were not ethically justified and would only be approving if they were being used to develop alternatives. Can you explain why the university would reach that decision and what the animal welfare concerns are with forced swim testing?

SARAH TOOLE: A forced swim test is a test where an animal is, basically, placed in a large barrel of water. The water height is such that the animal can't keep its nose above the level of the water. It has to actually actively swim. It's used by some researchers as a model of anxiety or, in some cases, depression. It's used in both rats and mice. In the time that I have been at UOW, it has been used in a number of rat studies. We have had some adverse events with that particular test. We had quite a few rats that were large, male rats that had been housed in conventional laboratory housing for a number of months. When they were in the forced swim test, we had some drownings occur. The test is conducted with researchers watching the rats.

The rats should actually be actively swimming. What they say is that, when the rat decides just to float or gives up trying to make escape attempts, that is a helplessness or a way of assessing depression or helplessness, anxiety. We had these incidents where the rats didn't die straightaway. Basically, it was aspiration of water that wasn't detected. The rats subsequently died, after the test. It was confirmed by post-mortem examination and histopathology on the lungs. Those issues were brought to the attention of the committee. The committee reviewed some videos of that test and subsequently decided that they would only allow that test if it was being used in parallel with an aim to look at alternatives to that test. Since the committee made that decision, the test has been conducted once this year. That was a study that was designed particularly to look for alternatives.

The Hon. EMMA HURST: Professor Hawthorne, on the same survey, your ethics committee had said that there isn't any applications for a forced swim test but that such procedures would be unlikely to be approved by the AEC. Can you explain why that particular view was formed on this particular experiment?

WAYNE HAWTHORNE: We've never had an application. That's based around the fact that we do different types of research. Ours are very much clinically directed. We don't have many mental health studies. So from that aspect, we don't necessitate utilising those sorts of tests. The reason we would avoid that is simply because we don't have appropriate facilities to undertake those sorts of tests. Without the appropriate facilities, appropriate training and appropriate oversight, then we wouldn't want to undertake those, obviously.

The Hon. EMMA HURST: Thank you. I'll go back to Dr Toole. Another experiment that has drawn a lot of attention during this inquiry is the nose-only smoking experiments. Again looking at this survey, it says that the University of Wollongong committee concluded it would not approve the use of nose-only smoke inhalation procedures, because it would not meet the code's requirements for refinement and ethical justification. Can you explain some of the welfare concerns that the university has with these smoking tower experiments?

SARAH TOOLE: I actually have no experience with any sort of smoke inhalation test. I've never seen one performed. We haven't had them happening at the university in the seven years that I've been there. So I really don't think I can comment on that. I know that the chair of our committee has worked in institutions with that test, and the committee did discuss it, but most of the members of our committee have no experience with that test.

The Hon. EMMA HURST: We have heard a lot about facilities with non-disclosure agreements. You mentioned in your opening statement that you do run a rehoming program, which is good to hear. There was an article printed on the weekend in *The Sunday Telegraph* that talked a little bit about these non-disclosure agreements that often come with rehoming of animals and that they can actually serve as a way to silence rehoming groups, and that sometimes some of these rehoming groups felt as though it was almost like a threat that animals would be killed or not rehomed if information was disclosed. Are you aware of that, and do you think it should be a concern? Should there be certain species of animals, like cats and dogs, where we have a mandatory rehoming regulation put through to make sure it is done properly?

SARAH TOOLE: I will start by talking about the University of Wollongong's position on rehoming. We only really have rats and mice as our biomedical animals. We do have an arrangement with the Liberty Foundation to rehome any suitable animals through that organisation. I was involved initially when the legal agreement was drawn up. Our agreement does state that the Liberty Foundation is not to disclose that any particular animals have come from our institution. My personal opinion—and I make it clear, this is my personal opinion—is I don't see any issues with people knowing that the animals have come from our institution. I also personally would say that animals like cats and dogs that have been used in research should be made available for rehoming, but those animals would need to be assessed as suitable for rehoming given their behaviour and what procedures have been performed on them.

The Hon. EMMA HURST: One issue that has been raised in this inquiry is honours students using animals for research. Do you feel that there are concerns about honours students using animals for research, particularly given some of the concerns raised, such as that a lot of these projects are re-runs of projects with a known outcome?

SARAH TOOLE: The situation we have at UOW is that we do have a number of honours students doing projects in our biomedical facility. Because honours is a very short time frame, most of those honours students are actually brought into an existing research program. It would be very unusual at UOW for an application in biomedical research to be submitted purely for an honours student, simply because of the time that it takes to go through the ethical review process and get approval and then get training underway—all our researchers have to be trained before they can order animals in—and then to actually complete that within a year.

The situation we have is that honours students will come in and be added to a project. They may be responsible for a small arm of that project and looking after them. But we also at UOW have some guidelines surrounding what sort of procedures honours students can be trained in because of the limited time they are in the

facility. Mostly our honours students are only trained in general handling of the animals and health and welfare checks. It is very rare for us to actually train an honours student in anything invasive such as injecting animals. They will be trained in certain restraint procedures for other people to give injections, but it is quite rare for us to actually train an honours student for injections or anaesthesia. We do that sort of training for PhD students, but generally not for honours students.

The Hon. EMMA HURST: Do you think that that should be across the board?

The CHAIR: We are going to stick to times. Ms Abigail Boyd.

Ms ABIGAIL BOYD: Good morning to all of you. Just picking up on that point, in terms of students undertaking animal research from a training perspective as opposed to being something that is part and parcel of an existing research project, Dr Toole, do you think that there should be restrictions imposed on that sort of pure use of animals for a training purpose?

SARAH TOOLE: I make it clear that I'm voicing my personal opinion here, not the university's position. My opinion is that honours students should not be trained in invasive procedures. I don't believe that there is justification to subject animals to training for such a short period of potential use time, and that the cost to the training animals is not outweighed by the benefit. It is outweighed by the benefit, I mean. So there's too much cost to the animals for a short period.

Ms ABIGAIL BOYD: Thank you, that is very clear. Professor Hawthorne?

WAYNE HAWTHORNE: I could add my own personal opinion to that as well. Just as a blanket rule, honours students, as Sarah was just saying—they are there for such a short duration that they're never assigned to undertake active research work per se without direct guidance, direct support by a supervisor, and they do not undertake any type of invasive procedure. What they generally are assigned to do is to take part in the experiment from a peripheral standpoint, as Sarah was saying, to hold an animal. They may be involved with health checks, as in, they will go down and be taught how to handle the animals, and then to weigh them on a daily basis. So they are simple things; they are not taking part in doing major types of experimental work. They are not there for long enough, and as a general blanket rule, we do not support that sort of thing. It is different when you have got a PhD student who is with you for four years.

Ms ABIGAIL BOYD: Could I clarify, when you say they are not involved in experiments and research, does that also mean they're not involved in this sort of training on invasive procedures as well?

WAYNE HAWTHORNE: Sorry, I should clarify. They're involved with the research projects, they are assigned and they are signed off as being part of a research project, but they do not do anything that is of an invasive nature per se. It is more the handling—simply because they're there to be part of an experiment. As a researcher, I would never get an honours student to do anything such as injections or take bloods, or anything like that, because we want it done how we've been doing it with our trained staff. They will help analyse the samples, and that is generally what you get them assigned to do—is to take part in the other aspects from a laboratory standpoint.

Ms ABIGAIL BOYD: But to be clear, outside of the research project context, is there any separate training that goes on using animals?

WAYNE HAWTHORNE: Yes. Using my opening statement, all honours students have to undertake a training program. They all have to undertake the ITAR course before they actually are allowed to even enter the facilities. We also have our own in-house training, and as part of that it's assigned to a training module and then they're assigned to their individual senior principal investigator and group to train them how to handle a mouse or a rat or whatever, and then to do things like weighing the animals.

Ms ABIGAIL BOYD: But not invasive procedures—

WAYNE HAWTHORNE: Not invasive, no. Not in our facilities.

Ms ABIGAIL BOYD: Could I ask you the same questions then, Professor Dunn?

KEVIN DUNN: Sure, Abigail. I mean, as a principle, in the area of our research with animals, research and training go together. That would be my first principal comment—and that a researcher in this area needs to have training in animal care. Some of that training might be at a very basic level, and for students at lower levels. Animal care, husbandry, principles, three Rs principles—all of those sorts of things. That's essential. Deeper levels of training around other types of experiments, invasive procedures, would be attached to where the research was necessary or where the research was involved. You wouldn't do that sort of training, particularly if it affected an animal, just for the sake of training.

Ms ABIGAIL BOYD: Dr Toole, I understand that you're a vet as well as an animal welfare officer at Wollongong, but I understand that some institutions don't have a vet. Does that concern you? Do you think it should be a requirement that every institution researching on animals should have a vet?

SARAH TOOLE: In my opinion, yes. The code states that there has to be a program of veterinary care and somebody with either veterinary or other appropriate qualifications responsible for veterinary care, but it does not stipulate that that person has to be a veterinarian. I believe that it was a recommendation to UOW from ARRP in an audit before I commenced that they have a veterinarian on staff. I believe that all institutions should have a veterinarian on staff.

Ms ABIGAIL BOYD: Professor Hawthorne, do you have a veterinarian on your staff?

WAYNE HAWTHORNE: My own personal staff, I've employed more than two or three vets at any one time to take part in our research work to oversight. But in terms of our campus, our director of animal care is actually a vet. We also then have a consultant veterinary anaesthetist, or several veterinary anaesthetists, that help with the research projects and advise in animal care. There are a number of other—four or five—vets on our campus that are part of the programs. I think that's integral to research projects. There's also consultancy through universities et cetera to help those facilities that don't have vets on staff so they can actually have access to vets for research.

Ms ABIGAIL BOYD: Is that the case as well for you, Professor Dunn?

KEVIN DUNN: Yes, our animal welfare officer is a trained veterinarian; so was the one before, and so was the one before that. Many of our approved ACEC research projects involve veterinarians as chief investigators.

The Hon. CHRIS RATH: Thank you so much for your evidence so far. Do you think we have a strict regulatory regime here in New South Wales? That question is to all three of you.

KEVIN DUNN: I will go first; I am sure that Wayne has a bit more to say about this. We have a good and robust regulatory regime. "Strict" is a particular word that I wouldn't use. Many researchers may see it that way but that's tough, because it has to be that way. I think we have a high-quality regulatory regime and it delivers good outcomes.

The Hon. CHRIS RATH: There is probably where the regulations are and then probably you would go, in your various campuses, a bit above and beyond that?

KEVIN DUNN: Absolutely. That is the role of our ethics committee, too, to continually lift the bar in this regard. As you'd be aware, the way an animal ethics committee is constructed in terms of its membership is intended to do that as well.

The Hon. CHRIS RATH: This may be a question to you, Dr Toole, about the forced swim test. I am just trying to get my head around why those tests are used. What potential medical benefits would you say could come from those tests?

SARAH TOOLE: I'm not an expert in that field of research, but generally they're used by researchers that are investigating mental health disorders. The way it has been used at UOW is that a researcher may be looking at a new or alternative medication that may help with depressive states or anxiety states. What they do when they have the test is they would have a control arm of animals—animals that are not receiving any medication. Then they would have animals that are receiving a medication which is known to be effective, for example, something like Prozac, and then they would have their test medication and they would have a cohort of animals on that. Then they also use different strains of animals. There are a number of strains of rats and mice, and some of those strains might be more inclined to exhibit depressive or anxiety states. Each animal would have the same type of treatments and a number of behaviour tests, not just the forced swim test, to assess how their behaviour is changed by that medication that is given. It is a very contentious test, and a number of pharmaceutical companies do not use it because they do not feel that it actually provides robust information. Does that answer your question?

The Hon. CHRIS RATH: Yes, it does. I'm just trying to understand because it came up a few times in the first day of the hearing, the forced swim test and also smoke inhalation. I am trying to understand, is opinion divided within the profession about whether there are benefits or is it the ethical concerns that outweigh the benefits? I think the Committee would appreciate an understanding of that.

SARAH TOOLE: I think there are a lot of ethical concerns about it. But we have had researchers who have been very adamant that if that test was to be banned, they would no longer be able to do their research. We did have very robust discussions about it at UOW. We had some research groups that were quite upset about the

fact that they would have to provide further justification or include an additional arm of the study to look at alternatives. Since UOW came up with the position of only approving it if there was an arm to look at alternatives, we haven't had any researchers apply to perform that test. One of our technical officers received a scholarship from the industry and her project was specifically looking at alternatives to the test. Following that project. she did have to conduct the forced swim test as well as other alternatives. That has only just been conducted and the data has not been analysed as yet.

The Hon. CHRIS RATH: Professor Dunn and Dr Hawthorne, any views you might have on the forced swim test and the smoke inhalation, any ethical concerns compared to the medical research benefits?

WAYNE HAWTHORNE: Can I just say from our perspective we have never done it and we have never been approached to, obviously because we are a different type of health and medical research institution. So I have no comment on that. I will take you back to your previous question, with regard to how we legislate and how regulations are. I think they are appropriate for what we do. With regard to non-human primates in particular, there are extra barriers there and extra assessment.

If you go to apply for a non-human primate research project, you have to go to your own institutional ethics committee, then the ethics committee from where the animals would come from. You also have to report to ARRP and you also have to report to the NHMRC non-human primate committee. There are a number of checks and balances there before you undertake any of those specific types of research. I think the appropriate level of guidance and assessment is there. Regular assessment by the ARRP also oversights our committees. I think it is appropriate. Looking towards the three Rs, I think obviously we can put in more infrastructure and more support, as Kevin said earlier. But we need that financial support to be able to do that.

The Hon. CHRIS RATH: Do you have any observations?

KEVIN DUNN: I am not aware of any protocols at Western. I will check on notice and get back to you on animal ethics matters. Any experiment needs a very credible and considered response.

The Hon. CHRIS RATH: That will be good, just on those two tests. It has come up a few times and I think it would be good to understand what they are used for and what the benefits are versus the ethical concerns with using them. That would be great, thank you.

The Hon. WES FANG: I just wanted to put things into a wider perspective. Professor Hawthorne, can you provide us with some real-world examples of how the research and also the procedures that are undergone in your area are actually benefiting people and making a difference in their lives?

WAYNE HAWTHORNE: Sure. That is an easy statement to make. As per my opening statement, I have been involved with a number of programs that started in their infancy, looking in the laboratory, trying to treat patients with type 1 diabetes and renal failure. The wonderful thing there is, obviously, we have been able to take them through from the bench side, from laboratory basic cellular testing, through the murine models to porcine models to then develop the specific ways of doing the diagnosis of, the management of, transplantation, diagnosis of rejection, use of the various drugs and ways in which to minimise rejection, immunosuppression, and so on.

As I've said, we've transplanted now and got Federal funding for our national pancreas and also a second program, a national islet cell transplant program, benefiting almost a thousand patients directly, and that's affected them dramatically because they've had a kidney transplant and a whole pancreas transplant—changed their life, changed their quality of life for them and their families. The patients that have received islet cell transplantation specifically for type 1 diabetes and hypoglycaemic unawareness—that's where they can't detect a low blood sugar and will collapse and die from their low blood sugar—we've done more than 300 of those islet isolations for transplantation and benefited those patients. They no longer need to take exogenous insulin and are cured from their hypoglycaemic unawareness, so essentially saving their lives.

The children that have undergone more recently, we have done 13 auto islet cell transplants. This work was all done in our basic laboratories—even the simplest things of how we do the surgery, how we actually then isolate the islets and are able to transplant those patients. Most recently there was a program on SBS, one of our patients, little Mila—of great benefit. She was dying in acute pain, agonising pain, from her severe pancreatitis. We removed her pancreas—her duodenum and the lower end of her stomach and then took the pancreas. Through our research we were able to isolate the islet cells and put them back into her liver. She is now off of all exogenous insulin. She does not require any insulin and she suffers no more chronic pancreatitis pain. So they do have dramatic effects. Again, this is just my own personal work. We have many hundreds of other of these sorts of things that have come through Westmead, not to mention every other research institution in New South Wales, Australia and around the world.

The Hon. WES FANG: Is it fair to say that animal research played a large part in being able to reach those milestones and achieve the outcomes that you've got?

WAYNE HAWTHORNE: Absolutely. It was the underpinning reasons that we were successful in being able to do it and, again, being nationally funded. Worldwide, the institutions that are very similar to us and have got similar programs, we all utilise the background of our research work. We go to Congress, present our data and we share. I went overseas to actually train in a number of institutions and we have other people come to our institutions to train on the same sorts of things, so we share our data, we share our expertise and give these benefits round the world to as many patients as we possibly can.

The Hon. WES FANG: Would you have been able to achieve the same outcomes if, say, for argument's sake, animal testing was not permitted?

WAYNE HAWTHORNE: Animal research, if it's not undertaken—

The Hon. WES FANG: Sorry, animal research is correct, yes.

WAYNE HAWTHORNE: —we would categorically absolutely never have had our transplant programs happen. There is a huge interaction. It is fine to say we can test things on a chip. We can look at organoids, organelles, Petri dish cell assays—they're appropriate for basic understanding of a simple single pathway. What we're talking about in our context, certainly for transplantation, is thousands of pathways that you cannot mimic, you cannot change or have them happening in a single entity such as a microchip or an organoid or any sort of cell culture. You've got to think you've got an immune system, a haematological system, biochemical pathways, endocrine pathways, neural pathways, let alone the surgical aspects or the after care. There are so many interactions that happen within an animal that you cannot mimic in cell culture or any other model of this type. Obviously, we would like to have the ability to do so, to pre-test and so on, and we do a lot of this pre-testing in our various models before we go to mice or larger animals. But categorically, no, we would not have our programs that we have got.

The Hon. WES FANG: Professor Dunn, is the experience in your centre similar?

KEVIN DUNN: Yes. We would point to brain cancer treatments that have been delivered. Some of those are mentioned in our submission, but also medicinal cannabis use from animal research with mice. Yes, absolute clear benefits.

The Hon. WES FANG: Apologies, I have run out of time. Thank you for your insights.

The CHAIR: For my questions I draw on content in the submissions and also comments made in the helpful opening statements. Professor Dunn, in your submission on page 3 under (d), the comment is made in the third paragraph:

> Within the research community in NSW, there is growing consensus that the current method used by the NSW Department of Primary Industries (DPI) to collect data on animal usage statistics in research and teaching activities requires revision.

Can you elucidate on that to help us understand this emerging view and the thoughts about how that is best addressed?

KEVIN DUNN: There is a little bit of detail in there, but thank you for drawing attention to it. The big distinction is between wildlife-based research and research which is occurring within our facilities. To me, they are categorically different in terms of the interaction with the animals involved. At the moment, treating them the same in terms of the count of animals inflates the extent to which animals are being used for medical research or for research generally, particularly where they are very low levels of observation. That is just a recommendation with regards to the data gathering that we are making.

The CHAIR: I will stay with you at the moment, Professor Dunn. In your submission at page 2 under (c) you reflect upon the lack of funding opportunities in New South Wales and Australia to support research into the three Rs. I will ask all three witnesses to comment, starting with you, Professor Dunn?

KEVIN DUNN: First, I would say that as a sector I think in Australia, and New South Wales in particular, we have done very well. It is just that I jealously look at other jurisdictions around the world where there is a coordinated investment to encourage universities to even push this further. We could go further. We could do more in terms of our innovation on the three Rs if we were provided with the resources to do so. I think we could coordinate that effort as well, in New South Wales for instance, if the resource was there. And I know that, because of the great advances we have already made.

In our submission we make reference to some of the examples of each of the three Rs anyway at Western Sydney University. The UK offers a funding scheme annually. It is a two-part scheme. One is for major projects up to £75,000. There is also a smaller scheme in which people can get salary subsidies and focus on innovation

in this area. It does expressly proscribe funding for facilities and equipment. That is appropriate, because that is in the commercialisation realm, maybe. But I would encourage in Australia for us to look at something similar.

The CHAIR: Professor Hawthorne, would you like to comment?

WAYNE HAWTHORNE: I guess I would echo Professor Dunn's comments. Certainly, we struggle as it is to get appropriate funding. Funding levels are around 8 per cent success when you apply for an NHMRC grant, so you are struggling to get your basal research funding these days. It is highly competitive. Outside of the current schemes, I think—and certainly this is my own opinion—that we should have additional State-based funding directed to help support the three Rs. We certainly would welcome that to allow us to undertake any sort of research that could help develop changes to the three Rs.

The CHAIR: Dr Toole, would you like to comment on the three Rs, and enhancing and improving that position in New South Wales?

SARAH TOOLE: Yes. UOW has, as I mentioned in my opening statement, a very small grant, and it's in the order of $3,000 and $5,000 that we have been able to make available over the last couple of years. We receive a small number of applications because it is such a small amount of money that we are able to offer. It really isn't sufficient for anybody to look at replacements. Often the researchers that apply for those grants at UOW are looking at ways to refine their research. For example, they might be wanting to look at an analgesic we used in their model, and so they want to run an additional arm of the study using an analgesic. Yes, we definitely need a lot more money available for research and funding in refinements, reductions and ultimately replacements.

The CHAIR: Professor Hawthorne, if I could just take you to your submission, particularly on page 4 under (b) in the second paragraph. You helpfully give some perspective there about the matter of progressing to clinical trials and the steps leading to that. It's all compressed into one paragraph, but halfway down that paragraph, at about the fourth line, you say:

> Given the timeframes and costs involved only those drugs that stand the best possible chance of success can proceed to clinical trial. All of these have been developed and trialled in animal studies at several levels of testing.

I'm wondering if you could just elucidate that a little bit because there has been some evidence to the inquiry, both in submissions and oral evidence, that seems to suggest that it moves relatively quickly and perhaps in a less than rigorous process before something gets to a clinical trial. In other words, it can move pretty quickly and all sorts of things can be done in a clinical trial, particularly in the area of—I'll use the vernacular term—the wastage of animals in experimentation. I know there's not much time, but in terms of the rigour around the clinical trial process and getting to that, could you give us a sense of what's involved?

WAYNE HAWTHORNE: Certainly I'm no expert in this area, but I can make comment from the point of view of our own experience trying to get agents that we use as immunosuppressives. You mentioned timescale; I guess it's all relative. Ten years or 15 years for us is a quick time. Certainly development of vaccines like we've seen for COVID—that happened over a period of only two years. The difference there is you've already got decades of research that led to a number of things that underpinned the development of those vaccines. Likewise with a number of pharmaceutical agents—certainly immunosuppressives can be tested in various other models prior to being used in research projects or then getting to a clinical trial. The clinical trial process is obviously human patients that undergo trials with those agents. To get there, though, it's only the best drugs that have the appropriate use on that specific target that will get to those trials.

The CHAIR: Perhaps the other witnesses could comment about the phrase "best possible chance of success". That's very hard to define with any specificity. Is that essentially a process of distillation—of looking at what the possibilities are and the likelihood and the judgement made over time to go in a particular direction?

WAYNE HAWTHORNE: I will make the example from my own research and that is, basically, we try to define a number of immunosuppressive agents that have been developed and used for different organs. We may start with models that have been developed and we know clinically that kidney transplantation sort of leads the field. Specific immunosuppressive agents—one called belatacept is being trialled clinically in kidney transplantation. We felt that that would be of benefit potentially for islet cell or pancreas transplantation. So it's already been tested or trialled clinically in the kidney model, but we then went back and utilised it in our animal research projects, looking at a number of other immunosuppressives with that agent. We've also shown that it has effect for pancreas and islet cell and it is now being used in a clinical trial. So things can be streamlined by looking at different aspects. It doesn't mean that we've tested five or 10 other agents to get to a specific agent. It's more how we look at the overall modelling. That's what that broad statement is sort of trying to say.

The CHAIR: Well, time has beaten us. I've certainly got more questions but they'll need to go on notice. So if you're agreeable other members and I will place questions on notice.

WAYNE HAWTHORNE: Absolutely.

The CHAIR: Once again, I know the time has been relatively short, but it's been an opportunity to ask you a range of questions. We appreciate you making time available so thank you very much.

WAYNE HAWTHORNE: Thank you for your time and thank you for the questions.

(The witnesses withdrew.)

Professor KAY DOUBLE, Professor of Neuroscience, Chair of Animal Ethics Committee, University of Sydney, affirmed and examined

Dr SUSAN MAASTRICHT, Director, Research Integrity and Ethics Administration, University of Sydney, affirmed and examined

Dr TED ROHR, Director Research Ethics & Compliance Support, University of New South Wales, affirmed and examined

Dr CHRISTOPHER McCARTHY, Chair, Animal Care and Ethics Committee, University of Newcastle, sworn and examined

Professor BRIAN KELLY, Pro-Vice-Chancellor (Research), University of Newcastle, sworn and examined

The CHAIR: We'll move then to our next set of witnesses. Good morning and welcome to you all. Thank you very much for making yourselves available. We know you're very busy in your professional roles. Thank you all for your respective submissions. By way of formal recognition, submission 217 of the University of Sydney, submission 221 of the University of New South Wales and submission 231 of the University of Newcastle have all been received, processed and uploaded to the webpage for the inquiry. First of all, I invite each of the organisations to give an opening statement. Normally we'd have individual opening statements, but that would be five opening statements. We can do that if you wish, but perhaps a person has been delegated for each university. Perhaps we will start with the University of Sydney.

KAY DOUBLE: I am a professor of neuroscience. I'm a biomedical researcher and I'm also the chair of the Animal Ethics Committee at the University of Sydney. I am joined today by Dr Susan Maastricht, who is director of research integrity and ethics administration at the university. Professor Belov, who is the interim deputy vice-chancellor of research, extends her apologies as she is unable to attend today. The University of Sydney has a strong commitment to animal welfare. We welcome the opportunity to assist with this inquiry. We'd like to reinforce several key points in our submission.

First, research involving animals continues to play a critical role in improving human health and in treating disease. Second, the university supports alternatives to animal research wherever possible. However, further government support is needed for three Rs research. Third, the current method of reporting animal use requires revision. Finally, we need to retain Federal legislation specific to animals in research and teaching. Animal-based research underpins medical breakthroughs that improve human health. In Australia, the Therapeutic Goods Administration requires evidence of safety, derived from controlled animal studies, for the registration of therapeutic drugs and devices. But, on the other hand, much animal-based research is specifically directed to improve animal health and welfare. We are moving towards replacing animals in research, but progress is impeded because of the lack of three Rs research support from State and Federal governments. We recommend that the New South Wales Government supports the establishment of a national three Rs centre, charged with support, training and grant provision for three Rs promotion and research.

Active collaboration with the NHMRC and the ARC for a three Rs centre could be vested in the Australian and New Zealand Council for the Care of Animals in Research and Teaching—ANZCCART—which would see Australia move more rapidly towards embracing the three Rs, including the replacement of animals in research. Inconsistent reporting of research animal activities in different States and Territories, and including all animals involved in biomedical, veterinary, wildlife, environmental research and teaching, significantly distorts animal research statistics in Australia. Other countries report only animals directly used in biomedical research. This could be addressed by a harmonised national reporting system embedded in legislation, as seen in the EU and the UK. We also recommend that the New South Wales Government urge the Federal Government to improve resourcing of ANZCCART to deliver support and administer an openness agreement to facilitate greater transparency, community confidence and the social licence that we currently receive for animal research. Thank you. We are happy to take questions.

TED ROHR: Thank you for the invitation to participate in this important hearing. I appear here on behalf of the University of New South Wales in my capacity as director of research ethics and compliance support. Our apologies that Professor Edna Hardeman was unable to accompany me today. With this statement, I would like to outline the core points of our submission. We conduct world-class research on twenty-first century biomedical challenges and are affiliated with prestigious medical research institutes, many of whom have also presented to this panel. We receive significant research funding from NHMRC and MRFF, and our research efforts are underpinned in part by animals other than non-human primates.

In this context we have outlined our strong commitment to ensure that this work is reviewed prior to commencement, to maximise its benefits for human and animal health and the environment, and that strong

safeguards are in place around any risks that would arise as part of this research. We also have strong safeguards in place for animal welfare, from the review of all research involving higher order invertebrate and vertebrate animals prior to commencement, to continuous monitoring by our animal ethics committees and animal welfare team, to world-class training and emergency care.

Importantly, UNSW has decided to commit significant funding towards a dedicated research facility using high-level imaging and other technology to advance the three Rs through the use of organoids to mimic the behaviour of human organs et cetera. We have so far set aside $170,000 for staffing and $250,000 for equipment, with more to come. Further investment in this exciting opportunity will come in our collaboration with the Prince of Wales Hospital and other partners. Already 50 UNSW and affiliated researchers have expressed interest in using this facility.

I would now like to reaffirm our recommendations. One, consideration should be given as part of this inquiry to steer a discussion at the national level towards the regulation of animals used in research, equivalent to the oversight of gene technology research by the Commonwealth Office of the Gene Technology Regulator. Two, reporting of animal usage should be considered in the context of openness and transparency and be meaningful for the informed public. Three, the regulation of animal use needs to be considered in the international context and environment to really be able to achieve best practice. And, four, investment from the New South Wales Government towards initiatives such as the three Rs and the repeatability of animal research would be invaluable to retain our top international standing. Thank you.

The CHAIR: Thank you very much, Doctor. Professor Kelly, will you be making an opening statement?

BRIAN KELLY: Yes, I will. Thank you.

The CHAIR: Please proceed.

BRIAN KELLY: Thank you very much for the opportunity to be here today. I am Professor Brian Kelly, Pro Vice-Chancellor of Research at the University of Newcastle. As mentioned in the introduction, I'm accompanied today by Dr Paul McCarthy, who is the chair of our Animal Care and Ethics Committee. I wish to acknowledge the traditional custodians of the lands on which we are meeting today and pay my respects to their Elders past, present and emerging. The University of Newcastle has a long history of health and medical research, and our studies have a clear aim: to help people live better, healthier lives. We understand that involving animals in research is and can be a challenging subject. We also know that animal-based studies are leading to better treatments for conditions such as stroke, mental illness, asthma, COVID-19 infection, chronic pain and a range of cancers. Animal models are carried out in combination with other technologies to help us better understand and treat disease. They do not perfectly mimic what happens in the human body, but neither do molecular methods, cell cultures or clinical trials for that matter. Animals do, however, provide an essential degree of guidance and confidence that enables subsequent clinical testing to proceed more safely.

For example, one of our research teams developed a nasal spray to help fight COVID-19. This group was initially investigating ways to counter severe illness caused by cold and flu viruses. When COVID-19 hit, they pivoted. In April their innovation entered phase two clinical trials to further test efficacy and safety in humans. If successful, this treatment could complement COVID-19 vaccines, particularly where a vaccine may be less effective or in particularly vulnerable individuals. Another team pinpointed a cell that's behind health conditions affecting the uterus, including endometriosis and infertility. Researchers collected tissue samples from a large number of women while also using laboratory models to test their findings. Their work provides a framework to help scientists better understand potential treatment options for uterine disorders.

Our researchers are also adapting medical technologies created for humans, such as IVF, and using them to help our native species, including the now endangered koala. We remain committed to the three Rs of animal-based research: replacement, reduction and refinement. We would welcome greater investment in the development of viable alternatives to animal models, but funding to advance this is limited. We would also welcome greater investment in central research infrastructure as recommended in the 2021 National Research Infrastructure Roadmap. Given our State's strong track record in health and medical research, we encourage the New South Wales Government to also consider opportunities that could enhance the collective capabilities of our research institutions so we can continue helping people to live better, healthier lives. Finally, I wish to reiterate the firm commitment of the University of Newcastle to animal welfare and the highest ethical standards in the conduct of our research. We welcome this opportunity to talk with you here today.

The Hon. EMMA HURST: I want to ask some questions of Dr McCarthy and Professor Kelly. Newcastle university has come under quite a bit of scrutiny in this inquiry about the approval of nose-only smoke experiments. Are these experiments still approved and currently running at the university?

CHRISTOPHER McCARTHY: That's correct.

The Hon. EMMA HURST: We have heard evidence at this inquiry—somebody actually suggested in the last day of inquiry that one of the members of the Newcastle Animal Care and Ethics Committee had objected to the smoking mice research. I am wondering, first of all, if that is correct or if you are aware of it? If so, how was it approved if one or more of the animal ethics committee members did not want to approve the project?

CHRISTOPHER McCARTHY: Sure. That was before both our times, so I can't speak directly to the events that occurred around that time. I joined the committee after that had occurred. My understanding was that there had been consensus on the protocol that had been put forward to the committee.

The Hon. EMMA HURST: One document highlighted a significant number of deaths—102 deaths—between April 2018 to June 2020, with 73 of those deaths directly related to the smoking tower. Asphyxiation, essentially, was the primary cause of death. We also heard this morning that one of the universities cancelled or made a decision not to approve any more projects from two deaths, but we are hearing that there were over 100 deaths in these projects. I am wondering why these projects are continuing to be approved and run by the university despite what seem to be quite significant numbers of deaths?

CHRISTOPHER McCARTHY: I can speak to a little bit about that in that I was a category A member on the committee with one of those events. I can't speak to all of those, unfortunately. There had been a failure of the machine at that time, which made the numbers obviously larger, rather than it being a series of smaller incidents, which is why the number was large. At that time the machine was shut down and investigations were performed and no processes were allowed to go forward until the ethics committee had received information from the engineers that the machine was safe to use. After that event there had been a cessation of all animals in that model until the confirmation had come through. Since that incident, engineering and ethics committee involvement put more stopgaps to try to ensure that that incident would never be repeated again. Since that time, the cause of that incident has never been repeated.

The Hon. EMMA HURST: How many animals died in that specific adverse event?

CHRISTOPHER McCARTHY: I don't have that detail before me immediately, but I can certainly take it on notice for you.

The Hon. EMMA HURST: Those 102 deaths occurred from various adverse events, is that what you are saying? But the only one that you were involved in was that particular one?

CHRISTOPHER McCARTHY: That was a series, is my understanding. The one that I was involved with, I believe there were maybe 20 deaths from the machine. Again, I would have to take on notice the exact numbers. I am sorry.

The Hon. EMMA HURST: Thank you. Do you have plans to phase out the smoking tower experiments in the future, or does the university have plans to continue to approve these projects going forward?

CHRISTOPHER McCARTHY: Look, I think, on behalf of my committee—and I think I speak on all researchers—the day we don't need to use any animal models would be a good day. At this moment, we don't have, from my understanding from the researchers—and we always ask the researchers this question, every protocol, is please justify to us the need for an animal model. At this stage, my understanding is that the researchers do not have an alternative that would remove the animal model.

The Hon. EMMA HURST: Has the university or the Animal Ethics Committee received complaints about the smoking experiments, or anyone involved in the smoking experiments? If you have received complaints, can you talk a little bit about what those complaints have been?

CHRISTOPHER McCARTHY: I'm not aware of any obvious complaints but, again, I can take notice on that. My understanding is we have acted upon any adverse events that have occurred from the machine. So the ethics committee are involved in any death, obviously, and any adverse event. Every adverse event that comes to us from any animal model, it goes through the committee and we discuss why it occurred, how it occurred and what could be done to prevent its re-occurrence. Any complaints that may have come, I guess, through researchers about an adverse event, we would certainly have dealt with. The university does have its own complaint process. The ethics committee works independently, as I'm sure you're aware, of the university. But I believe there would obviously be that process available.

The Hon. EMMA HURST: I want to ask about the nose-only apparatus, because that's something that has come under quite a lot of criticism. Some people who aren't necessarily against the use of animals in experimentation have been specifically against this experiment because of the nose-only apparatus. My understanding is that if the animals move they can suffocate, if they wet themselves they can die of hypothermia, and some people within the research industry are saying that it's this actual apparatus that's causing an enormous welfare impact and a lot of animals dying, and there are alternatives. I'm wondering why the university is

continuing to use the towers despite the criticisms for that massive welfare impact, when other people in the same space are saying that there are alternatives to these experiments, where animals can be smoked, but not in those towers.

CHRISTOPHER McCARTHY: Sure. Again, I can't speak for the researchers who have had negative opinions of it. Within my time as both a category A member and chair, we have made many reinforced recommendations to the researchers, and all of those have been enacted. So as far as cooling in the units, the mice have also now been placed—and, for several years now, warmed both prior and post any of the procedures that are occurring. Any animals that are seen to be turning in the tubes—both those towers are monitored at all times and so researchers are able to identify those animals and remove them immediately. There have been no deaths from turning of mice in the last few years that I've been involved as chair of the committee.

The Hon. EMMA HURST: Have there been any adverse events with the warming of the mice after the procedure?

CHRISTOPHER McCARTHY: No. In actual fact, warming has been a very good initiative and we've had a much faster recovery from animals from the tower.

The Hon. EMMA HURST: Are students involved in working on the nose-only smoking models?

CHRISTOPHER McCARTHY: I believe students, if they would be involved in those animals, would have strict supervision. As part of our ethics committee requirement, any student involved in a protocol must do what we call CARE 1 and 2, which are modules designed to have them be aware of legislation around animal use, but also around the university's requirement for welfare impact to be examined. So no student would be able to do a monitoring role unless they've done both those CARE modules. We also require that a supervisor be allocated to any student on any project across all protocols and their competencies must be explained to the committee before they're allowed to do anything on their own.

Ms ABIGAIL BOYD: Does that mean students are involved in these smoking tests outside of research projects?

CHRISTOPHER McCARTHY: No, nothing occurs outside a research project.

Ms ABIGAIL BOYD: Okay. What—

CHRISTOPHER McCARTHY: Sorry, I may have misinterpreted the question. Did you mean by student, as in university students doing their degree? Or research students under the ARA of a research project?

Ms ABIGAIL BOYD: I am talking about university students—undergraduates.

CHRISTOPHER McCARTHY: No. No students at all would be using any of those research routes.

Ms ABIGAIL BOYD: You often hear stories of undergraduates in psychology or other things doing experiments involving mice and rats. I did psychology some time ago, but we used mazes and did all sorts of things with mice. Is that something that still occurs? Are there still experiments and testing that go on with undergraduate students at your university?

CHRISTOPHER McCARTHY: Again, I don't have the knowledge base on that, being the chair of the ethics committee. I only have a knowledge base on projects that come through to me. We do have teaching projects come through the ethics committee and we review all of those teaching projects. I believe some of the wildlife researchers have desk students, obviously observational; they come through our committee. I know that any of the teachers who are using animals in their research are required for us to have feedback from those students. As part of their annual reporting, we get feedback about the use of animals in that research and whether the students believe that the animal use has been beneficial or not beneficial to that research, and then it is acted upon by the committee.

Ms ABIGAIL BOYD: Just coming back to the smoking test, my understanding, especially when that nose-only apparatus is used, is that you're exposing an animal to—basically they have to sit there for the time that it takes to burn 12 cigarettes and they are inhaling that, and that is to induce disease in the animal. Is that correct?

CHRISTOPHER McCARTHY: Correct. The goal of that animal model is to reproduce a disease called chronic obstructive pulmonary disease, which is a disease that about 1.5 million Australians currently suffer from.

Ms ABIGAIL BOYD: The idea, then, is that they get that disease and then you can test treatments on the animals once they have the disease.

CHRISTOPHER McCARTHY: Correct. I think the term "smoking" often is very confusing for laypeople. This is not a smoking model. This is a model about COPD. The smoking is purely to try to provide a space for that disease to be present.

Ms ABIGAIL BOYD: Understood. But I also understand that there has been quite a lot of criticism as to the validity of a lot of the tests that follow that and that there are alternatives. Why are we continuing to use that sort of smoking model in light of available alternatives?

CHRISTOPHER McCARTHY: Again, I can't speak on behalf of the researchers, but the first question we ask in any of our projects is, "Could you please justify the use of animals in this project, and have you looked at alternatives that may replace an animal in the project?" We can only go based on the information provided to us. I don't think at any stage that we have felt that a justification for the use of this animal model has been unnecessary. Some projects that have had use of this model we have questioned and have had more justification provided, whether that be from other papers that have used that sort of research and achieved the same goals. But the committee is very much trying to make sure that there's always justification for why animal models are used across all of our projects.

Ms ABIGAIL BOYD: Given the obvious animal welfare impacts, the real cruelty of—I have read stories of animals who have had this nicotine withdrawal and just how awful and cruel this particular method is. Do you think that the committee is failing in its duties to weigh up the welfare impact against the potential benefit of the research?

CHRISTOPHER McCARTHY: I've been a veterinarian for over 20 years. I've dedicated my life to the care and support of animals. I probably do take objection to the fact that I think you are doubting the fact that our welfare committee is in any way putting any animal under a degree of stress that is not monitored well and covered for.

Ms ABIGAIL BOYD: I didn't say "monitored well"; I said justifiable given the potential benefits of the research.

CHRISTOPHER McCARTHY: Sure. There have been translational benefits from this research, which have been shown and proven. I believe every member of my committee would stand here and say that we believe that the animal welfare and the translational ability would be justified in this experiment. Otherwise, the experiment would not be allowed to go through by our committee.

Ms ABIGAIL BOYD: I understand the University of New South Wales has just in 2021 put $250,000 into researching alternatives and basically doing things better using the three Rs. What has the University of Newcastle done in terms of actively providing funding for alternatives?

BRIAN KELLY: A number of our researchers are already pursuing alternatives for studying conditions such as chronic obstructive pulmonary disease and issues like use of cell cultures or organoids, that you heard about in other presentations.

Ms ABIGAIL BOYD: Is that something that your university is funding, or is it something where there happens to be people at your university that are funded to do it by someone else?

BRIAN KELLY: People will be seeking funding from our external funding bodies, like the NHMRC and so on, using those technologies. I would have to take it on notice in terms of the specific funding that has been provided from the university through its internal grant scheme and so on, or other initiatives that would have directly supported those activities. I can take that on notice and provide that information.

Ms ABIGAIL BOYD: Could I ask you, Dr Rohr, it is correct that the university itself is providing that $250,000 in research funding?

TED ROHR: We have a unique system in that we encourage a centralised approach to buying equipment. So rather than having a microscope in one laboratory, we have a central facility where all the researchers can go and utilise that. The idea of funding the organoids initiative came from that strategic overview of, how do we fund all of our facilities for our researchers in general. That is why we are a bit different to most other institutions. Obviously in that case that is a big benefit.

The Hon. LOU AMATO: Your inside experience is invaluable to this inquiry and we really appreciate your knowledge. I am going to start off with Professor Double. In your submission, I found quite interesting that you mentioned a bionic eye. The reason why I am interested in the development of the bionic eye is that my brother lost an eye when he was three years old through retinoblastoma. Could you give the Committee a bit of insight into what is happening in that area. I know back then, and this is going back to the fifties when he had the

eye removed, for a lot of children the cancer went from the eye into the brain. I want to find out if that is still occurring or not occurring, and when we had these advancements, was animal testing available?

KAY DOUBLE: Thank you for the question and I am pleased to have the opportunity to speak to some of the benefits of the research that comes from the work done by our researchers. As our submission describes, the research into retinal diseases at the University of Sydney has led to the development of the bionic eye. That technology can be used for individuals who have vision problems from a variety of causes including tumours but also other causes. The development of that technology and the fact that it is at the stage that it can go into clinical trials to be used in humans is really the result of the fact that we have been able to progress from very basic development of that technology, in the electronic sense, and being able to test it in animal models in a functional eye that is connected to the functional visual system of a mammalian brain. That is not my area of research. I am a neuroscientist. My understanding from the work and what I know of it and what I have read about that work is that we would not be at the point that we are now, where we can use that technology and trial it in humans, if we did not have the ability to trial it in the animal models.

The Hon. LOU AMATO: A question perhaps to all of you. What advances have you made in the last decade that otherwise would not have been achieved without animal testing?

TED ROHR: I think the most convincing argument for me is what we do in our Children's Cancer Institute. We take extracts from a tumour that a child has, a hard-to-treat tumour, we transplant that into a mouse and we use all the current treatments that are possible to test on the mouse, so that we can apply that treatment to that particular child or future children who have that specific cancer. So I think that's the most convincing argument for me.

The CHAIR: That's a great case study.

KAY DOUBLE: One thing that has really been one example of the many developments that we've had from our work at the University of Sydney has been the development of new treatment, potential treatments, for opioid addiction. One of our researchers at the university has now developed a compound, which appears to be very promising, to treat opioid addiction that we know is a problem in Australia and is a huge problem globally. There are very few effective treatments for that and the burden of that disease globally is very, very high. One of our researchers has come up with a compound. They have been able to test that initially in cell culture systems and other sorts of systems.

But based on the data from those models, they then progressed to animal models. They got very promising data from that and it is now approved to go into clinical trials in individuals who suffer from opioid addiction. So that's one example of where I believe that we've made significant progress in a disorder that has a very high global burden both for the individuals who suffer from that but also for the community. We certainly wouldn't have progressed as fast if we weren't able to use animal models, and very likely we wouldn't be at the point where we are now of being able to go into clinical trials if it wasn't for the animal research that was done in that space.

BRIAN KELLY: In my opening statement I mentioned a couple of the examples of initiatives that have occurred through the university in recent years, but in addition to that I mentioned some of the work that is undertaken around new cancer treatments. One of those is a cancer-treating drug called Cavatak. Before undertaking the initial clinical trials with this new treatment, the treatment itself required validation using original mouse models to do that. So the animal research was fundamental to that development. This has been shown to be highly effective in combination with what is now called immunotherapy treatments, particularly for advanced melanoma, lung cancer and bladder cancer and is now entering the early clinical trial stages. So it expands our repertoire of cancer therapies, particularly for some of these very debilitating advanced diseases. There may be other examples my colleague has to bring to mind.

CHRISTOPHER McCARTHY: Certainly. I work quite closely with some researchers who are doing some amazing work in endometrium disease, a disease that cancer is often found very late in life. Some of the research they have done has been able to indicate there may be some markers we can look for earlier that could help the diagnosis of this disease before it reaches a stage when it is no longer treatable.

The Hon. LOU AMATO: My last question before I pass on to my colleagues is one for Professor Rohr. In your submission you mention that research is an international effort. You go on to say that you also receive significant funding from international sources, such as the US, the EU, governments and charitable organisations, such as the Bill & Melinda Gates Foundation. Can you tell us a bit more about what you have to do to try to get that sort of funding and how much of that funding would equate to what your university gets? I am trying to work out what exactly do you have to show to some of these organisations overseas to get your funding and what percentage of that funding would go to your university?

TED ROHR: The actual amounts of funding obviously vary; but overall, the process is the same as applying to NHMRC and ARC in Australia. They have international funding schemes. So the Bill Gates foundation, for example, has funding schemes where our researchers can apply to and our central research grants and contracts office facilitates that. They inform researchers about the international and national grants schemes. In other instances the researchers can directly approach funding bodies and say, "Look, this might be a good idea to do that," especially something like the Gates foundation. But, in general, it's a competitive grants process. I hope that answers your question.

The Hon. LOU AMATO: Obviously you have to demonstrate a high level of animal ethics as well?

TED ROHR: The animal ethics side?

The Hon. LOU AMATO: Yes, that's correct.

TED ROHR: Yes.

The Hon. LOU AMATO: You obviously have to demonstrate that to them in order to get those fundings.

TED ROHR: Yes. There are a number of accreditations that are viable at an international level, but in general all of the research that is conducted here is reviewed by our animal ethics committees according to the Australian code and legislation. So there is no difference if you get money from the US or from another country, if the work is done here, it's the Australian code that applies and our ethics committee reviews it.

The Hon. WES FANG: Dr Rohr, I was listening quite intently when you were talking about the impact that animal research allows you to have in the children's cancer space. I just want to give you the opportunity to provide some insights to the Committee and, I guess, to the broader public about the real personal benefits that come out of the work that happens in that space—that is, the parents and the children that are actually affected on a personal level. Can you give us some insights as to the life changes that are made and how people react when there is the ability to find a treatment through the work that you do that works for a child with cancer?

TED ROHR: There is a very good website that demonstrates the responses by parents and children to the treatment. It's publicly available. I think that's the best statement that can be made in support of this research. There are great emotional videos and so on—evidence of that—on the institute's website.

The Hon. WES FANG: I think that's really important that we communicate the impact on a personal level that this is able to make in people's lives. In the instance that the testing that is done was not available to you, that is, there was perhaps a restriction or a ban on animal testing or animal research, would you be able to have the same outcomes by another means?

TED ROHR: The only means I can imagine at the moment is to test different compounds on a particular child.

The Hon. WES FANG: That would obviously have, I would imagine, a drastic and detrimental effect on that child's welfare—potentially. What would that be a fair assumption?

TED ROHR: A comparison is chemotherapy under different methodologies that are trialled on patients, and obviously the effects are significant.

The Hon. WES FANG: So when we're talking about the lives of small children and their parents, who have put their hope and trust in the hospital and you, what do you think would be their reaction to not having access to the ability to do what you do at the moment, should we move away from the testing regime or the research regime that we have with animals at the moment?

TED ROHR: The equivalent I could imagine is there is medication available that is only available in some countries overseas where it is being developed. I get a lot of complaints in instances where people are ineligible for clinical trials where there is a last-resort medication. They are very distressed because they are ineligible because they have some other disease and so on. Obviously, it's very stressful if you can't get that medication.

The Hon. WES FANG: Dr McCarthy, we've heard a lot of criticism during this inquiry. It's quite targeted at some of the events that have happened. Given the scale of the testing and research that happens in your organisation, what percentage of the total research is made up by the events that have been highlighted during this inquiry? One per cent, half of one per cent?

CHRISTOPHER McCARTHY: Again, I would have to take on notice the exact percentage. But it is a very small percentage.

The Hon. WES FANG: Very minute, is it?

CHRISTOPHER McCARTHY: For example, 127 mice were smoked in the past 12 months. So that animal model is a very small percentage of the work that's being done at the University of Newcastle.

The CHAIR: I will quote from the University of Sydney's submission. But I think it's a theme that has been picked up by other witnesses to the inquiry to this point, particularly from the university and research sector. I take you to page 5. I will ask each of the three universities to comment on this and share their thoughts. At the top of page 5 is the heading "Current initiatives for 3Rs research available to Australian researchers". Specifically, I draw your attention to the first paragraph, which states:

> Compared to other countries, there is a paucity of funding for 3Rs research, including research into alternative research methods and technologies that is needed to transition away from the use of animals where possible.

Indeed, the professor incorporated that observation in the opening statement. From the point of view of the three institutions, I am wondering whether you agree with that statement in general—about the paucity of funding for three Rs research—and what your thoughts are about how we may progress doing this better. There has been a consistent theme, particularly with reflections on other jurisdictions—particularly overseas—that appear to be doing this better than we are. Perhaps we will start with the University of Sydney.

KAY DOUBLE: Thank you for the question. This statement comes from our own submission, so we definitely agree with this. The funding that is specifically available to conduct research into the three Rs at the University of Sydney is no funding. We have a small prize available from the DVCR's office—the deputy vice-chancellor for research—to encourage work that supports the three Rs. There is an annual prize available, which is $4,000, which encourages and acknowledges the work of researchers who do research into the three Rs, and that can be any of the three Rs. However, the funding that is set aside for that is $4,000. That's obviously very modest. And because it is a prize for work already done, it does not support the research itself. It is acknowledging research that has been done. That means that if researchers at our university wish to do research in this space, they have to find the funding for the research initially.

The problem there is that we do not have funds available specifically for three Rs research in Australia—that is, from the State or Federal governments. Really, I would very much encourage the New South Wales Government to urge the Federal Government to support work in this area because if we want to move more rapidly towards replacing animals in research, this is what is needed. The reason why we are still using animal models is because we do not have valid alternatives available. The reason we do not have valid alternatives available is we cannot do the research to develop those, in most cases. We do have many researchers who are very vested in animal welfare. They do spend time trying to refine the work that they do to reduce the impacts on animals. But you've already heard from the witnesses who were here previously, that the success rates for competitive funding from the NHMRC currently is 8 per cent. Those are all going to be research projects which are not specifically towards the three Rs.

I've been doing research in Australia, funded by the NHMRC, for over three decades. I am not only applying for research but I spend a lot of time reviewing projects that come through. None of those are specifically for three Rs. The reason for that is the researchers know that they will not get those funded because there are no specific funds for it. What we really need is a system for sufficient funding to really enable three Rs research to occur. We have suggested in our submission that a three Rs research centre, which is national and similar to the ones that are available in the UK, Europe and the US, would probably be the best way of doing that. So we would encourage the Committee to consider this.

The CHAIR: Thank you. I'm wondering whether the other institutions have reflections on the way in which we can drive the three Rs thinking in New South Wales and perhaps in Australia more broadly.

TED ROHR: The critical points that are coming out of this discussion is that it comes down to funding and also advances in technology. The only reason why we are able to develop our organoid centre is recent advances in MRI and in 3D printing. They are two techniques that are really critical and they cost a lot of money. If you want to apply to our current funding schemes, there is little success rate anyway. So a specific initiative that could be started by New South Wales would be a great help—for example, like the recent initiative of the RNA Institute. There's a real possibility to dedicate funding and to get something off the ground fairly quickly.

The CHAIR: Could you elucidate that example a little? Is that a recent initiative that has taken root?

TED ROHR: That is the recent development in the COVID vaccines. There is now a research institute in New South Wales that is part-funded by the Government, as I understand, and the universities to get more of that type of research off the ground.

The CHAIR: I move to the University of Newcastle to add a layer of further reflection on the federation that we have. At one level the Commonwealth is regulating and providing substantial funding for the research that flows down to the universities and institutes. Then we've got the State governments. Of course, across a whole range of domains there is always this tension and perhaps a lack of coordination, and clear channels of operation and synergy, and all the rest of it. Do you have any thoughts about how that can be overcome? Dr Rohr, I think you referred to the gene technology regulator as a potential model or framework. I might come back to you, Dr Rohr. University of Newcastle?

BRIAN KELLY: Thank you. I appreciate the opportunity to comment on this. I echo a number of the points that have been made already and reiterate our commitment to the three Rs in animal research. The issues reflect a number of things. Our existing commitment is indicated in our processes that are undertaken around research already to ensure that not only do our researchers understand the three Rs but also there is evidence against those in any application for research. It relates to research practice as well as research resources and methodology, and how we advance and innovate our scientific methods, knowledge and practice. Researchers are committed to innovation; that is in their DNA. They like to be questioning, to be thinking about how to be improving their methods and so on. We need the resources, support and infrastructure that encourages and supports that innovation.

The sorts of initiatives we have been hearing about are very important elements of that—the infrastructure that can support alternative methods of research. We have heard already about initiatives such as organoids or different ways of clumping cells so they can be studied. That might replace the need to do that within animals. It is not perfect but it is another model. There is also the use of mathematical models and biostatistics and expertise in that area. Another area is strengthening biobanking so that tissue banks can be used rather than using in vivo studies, for example. There are enormous advances being made in that regard. The other is the coordination of a central animal resource facility so that it reduces the variability between different animals and it creates greater validity and reliability for those animals that are used in research. The Australian facility that exists in Moss Vale around that is a very important element of that infrastructure. All of those things, I think, are important directions for future investment in this area to strengthen the three Rs.

The CHAIR: Doctor, do you have a comment? Sorry, did I misquote you about the reference to the gene technology regulator? Was that you?

TED ROHR: Yes, I think I commented. The Office of the Gene Technology Regulator is a Commonwealth agency that focuses on the Gene Technology Act, which is Commonwealth legislation governing the use of genetically modified organisms—as opposed to animal research, where we have research legislated at a State level. We have differences between States and our research is at least national, but even more so international. I think at the moment we don't have an Australia-wide focus on reporting. On that idea of transparency, we have to report different statistics to different States and then they get reported differently to the public and the legislation differs between States. The Office of the Gene Technology Regulator works very well from what I and my colleagues can see. That would be an idea.

The CHAIR: Perhaps on notice I will invite you to reflect on a pathway of engaging—with the change of government now and introducing a new Minister to the role—how there might be an ability for the State of New South Wales, which is the largest in terms of its population and its economy in Australia, to try and drive this with a new government. The matter of the inconsistency of reporting of statistics has been raised as a bit of a bugbear by other witnesses. I will invite each of the institutions to comment on that and make any reflections.

KAY DOUBLE: Sure. Thank you for bringing this up again because I think it is a really important point. As I said in my opening statement, the problem is that there are differences in the requirements across States and Territories about what has to be reported and how animal use numbers are reported. It is very difficult to really understand what is being used across States. It is very difficult to really get a grasp on the scope of animal use in Australia compared to other countries. Other countries, in the main—for example, major countries such as the United States and the United Kingdom—only report animals that are used directly in biomedical research and they only report the animals that are actually directly involved in the actual experiments. For example, animals that are used for breeding the animals that are subsequently used would not be included, despite the fact that they are bred only to produce the animals.

In Australia it is quite different. We include all animals. For example, if we are talking about rodents, it is about the animals that are initially breeding the animals that might subsequently be used. Animals, as soon as they get to half of their gestational period, are then counted even if they are used prior to birth in the experiment. Sometimes we use embryos. They would also be counted. They would not be counted in most countries in the world. The thing that really blows out the numbers, or the apparent numbers used for animal research in Australia, is the fact that we don't just count the animals used for biomedical research. If people are doing wildlife research,

if they are doing veterinary research or if they are doing stock research—for example, cattle research or chicken production and egg production, which is a large amount of research that comes through our animal ethics committee—all of those animals are counted.

Let me give you an example. If someone is doing purely observational research, so they are doing research on, for example, a fish species, and they are only looking to see where the fish are and how many there are, they set up cameras and they are watching the fish swim past a camera. If they have 60,000 fish that swim past that camera, they count those as being animal use. If those animals then turn around and swim back the other way, we don't know whether they are the same animals or not, but they would then be recounted, so that would be 120,000 fish that would be used as animal research usage. Whereas in any other country in the world they would not be counted because that is not biomedical research. There are large inconsistencies about the way we do it. That is fine; I don't mind what the system is. But we need clarity around what it is we are reporting, we need to divide it between the different types of use of animals and then we need greater transparency for the public so that the public understands exactly how animals are being used, rather than having these very large numbers and then making assumptions about the sorts of research that those animals are being used for.

The CHAIR: I know we have gone over time but, with respect to New South Wales and Newcastle, do you have any comments about the statistics and its gathering?

TED ROHR: From my view the critical part is the meaning of collecting statistics. It is one side to collect numbers; it is another side to produce information for the public, for the informed public, so they get what they want. I think this should be constructed by academics in the social sciences who are familiar with these types of surveys, rather than by a regulator saying, "Give us this number", or "Give us that number", because that doesn't translate to the public understanding what these numbers mean.

CHRISTOPHER McCARTHY: I can briefly give an example including the fish. We had some amazing research in conservation of the bell frog in Newcastle, which has been decimated due to a fungus called chytrid. We had to count the tadpoles. There are hundreds of thousands. The numbers that are being published—again, like the fish, these are animals being observed, not acted upon. It really does inflate those numbers substantially.

The CHAIR: On behalf of the Committee, thank you so much for the submissions and for coming along today. It has been very helpful to us. I know that you are all very busy, so to carve out that time to come along is much appreciated. I am sure there will be some questions arising from today once we read *Hansard*. I am sure it will stimulate further questions. We will provide them to you. Once again, thank you for making yourselves available.

(The witnesses withdrew.)

(Short adjournment)

Professor ALASTAIR J SLOAN, Professor of Tissue Engineering and Dental Biology Science Advisor, MAWA, before the Committee via videoconference, sworn and examined

Professor WOJCIECH CHRZANOWSKI, Professor of Nanomedicine, University of Sydney, and Science Advisor, Medical Advances Without Animals Trust (MAWA), sworn and examined

Ms PAULA WALLACE, Director, Liberty Foundation Australia, before the Committee via videoconference, affirmed and examined

Ms NIKKI STEENDAM, Co-Founder, Beagle Freedom Australia, before the Committee via videoconference, affirmed and examined

Ms TAM BURKE, Co-Founder, Beagle Freedom Australia, before the Committee via videoconference, affirmed and examined

The CHAIR: I welcome our next set of witnesses. I confirm receipt of the submissions made by the respective organisations. We have submission 351 from Professor Sloan and Professor Chrzanowski, generically under the name of the MAWA Trust. You also have your own professional representation. We also have submission 213 from Ms Wallace on behalf of Liberty Foundation Australia, and submission 241 from With Beagle Freedom Australia. They have been processed and uploaded to the inquiry's webpage. We now have time for opening statements. We normally do it by organisation, but if each of you have your own opening statements that probably would be worth telling me. I presume there is a decision with some organisations that there will be a spokesperson to give the opening statement. Perhaps if we start with MAWA. Was there going to be the single opening statement?

WOJCIECH CHRZANOWSKI: I believe there are two separate—

The CHAIR: That's fine. We will just go through them then. With Beagle Freedom Australia, was there going to be one opening statement from that organisation?

NIKKI STEENDAM: Yes, just one.

The CHAIR: We will start then with MAWA and your opening statement.

ALASTAIR SLOAN: Medical Advances Without Animals is a registered charity established in 2000, so it has been going now for some 20-plus years and takes a leading role in representing animals in medical research, with a clear focus on replacement as one of the three Rs. It operates as an independent medical and scientific trust to encourage and develop research to look at the idea of replacement model systems to replace the use of animals in research. This is probably the one R out of the three of refinement, reduction and replacement that is the hardest to achieve. It is also probably, in my broader experience as a biomedical researcher in Australia but also the majority of my time in the United Kingdom, the most challenging to actually undertake because MAWA quite rightly is focusing on the idea of absolute replacement. So that means any culture media, chemicals or antibodies that you would use as part of your research have to be produced or created without the use of animals.

That has naturally been the most challenging of areas, but certainly in the United Kingdom they have taken a significant step forward, and MAWA's focus on funding research in that area has driven this forward as well. I think MAWA's focus has been to try to encourage young researchers to actually adapt their biological research environments and their research streams to address this significant point and to advance their own research by developing non-animal-based models, whether they be laboratory based, mathematically based, computer algorithms, machine learning and so on and so forth. It is providing leadership in Australia and it is actually lobbying significantly for the allocation of sufficient funding and research support and other incentives so that young, early-career researchers can address this neglected issue. Thank you very much.

WOJCIECH CHRZANOWSKI: I am a professor of nanomedicine working primarily in respiratory health. If you take respiratory health as the research, one could say, "Look, animal models should be the gold standard for use." But, in reality, there are only two models that represent human physiology—but pathophysiology very poorly—which are baboons and sheep. If we have to do 100 samples, imagine how many animals would be sacrificed and what the ethical application of this is. For any other model—the small animal or rodent model—the correlation to human physiology and a translation to clinical trials is zero. Absolute zero. There are different aerodynamics, a different number of lobes, different cells—no cilia, no mucus. So why do we test using these animals? For that reason, alternative models are the only option for us.

The alternative models—building up these artificial, or I should rather say, mimicking structures of human physiology—are really great options because we can build a lot of them. What that means is that we can create hundreds of models and do the high-throughput screening. They are reproducible; they are reliable. On top of this, they allow rapid screening and they also allow us to take the cells directly from the patients, which means

that we can create a model of each of the individual patients for personalised medicine. So why do we still use animals?

A global interest in alternatives is huge. It is a $1 trillion business at the moment with over 300 established companies producing alternatives. DARTA and DSD are good examples of putting millions of dollars into alternatives. Why? Because if they test biological weapons, there is no ethical approval for animals to be used for that. Also, the FDA has now an ISTAND process, which allows a submission without animals—for the first time in the world, the first time we have heard this. Symbio, one of the companies—we actually use their systems—was named one of the top innovation companies of 2021 by *The Scientist*. Big pharma Roche and AstraZeneca invested hugely in developing these models because they know that the animal models don't work for them.

Also, this model allows for the mitigation of the recalls of the product on the market because we test safety very effectively—3D printing or bioprinting, which is a huge business. Why? Because they produce the models which represent human pathophysiology. We need to build models of not only the physiology but the disease. None of the animals can represent human disease. On top of this, we are built of cells and microbes, and this is a critical element. We actually have the same number of cells than the microbes, and we are consisting of these two worlds. None of the animals has the same microbes that we have and they help with treating the disease; they help with recovery from the disease.

The situation here is, in my view, a win-win. For those who like the animals, we need them. We need to verify our models, and we still need them in our final stages before we go with our clinical trials. Why? Because it will screen our molecules, our materials, chemicals et cetera in the alternatives and go with a very high confidence to only a few animals before we travel to humans. I believe we have two options. Watch what the world is doing, and in a few years wake up and follow what they have done, or be part of the leading team. And potentially being at a New South Wales university, also leading here. I believe New South Wales can lead the development of the discovery centre in alternative models and create a world-class centre in this State.

The CHAIR: Thank you, Professor, that's very helpful. No doubt it will lead to a number of questions when we get to that part of the session. Ms Wallace, I invite you to make your opening statement.

PAULA WALLACE: Liberty Foundation is a registered charity that rehomes animals from research and has been active since late 2017. We are a non-political organisation, which does not take any formal position on whether animals should be used for research and scientific purposes. We're not aligned with any other groups or political parties. We appreciate the opportunity to give evidence today about an issue that I believe is relevant to your inquiry, and worthy of consideration in your recommendations and final report. My submission provided comprehensive information on the number and types of animals used in research and a potential demand for specialist rehoming services in Australia. I won't attempt to summarise that here, but I will make the point that there is no question that providing rehoming presents a more ethical approach as opposed to euthanasia or sending an animal to another research facility.

In my experience, there is a high percentage of the animal-based research industry that believes rehoming is a win-win for everyone involved. Like the Australian code for the care and use of animals for scientific purposes—or the national code—states, "rehoming should be considered wherever possible". Ethically, I don't believe there is any question about why any more. It is more a question of how, and that question is now being answered by the work that we are doing and of groups like Beagle Freedom. However, we need to remember that although rehoming has been enshrined in the national code for some time, actual rehoming activity has only become more commonplace in recent years. There are a number of reasons for this, one of which involves money and convenience, which should not be driving factors in deciding the fate of animals used in research. They should not be euthanased because it is considered to be easier. We believe the industry requires a greater push towards compliance with the code around rehoming and reconsider these ethics around the reuse of animals.

To introduce mandatory rehoming and a mandatory retirement age for domestic animals in research, alongside this we must also consider how we are going to upskill, fund and support animal rehoming charities to meet this increased demand. We would like to see a rehoming task force formed to bring together animal rehoming groups with the industry and government to develop solutions and build capacity in the rehoming sector. This must be a collective effort, involving all players. I was heartened by the news yesterday that the Victorian Government has supported many of the recommendations of the task force on rehoming. They have also called for a review of the national code to include mandatory retirement age for dogs and cats in research. It will also consider introducing a mandatory retirement policy in Victoria for dogs and cats. I hope this inquiry considers making similar recommendations and that these receive the full support of government.

The CHAIR: Thank you very much for that opening statement. We will now move to Beagle Freedom Australia.

NIKKI STEENDAM: Good morning, everyone. Thank you for this opportunity to speak today. We are both are appearing on behalf of Beagle Freedom Australia. We are a not-for-profit organisation, and we specialise in the rehabilitation and rehoming of ex-research animals, specifically beagles and other dog breeds and cats. Beagle Freedom Australia was established in 2005 as Beagle Rescue Victoria. We eventually began rehoming beagles from research facilities across Australia and so launched Beagle Freedom Australia in 2013 to cater specifically for this purpose. At BFA, we take any animal that has been used for medical research and find them a family home. We have rehomed hundreds of dogs and cats, and we have had a 100 per cent success rate. Every single animal we have rehomed has been able to be acclimated to a home environment. We provide extensive veterinary care for the animals we take in and we continue to provide this care for the life of each animal, if necessary.

Since our launch, we have been campaigning to various governments in Australia to implement mandatory release of research animals at the end of their use in research for the purpose of rehoming. In 2018, we worked in conjunction with Bio-security at what was then known as DETJR Victoria to develop a rehoming guideline document. That was then published and sent to all the registered animal ethics committees as a best-practice guide to follow. It opened some doors, but rehoming remained a voluntary practice in Victoria. Earlier this year, the Victorian Taskforce on Rehoming Pets put forward a report detailing multiple suggestions to improve the lives of pets in Victoria. Two of those recommendations came from our proposal: one, the mandatory release of animals from research and teaching for the purpose of rehoming: and two, the retirement age for animals used in research and teaching.

Yesterday, as Paula said, the Victorian Government released their response to this report, supporting both of those suggestions as well as many others. Today, we are here to discuss those same two suggestions in the hopes that common sense will prevail and that the New South Wales Government will follow suit. We would also like to see several other improvements made, including upskilling for facility staff, enhanced enrichment programs for facility animals, staff-to-animal ratio regulations implemented, and the standardisation of current best-practice documentation, as well as a maximum term of no more than three years for members to sit on an animal ethics committee. We believe that those improvements will aid in the enhancement of the lives of facility animals both within the facility and in their new homes.

The CHAIR: Thank you very much. That's a very concise and clear opening statement. I'm sure there will be some questions arising from that.

The Hon. EMMA HURST: I will start with Ms Steendam. In your submission you talk about making rehoming mandatory. I understand that there are guidelines. I am just wondering why a guideline is not enough. Why do we need to move into mandatory model?

NIKKI STEENDAM: Sorry, could you just repeat that last bit? You were cutting out.

The Hon. EMMA HURST: We have guidelines at the moment in regard to rehoming. I am wondering why guidelines are not enough? Why do we need to move to an actual mandatory model for rehoming?

NIKKI STEENDAM: Because a guideline is exactly that—it's just a guide. It's not enforced and there is nobody checking to make sure that it is actually being done.

The Hon. EMMA HURST: So you think that while the work you and Liberty project are doing is saving lives, there are some facilities and some animals still falling through the cracks?

NIKKI STEENDAM: Definitely. It takes time to convince facilities to release their animals to us. For us, it has taken up to four years for some places to convince them that we would do a good job at rehoming their animals. I would hate to think in that four years of us discussing and going back and forth of what has been happening to those animals in that time. If we took away the need to have to negotiate, it would make it a lot easier for us to actually do our job to rehome, and they would have to release them to a rehoming facility like ours.

The Hon. EMMA HURST: Are there problems with the non-disclosure agreements? I understand they can be quite variable, but does it sometimes make an animal difficult to rehome if the non-disclosure agreement goes too far?

NIKKI STEENDAM: In our experience, we haven't had a lot of issues with the non-disclosure. It's like any privacy policy, really. We do tell our adoptive families that they're adopting an ex-research animal. We don't get information on what research they were used in. Even if we didn't have the non-disclosure in place with the facility, we wouldn't share what facility that animal was from anyway because it's just a matter of privacy.

The Hon. EMMA HURST: Ms Wallace, there was an article in *The Daily Telegraph* on the weekend that proposed that cats and dogs were being sourced from online marketplaces. As someone that is involved in

this space, is that something that you have personally heard of, or are there other places that you're aware of where facilities are locating cats and dogs?

PAULA WALLACE: I can't really comment on where research places are procuring animals. You'd really have to ask them directly. I'm not privy to that information. In terms of a research facility procuring an animal from a website like Gumtree, I think the onus here, from my perspective, would be on the unscrupulous people that are exploiting animals for profit on Gumtree. The reality is that anyone can buy an animal from a website. Whether that's ethically acceptable or not, really that is up to the animal ethics committee to decide. But I don't think anybody should be buying animals off Gumtree.

The Hon. EMMA HURST: Professor Chrzanowski, in your opening statement you talked about some of the concerns about lung issues. We've been talking today about the smoking mice model. Is that something that you consider problematic, from a science perspective, when you're looking at studying lungs and these are mice and rats that are being used in these smoking models?

WOJCIECH CHRZANOWSKI: Absolutely. The main problem is that the lungs in rats and mice do not represent at all the physiology in humans—zero. The other thing is that smoking is very different to humans than to animals. You cannot give a cigarette directly to the mouth of an animal. It is the same if you would like to develop the treatment, you cannot use the same devices. You cannot use the puffer for asthma to the animal because the mouth is not fitting there. Physiologically it's very different. As I mentioned, the aerodynamics in the lungs of animals is completely different than the one to the humans. They have two lobes, we have four, four of which are actually—both of them are different on both sides because we have a heart as well. This makes injury completely different and the deposition of chemicals completely different than what we have in human lungs. Hallmarks of the disease in the small animals in the rodent models are very different to the hallmarks of the disease in humans. If you would like to develop a treatment or even study physiology of this disease, there's actually no way of doing this properly.

The Hon. EMMA HURST: Are there currently alternatives on the market that you're aware of?

WOJCIECH CHRZANOWSKI: There are some alternatives for these. We buy some of those, as well as the controls, but we grow them ourselves in the laboratory. We try to build human physiology. We take directly cells from patients or we buy cells from human sources, because you can buy them directly and you can differentiate them to different parts of the lungs. You can do the small airways, you can do the upper airway, the trachea—you can create certain parts of the physiology. But this is not an entire lung. That is the limitation. But it is a certain part of the physiology which you can study in depth, in large number and reproducibly.

The Hon. EMMA HURST: Obviously alternatives are something we have talked a lot about in this inquiry. Is it the case that there are sometimes alternatives available but they're just not being used and taken up? Is the solution to that that there needs to be more funding and efforts towards these alternatives, and also retraining for people who are using animals to actually understand how to use the alternatives?

WOJCIECH CHRZANOWSKI: Funding is the main problem here. If we look in Europe and the US, or even Korea, they use a lot of alternatives. I think the funding there is more for those kinds of research. There are huge projects which are funded in Europe which are purely on the alternatives—building the gut-lung axis and gut access, brain, gut and lung access. This is something that is critical. Organ cross-talk is very important. It is not only a single model but a combination of models, which is very, very important. DARPA put $76 million into developing their artificial models, which was their multiple-organ models.

This is one thing: funding is limited. I would say it's non-existent in Australia. We've never been successful in acquiring any major funding for those kinds of models in Australia. Everything was coming from overseas. Retraining, I don't think it is a problem with those, because those people who do histology for lungs, it is exactly the same testing. Sometimes it is maybe education in this space and understanding that they can benefit from alternative models. Some people might be more conservative than the others. Some may see that there is an opportunity, actually, in these models and drive these even to the next level beyond what we can get from the animal models, and get, in my personal view, more confidence with the products which go to the market.

Ms ABIGAIL BOYD: I am going to stay with you, Professor Chrzanowski. In your submission you talk about the need for cultural change. This has been reflected in some other submissions as well. How do you think we actually—you've noted a few things, for instance, researchers and scholars perhaps believing that if they use animals it will advance their careers. How do we begin to break down that culture to encourage the use of alternatives?

WOJCIECH CHRZANOWSKI: I think there is one element: the TGA in our country and the FDA in the US. If they say that they can approve the submissions without animals, and they recognise alternatives as something which is equally good or even better than the animals, this will be a major shift. We look at these—we

have a product, and can we get this product to the market? The TGA and FDA are the main places where we have to go for the approvals. If they say, "Look, you have to have animals" then there is no option. But if they say, "Look, you can submit it without the animals", this gives us the trigger to actually use our research in the alternative models.

The second thing is the publications. Obviously we aim for the publications. It is prohibitive sometimes for us to publish in the top journals without the animal models. It is also working with the publishers, lobbying them and saying, "Look, these models are equally good." There are examples of those groups who are lobbying. The one in Wyss Institute in Boston is the main one. They do a lot of work in lobbying journals and publishing. There was even a paper when they said, "We are waiting for the moment when we submit the paper with the animal models and the reviewers or the publisher will ask us, 'But can you please do it under alternative models?'" We will reach this time, I am certain.

Ms ABIGAIL BOYD: When you look at the EU's phase-out of the use of animals in medical research, my understanding is that the idea behind that is basically to act as another incentive: This is going to be phased out so now you have no choice but to develop alternatives. Do you think that we need something similar in Australia?

WOJCIECH CHRZANOWSKI: It is difficult to say because I still believe that there is a space for the animals in research, but not in the number which we have at the moment. Bear in mind, these models are only models and they represent only certain parts of physiology. You cannot create an entire human in these little plastic things. We still probably need some of the animals with certain types of research but the number will be substantially reduced. But if we have this kind of declaration that we cannot use them, obviously everyone will move immediately to the alternatives.

Ms ABIGAIL BOYD: You mention in your submission as well that the University of New South Wales and the University of Wollongong seem to be a lot better than some of the other universities when it comes to animal research. What do you think has led to the cultural change within those organisations that seems to be lacking elsewhere?

WOJCIECH CHRZANOWSKI: I can maybe speak to Wollongong, which has the country's best and largest bioprinting facility, and they developed these models. So for them it was easier and cheaper to do their research not on animals but on these models, rather than hassle with the animal house ethics and all of these approvals. But also, it is probably recognition that some of the fundamental science can be done at a much better level on the alternative models than on animals. Sometimes it takes a few researchers, who build a culture and perpetuate it to the rest—some successes, maybe presenting these successes to the public and some promoting them as well and having some leverage in different places including in our government.

Ms ABIGAIL BOYD: When I was speaking at the last panel, I was trying to understand how much students use animals in training as opposed to research. Are you able to give us any kind of insight into whether that is still going on in universities?

WOJCIECH CHRZANOWSKI: It depends on what you consider as training. If you consider PhD as training—for us it is a training program. PhD is training.

Ms ABIGAIL BOYD: Right, okay. Below that, I guess.

WOJCIECH CHRZANOWSKI: Below is negligible. It will be very little because of the cost. If we consider veterinary degrees, they have to deal with animals, but this is not in the context of damaging the animals. It is actually the opposite. But in terms of the training, if we take medicine, pharmacy, pharmacology and biomedical research, I would say almost none—no research on animals. But the one which I mentioned—dentistry as well—negligible. Very little. Animals will come when you do a PhD—when you are a higher degree research student and, I would even say, only for those who are lucky and have a lot of money.

Ms ABIGAIL BOYD: Just one question to the Liberty project if I may, to Ms Wallace. What kind of transparency do we have over the numbers of animals who are dying or being euthanised in research facilities in New South Wales, and what can we do to improve that transparency?

PAULA WALLACE: What we have is figures that research establishments are required to produce in different States and Territories. I think we can get figures for all but two or three States and Territories at the moment. But the figures are not particularly transparent, in that you can't discern from publicly available sources right now how many animals may be available and/or suitable for rehoming at any given time. And it is not just me saying that. If you asked the Department of Primary Industries or you asked the Minister how many animals are available for rehoming this year, he would be unable to tell you. We simply don't know. We can make a guesstimate about what that might be.

We have started collecting in the last couple of years statistics on the fate of animals in research in New South Wales only, through DPI. Those figures have started to filter through since 2019. In my view, I'm not entirely sure that they are being accurately reported. For example, in the 2020 figures that were issued by the Animal Research Review Panel through DPI, they said that no dogs were rehomed in New South Wales. Now, I know that I received dogs for rehoming, and I think Beagle Freedom would concur that that occurred in 2020, but they had not been reported in those statistics. The statistics that are being reported are what they are. They are the figures that the establishments have provided.

If we want to have a look at what we think might be available for rehoming in New South Wales for dogs and cats, a very rough guesstimate might be 100 to 200 dogs a year and 100 cats, currently, but if we introduced a mandatory retirement age or mandatory rehoming policy then those figures would go up by several hundred. In terms of the level of euthanasia, you can look at my submission. It gives you the overall figures for how many animals are being used in research in Australia. It shows you how many remain. So they don't die as part of the process. They don't either die as part of the experiment or are euthanised. It gives you a figure of how many are left, and it is about 33 per cent. So you could roughly say that 70-odd per cent of animals that are used in research facilities or used for research and science in Australia do die as part of the process. What we are saying is that not all of them need to. My submission gives you as much really as we can discern from the figures that are available. Does that answer your question?

Ms ABIGAIL BOYD: Yes, thank you.

The Hon. CHRIS RATH: Thank you all for your evidence so far. Probably just going back to Professor Chrzanowski and Professor Sloan as well, all of the scientist researchers that we have had so far over today and the first day of hearings have basically said that they are committed to the three Rs. Is it a case, do you think, that it's just a matter of everyone agreeing that the final destination of where we want to be is not to have to use animals in medical research? That is the final point that everyone in the medical profession essentially wants to get towards, but it's just a matter of how we do it or the pace in which that transition occurs. Professor Sloan, I think you've got your hand up.

ALASTAIR SLOAN: Yes, thank you. I am happy to start on that one. I think every scientist would agree with what my colleague has already mentioned as well and this is obviously what you are talking about, that we want to get to an end point where we don't want to be using animals or have such few numbers of animals in research it becomes the norm. The barriers at the moment are around actual culture and funding. The real strength where I come from—and I've only been in Australia for two years—but the real strength of the NC3Rs in the UK, which has now been in existence for some 18 years, has been a research funding stream that funds high-quality science to address the three Rs and significantly tries to address those three Rs equally, with a focus on replacement, refinement and reduction. Replacement being the most difficult one, but the projects in that area have increased dramatically. They funded my research back in 2006 and 2008, and I spent a number of years on their grant funding panels. What you get then is a cultural shift of people thinking how we can use different model systems and actually remove the need for using animals and excessive numbers of animals quite significantly.

The other stepped link that I have been exposed to was, acting in my previous role when I was at Cardiff University in the UK, I was a three Rs representative on Cardiff University's biological standards committee, which assessed all animal licences. And the UK Home Office had a very strict policy of increasing the need to address the three Rs in any project licence. Very quickly researchers stop paying lip service to that because their project licences and their grants were not being funded because they were not taking seriously the other options and availabilities that were out there. So it was a culture change, and that culture change is funding. That culture change is how we as researchers and scientists approach the problems we are trying to address, and as my colleague has already mentioned complication is one of the most significant barriers.

To give you an example at the moment with my collaborator at RMIT here in Melbourne, we have a great piece of research around antimicrobial coatings of implants. It is proving to deliver some superb data. We tried to get that published now twice in very, very good journals and we are getting reviewers comments back and editors agreeing with those comments of, "You must do an in vivo experiment. You must put it into an animal model." The answer is, "No, we mustn't. We don't need to. That actually would not be a good scientific move." But the barrier to publish is with the editors-in-chief and the editorial boards of some of these journals. That has two effects. One is it prevents you driving culture change, and it comes back to what we've made in our statement with MAWA—it starts to have a negative impact on the publication ability of young, early-career researchers. So we perpetuate the myth.

The Hon. CHRIS RATH: Why would they be so insistent that you would have to use an animal model? Why would they be doing that?

ALASTAIR SLOAN: To see how it responds in an in vivo biological setting. Our work is in 3D. It's in model systems, it's on surfaces, but people still perpetuate the view that the gold standard would be an in vivo animal experiment, even though the animal model we would use is so removed from the human condition. It would actually probably provide no additional useful data because we are developing coatings for dental implements. The oral microbiology, the flora of the human mouth, is different to any animal model system you would want to use. So the actual argument is flawed, but the insistence is that people still think the gold standard would be an in vivo model to get your research published in some of the top journals. It is changing slowly but surely. In Australia, we need significant funding to be focused at this particular stream of replacement model systems—reduction and refinement as well but definitely in replacement. That allows you, then, to reduce significantly the numbers of animals that will be used in research. If you look at the animal statistics in Australia and the UK, yes, they are significantly high. They are unnecessarily high.

The Hon. CHRIS RATH: But if you— [disorder]. I agree with everything you are saying, but if you moved too quickly and you potentially rushed a transition to a world without animals being used in medical research, wouldn't that then also have significant disadvantages in the medical and research benefits? I understand it is more just a matter of what horizon do you think that we can get to that point of not needing to use animals.

ALASTAIR SLOAN: I agree with you. Ultimately, you want to use as few animals as possible and as needed. At the moment we can try to address that by power calculations to say we will use X many in vivo animals for our studies, but that's still too many because a significant amount of preclinical laboratory-based initial development can be performed on lab-based studies in cells, 3D model systems, algorithms and machine learning that can drive a sort of—think of a pyramid. The bulk of the work at the base and in the lab at the start of the project does not need to use an in vivo animal system if you can develop appropriate models. Ultimately, you get to a point where you might need to assess this in a full biological system, an animal model system, but you want that to be as limited and as small as possible if you have to get to that point.

Whilst doing power calculations gives you that number, actually, let's create model systems that mean you reduce the need for those numbers right from the very start. Systems I've developed have been shown to basically make a 50 per cent to 80 per cent reduction in the use of animals for the point in time of redeveloping our therapeutics. If you're developing a therapeutic, like I am, an animal system gives you one animal, one time point—or one animal, one dose point—whereas model systems can give you multiple dose points and multiple time points and are highly reproducible. It means when you ultimately get to the top of the pyramid and transition into a true preclinical environment, you are asking the right questions, very specific questions, and the need for animals, if at all, becomes very, very low. That is the journey we should be looking to progress to.

WOJCIECH CHRZANOWSKI: I agree with everything that Alastair has said, and I think how fast we go—look, as Alastair has said, instead of one animal you can do 100 models. You can develop really confident molecules on confident treatment and go with these to one or two animals only; otherwise, you would have to use hundreds of animals. Reproducibility of these animals but also the possibility to create a personalised model is an issue. I can take your cells and create you in the dish and test whether these treatments work or not. That's the beauty. You will never do it in the animal model.

In one of the examples with animals, if you house the animals into different houses, the results are actually completely different. Even sometimes when you house them in the same house but in two different corners, your result will be different. So how do you normalise it, and how do you know that your result is actually correct or not? The microbiomes are different. Also, what Alastair mentioned—and I mentioned also in the opening statement—microorganisms in animals are completely different and we are holobiont at the moment. This is a new theory about how we exist on a planet, and we have to understand and consider always microbes and the cells together in the system. We also promote not three Rs but six Rs, and the additional three Rs are rapid, reproducible and reliable, and that is not something which animals offer.

The Hon. CHRIS RATH: Yes, you are right. It is probably a matter of controlling the variables, which is basic in any research you do. The evidence you have given so far is that basically you're saying that Australia is a bit of a laggard in this regard. What would be some jurisdictions around the world that you think would be best practice or that are doing a much better job than we are in terms of the three Rs or the six Rs that the Committee might be able to look to?

WOJCIECH CHRZANOWSKI: I will refer to Alastair, but for me, as a researcher, if we apply for funding overseas the models are accepted. If I apply for NHMRC funding, I get a comment, "You need an in vivo model. You cannot progress any work because you need an in vivo." Then the argument which Alastair made—it is irrelevant. This model is irrelevant. If someone tells me that I have to use mice for my lab model, I say no way. This is the problem. I think the UK and Europe in general—European funding is a huge amount of money for safety assessment and alternative models. I am actually part of two large research programs, which was

submitted recently, in the USA, defense agencies like DARPA and the DST in Australia also put a lot of money into alternative models, which I mentioned.

ALASTAIR SLOAN: I would add to that that I think Australia is lagging behind significantly. I think one of the strengths in the UK has been the NC3Rs, which was initially funded by taking certain amounts of funding from the MRC, which is a government research council, and the BBSRC, which is another government research council, directing that into this centre for the three Rs so it would fund development of model systems and approaches to address the three Rs. Over the last 18 years, what we see in that—I stepped down from the grant panel and the board as I left the UK to come here in 2020. We would be getting, on average, every year in the region of about 120 or 130 grant applications that were pre-screened to get down to about 45, from which we probably fund about eight or nine, but the quality of the science was significantly high. The quality of the three Rs and the approach that was being taken was very high. When I applied and got my funding in 2006, you were getting 10, 15 or 20 applications. You then go up to 2019, 2020 and 120 or 130 applications. You can see how that has shifted the culture.

The NC3Rs works in partnership with the other funding bodies from the UK Government. So it is not in isolation, which is a real strength. It has strong connections with the Dr Hadwen Trust as well as FRAME. But the other argument that I would make is that, as researchers, the evidence I give to you is that big global pharma want to avoid animal model systems. I work significantly with large global institutions, and people that have funded my research—GSK, Phillips or Renishaw Limited are three, and these are big global institutions—not one of them really wants to entertain an animal-based project. They might use some of our model systems that may be using some animal material—it could be culture media; it could be antibodies—but they really avoid doing fundamental research with academic partners on animal model systems, and that has been very clear advice back to me. So you have to adapt, but I think funding is one part of it. Driving funding in that direction is the other critical line, as Wojciech has been mentioning as well. Then I think we can make some big rapid changes in Australia and take some big leaps.

The CHAIR: My first lot of questions are to the professors, and either one can jump in. In regard to Australia, we are obviously a federation. So we have the State of New South Wales; we have regulation at the State level, primarily. At the national level, we have the approval mechanism for research and funding. It seems there could be an argument advanced—in terms of trying to address this issue and progress this matter along whereby we are focused on using, over time, less animals in research—that there needs to be a clearer line of sight between the Commonwealth and the State in this whole area of animal experimentation and a greater synchronicity in the way in which the whole thing operates. At the moment, one is getting a sense that they are almost operating at separate levels. They do intersect at points, but they are in their own domains and operating almost separately. Would you like to comment on whether you think that is a fair observation? That is my first question. Secondly, how does one drive change where that is less of an issue over time?

ALASTAIR SLOAN: I think it is a very fair observation. It is certainly what I have experienced in the two years that I have been here in Australia, so I think you are absolutely right with that observation. How do you drive change? My view would be that if the State of New South Wales can show leadership and that leadership leads to significant step change in culture or practice, suddenly you are getting a whole collection of researchers in New South Wales winning highly competitive but excellent grant projects that actually drive things forward. That should—in fact, I am fairly certain it will—send quite a shock wave across the other States. Here in Victoria, I can imagine my post-doc going, "How can I do that? If they can do that in New South Wales, in USyd or UNSW, how can we do that? How can I do that?"

You almost send a shockwave across the sector and the biomedical research sector that way. So I think someone should take a step change and leadership to show quite dramatically—and it could be done quite quickly—that that leadership, that decision-making, this focus, whether it be funding or direction or awards, whatever it may be, is making a step change. Then I think other States will want to follow suit. Certainly from a Federal point of view, the Federal Government and your NHMRCs will start to go, "Okay, we need to take notice of this." I think someone has to plant the flag and show significant leadership. It should nudge everybody else to go in the same direction. I have only been in Australia for two years, but I get a sense from my two years here that if someone shows some leadership, it should—certainly from a young researcher's point of view, they would want to know, "How can I do that? How can I get this funding? How can I get my research going in this direction?"

WOJCIECH CHRZANOWSKI: I certainly agree. Leading by example and having this leadership would be phenomenal, and showing the example to the other States that we can actually achieve this. Alistair mentioned and I mentioned about global companies which can come here and work with us and set up the centres with us to develop these alternative models. They are looking for researchers like ourselves, to work with us, and we have a good example of this. As an example, funding or developing the centres and initiatives within the State,

which hopefully will be picked up later on by the other States and the Government, as well—especially NHMRC, in terms of the funding—would be something which we would like to see.

The CHAIR: The culture change issue has been raised by other witnesses, and it is featuring as part of the narrative that is coming forward with this inquiry. I have to say that I am a little bit surprised—maybe I am just naive—that with respect to the national bodies like the NHMRC and the TGA, at the very leader level of research and the determination over which research projects should be given the green light and which are not, those individuals who are involved in that decision-making are presumably aware of these developments overseas, particularly with respect to the use of models, as opposed to this insistence on the in-vivo model as being almost a requisite to green-light a research project. What is the cause, if I may ask, of what appears to be an inertia? Clearly they are aware of these matters that you have both posited today and explained quite articulately. Is it fair to say that there is inertia and resistance there? Or is there some, dare I say, ignorance and wanting to turn one's face away from what is happening overseas because we are used to what we are doing and we do not want to change?

ALASTAIR SLOAN: I think there is some inertia. I also think that currently the way that grants are reviewed and approved for funding in Australia is deeply flawed. In Australia we have gone away from having grant panels sitting with designated panel members speaking about a project, where you have key expertise in a room declaring conflicts, where you can talk about a grant and the rebuttals an applicant might make and the reviewers' comments, and you can have a fair, open discussion about the strengths and weaknesses, to a situation now where grants are simply reviewed by reviewers anonymous to the applicant and awarded simply on the score it is given. I think you have taken away the critical part of grant funding, which is discussion.

I think currently the situation of grant funding in Australia is deeply flawed. It means, quite simply, that money simply follows money. If you have had 20 years of funding and you delivered on that funding, you are likely to get your next grant funded. If you are an ECR with an emerging track record, it depends who you work with and it depends very much on how lucky you are with your reviewers. I think that is one of the biggest problems at the moment. By not having panels sitting—and I think we have to go back to that—you do not get a real, focused discussion around the quality of the science, the quality of the project and whether things could be done differently. You are simply in the hands of a reviewer. I review for the NHMRC, and I have said, "We need to go back to grant panels." I think it is a very big problem at the moment.

I have not seen this anywhere else in the world. NIH in the US meet on an annual basis for the grant calls that come out. MRC, NC3Rs, BBSRC and EPSRC meet with their calls twice yearly for their grant calls on a grant panel. You are designated a panel member to argue for or against or pick up comments on a grant, so everybody putting an application in gets a fair hearing. Comments like "This model is not particularly good; we should look at the three Rs model," or "They are using 400 animals and the power calculation is way out"—if they had been looking to get some good friends to review their grant, that just might get through on a review. Or you have someone that kicks a grant because you have a competitor reviewing you, and that is a different argument. But I think the way grant research funding is reviewed now in Australia does not help shift the inertia that we see—and a step change to try and change things.

WOJCIECH CHRZANOWSKI: You raise a very important question. Sometimes I ask myself the same, and honestly I do not know what the answer is. The same people who are criticising these alternative models—and they work with the animals—consider using the alternatives. But still, if I apply for funding, they will kill my grant because I use the alternatives. As Alastair mentioned, the system is flawed. One of the problems is that we do not have international experts on the panel. We do not have international reviewers. Why? Why are these scorers, which are completely independent, not considered here? When I review for Singapore, my score is worth 50 per cent of the total score of the panel because I am independent of all the people there. Here, the country is very small. Everyone knows everyone.

But there is definitely inertia and some resistance. Maybe people become really comfortable and quite conservative considering something new. I think if we have some spectacular successes showing that it works, maybe this would drag more people behind. But definitely what I see at the university, maybe with slightly younger academics—there is definitely a strong push towards the alternatives and the better models. They give a lot of chances and more opportunities for fundamental discoveries, which you cannot do in the animal models. The fundamental discovery drives the outcome and drives the commercialisation. Without the fundamentals, we cannot do anything.

The CHAIR: With respect specifically to New South Wales, because obviously this is a committee of the New South Wales Parliament, do both professors have any thoughts around possible recommendations that we could make from this inquiry? We are going to produce a report with recommendations specifically about

driving the change and dealing with some of these matters that we have been contemplating. In light of your submissions and your comments today around driving change, do you have some recommendations?

ALASTAIR SLOAN: I wonder whether you as a parliament could consider awarding or creating an award, not a research grant, not a research project grant, but a three Rs award. The universities in Cardiff, Bristol, Bath and Swansea did that when I was there. It was led by the Welsh Government, predominantly because Swansea and Cardiff drove it. But maybe there could be an element of the New South Wales Parliament having a competitive three Rs award. You are reviewing context that is taken in the universities in your State that are addressing the three Rs challenges or projects that make a step change towards three Rs advancement and bringing the three Rs into their research. That could be working, you can actually target that, even at a young career investigator award, a young researcher coming through, not an experienced professor like myself or Wojciech, but you actually try to do it at an ECR level, even a PhD level. You could probably have two. It wouldn't have to be big funding, but you are awarding excellence of science and a step change, or something that results in a step change to three Rs. A three Rs award would be something that I think would be my recommendation to come from this.

WOJCIECH CHRZANOWSKI: I would go probably even further. With the three innovation precincts, which we have now, why not establish an innovation precinct in replacement of animals, or a discovery centre and bring together really powerhouse brains, which we have in the State, bring them together and establish something which is world-class, the first in the country, probably the first in the world. I will give you a very simple example. A few years ago I started working with a company in Korea, ROKIT. It is a 3D printing company. I focused at that moment on bioprinting. Today they have a factory that is producing the skin replacement after burns after injuries and they have, literally one of the buildings the size of a university building. It is only production of skin replacement. The company after five years moved from literally one bioprinter to hundreds of bioprinters printing the skin. Why can't we do it here? Why can't we have a replacement for liver, heart, lungs? We have wonderful research happening across the board, why not bring it all together and create a world-class facility, discovery centre, or even an innovation precinct in this space?

ALASTAIR SLOAN: You will likely find yourself attracting researchers from across the country into New South Wales, because it is something that will attract half of my lab. I'll have to move States.

WOJCIECH CHRZANOWSKI: Especially that you build now next to the new airport, the company which is focusing on therapeutics. They would love to test them straight away, any nutraceutical company, any cosmetic company. I was attending a conference two years ago, unfortunately virtually, which was in replacement in Maastricht with 3,000 people attending. Honestly, this is probably the largest conference I have ever been to and every big company, whether it was producing cosmetics, whether it was producing shampoos, all those things, were attending. Johnson & Johnson has a massive unit which is producing artificial skins for testing, because they don't want to test on animals, because we don't want to have a shampoo with the label "tested on animals".

The CHAIR: That brings us to the end of this session. We could easily spend another hour and there are many more questions we could ask. I thank all witnesses. The fact that we did not get a range of questions to everyone, please do not start on reflection, it is a time pressure. No doubt there will be some supplementary questions, once we have a chance to read the transcript. The secretariat will provide those to you and you will be invited to respond to those questions. On behalf of the Committee, thank you for your submissions and valuable testimony today.

ALASTAIR SLOAN: You are welcome. Thank you very much indeed.

(The witnesses withdrew.)

(Luncheon adjournment)

Dr SUSAN MAASTRICHT, Animal Welfare & Ethics Committee Member, Australian Veterinary Association, on former affirmation

Dr TANYA STEPHENS, Animal Welfare & Ethics Committee Member, Australian Veterinary Association, affirmed and examined

Dr PETER JOHNSON, Private individual, affirmed and examined

The CHAIR: I welcome our next panel of witnesses. Thank you for making your time available. We know you are very busy. We are looking forward to your evidence this afternoon. We have two representatives from the Animal Welfare & Ethics Committee of the Australian Veterinary Association. I understand that Dr Johnson is appearing in his own capacity.

PETER JOHNSON: That's correct.

The CHAIR: To confirm, the Australian Veterinary Association submission is number 242 to the inquiry, Dr Johnson's submission is number 248. They have been received, processed and stand as submissions to the inquiry. They have been uploaded to the inquiry's web page. Thank you. Those submissions can be taken as read. I now invite opening statements. In addition to the submissions the opening statements will open up questions from Committee members. Does the Australian Veterinary Association have an opening statement?

SUSAN MAASTRICHT: I will read the opening statement.

The CHAIR: Please proceed.

SUSAN MAASTRICHT: My name is Dr Susan Maastricht and I'm joined today by Dr Tanya Stephens. We are representatives of the Australian Veterinary Association—the AVA—and we're both members of the AVA's special interest group for animal welfare and ethics. Collectively, we have—for our souls—more than 40 years of veterinary experience, particularly in this field. I would like to begin by thanking the Committee for the opportunity to contribute to this inquiry and to congratulate the Government on its ongoing dedication to improving animal welfare in New South Wales. Of note, the AVA has been in consultation with the Government about animal welfare reform process since October 2019 and we have made several submissions throughout the various reviews. The AVA has over 8,500 members made up of veterinarians across Australia working in all areas of animal science, health and welfare. Veterinarians are key experts in animal health and welfare, so it is important for our views to be heard on any animal welfare legislative or policy amendments. A key priority of the AVA is animal welfare, and we acknowledge the ethical dimension of animal welfare in medical research. The AVA has a statement of principles that articulates the ethical basis for all our policies and advocacy on animal welfare matters. These include the AVA animal experimentation policy and our policy on the role of veterinarians in the care and use of animals for scientific purposes.

The AVA submission makes several recommendations to this inquiry, particularly focusing on: supporting and encouraging a continuing commitment to animal research in New South Wales and the important role that it plays in the knowledge and improvement of health and wellbeing for humans, animals and/or the environment; calling for a greater emphasis to be placed on the provision of research grants to address the three Rs of reduction, replacement, and refinement and alternatives to research; highlighting the need for veterinarians to be included in all aspects of animal research to enhance the applications of the three Rs, foster animal welfare and maximise quality of research; seeking an AVA representative on the Animal Research Review Panel; improving competency training of researchers and involving institutional or facility veterinarians in assessing the competencies of researchers to undertake procedures on animals; and advocating for better harmonisation and standardisation across jurisdictions for annual animal-use statistics and animal research legislation, particularly calling for a uniformed Commonwealth legislation aligned to the Australian code for the care and use of animals for scientific purposes. We thank you again for the opportunity to present and we welcome any questions from the Committee.

The CHAIR: Thank you, Doctor. That's a very good opening statement. It sets up the questions very nicely. Dr Johnson, I invite you to make an opening statement.

PETER JOHNSON: I am Dr Peter Johnson, a retired veterinarian. New South Wales introduced the Animal Research Act regulating the use of animals in scientific research and teaching in 1985, requiring that all institutions and organisations conducting such business must be accredited as animal research establishments. Inspections by external government inspectors commenced in the early 1990s and generally included members of a statutory body—the New South Wales Animal Research Review Panel—appointed from their respective fields of expertise to monitor the application of the legislation, providing independent advice to government and reporting annually to the New South Wales Parliament. Initially, the departmental inspectors were all experienced

veterinary graduates recruited from private practice, government research or field veterinary services. Routine inspections were carried out at intervals of approximately three to four years or more often where there were problems identified or particular issues that needed further attention.

Regular external inspections augmented by site inspection reports containing conditions and recommendations provided animal research establishments and their AECs with clear objectives for achieving compliance with legislative requirements and benchmarks, against which they could assess progress in the implementation of best practice. To maintain this important monitoring function, inspectors must be selected on the basis of appropriate qualifications. They must be trained, mentored and resourced to ensure rigour in the inspection process. They must be aware of both animal welfare and ethical issues and, in particular, advances in research technologies that promote replacement, reduction and refinement in animal-based research in accord with community expectations. The progress made through the monitored self-regulatory and inspection process has been supported by the development and maintenance of evidence-based resources for the respective stakeholders. Maintaining these resources requires the ongoing provision of appropriately qualified and experienced departmental staff and sufficient guaranteed funding supporting the regulatory framework. I thank the Committee for the invitation to appear and I wish it well in its deliberations.

The CHAIR: Thank you, Doctor. Your submission is very detailed.

The Hon. EMMA HURST: I'll start with Dr Johnson. It's good to see you. It's been a long time. Can I ask quickly what years you've worked as the vet within the DPI conducting inspections on animal research institutions?

PETER JOHNSON: Yes, I started in 1998. I had a brief sojourn between 2000 and 2001 with the Commonwealth. Then I came back in 2001 and finally retired from the animal welfare unit in 2014. It was around about 15 years.

The Hon. EMMA HURST: Quite a long time, then. During that time that you were an inspector under the Act, did you ever hear about research that was potentially being abandoned? Say there was a chief researcher that might have changed roles or moved to another institution. Is that something that happens or is that something that's somewhat of a concern within the research community?

PETER JOHNSON: There would have been perhaps one or two occasions where research that was being undertaken at an establishment might have ended when the person who was responsible for that research transferred to another institution. But I don't particularly recall any specific issues where, in midstream of a project, for example, someone left and then there was a problem with animals remaining that were no longer under a protocol. I can't recall that being a particular issue, no.

The Hon. EMMA HURST: What about university students doing projects? One thing we've heard in this inquiry is that there have been some concerns that sometimes projects—and even though that project in and of itself has a supervisor, obviously, if somebody is still a student—are just replicas of research with known outcomes. Is that something that you witnessed during that time? I'm not asking for names or institutions or anything like that. Is that something that was occurring?

PETER JOHNSON: I can't honestly recall any specific instances of exact replication research. I would have to say that, in inspecting across a number of institutions, which all of us who were appointed as inspectors did, there would be commonalities in research that was being conducted at different institutions. But generally speaking, there would also be differences in the method in which the research was being conducted and also some differences in the proposed outcome. If you think of situations such as cancer research, there are certainly commonalities between the types of projects that are conducted but the end results may well be different. There are certainly instances where there are commonalities, but I wouldn't say that there were—

The Hon. EMMA HURST: Exact replicas.

PETER JOHNSON: —situations of exactly the same research being replicated, and not by students. My recollection is that in the majority of cases they would be postgraduate students who are engaged in a specific part of a project that is being supervised by somebody within the institution. The outcome of that particular part of the project would often be their master's thesis or their PhD thesis.

The Hon. EMMA HURST: One thing that has come up a lot in this inquiry—I think it's really difficult for people to get a grasp of the different types of research that happen when you're not really looking in and you're not actually involved in it. We've heard from researchers that are talking about observing wildlife falling under research, and then veterinary research, and then there are all these different categories of research. There's been an enormous emphasis on human life-saving research. Considering all of the categories that there are, how much, as a rough estimate, of the research is around human life-saving research?

PETER JOHNSON: That's a challenging question.

SUSAN MAASTRICHT: Could I help?

PETER JOHNSON: Please.

SUSAN MAASTRICHT: Only because I happen to have some data that has come not from the AVA but indeed from Sydney university, where we have about 51.5 per cent of our research which is actually biomedical and the rest is not.

The Hon. EMMA HURST: But that's just your university.

SUSAN MAASTRICHT: Correct. I can only speak to that.

The Hon. EMMA HURST: No, I appreciate that—and thank you—but I might just throw back to Dr Johnson for a more holistic view.

PETER JOHNSON: I think there is considerable variation across institutions. For example, at our regional universities there would be substantially less medical research. There would be some, but at the regional universities you would tend to have a lot more in the production animal and wildlife area than you would, say, perhaps at the University of Sydney or the University of New South Wales or Macquarie. Having said that, all of those institutions also have a substantial amount of research that is not human based. There is a lot of wildlife research. There is quite a bit of research on domestic and companion animals as well. I honestly couldn't give you a figure any different to what Sue has given. I would think it would be roughly equal if you took it across all of the institutions. The other thing to bear in mind is that it's not only universities either; it's commercial companies that are producing vaccines, and it's generally producing vaccines for domestic animals and livestock. There are other companies that are doing environmental research and that is essentially wildlife-based observations and surveys, that type of thing. All of that needs to be taken into account as well when you're looking at the overall break-up of what is directed towards human health and what is directed towards a range of other purposes.

Ms ABIGAIL BOYD: If I could perhaps ask the representatives from the AVA, in your submission you talk about—and we have heard this a lot—that every project that gets approval from the ethics committee needs to have justified that the three Rs have been addressed and that the impact on the animals is managed to maximise their welfare. We keep being told that. How does that work in practice? Is it really just a tick box, or at what point do the funding bodies decide that, "Enough is enough. You need to go and do some more research into alternatives before you can carry on doing this sort of treatment?" Is it all very siloed? Could you give me a bit of a colour as to how that process occurs?

TANYA STEPHENS: I've sat on four or five animal ethics committees since they were established, so I have a long-term interest. Of the ones I sit on at the moment, one is very basic research—the Children's Medical Research Institute one. The other one is the Department of Primary Industries, which is mostly wildlife and observational studies and independent research. I've got some across the board; I have sat on different committees that do different things. To be honest with you, I think animal ethics committees work very well. I think the concept of conflict of interest because somebody is paying for it, even if that comes up, I think that is really not an issue. I think they're very robust—every committee I've sat on. I don't think they've ever made decisions on justification based on funding. I think they work very well, and I think we have to remember that they were established so that the community could get involved and have a say in animal research.

Ms ABIGAIL BOYD: Perhaps I could clarify: My question was not about the behaviour or the decisions made by those ethics committees. It is about the processes and procedures that get input into those committees. For instance, if a research proposal came forward where a particular model of research was used where, perhaps, there could be alternatives to that but the work had not been done, presumably the ethics committee approves it on the basis of that particular research in that particular context as opposed to looking and saying, "More broadly, we should be perhaps refusing these so that people do go and invest more in alternatives." Do you see what I'm saying?

TANYA STEPHENS: Yes, that happens, definitely. Every committee I've sat on, we always talk about alternatives—have alternatives been considered? That's not ticking boxes, I can assure you.

Ms ABIGAIL BOYD: No, but there is also no consideration that if we were to actually prevent this particular research from going ahead because of the use of animals, it might encourage investment in alternative methods.

TANYA STEPHENS: It depends on the research. I think very much there's always a discussion on alternatives. I've sat on committees where research projects have been knocked back and there is always a discussion on alternatives. I think it's very difficult to generalise like that, to be honest with you. I think it just

depends on the specific situation where you would say, "Well, what are the alternatives?" You do that automatically. Every ethics committee does that.

Ms ABIGAIL BOYD: Perhaps then I could ask Dr Johnson, again from that more holistic perspective, If we have a situation where the commitment of researchers to the three Rs is done through a grant-by-grant process, what is needed to create that incentive, do you think, to invest or to follow alternative methods that don't rely on animals as much? Do you have a view on that?

PETER JOHNSON: I think that the granting process could perhaps be improved to encourage more of those types of studies to be undertaken. You would be aware, I'm sure, that it is a highly competitive process at present. Many of the good grant applications that are put up don't get a run. A lot of very well-trained people end up not being granted funds to do research and we lose them. Amongst those grants that go up, I'm sure there would be proposals that would be looking at the development of alternatives to animal research. The question is, how much research funding is there available to go around, and how much can be directed towards developing those alternatives? My answer to you would be, I think there is scope for more resources to be directed into more projects being given a run. At this stage, most of those types of projects would be at the fairly fundamental level of finding out what the best alternative is. So it's a question of whether you're funding some of the pure research that's necessary to get those things up and running as against some of the applied research that might be looking at the development for treatments against existing diseases.

The Hon. CHRIS RATH: How would you describe the regulatory regime in New South Wales? Robust, I think, was the word you used before? In particular, I want to know about the enforcement of the regulations that exist and, in particular, the inspections of the facilities as well. Could you provide a bit more context to all three in that regard?

SUSAN MAASTRICHT: It is a very robust piece of legislation directed towards animal research, which means that from the point of view of people who are undertaking research and animal ethics committees, the DPI and Animal Research Review Panel have got a very specific place to go to find out what their obligations are. I think that it needs to be very well resourced for all elements of it to be attended to, particularly the issues around inspections. The inclusion of veterinarians in many of the elements of it could provide a really significant interpretation of the animal welfare issues. I know that when Peter was part of that, there were a number of vets that were actually part of the animal welfare unit and, functionally, it was fantastic because when those inspections were conducted, they were very robust and they were done by the department.

There have been changes in terms of the allocation of resources and things have changed within the department. There's probably something that this group could do that would really effectively help that to return to perhaps the level that it was before. Let me tell you, I've been in this industry since before 1985 and the improvements that I've seen since the legislation has come into place have been extraordinary. Part of that is because the responsibility for what is going on in the institutions was placed absolutely on the animal ethics committees in the institutions and they have taken those responsibilities incredibly seriously. I remember having some chairs who were extraordinary in being able to say no to very powerful people doing research, to say, "No, that is not how you will do this anymore." It changed things. It really changed things.

We haven't finished the journey yet. We've got lots of work to do on the three Rs and alternatives. There's still lots to be done. We've made some significant improvements and this Act has been the means of doing that because it embedded the national code. In embedded all of the best parts of how we do research and get quality outcomes, and looked after the welfare of the animals that we were using. It has been an interesting journey that we've been on but a very effective journey, but I do think that more resourcing needs to be done if the State system is going to be the one to carry this forward in a really meaningful way. With my AVA hat on, I would love to see more vets doing this and being involved in this.

If you don't mind me saying this, I note that there had been a question about whether or not vets are trained and how many vets we have got out there to do that. We're doing things. Vets can do their memberships in animal welfare and, indeed, in the medicine and management of laboratory animals so that they can become fully equipped to function in this space. They can do external training from overseas. Our intern is currently doing royal college of veterinary surgeons endorsed training from Edinburgh university. So there are lots and lots of things that can happen, and that is what we need to also see happen. We'll have university students doing placement with us so that we can give them something around what it is to be a vet working in this sector. That's one of the things that I think that we do need to do as well. But these are all parts of how we can make this better. I have to say to you that the universities are very keen to be part of that and the AVA, in particular, is very keen to be part of this whole process because we bring unique expertise to the table.

The Hon. CHRIS RATH: In terms of the animal ethics committees, it is a bit hard for us—and this is a similar line of questioning to Ms Boyd—because we have never sat on any or seen them work in practice. How

do they work in terms of how often would a research proposal involving animals be rejected, for instance? I assume researchers won't come to an animal ethics committee, saying, "This is what we want to do," and then it is a simple yes or no. There's probably a lot of back and forth in terms of refining the process.

SUSAN MAASTRICHT: Oh, yes.

The Hon. CHRIS RATH: It is neither a tick-the-box, easy process to get through, but it is also not no, and then it never happens. It is more—

The CHAIR: Iterative.

The Hon. CHRIS RATH: Yes.

SUSAN MAASTRICHT: In fact, it can be "no": No, I'm sorry you can't do it. No, it's not the right model. No, you need to go back to basics. No, you can't do it. That happens. More commonly, it is, "No, that's not sufficient. The welfare of the animals is not being addressed. We see the benefit. We see what you're trying to do, but you can't do that for the welfare of the animals. The impact is far too great." There's a lot of back and forth, and a lot of requests to go back and revisit and redesign. We often say we want the animal welfare vets to be involved in the design process to make sure that we get this right, and then it comes back.

There's some work that could be done that vets could contribute to about the right models. Is this the right model for this type of research? Show me the evidence. Wouldn't it be lovely to have a three Rs centre? One of their systems was to look at the models that are available so that we've got somewhere to go, so that ethics committees have somewhere to go and researchers have got somewhere to go. These are some things that we could look at that would make a huge difference, and help the ethics committees and help the researchers. None of the researchers want to be going back and forth. They don't want to get a grant and then be told, "Sorry, you can't do that work. You will need to think about something else." And that happens because that is how seriously the ethics committees take their role in all of this.

TANYA STEPHENS: To add to that, research funding in Australia has been going down and down and down over some years. It is so difficult to get a research grant that you're not going to put forward a proposal, to go to an animal ethics committee without having done the groundwork, considering the difficulty of actually getting a research grant to do that research in the first place. Australia really needs to better fund research, into the three Rs but into basic research as well. We're really falling behind. There's an enormous loss of talent. If you've been studying, you do a PhD and you want to do research in Australia, there are very limited options nowadays. What we need to do is to make this process simpler. So we're talking about going to animal ethics committees. You're not going to go there unless you've got your research grant, and at that stage you've done your homework. You are going to try and make sure that that research is humane and is worthwhile. I think those of us who have been around this area for a long time appreciate that.

The Hon. WES FANG: In light of that, given there is a rigorous regulatory regime in this State, given that the dollars seem to be quite tight—so you would expect that researchers have a plan in place already before they approach not only the application but also the work that goes into the research—given the outcomes that we've seen and we've already heard the benefits to the populace that the research can deliver, is there really an issue? I'm failing to see exactly where the concern is around this area and the need to strengthen it. It seems to me that it is almost a self-managing situation, given the current legislation, the restrictions and the ethics bodies that are in place. It is very rare to see any issues at all. I fail to see the problem. Can you enlighten me, perhaps, as to where this urgent need for change would be?

SUSAN MAASTRICHT: It is, in fact, enforced self-regulation. This is the system that was set up, absolutely. If you look at the national code, it says every single person who is involved in every project using animals has a personal responsibility—everyone. Every animal care person, every person in the research project, the animal ethics committee, everybody who is involved has a personal responsibility, and we take that very seriously. It is one of those key things that the code calls for, and it's what the legislation calls for. In a way, we're not saying that the system is broken and needs to be fixed. What we are saying is there are some other elements that need additional funding. I think, to be frank, the regulator could do with more resources to be able to do their part of it because I think there is some real merit in them being able to do what they need to do and to give more opportunities for veterinarians to participate on ARRP, in the DPI and in this particular sector. I think that would be fantastic.

I think if we could have more research dollars around the three Rs and around the alternatives to research, because, believe me, everybody will be really glad if we didn't have to use animals to do research. I know that there is this notion that we all want to do this and that we all want to be using animals for research. It is not that. We use animals for research because we do not have an alternative at this time—at this time. What we want is to be able to find those alternatives and implement them because, let me tell you, being completely pragmatic about

dollar cost, it would be so much cheaper to use alternatives than it is to use animals. When we're talking about cost benefit, we are talking about the cost to the animals and that's what we balance up. We don't really care about the dollars at all. It doesn't matter—if you have a $5 million grant, that's lovely. Thank you very much. Bring that into the university or wherever it may be. The truth of the matter is the ethics committee says, "What is the impact on the animals?", "What's the cost to the animals?", and balance that against the benefits that you are anticipating you will get from the research.

TANYA STEPHENS: I was going to add that animal ethics committees were established so the community could have a say in experimentation. I think we have to remember that. Anybody can apply to sit on animal ethics committees. They are not detached from the real world. If you want to sit on one, you can get a list where there are vacancies and you can apply. This is why they were established, and they do play a really important role there for the community to make sure.

SUSAN MAASTRICHT: They have been key to actually helping committees to grow, develop and be better at the job that they do. They are an incredible inclusion. Of course, we sort of led the way on this by bringing community members in, and this State led the way with this legislation.

PETER JOHNSON: I would agree with what Susan and Tanya have said. I can tell you that in the early stages of when inspections were being conducted—and I was in after it had been in place for a while but at the fairly early stage—there certainly were instances where things were detected at various establishments that were clearly outside of the Act and outside of the code. Did we stop projects at those institutions? Yes, we did. Did I have researchers sitting on the other side of the table from me under caution? Yes, I did. Did we prosecute anyone? Yes, we did. But as time progressed, as ethics committees progressed and as institutions progressed with their approach to implementing the code as they adopted the evidence-based guidelines that were becoming available, those kinds of instances dropped away dramatically. The number of times that we had to implement conditions on institutions and establishments dropped substantially.

You could see over time that right across the industry there was progress towards a much more directed approach to animal welfare and animal wellbeing and a much greater acceptance of the evidence-based guidelines and information that was becoming available. I think the important thing is that that process needs to be properly resourced, and the monitored self-regulation is the way of doing that. I can't speak for how it has been in the last six years or so because I retired in 2014. I understand there have been some changes, as Susan has alluded to, in the way that the licensing and inspection is done. My deep concern would be that if there are changes to the legislation and changes to the process, the gains that were made over those early years, over the first two decades of the Animal Research Act, are not lost.

The CHAIR: I have a couple of questions to elucidate that. Being able to establish, as a committee looking in on this as an inquiry, to see and identify if there has been—and I will use this word colloquially—slippage backwards compared to where things were when the Act commenced and perhaps time immediately thereafter with its implementation and all that went with it, if the only way that we can see that the integrity that you have argued is there and was there is still the case these days and if the answer to that is, yes, you believe it is, how do we validate that integrity? Or is your answer that you are not sure and that really requires an investigative exercise to establish the integrity is being maintained?

PETER JOHNSON: My answer to that would be I am not sure. I really think one of the things that the Committee could look at is what the current situation is. I'm not sure whether anyone from the department has made a submission or not, but, yes, I think it's something that the Committee needs to consider carefully—what the situation is now, whether it has changed from the way it was six years ago or 10 years ago and, in light of the proposal, to combine legislations and create a new Act. I think it's really important to be certain that the gains that were made are not lost in that process or will not have been lost in recent times.

The CHAIR: Given that the regulation effectively is the key domain for the State in this area of animal experimentation—and I think you have all commented on this, particularly about the matter of inspections—are we able to look at the issue of regulation, do you think, and be able to make some judgement about whether or not—and I think I just asked the subset of the question—that the regulation has somehow diminished and become less robust or it is basically the same? I get the general impression that some witnesses—and I'm not going to say yourselves but others who have presented—have been implicitly suggesting that there has been a diminution, perhaps, in the robustness of the regulation in New South Wales. I'm trying to tease that out to establish whether, as experts, you would come to that conclusion from your own observations or say that more work needs to be done to establish that.

SUSAN MAASTRICHT: I don't believe that there has been a diminishing in the rigour with which the researches are being reviewed by ethics committees or, in fact, monitored by institutions. The code calls for four-yearly external review to be conducted, and we certainly see that happening. That used to be the responsibility

of the department and they would go in, and in a way that meant it brought the regulator in to see what was going on. This is to say nothing about the competency of the external people who are conducting that now, but there was something quite meaningful about the fact that a regulator and the people from that group were coming in to do those inspections.

Of course, we have had that but we haven't had that all the time. It has been particularly challenging over the last 2½ years of COVID. We would certainly not lean back from the notion of the regulator, a group of people, particularly qualified. Peter described the competencies of the people who undertake that review coming in and doing it. We would certainly not be stepping back from that, and we've had some very, very skilled people come in to do the reviews. In a way, it gives a legislation strength if the regulator actually plays a role in that and is able to do that more readily. We have really highly competent people who are part of that process. I think that somehow that is saying, "Yes, we are going in and we are looking and we're going into all of those institutions and we're checking what is going on, because how else are you going to do this?"

The CHAIR: On the question of the enhanced and improved role of vets and what we have been discussing this afternoon, from your own point of view what could we, as a Committee producing some recommendations to this inquiry with its terms of reference, be suggesting or proposing to the Government to enhance the role in terms of presumably the number and the general availability of vets to be involved in this animal research work that is currently underway in New South Wales?

SUSAN MAASTRICHT: I think we could engage more vets to give them opportunities to do the learning in this space because it is not a large part of what a vet would actually receive as part of their undergraduate training. Making sure that that is available to them, supporting them through that and allowing them to do memberships are the sorts of things that could be done. I really would love to see that happen. Doing in-house training used to happen all the time and that is the sort of stuff that would be fantastic. We could make opportunities for that to happen and go to all the vet schools and say, "What else can we do? How can we make that happen more readily so that this becomes part and parcel of what veterinarians actually can contribute to this space?" That is what our training is. Our training is about animals and understanding animals—all about them, not just their health and wellbeing but the environment in which their whole of life is actually given the greatest merit and benefit. It is just something that we carry with us. It is part of our integral training that we bring, and it would be such a unique opportunity for New South Wales, who has led the way in this space. It would be lovely to see New South Wales do something really meaningful to provide opportunities for veterinarians to receive further training and to get employment in areas such as this.

The CHAIR: In regard to this opening up of more opportunities for vets—and perhaps you can take this on notice—I would be very interested to see what your suggestions might be in terms of—is there postgraduate study or are there units they do within their actual undergraduate degree which actually provide opportunity, and a range of things that we could be looking at as potential recommendations to put forward subject to how we—

TANYA STEPHENS: I think they are not really exposed to it too much, and of course the curriculum is pretty crowded. But I think unless they are interested in research, they do not quite understand that they can get involved in this without actually being researchers. I mentor new graduates and I suggested to one that they might sit on an animal ethics committee, and they were not aware too much of what they do, so I think there is also this lack of understanding of "you can make a contribution without actually being a researcher". I think it comes down to education and not just postgraduate training. I think the universities have a role here to promote the idea of vets getting involved. One of the problems is, of course, that the veterinary profession, the same as the medical profession, has become a bit splintered as it were and specialised, and I think that to me has become a big issue. When I graduated, I sort of thought vets could do anything and you could go out and do community work. I think that has changed a little bit and I think we have become a little bit too much specialised. But I think it goes back to education and giving students the opportunity to think outside the square.

The CHAIR: Thank you very much. This has been most valuable to be able to ask you questions that elucidate the content of your submissions. I know there are going to be some supplementary questions arising from having the opportunity to read the transcript once that becomes available. If you would be agreeable with those supplementary questions, our secretariat will liaise with you. Once again, thank you very much for making yourself available and thank you Dr Maastricht for coming back a second time.

SUSAN MAASTRICHT: It is my pleasure.

(The witnesses withdrew.)

Professor ANDREW KNIGHT, Private Individual, before the Committee via videoconference, affirmed and examined

The CHAIR: Thank you very much for your submission. It stands as submission No. 250 to the inquiry. It has been received, duly processed and uploaded onto the inquiry's webpage. You can take it as read with respect to the members of the Committee, who will be wanting to ask you some questions shortly. Before that, can I invite you, if you wish to do so, to make an opening statement to get the ball rolling, and then once that is done, we'll then move into the questioning if that is agreeable with you.

ANDREW KNIGHT: Yes, thank you. I am obviously a veterinary professor of animal welfare and ethics. I studied animal research extensively within my doctorate and since that time, and I think it is very clear to anyone who does this that there is a very sizeable and consistent body of evidence. In fact, there are systematic reviews, which is a type of scientific study that aims to appraise all of the evidence in a particular research area and do so very thoroughly and systematically. There is a very sizeable body of this evidence looking at how useful animal research has been for advancing key human outcomes, in particular the advancement of human health care.

Although there have been some times where there are positive links, it is clear that unfortunately overall the efficiency of this research method for attempting to achieve this social objective has been very low, and there is a well-identified set of reasons that seems to be limiting the utility of animal research for advancing human health care. In light of these, as I have said in my publications, a range of measures are strongly warranted to increase the scientific quality of animal research, the reliability of subsequent results and to overcome some of the barriers that currently prevent reliable extrapolation to human outcomes. Compliance with each of the three Rs and other best practice standards during the design of animal research and the conduct and reporting of animal research must become mandatory.

Such standards should cover the animal sourcing, housing, environmental enrichment, socialisation opportunities, appropriate use of anaesthetics and painkillers, handling, non-invasive end points, and a range of measures designed to minimise sources of conscious and unconscious bias and to ensure scientific quality and safeguard animal welfare. Compliance with standards such as these should be a necessary condition for securing research funding and ethical approval; licensing of researchers, facilities and experimental protocols; and publication of subsequent results in scientific journals. Implementation of these sorts of measures would require cooperation and coordination between researchers, regulators, licensing bodies, ethical review committees, funding bodies, journals and authors and, of course, the necessary willingness among all parties to change.

However, given how sizeable and consistent the evidence in this area is, showing us that the current culture of how animal research is designed, conducted and reported has produced such a low level of benefits in light of the resources that have been invested in it, a paradigm change is clearly warranted. Instead of uncritically assuming the benefits of this research, we should be subjecting it to much more rigorous and critical evaluation. Where animal research continues to persist, a broad range of measures must be implemented to substantially improve its scientific quality and compliance with the three Rs and to maximise the reliability of subsequent results. When such research fails to meet the harm-benefit standard expected by society, it should cease, and the resources consumed by it should be directed into more promising and justifiable fields of research and health care.

The CHAIR: Thank you. That is a very helpful opening statement which sits very nicely with a quality submission. Thank you very much, professor. We have representatives at the table from the Opposition, the Government and the crossbench. If you are agreeable, between now and the end of this session we will spend time moving questions around between the three groups. Are you agreeable to that arrangement?

ANDREW KNIGHT: Yes, of course. Thank you.

The Hon. EMMA HURST: Thank you, Professor Knight. One argument in this inquiry has been the continued need for experimentation on primates. Would you agree that primates should still be used for experimental purposes? If not, why would you propose that they should not be used for further experimentation?

ANDREW KNIGHT: Primates are particularly concerning when used in animal research, for a couple of reasons. One is that they have particularly advanced cognitive, psychological and social characteristics, which means that it is particularly problematic when they are confined in relatively small environments where they are not able to exercise their full, natural behavioural repertoire. The disruption of their social networks is also important. These factors create a particular set of stressors, which may be less commonly experienced by other species. One characteristic, for example, is their long memories. They have the ability to remember that certain people—as in, laboratory technicians—certain tools and certain procedures may be associated with pain and stress, and to anticipate those occurring in the future. These sorts of characteristics may place primates at particular risk of suffering when subjected to invasive research in confinement within these environments.

Should they ever be subjected to experimentation? Certainly some level of research is justifiable; non-invasive, observational or behavioural research in sanctuaries or on free-living populations are examples of that. You could argue that if there was a primate that needed some kind of veterinary medical intervention, a treatment or surgical intervention, or a pharmacological intervention, existing treatment modalities were unlikely to work and there was reason to believe that a new test intervention might work – in a situation like that, if the need was great enough, it might well justify such research. In general, though, these studies, including the systematic reviews that I have conducted and published myself, have shown that research on primates for the normal purposes—which is attempting to test drugs, vaccines and so on, intended for human patients—unfortunately is not sufficiently reliable or predictive enough for human beings to be of very much use.

One of the reasons for that is perhaps simply logistical. The accessibility to these species, because of the cost and because of their relatively low numbers and difficulty gaining access to them for research, is so limited that the number of animals used in this research is relatively small compared to rodents, for example. This means that it is often not possible to reliably extrapolate results from very small samples to much larger groups for the same species, and certainly to other species as well. Unfortunately, there is a well-understood set of reasons explaining what the evidence clearly indicates, which is that this research has not been reliably and consistently useful in helping us to advance important human healthcare objectives. I do not think that kind of research should be proceeding, particularly in light of the unusually high animal welfare impacts and also the costs of that research in terms of financial resources, research resources and skilled personnel hours.

The Hon. EMMA HURST: I am assuming that you know what the forced swim test is, but if you do not, please let me know. In New South Wales there is evidence that there were forced swim tests of up to 90 minutes where animals were forced to swim for 90 minutes, whereas I know that a lot of the forced swim tests are 45 seconds to 90 seconds. As a vet, what are the welfare impacts of a 90-minute forced swim test? Do you think that, with those animal welfare impacts, that experiment should have been approved in New South Wales?

ANDREW KNIGHT: That is a very interesting question to me because, with scientific colleagues, we actually published a systematic review of the forced swim test in a scientific journal within the last year. We looked not only at the animal welfare aspects but, in particular, the scientific benefits accruing from the forced swim test. One of the major reasons that this test is conducted is to study depression – major depressive disorder, one of the top human psychological disorders worldwide, affecting many millions of people. The idea is that by putting these rodents into water with no ability to support themselves, eventually they will give up and enter a state which is thought to be similar to learned helplessness, which simulates aspects of major depressive disorder.

What we found by studying forced swim tests published in the scientific literature is that unfortunately the results of this research were almost never actually cited by clinically focused papers aimed at tackling major depressive disorder and other important psychiatric disorders in human beings. This research, if it was cited, tended to be cited by other animal research. But human, clinically focused research was continuing almost in a parallel world without making very much use of this forced swim test data whatsoever. It is not achieving its intended objectives scientifically, in terms of contributing to combating those major human diseases. It has a particularly severe animal welfare impact. So, based upon the harm-benefit analysis that this research is meant to be complying with, it should not be proceeding.

Ms ABIGAIL BOYD: Following on from that question, on that basis, do you think that there is any justification for using the forced swim test? Should it be outlawed?

ANDREW KNIGHT: Yes, I do. Indeed, that is what we called for in our recent published scientific study of the forced swim test. After conducting a systematic review, looking at how often this kind of research does go on to produce human clinical benefits, and looking at the alternatives and the level of contribution of those compared to forced swim tests and so on, we concluded that it clearly did not meet the harm-benefit analysis that animal research is required to meet and is expected to meet by society at large. The forced swim test is a particularly egregious example of animal research that has particularly high animal welfare impacts and a low level of actually achieving the benefits that are so often hoped for and so often claimed actually in attempts to justify this kind of research. That is usually made to grant bodies that are funding research and funding researchers. There are various justifications made, but unfortunately the evidence does not stack up in this particular case and that research rarely, if ever, produces those kinds of benefits. So, yes, I think it should not be continued.

Ms ABIGAIL BOYD: In a similar vein, the other thing that we have been hearing a lot of evidence about is smoking towers with mice and the nose apparatus and the forced inhalation of smoke for a prolonged period. Is that something you are familiar with, and do you think that the supposed benefits outweigh the animal welfare concerns when it comes to those smoking towers?

ANDREW KNIGHT: I would have the same kind of concerns that we have identified in systematic reviews of many fields of invasive animal research, and they are concerns about aspects which limit the

predictivity of this research for wider populations, both of the same species but also for other species, notably human beings. Unfortunately, the problems are very prevalent with this kind of research. They are very, very numerous but they concern things such as lack of statistical justification for sample sizes and lack of sufficient sample sizes. Both of these mean that you can conduct the experiment but it doesn't mean that you will necessarily be able to reliably predict outcomes in the entire species of mice, for example, or primates or whatever the species may be. That is a problem.

Lack of randomisation of allocation of animals to different treatment groups and control groups—that is something that is absolutely standard within human clinical trials, because failing to do that is known to distort the outcomes of the research. Lack of blinding during the assessment of the research results—that means the researchers should not be aware of whether the animal being studied has undergone a test intervention or has been in a control group. It is well known also from human clinically focused research that failure to do that also distorts scientific outcomes. I would be [audio malfunction] at this kind of research and looking at the prevalence of those kinds of errors we know from conducting large-scale studies – systematic reviews – that these kind of errors unfortunately are very prevalent and these are some of the key reasons why the results are not very reliable. They don't tend to reliably predict the same species and certainly other species as well.

The likelihood benefits, unfortunately, are low. The reasons why that occurs are well understood and well studied and, in light of that, should this research be proceeding? Well, when it is particularly invasive and when the animal welfare impacts are particularly high, as they are in smoking towers and forced swim tests, then the research needs to be especially justifiable in order to be proceeding. It needs to be particularly good scientific quality and the likelihood of benefits should be very high in order for there to even be a case. And that's not true, unfortunately. Those conditions are not met by this kind of research. It should not approved or funded and it should not be proceeding.

Ms ABIGAIL BOYD: One of the themes of this inquiry has been the lack of funding for alternatives in Australia. I understand in the EU they are working towards a phase-out of the use of animals in medical research. Do you think that that phase-out time frame or plan is necessary in order to properly incentivise adequate funding and focus on research alternatives?

ANDREW KNIGHT: Yes. I think that's certainly very beneficial. Obviously there is a long history of animal research. There is a lot of scientific culture which has been focused around setting up research institutes, getting in equipment and facilities that have been used in basic animal research and it takes time to transition those to alternative methods. But it is absolutely something we should be doing, with the national centres for alternatives in EU member states, which are government-funded, which provide grants to people working on the development of non-animal alternatives—providing opportunities to present their work at conferences and helping to provide career pathways for scientists working in these areas. All of that is necessary to help to generate a new scientific culture focused around alternatives. From a scientific perspective, perhaps the most important thing is simply the use of the research methods that are most likely to predict human outcomes, if the objective is to advance human health care, or to accurately answer research questions.

It happens to be the case that when you use things like human cell cultures in microfluidic circulatory systems— which start from different organs connected via tiny microfluidic circulatory systems—you predict human outcomes better than if you use rodents or primates, because you are actually using human cells. From a scientific perspective it makes sense to be using the research method that is most appropriate to your research questions—the most likely to answer the research questions that you have. If Australia wants to produce a world-leading research culture in this area, it needs to be resourcing that. It needs to be encouraging researchers that want to develop those methods and to use them, funding that research, setting up centres, providing conferences for people to present that work and helping to support career pathways for researchers who are keen to push the envelope forward in these sorts of research areas.

The Hon. WES FANG: Thank you, Professor Knight, for appearing today. Do you think it is fair to say that every dollar that would go towards funding new three R solutions potentially comes out of the budgets that would go towards funding cancer research, diabetes, heart disease—all the issues that Australians are living with day to day now? Is it fair to say that they would likely have to take a back seat in order to have those research dollars realised?

ANDREW KNIGHT: Thank you for the question. No, unfortunately, I wouldn't say it's fair to ask that. Those key public health concerns are so important and affect so many people. I think the important thing from a public health perspective and also scientifically is to pick the research methods that are most likely to produce benefits. If we have a budget for the treatment of cancer, for example, I think it is important to spend that budget in a way that is most likely to produce outcomes that actually are going to help human cancer sufferers. It is very clear from the systematic reviews that have scientifically studied how often does invasive research produce those

sorts of public healthcare benefits—it is very clear that although there are some benefits and some links, the level is unfortunately much lower than is usually hoped for, and often what is expected, and is in fact very low overall. It's a method that we can use, but the efficiency of this method or this tool for achieving that public healthcare objective is very, very poor.

If we want to spend our budget more effectively—we are certainly not taking from that budget; we are just seeking to spend that budget more effectively—then we want to be using methods which are much more likely to be predictive for human patients and likely to produce those benefits. Myself and other researchers have published papers looking at the effectiveness of different research methods for achieving these sorts of objectives, and human clinically focused research is currently under-funded in many areas and believed to be more likely to produce those objectives. It is not a matter of taking from those budgets; it is a matter of discontinuing the wastage of much of those budgets and redirecting it to more effective research methods, more likely to produce those public healthcare benefits.

The Hon. WES FANG: The evidence you have just given is in total contradiction to the evidence that we heard earlier this morning from Dr Ted Rohr, who was talking about the requirement for animal research to aid children who were undergoing cancer treatments. I asked him specifically about what other methods might be able to be employed to supplement or replace the animal research that is undergone in his clinics. He said that it wasn't possible and that, effectively, to trial and error on the child would be the only other method that he could see that would work. In that instance, I think that there's been a clear demonstration that there isn't another pathway. Obviously, there's a thought that we need to be doing more in researching triple R but, if we weren't able to do that sort of research, then does that not have an impact on those patients?

ANDREW KNIGHT: Yes. That's a good example and that's exactly the kind of point I was making—that we often have expectations of animal research in the hopes that animal research will produce certain kinds of benefits. The trouble is that, when we conduct the systematic reviews to examine very thoroughly the evidence—so how often does this research method produce those kinds of benefits? I mean, every systematic review that's ever been published in any field of animal research has demonstrated that the majority of the research in that field has a very common set of scientific flaws, which seem to be limiting the reproducibility and the reliability of this research and, consequently, the ability to produce the hoped-for benefits in terms of human healthcare advancements.

The trouble, I think, with the sorts of claims that you heard before is that they are claims that are talking about the benefits of a certain kind of research without systematically, carefully and rigorously evaluating that research in a study that then is published in a good quality scientific journal. That is a systematic review. The problem with a lot of animal research is that it's been uncritically assuming benefits and it's not been undergoing that kind of scrutiny. Researchers such as the gentleman you heard from before and the research fields should be subjecting their own research to that kind of scrutiny. It should be undergoing systematic reviews so that they can give an accurate impression of how often that research produces hoped-for benefits and also what the barriers are that are holding it back from doing things better and from becoming a more efficient research method.

Very often, we hear claims and anecdotes about the importance of certain kinds of research for advancing human health care—such as in that particular case—as a means to try to justify research funding or to seek to obtain ethical approval or perhaps, in your case, to speak to an expert committee assessing this issue. But what we're not seeing in those sorts of narratives is evidence from systematic reviews and other thorough scientific studies that have looked at how often that research actually produces those benefits and what the level of compliance is of that research with best practice standards designed to minimise scientific errors creeping into the research. Unfortunately, we know that whenever we do this there has not yet been a systematic review published that's found that the majority of the research in an area of animal research complies with good scientific standards.

There is a very well understood and common set of problems, which were identified many years ago in human clinical research, that have been effectively weeded out of human clinical trials to make those more predictive for human populations. But, unfortunately, they are still very persistent within animal research because the culture has not improved.

You hear those stories. They have been given to us many times, but they make the assumption that that kind of research is highly efficient and highly useful for producing these outcomes and that it's the only way that those outcomes can be achieved, whereas the reality, when you study it, is that the research is normally unfortunately—scientific errors are very common within that research. The efficiency for producing those outcomes is very low. Indeed, methods using things like human cell cultures, simulations and epidemiological studies are more likely to produce benefits for actual human beings.

The Hon. WES FANG: Professor Knight, if it was your child, would you want the animal research to be trialled for cancer treatments for your child? Or would you be prepared that that not be conducted in order to

satisfy perhaps an objective—you know, to further triple R treatment? Because I know in my case I would absolutely want what's proven for my children.

ANDREW KNIGHT: Again, a good question. Look, if it was my child I would be, I think, even more motivated to try to ensure that the research method chosen was the most likely to be predictive for my child. I wouldn't want financial resources, skilled personnel hours or other scientific resources being essentially misdirected into fields of research that are unlikely to be very effective or efficient in producing what I needed. I'd be wanting the use of methods that are most likely to be predictive for my child and that unfortunately is not animal research—certainly as a general rule. It is certainly not studying cancer in rodents or even in primates, I'm afraid.

The Hon. WES FANG: We'll agree to disagree.

The CHAIR: Doctor, towards the end of your opening statement—you may have it in front of you. I didn't write this down fast enough but I thought it was a very salient point. You spoke about the matter of paradigm change and then you actually went through a number of items: funding, regulation, research and journals. I think there might have been two or three others, but they essentially were sort of the research universe as a totality—if can I describe it that way. Can I ask you, in regards to that, would you agree that what we've got to try to do is move forward on all of those fronts concurrently to push this thing along and drive it as opposed to focusing on any particular one? Or do you have a view that there's a particular element that we should be giving particular focus to?

ANDREW KNIGHT: Absolutely. As I said, with respect to the last speaker, it's not just my opinion; what I'm giving is the results of systematic reviews, which are numerous and published in scientific journals. They have identified very commonly a certain set of flaws within animal research. We're talking about the design of the research, how it is conducted and also how it is reported thereafter in scientific journals. This is certainly much more than just my opinion. In order to address that, we need to change fundamentally how we assess animal research and how we conduct it. We need to be subjecting it to scientific scrutiny. Animal research is not somehow exempt from the need to be subjected to scientific scrutiny, particularly when it consumes so many research resources that are unavailable to other research fields. We need to be subjecting it to scrutiny and we need to be changing the way that we conduct animal research.

I mentioned a range of measures that need to be undertaken to change how animal research is designed, conducted and reported. If we did those things, theoretically we would be able to eliminate many of the problems that are so prevalent within animal research which give it such poor reproducibility—when you conduct the same experiment in a different lab, you very often unfortunately get different results—and also the poor predictivity of that research for wider populations. Interspecies differences would remain so it wouldn't fully remove the barriers to extrapolation to human beings but it would certainly improve the quality of research and the welfare impacts as well. In order to achieve that I said that there needs to be cooperation and coordination between all relevant parties, so that's animal researchers themselves, regulators of research, bodies that license research and also facilities—so we're talking about laboratories, ethics committees, funding bodies, journals and others, so everybody involved in the field.

We are talking about changing the field of scientific research. We are talking about cultural change. The need for this is very clear if you look at the evidence in this area. The same needs were identified, recognised and addressed within human clinical research some decades ago. The same kind of scientific problems were found to be highly prevalent. The same kind of problems it was causing with the reliability of the research results—the inability to accurately predict outcomes in wider populations—was widely recognised. In order to fix that up, the guidelines were published that human clinical trials needed to comply with, moving forwards, and appropriate measures were taken, such as the establishment of clinical trial registries so that future researchers could look at all the existing past research in an area and not miss key research. These things were done in human, clinically focused research decades ago and they have been effective.

In recent times we have had the publication of similar guidelines within the animal research field, following wide recognition that the same kinds of problems are highly prevalent within animal research, but unfortunately there has not been the cultural change. Follow-up studies have taken place and have been published in scientific journals demonstrating that even though guidelines have been put out there requiring research to be conducted to a much better standard, unfortunately, the reality is those problems and errors have persisted, and there has not been a widespread change in the way that there was in human, clinically focused research. Accordingly, the efficiency of this research method for achieving these key social objectives, such as the advancement of human health care, remains very low. There does need to be a change in the culture of science in this area. Animal research should not be immune from scrutiny. It should not be immune from change and

improvement. In order to achieve that, all those different bodies need to work together and have the willingness to change. That has not been the case to date, unfortunately.

The CHAIR: Can I be a bit of a devil's advocate and invite you to be as frank as you possibly can or wish to be? What is, in your considered opinion, professor, the cause or the root of this inertia?

ANDREW KNIGHT: This is going to be—

The CHAIR: I make the assessment that, from the witnesses that have come along and given evidence to the inquiry thus far, and the submissions we have read and what have you, we're not talking about unintelligent people, people who, dare I say, are not very fine minds in their particular fields. They can presumably see, if I could use this sort of phrase, what you can see if they're looking like you're looking. But the question is, to invite the response, why are they not looking like you have looked, if I could put it that way?

ANDREW KNIGHT: Yes. I guess one reason is they have not been compelled to do so. There is also not time to do so. Researchers are extremely busy people. It has been said that animal researchers are sometimes scientific giants but ethical infants. It is also true, I would say, that they may be very intelligent and expert in a particular area but unfortunately not in the crucial area of subjecting this research to the kind of scrutiny that systematic reviews subject the research to. Surprisingly, this research is proceeding somewhat unscientifically, in the sense that it has not been subjecting itself to scientific scrutiny adequately. There have been uncritical assumptions that this research is likely to produce the sorts of key societal benefits that have been so often claimed in applications to grant committees, to ethical review bodies and even to journals. That needs to stop.

This community needs to recognise that even though they may have a great deal of expertise in their own very narrow area, that is not a substitute for being willing to scrutinise the field with respect to how often it is producing those kinds of hoped-for benefits. We are talking about things like prospective and retrospective analyses of the research to see how often it went on to produce the kind of benefits that were previously hoped for. There is a list of around about 20 or so key scientific flaws that research in this area is often known to run afoul of. How much of the research is suffering from those flaws? What can be done to change that? People are just not thinking about these aspects. They may be brilliant in a very narrow field but they are actually not being sufficiently scientific enough.

The scientific thing to do is not to uncritically make assumptions. It is to critically scrutinise, question and identify flaws, and then the responsible thing to do is to try to fix those flaws. That has not been happening. It has not been happening, I suppose, because they're incredibly busy people, because it has always been done that way and because they have not been compelled to change. Stronger steps were taken in the human, clinically focused field decades ago. You could no longer publish your research in key journals in your field if your research did not measure up to standard—if it did not meet the required standards. That is compelling change. You couldn't necessarily get grants for your research if it did not meet the necessary standards. This compels change. These kinds of steps have not been taken, unfortunately, in the animal research field and so change has not occurred.

The CHAIR: It is a shame we don't have more time. It would be great to be able to follow that up with further questions. Nevertheless, time has got to us. Certainly I will have, and I suspect other members may have some supplementary questions to follow up on what has already been asked. I would like to follow up on that particular line of questioning I had to end it off. On behalf of the Committee, I thank you once again for getting up so early. I understand you may be on a holiday over there with your family. If that is the case, may you and the family have a wonderful break and a bit of a rest. Once again, thank you so much for making yourself available. We very much appreciate the evidence you have been able to provide the Committee. Thank you.

ANDREW KNIGHT: Thank you very much indeed, and best of luck for your deliberations. It is always a pleasure to talk to Australians. Thank you.

The CHAIR: Thank you, professor. We will now have a short break. We will be back at 3.00 p.m.

(The witness withdrew.)

(Short adjournment)

Ms PRUE TORRANCE, Executive Director, Research Quality and Priorities, National Health and Medical Research Council, before the Committee via videoconference, affirmed and examined

Ms MARY BATE, Assistant Director, Ethics and Integrity Section, Research Quality and Priorities, National Health and Medical Research Council, before the Committee via videoconference, affirmed and examined

Ms CATHY PITKIN, Executive Manager, Social Responsibility and Ethics, CSIRO, before the Committee via videoconference, affirmed and examined

Dr JACK STEELE, Director, Science Impact and Policy, CSIRO, sworn and examined

The CHAIR: We will get the next session underway. Once again, thanks to all those participating this afternoon and particularly those present now with our next session. We have three of our witnesses joining us by videoconference, and Dr Steele is in the room. I thank and acknowledge the respective organisations for your submissions—NHMRC submission 238 and CSIRO submission 237—which have been received, processed and uploaded to the inquiry's webpage. I invite both organisations to make an opening statement. I presume one person has been delegated or agreed. That's my assumption, unless there is a plan for everyone to make an opening statement. We'll start with the NHMRC's opening statement.

PRUE TORRANCE: Thank you for the opportunity to present to this Committee. I am joining today from Ngunawal land and pay my respect to Elders past, present and emerging. The National Health and Medical Research Council is the Australian Government's lead agency for supporting health and medical research in Australia. NHMRC's legislative functions under the National Health and Medical Research Council Act 1992 are to fund health and medical research and training; to issue guidelines and advice on improving health outcomes through prevention, diagnosis and treatment of disease and the provision of health care; and to promote the high standards of ethics and integrity in health and medical research.

NHMRC provides national leadership on the use of animals for scientific purposes through the *Australian code for the care and use of animals for scientific purposes*, which I will hereafter call the code anytime I need to mention it. This national leadership and provision of ethical guidelines on the use of animals is a longstanding role which NHMRC has undertaken since 1969, but it is in addition to our legislative responsibilities for improving human health. The current code is endorsed by NHMRC, by the Australian Research Council, by the Commonwealth Scientific and Industrial Research Organisation and by Universities Australia. The code is incorporated in legislation in all States and Territories, including in New South Wales.

The code outlines principles for the care and use of animals under responsibilities of all those involved with the use of animals for scientific purposes. Any research involving animals must be approved by an animal ethics committee before it begins, but the day-to-day operation of these ethics committees is the responsibility of research institutions, such as universities, which maintain those committees. NHMRC has also produced guidance for best practice in animal-based settings and, as a funder of health and medical research, NHMRC requires that any use of animals in any NHMRC-funded research complies with all relevant legislation, the code and NHMRC guidelines. Thank you.

JACK STEELE: This will complement that opening statement. I thank you for the opportunity to attend the Committee. I would like to acknowledge the traditional custodians of the lands on which we are attending this meeting and pay respects to their Elders past and present. The CSIRO submission to the Committee is basically set out in terms of the specific terms of reference of the Committee. All of CSIRO's research activities are under a strong policy structure and also audited by CSIRO's internal audit process, which is quite active about looking at our science integrity performance. The government structure includes our science and delivery policy and our code of conduct, and they adopt the code, using the short form of the word that Ms Torrance has used, and also the best practice methodology that Ms Torrance referred to, and also the NHMRC *Australian Code for the Responsible Conduct of Research*. So we are on a very common footing in terms of policy position.

Ms Pitkin's team supports the operation of four animal ethics committees in different States of Australia that review and approve the use of animals in research. In New South Wales our research involving animals is conducted at Armidale and is largely into livestock management—sheep and cattle. Really importantly, Ms Pitkin's team provides advice to researchers in preparing their proposals for committee consideration, including and emphasising implementation of the three Rs. That team also supports the animal ethics committee members, including access by those committee members to ongoing training. Each year those four committee chairs meet with Ms Pitkin and myself to go through and talk about best practice that they have been seeing, issues that they have been seeing and contemporary matters that need to be considered for best performance of those committees.

Each year we also provide targeted training programs of human and animal research ethics to staff and ethics committees—Ms Pitkin is doing one of those in Canberra today—to support and maintain our best practice. And of course we provide online services and individual advice. As Ms Pitkin has observed, we are active members of ANZCCART. Finally, I acknowledge the members of our animal ethics committees for their service on those committees. It's a really crucial part of ensuring animal ethics is appropriately considered and all of the animal research is up to best practice. We are deeply appreciative of their care and diligence and the way in which they do that and approach those responsibilities. Chair, over to you.

The CHAIR: Thank you very much for that opening statement, which complements the previous one very nicely.

The Hon. EMMA HURST: I'll start with some questions for either Ms Bate or Ms Torrance, whoever feels more able to answer the questions. I have read through your submission and in the submission you give quite a detailed breakdown of the amount of funding given to animal research projects in the last five years or so. I'm wondering if that information that was in the submission is actually publicly available elsewhere, such as in an annual report.

PRUE TORRANCE: Given there are a range of activities NHMRC undertake and our broad remit does not get into details about animal research numbers, no, those numbers are not published in our annual report. We are able to provide them on request. The total amount of funding shown in that would be the amount of funding for all of those projects, not the amount of funding that goes specifically to the animal research component. We are only able to provide the total amount of funding for each project. It is not itemised in that way, just to put up some clarification around those total figures.

The Hon. EMMA HURST: We've heard a lot in this inquiry about concerns around transparency, particularly when it comes to the funding for animal research. When you say that you would provide this information on request, have you ever had requests specifically for that information? Are you voluntarily providing that information to any request that comes in? Why is it not published annually?

PRUE TORRANCE: We do get questions on notice through the Commonwealth parliamentary process and through the Senate estimates process around the number of projects and the amount of funding that includes animal research components. That is usually where we would respond and publish those numbers when requested, and they would be available through the Australian Parliament House website. We could publish the numbers regularly on our website, but my sense is it's not the key data that people are looking for. The key data that people are looking for is usually the number and types of animals that are used in research and actually used in research, which would be information that would come from animal ethics committees that monitor those projects.

The Hon. EMMA HURST: So you don't have that information about the number and types of animals that are used in the projects that you fund?

PRUE TORRANCE: We request at the grant application stage whether or not animals are proposed to be used, what type of animals and the proposed numbers, but those numbers do get refined later post funding through the animal ethics committee approval process. We don't collect the final data; we only collect the proposed. We do that to monitor trends and what we fund over time. It's not to provide any national reporting, partly because we're only capturing NHMRC-funded research; we're not capturing all animal research that happens. We're only funding health and medical research as well, so it is really a subset of what happens nationally. I think it is really the animal ethics committees that have the best knowledge of what actually then happens in each research project, both that we fund but that's funded from anywhere, because everything must have approval, monitoring and oversight of those committees.

The Hon. EMMA HURST: It's an interesting thing that has come up in this inquiry. There has almost been an emphasis from some of the people who have come as witnesses to the inquiry and talked a lot about NHMRC funding as though that is the primary funding source. I'm not sure if you know the answer to this, but you talked about the fact that you're not the only funding source. Do you know how much of animal research is a percentage that you are funding from all animal research?

PRUE TORRANCE: No, because I don't [audio malfunction]—

The Hon. EMMA HURST: Sorry, Ms Torrance. You broke up a little bit.

PRUE TORRANCE: —know how much others are doing. I just know that there are both other Commonwealth departments [audio malfunction]—sorry, my audio cut out. I didn't hear that.

The Hon. EMMA HURST: That's all right. I was just letting you know that your audio was cutting out, but I think that there is a little bit of a delay. If it keeps happening, it might be good to turn your camera off; I think it might be a streaming issue. One experiment that has been flagged as controversial in some of the submissions

and by witnesses in this inquiry as the nose-only smoke model or smoking towers. Does the NHMRC fund any of these experiments?

PRUE TORRANCE: I would have to take that on notice. I don't have details of projects like that with me.

The Hon. EMMA HURST: There have been quite a few projects, I suppose, that have been flagged during this inquiry that some researchers say are not valid, like forced swim tests and smoking models, and a lot of people have flagged them as highly controversial because of the animal welfare impact. Does the NHMRC have any sort of process in place where they wouldn't fund certain experiments because of the high animal welfare impact or because of concerns around that scientific validity?

PRUE TORRANCE: That's a good question. The code, as well as the peer review processes that we use in the things we fund ourselves, really to set in place the key principles that should be taken into account when deciding what methods to use. There are a whole series of processes that should happen well before an application is received by us wherein the researcher is taking responsibility for considering whether the method meets best practice, considering all relevant aspects of, say, species-specific biology, physiology and behaviour; considering the best available scientific evidence, including international evidence and the potential adverse impact on the wellbeing of animals used and any strategies they might need to minimise adverse impacts. There are responsibilities in the code for the researchers, and the investigators themselves, to be considering all of that before they even propose to use the test.

Our peer reviewers, in reviewing a grant application, would also bring that lens, and we work very hard to try to match peer reviewers with applications where they actually do have the right skills and expertise but are not conflicted on the application and are able to provide those kinds of judgements on whether they are the right types of studies to use. If they're not the right types of studies to be used, they are not going to make it through the peer review process because that quality and significance of the research is something they are looking for. Even when we have funded something, we then require the animal ethics committee approval before the project proceeds, and that can result in variations to the grants that we funded to take into account these sorts of issues as well. So there are a lot of checks and balances already in the system, and if the code is well applied by all the responsible people—researchers, institutions, animal ethics committees et cetera—it should come out well.

That's it. We obviously look at when people report issues with particular methodologies or procedures. I think we have in the past made some statements about previous procedures, and we can look at those sorts of issues in the future. We have an animal welfare committee that advises us on policies. They are not an ethics committee, like the ones that review actual research projects; they are a policy advisory committee that might look at whether we need to produce particular guidance if needed. We can look at those sorts of things, but in general we think that there is a lot of confidence placed in the whole process and methodology of ethical review right from the researcher deciding through to the animal ethics committee approving. Most of these kind of tests you're talking about are being phased out over time because of that review process.

The Hon. EMMA HURST: So you're relying a lot on the animal ethics committee process, which occurs after you have provided the grant. Is that what you're saying—that you're relying on, first of all, the researchers to have looked into the welfare issues and then relying on the animal ethics committee after you have approved the grant to identify if there are animal welfare issues?

PRUE TORRANCE: You are right that the animal ethics committee's formal approval happens post funding in most cases. An experienced researcher or experienced research teams would have a good idea of how their proposal would be considered by the animal ethics committee and would be seeking advice if they had any concerns early on before they're putting in applications. Again, our peer reviewers would have a good idea. But it does formally happen after. Where the animal ethics committee obviously recommends any changes, that's taken very seriously. Some small changes—like, they will look at the 3Rs and the application of the 3Rs, which includes reduction in the use of animals.

If they are reducing the numbers and it's a relatively small reduction in numbers, then that will just happen. If it's a large reduction in the numbers that might impact the scale and significance of the research, they would have to come back to NHMRC to seek approval for a grant variation to make sure that we are still achieving value for money out of the research. But that is a fairly standard process that we would look at in variations that arise. So long as the original objectives of the research being funded are going to be maintained and achieved, we would look favourably on any variations that came about as a result of an ethics review.

The Hon. EMMA HURST: In regard to the forced swim test and the smoking tower models, I am not sure if you are aware that the Animal Research Review Panel has been reviewing those particular experiments.

Has your animal welfare policy advisory group also highlighted those or other experiments that could come up for funding with the NHMRC? Are they ever flagged as an issue of concern?

PRUE TORRANCE: Yes, the forced swim test, in particular. We will be taking some evidence and consideration to our animal welfare committee for advice later in the year. We are currently reconstituting the membership of the animal welfare committee because some of the people's terms are expiring and once we have it in place they will be looking at that. But we will also be looking to see whether there is already any international evidence or any international guidance because we do not look to duplicate things that are readily available elsewhere. Yes, we have had that particular one brought to our attention and our animal welfare committee will be looking at it to see whether it is something where we need to be doing anything specific to provide any further guidance on NHMRC-funded research using those tests.

The Hon. EMMA HURST: That is only for forced swim tests, so the smoking models have not been brought to the attention of the NHMRC? That is the other one that has come up in this inquiry.

PRUE TORRANCE: No, it hasn't been brought to my attention recently, but I will make a note of that now and we will see whether we need to look at that one as well.

The Hon. EMMA HURST: Stakeholders within the research industry as well as animal protection groups have all agreed that there needs to be more dedicated funding for alternatives and Australia is really falling behind other countries, but the NHMRC doesn't have any very dedicated funding streams. I know you do not exclude them, but there is no actual dedicated stream for funding. I am wondering if the NHMRC has considered ensuring that there is some sort of specific dedicated funding for alternatives and if that is an area that the NHMRC will be moving in at any point.

PRUE TORRANCE: What we have done is have a look retrospectively to see if there have been any innovations in alternative models that have arisen out of NHMRC funding. We produced an information paper that highlights some of those examples. While we have not had a dedicated funding stream for it, it has certainly been a feature of some of the research we fund. The real limitation on what we fund is under our legislation. We only fund research that improves human health. It has to have that focus, but there are certainly ways in which research that has exactly those objectives to improve human health and proposes to use animals or to move from using animal models can be framed within that objective of improving human health. We are seeing things coming through.

The other complication is that it is not always obvious when somebody is using a methodology that is replacing animals because they are not talking about replacing animals, they are talking about the new methodology that they are developing. We have seen some really exciting projects using mathematical models and computer simulations that are essentially things that would have previously been done using animal models, but that is not really drawn out in the reporting, so it is not obvious and easy to find and count all those things. In terms of whether or not we would do a targeted funding stream, as I said, the complication is that it needs to be for the purposes of improving human health and whether it would be possible to design something that achieves the broader objectives people were looking for. We do not have any plans to do that at this point in time because it is a little bit complicated, but we would absolutely welcome others with funding sources putting in those sorts of initiatives.

The Hon. WES FANG: I am curious to know how you feel about the current regulatory regimes we have in the State and if you believe that they are on the money for effectiveness or if you think that there's a strengthening that's required by the Parliament to achieve an outcome. Dr Steele, if I could start with you.

JACK STEELE: In the CSIRO context, the answer in relation to the State is in terms of our committee which overlooks the Armidale activities that we have, which, as I say, is largely in the livestock space. A general observation, as my opening statement inferred, is that it is the dedication, due diligence and sophistication that those committee members and the chair in particular bring to the matter—that's the first line of defence, if I can put it that way. The second line of defence is making sure that the organisation that's conducting the research has good, robust policies but really is attentive to the intention of the code, so treating it vigorously as opposed to treating it as a permissioned step. Our experience, I believe, when we talk to the chair of the committee is that it is a very robust process that is very effective and leads to improvement in the research activities and the way in which they are conducted. I believe that our experience is that it is pretty effective.

There is a design element here, which is how close do you have to be to the individual experimentation to be able to make effective judgements about whether it is an appropriate use of animals in research and whether or not the three Rs have been complied with and whether or not there is any better way of actually going for the aims of that particular research? That has to be done at the committee level and at the organisation level that is conducting the research. It is the intensity of those activities that is crucial. Of course, the overall legislative

framework sets the context for that, and of course DPI's oversight of that process is important to ensure that it is going the way in which was intended when the social licence was granted by legislation. But I think our initial view would be that the New South Wales process is robust and effective in our experience, as is generally the case with most other States, by the way.

The Hon. WES FANG: I have concerns when people talk about social licence because it is such an arbitrary measure. It has no determination; it has no framework. It is somebody's belief over somebody else's. What I am looking for is evidence, should I say, that either the system is working or the system is deficient in some way. So far over the hearings it has been my interpretation from the evidence that while some people may have concerns and may point to one or two historic events, currently the framework is working. We ask the same questions of each witness and I am waiting for an indication that it is not, but I am yet to get it. Does anybody else on the panel have a view whether in the space that New South Wales has legislative control, has there been a failure? Or is the system working in a way that would provide confidence to the New South Wales public that it is operating in the way that it should?

JACK STEELE: Cathy, would you like to comment?

CATHY PITKIN: I would just say that my observation of the deliberations of our animal ethics committees and the approval processes that they work through is that that system is actually very robust. It provides a very solid review and feedback to our research teams, and they work very hard to ensure that best practice in terms of animal welfare is maintained at all times. My view would be that that part of the system is working well.

The Hon. WES FANG: In that instance, if the regulatory framework and the legislative framework is such that the system is operating and people like yourselves, who have that higher level view and would also see what other States are doing in this space, are not saying that these things are being done deficiently or that these things need to be improved immediately, then what we are talking about is really a question of ethics and perhaps that social licence, as you spoke about: Where do we sit on this issue? Is that a fair way to present the issues that we are facing now? It is really about the involvement of animals in research.

JACK STEELE: I think you are absolutely on the money there. Having been legislated as a conditional possibility and a robust process that then tests that on each occasion, if the question that is on the table is, "Are we satisfied that, whether for medical research or other purposes, that is an appropriate use of animals"? that is a judgement that goes up to the Parliament's view about what is acceptable in that regard.

The Hon. WES FANG: Part of the evidence that we have heard in previous days' hearings and somewhat today was that without the use of animal research and animal testing, things like the COVID vaccine and children's cancer treatments would have been either delayed or the treatment would be impacted if we did not have those regulatory regimes in place. Ethically speaking, and again in a social licence aspect, do you think that is a reasonable use of the legislative framework and the robust nature of the ethics committees? Do you think that is an acceptable way to look at the issue? It is really, if we did not do this people would potentially die.

JACK STEELE: I have been watching a little bit of the evidence and you have certainly heard evidence that there are aspects of medical research for which there is currently a high dependency on the availability of conducting animal research, notwithstanding the fact that for reasons of ethics or economics and the cost of research, there is also—for a fair portion of it—quite a bit of motivation to look for in-vitro methodologies, screening methodologies et cetera to reduce the number of animals to get to the point where the animal experimentation is minimised. Those dynamics are certainly there, I can tell you. Animal experimentation is quite expensive. The production of animals for use in research is not really a viable economic business, so it is always the case that institutions are concerned about the cost of those activities and are keeping an eye open for that. I think those things are absolutely right. At the end of the day you do get to a situation, I am afraid, where there are some things you can only do with animal experimentation, even if it is right at the end of a non-animal-using lineage of research. In part, that is because you do not know what you do not know, so there comes a moment where you have to test it in—

The Hon. WES FANG: A living being.

JACK STEELE: Literally in real life. What you would hope, though—and there have been improvements in the Australian context in this regard over time—is that it is really value-delivering research. It is not cosmetic testing, for example. It is not chemical testing et cetera. I would make the observation that over the past 40 years, to my direct observation, there has been a very significant tightening up—I think you heard from an earlier witness on this, this afternoon—of the use of animals, partly because of the implementation of the code. But I will say to you that, at the end of the day, you get to the calculation being made by a committee with a carefully designed skill base that is brought to the committee. So, in each case, to be able to know whether it is

justified, that is the point at which the right skills in the room with the right level of detail need to make that calculation. I am afraid that is always going to be where that decision gets made. It would be tricky to make it in a legislative framework, although you can set the principles, obviously.

The Hon. WES FANG: There is one last part that I want to ask you about. A lot of the evidence has said that we need to be spending more on research in the triple-R space. We need to be doing more to make sure that we move away from animal testing and animal research. From a pragmatic standpoint, that is probably correct; however, I imagine that you have been in research for quite a number of years and that this is not your first rodeo, shall we say. In your experience, if a large amount of money is spent on pursuing that avenue and that goal, is it reasonable to say that it is likely that that money will have to come from another space and will not be new dollars that are put down that path—i.e., would it be at the expense of other research that, say, the CSIRO might do?

JACK STEELE: Let me come to the CSIRO in a moment. I am not surprised that the Committee has had the experience of people giving evidence that more money for research would be a good thing. That is a general phenomenon.

The Hon. WES FANG: I don't think anyone ever says it shouldn't be.

JACK STEELE: Because there is tight funding for research generally—including in medical research, although that has gone up fairly significantly over a few decades—it is inevitably always the case that unless you can identify a particular application of the research where you get both goals satisfied at the same time, you are making a choice between one option and another option. So, yes, you have to do the calculation on where you are putting your preference and where you are getting your best returns in terms of the nature of the research outcomes. A fair portion, but not all, of the funding for medical research—because this is the context in which you have got most of your evidence, I believe—comes from the NHMRC. Prue can talk to you about that. I think she has already told you the legislative framework in which the NHMRC is funded.

In the case of the CSIRO, we do some investment in research which reduces animals. We have a number of different business units that do different sorts of research. For example, the work that is done in Armidale is done by our Agriculture and Food business unit. There is another business unit, which is Health and Biosecurity, and the ACDP facility. They are actively investing in in-vitro tests, like organoid testing, to look for new and better ways of doing testing activities that would reduce animal use. That is part of the CSIRO's portfolio of activities. Even there, I am sure they would say to me, "Have you got some more money, Jack, in order to be able to do more of this?" It is an active investment that we are making, but you are always making those preference decisions, I am afraid.

The CHAIR: In the limited time left I direct this question to both organisations. Who answers it is a matter for you. It is drawn from some of the evidence that has come to the inquiry thus far from submissions and witnesses in their oral testimony. The proposition has sometimes been explicitly suggested, in other instances it is more implicitly suggested—I invite comment on this, even though effectively you are working in organisations which are operating in the Australian context—that if you look at the research being done in Australia that involves animals, the way in which this has been conducted up to this point has in effect become entrenched as the status quo position: That is the way we have always done it. That creates an inertia, or a tardiness to look seriously at other methods that could be available. If I put it this way, we are in our own research bubble in Australia involving animals and that is the way we have always done it.

There is State regulation and funding from the Commonwealth and the model is well understood. That is creating this difficulty of cultural change—the phrase that has been used—to look beyond what we are doing and how we have done it and look to see what is being done elsewhere, particularly in other jurisdictions overseas. I invite both organisations to comment on whether you think there is any validity in that proposition, that we struggle with the fact that we are doing it the way we always have and that has become entrenched. If you disagree with that, could you elucidate and explain, perhaps from examples or particular research projects you might have been involved in, to demonstrate why that is not the case to give us a sense that these propositions put need to be challenged a bit further?

JACK STEELE: Prue, do you want to go first?

PRUE TORRANCE: Sure. When we look at how we compare internationally, I think there are a few things to say. One is the regulatory framework that we have in place is international best practice. It does compare favourably. The only main difference is that in a number of other countries they have national legislation, whereas here we have legislation in each State and Territory, but there is legislation in each State and Territory and it does pick up the national code. The framework is quite good. We were concerned for a while that there was a gap in information about how well that framework is applied, which I think gets to some of the transparency issues that have been raised a few times already. The project we undertook in 2019, looking at the implementation of the

three Rs, tried to address some of that gap and again did find that, actually, comparatively internationally the three Rs are very well understood in Australia and are implemented relatively well. Those three Rs, of course, do all those things you are talking about. They do try to move us into more innovative approaches by actually questioning the use of animals—can they be reduced, replaced? Those questions actually start to drive those innovations.

To really get to your question, the example that I would use—I can't give a specific example of a project, but NHMRC's ideas grant scheme introduced in 2019 is all about innovation and innovative research projects. It is through that scheme that we are seeing examples of new methodologies, including mathematical modelling that I mentioned before. That really is starting to replace the use of animals and the system is actually driving some innovation through those sorts of schemes, and there are other ones across government that really do focus on innovation and research. I can't really talk to how a particular facility might run and whether there are some entrenched behaviours there.

As a funder, we certainly do try to drive the incentives that would lead to those sorts of innovations and keeping them top of the absolute best practice in scientific methodologies. We have a research quality strategy and an action plan into that. We are also trying to drive and improve the quality of research in Australia and more broadly, which does include consideration of the use of animals in research. That is an ongoing strategy and ongoing piece of work for us, but it is a framing that we have about looking at this. That, combined with our grant schemes—I think it is unfair to say Australia is falling behind in being innovative about how we approach the use of animals in research and moving away from them, but I am sure there are pockets of some stagnation, as you have suggested.

The CHAIR: Thank you. I am just testing the proposition. I don't know whether Dr Steele wants to add to that?

JACK STEELE: I will give you my personal experience in a moment. Cathy, do you want to make any comments?

CATHY PITKIN: I would just observe that the application process and review process by AECs actually does ask our researchers to show and justify that what they are proposing is best practice and how the application is meeting the three Rs. We undertake professional development with our ethics committees, particularly with the lay members of our ethics committees, to ensure that they are across expectations and best practice so that they are adequately able to assess applications. There have been instances in the past where ethics committees have said, "No, we are not prepared to provide an approval to that because we think there is an alternative, or there might be a better way of doing it." Those better ways of doing it are then developed and found. I would agree, I don't think this is a case where we are lagging behind international standards. I think the process that we have does expect best practice to be strongly demonstrated as part of the approval process.

The CHAIR: Thank you. That is very helpful. Dr Steele?

JACK STEELE: I just supplement to say—and you will see it in CSIRO's submission—we are keen on the openness agreement being implemented. The truth of the matter is the answer to your question would be much better based if we had longitudinal data on the number of animals and what they are used for and what is the nature of it, whether it is wildlife observation, or whatever. My own experience is CSIRO's number of animals that were used in New South Wales when I joined CSIRO and became the secretary of a committee back in 1982 would be at least an order of magnitude more than it is at this point in time. Part of that is because there have been changes in various technologies.

We used, for example, to use animals in order to produce nerve growth factor and other growth factors for various experiments. That would now be done by molecular biology techniques. We used to use mice to grow up high-concentration ascites fluid with monoclonal antibodies in. That would all be done by in vitro methodology. So what is the driver of that? Was the driver of that reduced animal usage? Well, I can tell you that it was certainly something we were looking for at the time and it was the implementation of the code that was part of that. But there has also been a fair economic impact of the cost of conducting animal experimentation, which has also been at play here. I would love to tell you that it was slightly more virtuous than that, but the truth of the matter is that's one of the factors that's actually quite significant about determining whether particular animal experimentation even goes to the question of whether it is justified or not.

The CHAIR: That has been very helpful. The submissions were very good and we have had the opportunity to augment that evidence with oral testimony. I am sure that after reading the transcript some members will have supplementary questions. They will be provided to you through the Committee secretariat, who will liaise with you over the timing of the answers to those. Once again, we know that you are all very busy and had to make the time available this afternoon. Thank you. It is much appreciated.

(The witnesses withdrew.)

Dr JOHN TRACEY, Deputy Director General, Biosecurity & Food Safety, Department of Primary Industries, affirmed and examined

Mr GREG VAKACI, Director Compliance and Integrity Systems, Department of Primary Industries, sworn and examined

Dr KIM FILMER, Chief Animal Welfare Officer, Department of Primary Industries, affirmed and examined

Associate Professor ROGER GARSIA, Chair, Sydney Local Health District Animal Ethics Committee, sworn and examined

Professor JACQUELINE PHILLIPS, Chair, Animal Research Review Panel, affirmed and examined

Distinguished Professor ANNEMARIE HENNESSY, Deputy Chair, Animal Research Review Panel; Director, Australian National Baboon Colony, affirmed and examined

The CHAIR: On behalf of the Committee, I welcome you all for coming this afternoon. It is much appreciated. This is an important inquiry for Portfolio Committee No. 2. We will value very much the contributions from you as witnesses for and on behalf of the New South Wales Government from your respective agencies. We acknowledge the Government's submission to the inquiry. You probably would be aware that the Government has made a whole-of-government submission, which is quite common to inquiries. It is titled "NSW Government Submission" and stands as submission No. 239 to the inquiry. It has been received, processed and uploaded to the inquiry's webpage. So that is before us. In addition, I will invite now an opening statement. Normally we just have the one opening statement from an organisation, but given the significance of the New South Wales Government's contribution, I don't know whether it is going to be shared across more than one person. I am in your hands in that respect. I probably would not be suggesting that we have six opening statements. How would you like to proceed?

JOHN TRACEY: I can make an opening statement from New South Wales DPI.

The CHAIR: That is fine. Would anyone else like to make one? If you feel like you wish to or had prepared one, you may. Let's just start with Dr Tracey.

JOHN TRACEY: Thank you, Chair. New South Wales DPI is committed to ensuring the best possible animal welfare outcomes. We have a strong and effective animal welfare system, underpinned by the Animal Research Act and regulation and the national code that applies to all teaching and research involving animals. This Act also legislates the operation, composition and role of the Animal Research Review Panel. This panel provides independent oversight of the conduct of animal research and any complaints related to it and includes equal representation from industry, government and animal welfare sectors. We support that panel in DPI. We provide administrative and technical support. We accredit establishments in accordance with the panel recommendations and collect and collate statistics on their behalf.

We also investigate complaints, inspect accredited establishments and licensed animal suppliers, report to the panel on outcomes of those activities and carry out delegated investigations into statutory complaints for the panel. The system provides independent, statutory oversight of animal research activities in New South Wales, with input from the animal welfare sector, while also bringing to bear the technical, investigative and compliance expertise of New South Wales DPI. As members will appreciate, the term "animal research" is extremely emotive and it's therefore important we prioritise transparency in this area so that public confidence in the system reflects the very high standards of care and conduct that are built into it. New South Wales continues to provide a very high level of transparency concerning animals used in research within the legal parameters which we operate in, including the publication of annual statistical reports and the annual report of the panel.

The information published in these reports goes above and beyond that of many other national and international jurisdictions and includes information on the level of impact and the field of research in which they are used, such as medical or wildlife research. The statistics for the 2020 reporting period again show that the vast majority of animals—so that's 98 per cent of cats and 91 per cent of dogs—are used in studies with minimal impact on the animal. These might be anything from trials to assess pet food, observational behavioural studies, educational activities in which students learn how to care for and handle animals, or even scent detection work in wildlife surveys. These studies are important to our health, community and environment and for animal welfare, as the Committee has heard in previous testimony today. New South Wales DPI will continue to work collaboratively across government and with all stakeholders to support the principles of the three Rs and to ensure the best possible animal welfare outcomes. Thank you.

The CHAIR: Thank you very much, Dr Tracey. Who would like to make the next opening statement?

ROGER GARSIA: I'll take that opportunity, if I may.

The CHAIR: Please proceed.

ROGER GARSIA: Firstly, thank you to this inquiry for the opportunity to present. I very much appreciate that. I thought what I would do is try and give some perspective from a chair of an animal welfare committee, which is the reason I'm here. The committee that I chair is a committee of 11 members, which includes two category C animal welfarists, two category D laypeople, three veterinarians and three members of category B, who are researchers, plus myself listed as a category B member.

My actual professional role is as a clinical consultant physician in immunology at Royal Prince Alfred Hospital, and I am an immunopathologist within NSW Health Pathology. I hold a research PhD in medicine. I have been a past president of the Australasian Society of Clinical Immunology and Allergy and served on a number of national granting bodies related to multiple sclerosis, hepatitis and HIV. I am just trying to give you a perspective on the sort of background—and my situation will be similar to very many people—

The CHAIR: That is helpful.

ROGER GARSIA: —who chair these committees. The animal welfare committee that I chair oversees research that is conducted by the ANZAC Research Institute; the Centenary Institute at RPA; the Heart Research Institute laboratories in Newtown; the national baboon colony and the onsite facilities used in teaching, training and research at the RPA animal house; the RPA robotics training institute; and the Institute of Academic Surgery. The research we scrutinise predominantly involves laboratory-bred, natural and transgenic-strain rodents. These are mainly mice which are studied in animal traditional models and novel models of human disease. To a lesser extent, we oversee the conduct of animal research involving zebra fish, pigs and baboons of the national baboon colony. The facilities we inspect are, in some cases, also authorised as animal suppliers for research and they conduct breeding for research and training purposes as well. There is no research currently under our committee's governance that uses companion animals—dogs and cats—in our facilities at the moment, though there have been many years ago.

Many of the researchers use animals sourced from Australian BioResources in the Southern Highlands or from the Animal Resources Centre in Western Australia. Many of our facilities have quarantine rooms that can be used for direct importation of strains from sources in other countries, interstate or locally. Some of these facilities operate as pathogen-free facilities with enhanced biosafety infrastructure and strict surveillance for entry to prevent contaminating microbes. One facility has PC3 level, which is a high level of bio-containment, enabling studies of virulent microorganisms, including SARS-CoV-2, the pathogen that has been causing COVID-19, and has been actively involved in that research.

All the facilities we monitor are staffed by qualified managers and a mix of full-time and part-time staff. Of course, our researchers are the investigators working within those facilities who have primary responsibility for the animals that they are researching on. As well as being under the scrutiny of the animal welfare committee, they also come under the internal scrutiny of their line management within their institutes, facilities and the organisation of Sydney Local Health District.

In my clinical role at the moment I don't currently use animals for research because I'm spending most of my time working with humans. That is my clinical role. But I did my PhD work in a project that could not possibly have been done without the use of animals at various stages of that work. It required the use of monoclonal antibodies, which at the time were produced in ascites, as you heard earlier; now they are done in vitro. The changing profile of animal use reflects the advances in technology. I went to the United States in 1989 and worked on humanised mice—mice which had had implanted in them human immune systems, which enabled studies to be done which were able to recapitulate the human response. Those sorts of humanised mice have been absolutely critical—in a different form, not exactly the same types of mice—but those approaches have been critical in the early development of SARS vaccine and other vaccines that prevent infections in man.

I will not go on in any detail to describe some of the other experiences that I've had close involvement with, which have been involved in the taking of basic science discoveries made in the United States, where I had the privilege of being a postdoctoral student, through to the point where some of those entities became drugs which were critical for the prevention of transplant rejection in kidney transplants, heart transplants and lung transplants, and have even been used recently in multiple sclerosis. Better drugs have come along, but for 20 years they were very important in the maintenance of the health of people right across the spectrum with those sorts of conditions.

What I'm trying to do is just give you the sense that, as a chairman of an animal welfare committee, where one is trying to balance the impact on animals versus the need for advances in health, that sort of perspective assists me, at least, in my consideration of what information I need to ensure is presented to the committee in the

justifications that are actually provided in the course of the submissions of the projects that come to our attention. I do emphasise that the committee is a committee. As the chairman, I see my role as being to ensure that the right questions are asked; the documentation is thorough and verifiable; that when we then go through the steps of modification those adjustments get to the point of implementation; and that in our inspections of facilities we are applying the highest best practice standards in our expectations of the adherence to the protocols that we've approved. I think I will leave it there.

The CHAIR: That is very good. That has laid out a very nice base for us. I am sure there are going to be some questions arising from that. Thank you. Professor Hennessy?

ANNEMARIE HENNESSY: If that is okay?

The CHAIR: Please do.

ANNEMARIE HENNESSY: Thank you, I will just add to that. I will start by acknowledging the Gadigal people on whose lands we meet in this, their Reconciliation Week. I will just add quickly, because Roger has set the stage for me, that I am a renal physician, a kidney specialist, and I deal with the complexity of patients in the New South Wales system every day. I see the complexity of our responses to those patients and I deal with distressed and bereaved families with early death, the loss of sight, the loss of limbs and the death of a baby. I've worked in the COVID wards. I've seen the death that COVID can bring and the scariness of being unable to breathe at the end of your life. In fact, I saw a COVID death this morning. I bring a perspective as a clinician-scientist also. I have a PhD. As Roger indicated, as part of being a clinician-investigator within the system it is my job to review evidence, to ask questions and to think about the best way to answer them.

I really wanted to just make a statement that I have seen in your questioning about the idea of how you get a linear journey from a problem to an animal experiment and then out the other end to a solution. I see that as much more of an iterative and a complex process. We would ask a question; the tools we have are family, teams and data. We then move to pills and surgeries, but we are every day asking for better solutions to the problems that we see and what is the best way to get the best information to do that. We would start with data that is based on a human population. We would think about the question that is relevant to those families. They would donate their tissues to us, and we start with that. We might use complex computer modelling to come up with a particular pathway or an approach, and then we have to try that out and see if that would work. We would, at all costs, try multiple tools to do that. In any application that I've ever looked at for funding—I review hundreds of those every year—we would have a multi-pronged approach to doing the work, of which animal research was only a part.

I wanted to use the example of the COVID research. Having come up with 20 years of work towards mRNA therapies, having used the computers to give us the best possible sequence for COVID-19 and worked out what that compound could look like—do we coat it in cholesterol? Do we put it in something else? What do we do to try to deliver it in the right way?—some 200,000 human subjects stepped up to be part of the research that would enable the global vaccine to go forward. But how much more comforting to be able to go to those 200,000 volunteers and say, "This has been tested in a few dozen macaques." It was done in non-human primates, but in a way that enabled the next step to go much more quickly. You heard from your witnesses on Monday last week about years being shaved off the journey towards a vaccine success by doing an iterative and integrated approach to research that takes into account all the advances that we are looking for.

My final comment is that the research quality is underpinned by a strong regulatory environment. That means that the animal welfare is paramount within the context that I speak of, about trying to improve these massive problems that we deal with every day. The quality of that work and its regulation, and its support through the mechanisms described today, means that we are all striving for the best possible outcomes for both. Thank you.

The Hon. WES FANG: The defence rests your honour.

The CHAIR: That is very good. Thank you for that. The combination of those three knit together very nicely and I think provide the basis of some questions.

The Hon. EMMA HURST: I would like to begin my questions to both Professor Phillips and Dr Filmer. We have received evidence on the first day of this inquiry from an animal care technician, who raised some quite serious concerns. One problem was in regard to over-breeding inside institutions and the culling of potentially thousands of animals that are healthy and had been bred in excess to experimentation. I wanted to understand if this is a problem that you're aware of and if it is something that the Animal Research Review Panel or the DPI have actually investigated.

KIM FILMER: The regulation of the breeding has an oversight by the animal ethics committee so any breeding that goes on should be monitored by the animal ethics committee that that breeding sits under. Animal

ethics committees look after, control, regulate and monitor the breeding as well as the research that occurs. If there was a suggestion of someone having a complaint about that, then that should be lodged as a complaint and go to the compliance area for investigation.

The Hon. EMMA HURST: One of the documents that we received as part of an SO 52 showed one facility killed 807 animals that were bred in excess. Is that normal that such a large number of animals are being killed because they've been over-bred or is that quite a specific situation?

The CHAIR: To appreciate the question, the SO 52 obviously is a process of obtaining information from government agencies. Can we perhaps provide the witnesses with a little bit to the detail of that, because it might be the first time they've heard this? I'm not sure.

The Hon. WES FANG: I was going to suggest, Chair, that if we're going to question the witnesses on evidence we should perhaps procedurally, and observing procedural fairness, provide them with copies and provide them with time—

The Hon. EMMA HURST: I have copies here, Chair. It's part of an SO 52. It was actually an agenda item of the Animal Research Review Panel, so it was part of the Animal Research Review Panel minutes. So it might be something Professor Phillips will have a better understanding of.

The CHAIR: No, I am just trying to show due process and procedure here.

The Hon. WES FANG: I think, Chair, we also need to allow the witnesses time to read it but also absorb the information, because as you said it may be the first time—

The Hon. EMMA HURST: Sorry, Chair, but this is an Animal Research Review Panel document, so I don't think it's the first time the Animal Research Review Panel has read their own minutes.

The CHAIR: Order! Just to make sure that everyone has an opportunity to be aware of what is before them and if they need to read it, they obviously need to read it. There's no assumption in my mind that people necessarily studied the document or are aware of its content. I'm not trying to be obstructionist; I'm just trying to make sure that everyone has the opportunity to be aware of what is put before them. If you need more time to study it and—I'm not being obstructionist—if you need to take it on notice, you are able to do so. But if you are able to make some comment, I will invite you to do that, but as you see fit.

KIM FILMER: I'm unable to answer that question. I would have to take it on notice. The Animal Research Review Panel—I'm not on that panel, so I'm probably not the best person to answer that anyway.

JACQUELINE PHILLIPS: Sorry, I am just reading the material.

The CHAIR: We have got to give the witnesses an opportunity to study the document.

JACQUELINE PHILLIPS: Can you remind me please, just in terms of what you are wanting to know about this particular—I'm assuming it's item 9 on the agenda that you've highlighted for us.

The Hon. EMMA HURST: Correct, yes. Item 9 says, "807 mice noted as culled in annual report". I'm just wondering if that is a common number that you would see as bred in excess of animals or do you think that that is quite an unusual figure to see?

JACQUELINE PHILLIPS: Right, okay. I'll just have to look at what we've said in the discussion at the ARRP again. We have questioned this, obviously. It was brought to our attention as a point of consideration for the ARRP. In terms of other numbers, I probably am not in a position to quote. I wouldn't know off the top of my head what other numbers are from other committees or other reviews that we've looked at. However, because we have looked at this, we've obviously gone back to ask questions and to need further information about it.

The Hon. EMMA HURST: So it was alerted to you as a high number.

JACQUELINE PHILLIPS: The fact that we've looked at it and discussed it would suggest that the ARRP has had some concern about it.

The Hon. EMMA HURST: Is there an actual reporting requirement on the culling of excess bred animals that goes directly to ARRP? I know that Dr Filmer said that the AEC oversees it, but is there an actual reporting requirement that goes back to ARRP specifically for excess culled breeding stock?

JACQUELINE PHILLIPS: In terms of our reporting requirements in terms of numbers, each year the institutions have to report the total number of animals that have been used and they will be classified under various categories. So if animals are reported under excess breeding protocols, I'm not quite sure what the category is that they would come under, in terms of our annual statistics report this year. I don't think we actually break that one down specifically in terms of a number that we get from AECs in their annual reports.

The Hon. EMMA HURST: Okay, so that's not something that is recorded.

JACQUELINE PHILLIPS: No. We get the animal numbers and we get their use per se, and that would be the type of category of usage that they've gone under in terms of the research. I don't have a recollection off the top my head as to whether we've got the—

The Hon. EMMA HURST: If you could confirm, just on notice, that would be great.

JACQUELINE PHILLIPS: Yes.

The Hon. EMMA HURST: I think probably from the statistics that I've seen coming from it that I haven't seen it either, so I think that we're probably on the same page there. Given the concerns that were raised by the witness that came, is that something that either the Animal Research Review Panel outside of this incident has investigated or is planning at any stage to look at, in regard to healthy animals that are killed because they have been bred in excess?

JACQUELINE PHILLIPS: The way we would be aware of this type of information, other than through a report like this, is we have annual reports that come through from each of the ethics institutions and we also undertake inspections of institutions, and these would be the type of things we'd look at, and then we would engage in a conversation with those institutions, particularly with the ethics committee, and try and understand the rationale or the reason for those numbers at that time and work through with each institution individually.

The Hon. EMMA HURST: It would be something you would deal with on a case-by-case basis, but it's not something you've ever looked at holistically across the board.

JACQUELINE PHILLIPS: At the moment, no, we haven't. But it would certainly be something that we look at when we look at reports coming through.

The Hon. EMMA HURST: You've probably also heard—possibly also heard—the evidence that that same animal care technician gave. She gave quite a few horrific examples of a facility she had worked at. She talked about toes and tails cut off adult animals, animals not being given proper analgesia and researchers culling animals because they didn't like the data that they were getting. Is this something that AARP is looking to investigate now that she has come forward with this information?

JACQUELINE PHILLIPS: We haven't been provided with that information, so I can't comment on that. I'm not aware of that information personally so I can't comment on that.

The Hon. EMMA HURST: Okay. She said that she put in a complaint to the facility—the animal ethics committee—and that was ignored, and so she left the institution. She said she felt that there was nothing else that she could do from there. Does that concern you that she didn't know where else to go beyond that and that an animal care technician had concerns that weren't dealt with?

JACQUELINE PHILLIPS: One of the things that we do look at when we do inspections and liaise with organisations is their complaints processes because that's one of the procedural issues that we think is really important. So there should have been the opportunity for her to have an internal complaints process. We also have the opportunity for complaints coming through to ARRP directly. Greg can perhaps speak on that in a little bit more detail. So those avenues are available for members of the public or for anyone within those institutions.

The Hon. EMMA HURST: We've heard a lot about smoking models and forced swim tests throughout this inquiry. I will talk about the forced swim tests first. I'm aware from minutes of the ARRP panel that the ARRP is actually looking into both forced swim tests and the smoking towers. We have heard evidence that some facilities have outright banned the approval of forced swim tests, while others are continuing to use them. There seems to be a lot of variability in their acceptability. Is that something that has become a concern with ARRP about that sort of variation and that some people say, "No, it's not justified," and other people say it is justified?

JACQUELINE PHILLIPS: As you mentioned, we have undertaken a survey of the institutions in New South Wales in terms of their use of forced swim tests and smoking procedure, as you have indicated. We are at the moment collating that information, and we are also looking to review the literature around the forced swim test and identify what the debate is, with the welfare considerations and also with the research outcomes associated with it. That's the work that is currently in progress, and it is something that ARRP hasn't quite landed on yet, but it is something that we are hoping to finalise with a guideline recommendation in the next six months.

The Hon. EMMA HURST: There were also some specific concerns about one particular forced swim test that was done at the Victor Chang institute for 90 minutes when a lot of other forced swim tests are between 45 to 90 seconds. I think we heard from one of the universities this morning that they were having deaths from these 45-, 90-second ones, and that another facility was doing them for 90 minutes. I suppose to a layperson

outside of this 90 minutes sounds quite extreme. Has the Animal Research Review Panel taken any action on these 90-minute forced swim tests or is any investigation taking place?

JACQUELINE PHILLIPS: I can't reveal the confidential aspect of that at the moment because it hasn't been discussed at the ARRP panel, but we have had a meeting with the Victor Chang research institute and have talked to them about that. But at the moment it's not a position where I can probably say anything as ARRP hasn't discussed it since that meeting.

The Hon. EMMA HURST: In regard to the smoking models, the ARRP panel minutes talk about they are concerned with the fact that NHMRC was still funding smoking experiments. Has anything come out of those concerns and any communication between the Animal Research Review Panel and NHMRC?

JACQUELINE PHILLIPS: I think that the minutes would probably actually reflect that a member of the ARRP had those concerns rather than the ARRP as a whole agreeing to that statement. As I indicated, we have undertaken a review of the forced smoking procedure and we are in the process of finalising a guideline associated with that. When that guideline has been approved by ARRP and falls to submission and publication by the DPI through the ARRP website and with the institutions and informing researchers, one of the groups we are going to circulate that guideline to is the NHMRC.

The Hon. EMMA HURST: We talked about guidelines for both the smoking mice and the forced swim test. One issue we heard today was—and it was more about rehoming in that discussion we were having—that a guideline is simply a guideline and that, even though there are guidelines put in place, some people who are trying to make positive changes adopt that guideline and some people simply don't because it is a guideline. Does the Animal Research Review Panel have the power, or even the ability, to submit that to the Minister to make it something other than a guideline, or is the Animal Research Review Panel just looking at creating guidelines on these experiments at the moment?

JACQUELINE PHILLIPS: Those capacities are there, but with regard to the smoking procedure specifically, we undertook an extensive consultation and review around that, including getting independent expert advice. At the moment, the panel decided that it was appropriate to have a guideline, which really raised the awareness for animal ethics committees specifically about the implications associated with the procedure, with some fairly strong recommendations about what those AECs should consider if they were to approve. What we have also done—and this is a guideline that is going to be available soon—is we have also made the reporting around smoking a higher level. It will have to be reported by institutions in their annual report to their governing body, which the ARRP will also review, which will increase the level of transparency around that and will also report it at a higher level of invasiveness than what it would have been reported and required before. We are then going to look to review that process in 12 months.

The Hon. EMMA HURST: Obviously there were people suggesting in this inquiry that those procedures should be outright banned, and then there were some people taking a softer view that they should have ministerial approval. Is that something that was also considered by the Animal Research Review Panel—that they would move into a category of ministerial-approved projects?

JACQUELINE PHILLIPS: No decision was made.

The Hon. EMMA HURST: No decision on that has been made. We also heard evidence at this inquiry that somebody on an animal ethics committee for one of the smoking mice experiments had actually objected to the project. Have you heard of that as well? Is it possible for somebody on an animal ethics committee to object to a project but it gets approved and runs anyway? Is that actually possible? I am just trying to follow up on what the process is there, based on the feedback that we have received from another witness.

JACQUELINE PHILLIPS: In terms of decision-making for animal ethics committees—Roger, you might be able to help as well—but the committees will tend to work towards consensus with regard to decisions for approval of projects or otherwise. Roger, in your committee, is that the process that you work for?

ROGER GARSIA: Very much so. This whole process works on the basis of finding and, I suppose, articulating what the issues are that the person is actually objecting to if there is an objection to a protocol and working with the researchers to establish whether that protocol can proceed with mitigation strategies that can reduce the impact on the animals or that will increase the validity of the model or whatever. There are various reasons people object. In some cases, it is scientific. They feel that that isn't the best model and there is a better one, or they feel that some aspect of that protocol needs adjustment—it's using too few animals to reach conclusions or using more than is necessary. Without looking at the specifics, you wouldn't know why someone actually objected.

But it is the chairman's role, I believe, to try to establish exactly what their concerns are in a given environment, what people feel in a committee environment, where they can articulate their concerns and work to establish whether that committee can reach a consensus about approval. It is not uncommon to defer an approval to the next meeting and in between meetings to do quite a lot of work with the researchers. Sometimes it is a matter of them giving much more detail about what they are doing. Very often they have considered some of the additional aspects that they haven't written, and people then are much more comfortable approving a protocol where they are sure that the experience in the international experience with this model is such or that the value of the work is such, because ethics committees are trying to always do this balance. We are depriving animals of liberty. We need to balance that by, again, medical and scientific knowledge.

The Hon. EMMA HURST: What I'm trying to find out is, technically—I guess the accusation was that one of the animal ethics committee members objected to it, and the project went ahead anyway. I guess what I'm trying to find out is: Is that legal? Is that possible? Say, if a category C member says, "No, I don't think that this is acceptable." Can the rest of the committee override that? I understand you're saying that there is an attempt to get a consensus but if there isn't a consensus, can the project be approved and run anyway?

ROGER GARSIA: It is a situation that must be extremely rare for that to actually occur where a consensus can't be reached. My understanding is that it could and that it doesn't require a unanimous decision on behalf of the committee. But I think one would find that the minutes clearly articulate that issue and that those reports that went forward from that committee to its administering institution would identify the fact that there is a conflicting view about the value of the research or the issues. These are part of the reporting that happens in a regulatory environment, with annual reports to institutions. Ethics committees are required to provide reports to their administering institution.

The Hon. EMMA HURST: Professor Phillips?

JACQUELINE PHILLIPS: I was going to clarify from the code. It is actually a provision in there—this is 2.3.11 in the code—that if consensus is still not achieved after, as you have described, discussion and attempt to resolve their differences and exploring with applicants ways of modifying the activity or the project, "the AEC should only proceed to a majority decision after members have been allowed a period of time to review their positions, followed by further discussion."

It is possible for that to proceed.

The Hon. EMMA HURST: It is part of it.

JACQUELINE PHILLIPS: Yes.

The Hon. EMMA HURST: Thank you. Is the ARRP panel aware of this accusation in regard to the approval of a smoking mice model where an animal ethics committee member had apparently opposed? Is that information in front of the ARRP panel?

JACQUELINE PHILLIPS: I don't think I'm in a position to state that in a public forum. My apologies.

The Hon. EMMA HURST: That is all right. I will move on to the DPI now. One concern that's been raised throughout this inquiry is around transparency and how funding is going to animal research from State and Federal government. The NHMRC has supplied us with some figures today, which are quite helpful, but we still don't have any specific number on how much State funding is actually channelled directly into animal research. I have asked the health Minister previously in budget estimates and haven't got any answers. Is there any insight into how much funding is actually going into animal research? If that data is not available, why isn't that being recorded and why isn't it accessible?

JOHN TRACEY: I will have to take that on notice in terms of the funding amounts because I do not have that on hand. I guess for transparency, we strongly support transparency in terms of animal research and this activity. We do everything we can within the powers available to us to get information out.

The Hon. CHRIS RATH: Thank you so much for all your evidence so far. I wanted to ask about how strict the regulation is, or the rules in place, for medical research on a non-human primate. I assume it is not exactly easy to get that sort of approval. How strict is the regulatory regime in place should a researcher or a scientist want to go down that path? What is the process involved? I don't know who to ask that to.

GREG VAKACI: I might give it a go to start with. With medical research and any animal research, the framework in place, which is the Animal Research Act, and the code apply. Going down to the detail of how it gets issued is quite a specific component of the animal ethics committee. The regulation around those committees is quite stringent and also there are the colonies and the use of primates all under two codes. There is one specific code that applies to the use of non-human primates as well. What the DPI does is we do inspections and work

with the Animal Research Review Panel and we conduct inspections of those facilities to ensure that both the animal ethics committee and also the site where the animals are housed and the baboon colonies are essentially maintained to the required standards. That is our component. I think you may be referring a bit more to how you actually get the research approval and what gives approval, which sits with the animal ethics committee that is responsible for issuing those authorities.

The Hon. CHRIS RATH: I assume it's a lot strict or harder to get approval for a primate than it would be for mice, for instance. I wanted to ask about the differences in the regulations that might exist between those different levels.

ROGER GARSIA: Perhaps I could add to that. I am just holding up a document here, which is about 30 pages or so, which is the *Principles and guidelines for the care and use of non-human primates for scientific purposes* 2016, which is in addition to the code which sets out all of the additional requirements for the use of non-human primates. As you have heard, there is a whole series of considerations, including where the animals are sourced from because currently the scientific community does not import non-human primates et cetera without specific approval higher than the animal ethics committee. As an animal ethics committee, we do not have the authority to approve a project where that will involve the importation of non-human primates without that authority having been obtained at other levels. From the sourcing of the animals right through to their ultimate fate, every step has a stringency because the threshold for working with those animals is augmented by the reality of the proximity of that species to man.

But we also take the view in the animal ethics committee that every animal is an animal and is valuable right through to zebrafish and the smallest vertebrates. The principles are no different, which are that the researcher has to justify the use of that species, and effectively the threshold for the use of non-human primates is that this experimental work could not be done effectively in anything other than a non-human primate and that it is a necessary step to advance an important field of medical research. To give a sense, in our work that we supervise with non-human primates, the numbers of animals that are used are very few because each animal is studied so intensively to try and generate the maximum amount of information. Some of the animals will participate in a number of protocols, some of which are observational, behavioural et cetera, right through to experiments which might be involved in transplantation or something which is a very major impact intervention.

As you have heard from Professor Hennessey, the conditions that are actually being studied are some of the most prevalent conditions in the community and the ones which have been, what you would say, the wicked problems—trying to impact on pre-eclampsia and premature birth and premature death of neonates in man to get treatments. One of the protocols we deal with is trying to develop a new treatment for leukaemia and is very close to going into human trial. Another is looking at a mechanism of delivering previously injected drugs in a different mechanism which would allow oral dosing. These are conditions for which the beneficiaries are not numbering a few; they are numbering hundreds and thousands of people in this country, let alone internationally. Those approaches cannot go into the next stage, which is human administration, without having had a step in a subhuman primate because the next step will be the administration into human volunteers. This is a very major threshold that has to be passed before those sorts of protocols would get approval from the committee.

The committee then has to be very satisfied that the researchers have the expertise and are using state-of-the-art technology. In all those examples I just gave you, what is being used is absolutely cutting-edge, state-of-the-art technologies for which we should be very proud that there is the opportunity for those sorts of medical advances to be made and for our researchers to be contributing to those developments. But it is on the basis of need. That is the step which must be done if that line of human advancement is to take place.

The Hon. CHRIS RATH: You mostly answered my next question but I will ask it as well. We heard from Professor Andrew Knight earlier about his view that we should not be using non-human primates for medical research. What do you think would be the impact if the Government were, for instance, to ban non-human primates for medical research? What medical research impact would that have?

ROGER GARSIA: Could I just ask a clarification? Do you mean the New South Wales Government or the national Government?

The Hon. CHRIS RATH: I will express it in a different way. Putting aside what level of government and what regulations are being changed, if you weren't able to use non-human primates for medical research, what impact do you think that would have?

ROGER GARSIA: For the sorts of projects that are currently running, I think that would potentially mean that that project could not continue into the next stage in Australia or in New South Wales. In some cases, the researchers may be able to find a funding partner which would enable that to be done with collaborators elsewhere, where there was a different regimen of governance. We have been proud in this State and this country

that we believe we have state-of-the-art governance for subhuman primate research. We very much believe that it is better to do that research in this country, in this State, than to have that research done in places where the stringency, the supervision and perhaps the quality of the research may not be up to the same standard, and so the reliability of the findings may not be at the same standard either.

If you take that argument further, what you lead to is a situation where you may administer things to people in human volunteer trials which you might not have had they been done in a more stringent, scientifically advanced environment. I think there would be commercial pressures, in some circumstances, to do the research in other places. For some types of research where the funding pathway is more meagre, it might be the end of that whole line of work. For some pathways of treatment, that might be very many years before it is able to be picked up again using alternative methods.

The Hon. CHRIS RATH: Smoke inhalation, which we have heard about constantly today and in the first hearing—the benefits of using it versus the ethical issues with continuing with those trials. What are the benefits? And what would be the problems if that were not allowed to happen in the future?

ROGER GARSIA: I think that is directed to myself.

The Hon. CHRIS RATH: To whoever is best.

ROGER GARSIA: I am happy to pick it up, because that type of research—one of the places it is done is under the supervision of the committee that I chair. There are over eight million deaths a year from smoking worldwide, at minimum—that is the WHO estimate—and 1.2 million of those are passive smoking. So it is occurring in people who have no choice, in many cases, in that smoking exposure. In many countries, it is over a third of the population. Worldwide, it is closer to—20 per cent of people smoke. It is an absolutely massive problem. Whilst there have been gains in reducing the rates of smoking, the harms are going to continue for many decades, even for those people who have stopped. So we have an absolutely critical need to make some advances in trying to stop the progression of disease in those people who have already been exposed to smoke, those people who will expose themselves to smoke and the passive smokers.

It is diseases like emphysema, which leads eventually to respiratory failure. It is lung cancer. And it is not just smoking; we are in a country in which bushfire, wood smoke, particulates—all of these actually contribute to the environment that we live in. That affects not just humans; that affects animals, as well, in the wild. We lost billions of animals in the recent bushfires. Getting some basic science understanding of the effect of inhalation of smoke—a greater understanding—is a very important issue for this country, as it is internationally. That is the balance. The question then becomes: Are the animal models able to answer some of those questions, to justify the addition of smoke to the air that the animals are breathing, whether they are in towers or whether they are in a cage with smoke or whether it is administered to their air in some other way? That is the question that has to come up to an ethics committee every time they approve a project.

Where is the state of knowledge up to? Is that knowledge already known? If so, we may not need it. We may have great doubts about it, and there may be a situation where it still needs to be verified with a different strain of animal, or whatever. That balance has to be struck, and that weighs heavily on the minds of everyone on a committee that is approving experiments which expose animals to anything that is something that they would otherwise avoid. Natural behaviour would be to avoid that environment. So then it comes down to how that exposure is delivered; how certain we are that any distress those animals are experiencing, any health deterioration, is being picked up in monitoring; that there is an opportunity for rest and recovery, and that the end points that are being chosen for assessing whether that has answered the scientific question are valid. Where that is the case and where those requirements are met, a committee can feel comfortable that the gain potentially is such that it is justified, and the researchers have justified doing the work.

The Hon. CHRIS RATH: It is a similar question with the forced swim test that we have also heard about. It would be a similar thing. What is the benefit of using that versus the cost if researchers were not able to in the future?

ROGER GARSIA: I do not feel I should answer the question on forced swim tests, because that has not come to our committee at any stage, so I have not really looked at the literature to see whether there are alternatives that are adequately reliable in the conclusions that are reached. I would take an agnostic view as to where that balance best fits in that particular investigation. There may be people on our committee who have had experience from previous committees they have sat on; I am not aware of that. But it is not something that has been discussed. Forced swim tests have not been discussed in our committee.

JOHN TRACEY: If you like, I can add to that. I think the key to this is the justification for the research. What we have in place within the animal research system here is a thorough one in terms of looking really carefully at the justification of each of these steps and, in addition to that, considering the alternatives. Is there any other

way this research can be conducted? It is quite thorough, the system. The animal care and ethics committee, overseen by the panel, is a thorough way of looking for alternatives and looking at whether the numbers of animals are sufficient or are too large, as well as minimising impact to animals involved. I think the structure in place is set up to ensure that research is conducted in that way.

The Hon. WES FANG: I had one question for Associate Professor Garsia. In relation to some of the questioning from the Hon. Emma Hurst earlier, is it fair to say, in instances where there are objections during a meeting of animal ethicists about a test, that perhaps an objection is not necessarily about the procedure itself but more that there might be a concern about the scientific rigour around the test? Like you said, there are not enough subjects or animals being used—or the methodology in the science, as opposed to an objection around the use of the animals. Is that a fair assumption? There are a number of reasons why it could be objected to.

ROGER GARSIA: Absolutely. The lens we put each protocol through is to look at all of these aspects, including the statistical power, the power of that experimental protocol to answer the question that has been posed—and contextualising that research. It is not uncommon for us to refer researchers to a literature paper which might take a different slant, and say, "Comment on this—how that information modifies what you are putting forward to us." That is certainly something that is commonly done. That is internal discussion in the committee. But many committees, and ours is one of them, often invite a member from the research team to present to the committee, particularly if it is a new technique or a new line of research and to justify their work, their written work, face-to-face and answer questions, and it is an iterative process.

The vast number of the protocols are, I think, improved by the actual review process that they go through. You have, in our case, 11 minds that have thought through every aspect of this protocol, lots of questions raised and addressed and in some cases that will actually point the researchers to things that can improve their actual approach. Sometimes it is even awareness of other people working in the same field who they can be put in touch with. All of this is part of the three Rs; it's about replacement, reduction and refinement. Refinement is an important part of what we do. All of those three Rs—we have got very good evidence that that actually is taking place, adherence to that. It is not uncommon for our researchers who had proposed to do experiments with larger numbers of animals to go, on the basis of some of their early findings, to the point that they are not going to pursue that line of research any further.

Occasionally that will lead to the culling of animals if they have been breeding them in-house for that work, but that work is not going to proceed because they found that it is futile, or they got an answer they weren't expecting. That comes to one of the issues which was discussed earlier. Committees will look at the reports coming back from each protocol, including the breeding and the culling and the reasons for it, and will ask why that took place. There has to be justification for the proposed numbers of animals, and also justification for why those proposals weren't actually met—was it a technical issue, was it a change in knowledge, has someone else done the experiment, reported it and it is no longer a necessary part of advancing the field?

ANNEMARIE HENNESSY: Can I add—I saw it mentioned by other witnesses—the notion within these committees of pilot experiments or side-by-side experiments with alternate techniques is not uncommon. Roger might like to speak to that. We don't necessarily go down a pathway that's going to—method or pathway—not that you would know in advance, but there are other options that you have also explored in these investigations about ways that you can refine the numbers to get the best and safest outcome. Do you want to speak to that?

ROGER GARSIA: I think that is certainly part of our role, to have an environment where we can keep coming back to the committee. It is, once again, not unusual for a protocol in its life of three years to come back to the committee with modifications and amendments. Some of them come back every second or third month with a refinement or a change in technique or something else that actually is an improvement. That is the regulatory environment we are in where it's not approve and leave it, and forget about, and come back 12 months later. It is let's keep this process as a live process so that we can get refinement and reduction and, in some cases, replacement.

The committee does keep an eye on international developments, in particular the European Union's commission, which has a group who validate assays that replace the use of animals. That's an important aspect, and that has been possible. Particularly those in vitro and non-living animal experiments are an important step in the drug development process now of a lot of drugs. But eventually it gets to the point where the ones which have had the best safety profile in the test tube get to the point that they need to be tested in a living animal to establish whether there are off-target effects, unanticipated effects, and whether the notion that has been the basis of that drug's development is in fact correct before moving to the next stage.

The Hon. WES FANG: Thank you for providing that context around the answers.

The CHAIR: I will be referring to the Government's submission, which you may or may not have. I will quote from the specific page, but if you have it in front of you all the better. I start on page 8 under (e), which talks about the regulatory framework. I address my question to Dr Tracey. It states:

> e) the adequacy of the current regulatory regime regarding the use of animals in medical research, particularly in relation to transparency and accountability
>
> Regulatory framework

There are then dot points. The third dot point states:

> The NSW Department of Primary Industries (NSW DPI) is the regulator responsible for compliance under the Act and Regulation.

If you were asked to explain, to scope out what are the boundaries or the elements of what the compliance work is that DPI does under the Act and the regulation, is there somewhere you point one to go to see what that scope is, in other words to understand the broad term of what the regulation means? As the regulator, whose role importantly involves compliance, how do I understand what that is as activity inside DPI?

JOHN TRACEY: I can make a start and see if Mr Vakaci wants to add anything to that.

The CHAIR: To give us a sense of the landscape that we are looking at.

JOHN TRACEY: We do underpin the oversight of the research panel. We provide support for that panel in terms of technical, administrative. But we also accredit establishments in accordance with the panel's recommendation. That is our compliance role there, the accreditation of that. We also investigate complaints. We are also delegated to investigate complaints on behalf of the panel. We also have an audit and compliance program in place in relation to that. One of the key advantages of what we have moved towards is a risk-based compliance approach in NSW DPI. That brings significant advantages to getting the most in terms of being able to target the highest risk areas. I might just see if Mr Vakaci wants to add to that.

GREG VAKACI: We do have a wide range of activities, as Dr Tracey has said. We deal—and we can point you to the Animal Ethics Infolink, which gives a bit of information about the inspections and how we do those inspections. But there are also components of that around the complaints and the approach that we take under formal complaints that are legislated, and also general complaints where somebody doesn't wish to put in a formal complaint. This goes back to what was discussed before. We always encourage people if they've got concerns, and they might be on the animal ethics committee or any general public, to make their complaints to the department for investigation. We have a role investigating complaints. We are sometimes delegated the functions of the Animal Research Review Panel to investigate those formal complaints and to assist in providing those reports back to the secretary to make a determination on those complaints.

Within my team we also administer the licensing components of animal research establishments as well as supply licences. There are a number of different components, the range of compliance that is undertaken. We have the inspector that does the inspections of animal ethics committees as well as working with ARRP to go and do those inspections and that is also detailed, I am pretty sure, on the Animal Ethics Infolink. It's quite a broad range of compliance activities that the department is involved in in administering the Act. It's not only providing those inspection functions but also assessing the applications, presenting them to the Animal Research Review Panel for assessment as well as assisting in the statistics that are collected and presenting that information. I think there was a discussion around the secretariat function in assisting ARRP. They're all key components of the system and the regulatory function in administering the Act that DPI plays.

The CHAIR: On the issue of inspection and audit, there's been what I discern from some witnesses a concern or some rising doubt—perhaps I could put it this way—about the integrity of audits and inspections which are not done by the regulator per se but may be done by another institute on the basis of, "You do the audit of my facility and I do the audit of your facility." I stand to be corrected, but I'm quite sure we've heard that example from witnesses from the last hearing. There is a suggestion that that is not as rigorous as actually having, dare I say, the cop on the beat coming in and doing the audit, and running the ruler down how things are being done. Could you explain whether this now has become the typical way in which auditing is done—via the parties perhaps involved in research—one for one? Or indeed is the DPI still involved in doing this sort of auditing work of institutes and facilities?

GREG VAKACI: I can talk to that. The Australian code provides that there's a requirement for independent external review, so the institution needs to undertake that activity. That's supplemented by these inspections that we do with ARRP members of facilities. It's provided for that you can conduct those independent external reviews where another institution, for example, reviews your performance. That's really a key component of the self-regulatory model as well. There's oversight by ARRP and the DPI, but it's in addition to these independent external reviews that are conducted as well by the institution to make sure that they're working within

the requirements. It's a critical component for them to keep under review their compliance with the code and the Act.

The department still undertakes inspections in conjunction with ARRP. As Dr Tracey said, they're focusing that based on risk and increasing the inspection frequency of that because, under the code, there's a requirement that the institutions undertake this on a four-yearly basis. Having looked at where risk-based compliance has come from, and also the requirements on government to ensure that a risk-based approach is taken in relation to its compliance and enforcement efforts, we see having worked with ARRP, we have looked at what's the best way of making sure that we are focusing our efforts in the right place and at the higher risk for high-impact areas of these institutions. It's a tailored approach that we take, but it supplements what's already being done and is allowed to be done from the independent external reviews that are conducted by the institutions.

JOHN TRACEY: The key to that is that you've actually got that additional layer. DPI also does inspections. In addition to that you've got the oversight of the Animal Research Review Panel. This sort of approach allows institutes to be under the requirement of some self-imposed review, but in addition to that you've got DPI doing investigations as well as the panel overseeing that activity. So you've got essentially all elements of that that make it a stronger system. I think the key point about the risk-based approach here also allows a greater focus where we see higher risk or where the panel sees higher risk in relation to that. It actually is a much stronger way forward. As we're progressing, it's getting stronger and stronger in relation to that.

The CHAIR: Perhaps various people might like to answer the next question. We've covered ethics committees a bit this afternoon. It's been explained in some detail by some of you and also other witnesses about the way in which the committees function and how they can function well in terms of their role. How many ethics committees are operating in New South Wales? I don't know the number that but let's call it X. We've got X number of these committees. I'll use these word advisedly, in terms of the standards and the quality of the work it does as an ethics committee, assuming that clearly people who are involved in ethics committees are individuals with expertise, knowledge, and obviously desire and motivation to play that role on the committee, there surely must be some variance in the output or, dare I say, the quality of the work done by an ethics committee.

That leads me to this question about how can we be sure—and if we are sure, please say so—that ethics committees are functioning in the best ways that they possibly humanly can, bearing in mind nothing is infallible? If the answer is: There are issues, but to enhance the ability of their function in the best possible way, this is what ought to be done." It's an open question.

JACQUELINE PHILLIPS: Sure, maybe I can start there. Firstly in terms of—we were talking about inspections. One of the things that we do when we undertake inspections is we actually virtually, as in cases that have occurred, or really attend an ethics committee. We will sit as observers, see what happens and then have a discussion with both the committee and perhaps also the chair afterwards on both their compliance with procedure associated with the code and also the function of the committee; how well they're interacting, the engagement of all the different committee members and is the actual committee working effectively in the way that it's supposed to in the code? That's one of the things we do.

The other thing we do is, every year—as I mentioned—we receive an annual report from each of the accredited institutions. This is a report that they have to submit internally and to us. In that are questions about the function of the ethics committee. It also gives the ethics committee an opportunity to indicate where they feel they have issues in compliance or they have concerns with the institution. So that's another avenue where the ethics committee can have a voice to indicate where they feel that they may need support. That's two of the main ways that we engage with ethics committees to have oversight of how they're functioning and also, from the ARRP's perspective, to support them. So we will then go and support, provide advice and help with, perhaps, its templates to help them engage better with the researchers. There are a number of different ways that, through the ARRP, we provide that support and oversight for ethics committees.

The CHAIR: When one joins an ethics committee are any training or educational programs undertaken to enable a person, whatever their particular professional role might be—or they might be a lay person—to carry that out well?

JACQUELINE PHILLIPS: Absolutely. We actually provide a guideline for induction of new members onto ethics committees. It is also part of the code that that is an important thing of what ethics committees do. The process there is something, again, we will support ethics committees in doing that. There is support around how the committee runs, what the work of the institution is and really bringing those people up to speed in terms of their functions and their responsibilities as being members of that committee.

The CHAIR: We heard from a witness, I think earlier today, or it might have been on another occasion, about people joining the committee who are very much drawn from the citizenry. They are people who have an

interest and put their hand up, so to speak, to enter onto a committee. Are those positions advertised when they come up? Just out of interest, because I don't know the answer to this: Are those vacancies, as they become available, something that is advertised and people can apply? How does that generally work?

JACQUELINE PHILLIPS: Different institutions will do that differently. Perhaps, Roger, in terms of how your institution works to receive—I suppose you are referring particularly to the category C and category D members?

The CHAIR: Yes.

ROGER GARSIA: There is a variety of mechanisms. We have advertised in newspapers, local newspapers, et cetera. In the pre-COVID era, the practicality of attending meetings and giving an aside—what is a significant contribution of time for volunteers—we try to make sure that they understand what they're seeking to do. We interview them, mainly to make sure they can take the time off from their employment, if their employer is giving them time off or whatever. But I think the thing is to make it known that these vacancies are available. There is a listing that the department also keeps because people contact them, and periodically will contact them, to know if there is someone who has put forward their name as wanting to do this sort of work, so that there is that avenue for appointment to committees.

As was alluded to, the most difficult categories to fill are those who have a track record of working for animal welfare organisations. Whilst they are not representing those organisations, the requirements are that they be endorsed by an animal welfare organisation to sit on the committee. That step does mean that they have credibility as members in category C. Very many of them have already done committee work in some role in other settings. Sometimes they have sat on other ethics committees, but the induction is important. In the last week I spent half a day with our newest member of our committee, giving them an opportunity to see one of our animal facilities firsthand so that they are not in a situation where they might be making decisions about housing or other things or something that they weren't physically aware of, in terms of what resources were on the ground. I think that is actually an important part of these committees functioning well: that the people on them do their homework, do their inspections and have the opportunity when they are inspecting facilities to interact with researchers and to ask questions that they want answers to.

The CHAIR: The next question, which is once again open to witnesses across the board, concerns evidence about the involvement of vets. There have been some examples—I can't think of the precise case itself—whereby on the ethics committee there were two or three vets. There has been counter-evidence from some witnesses that there are not enough vets or there is a dearth of involvement of vets interfacing with the committees or being on the committees to play the role a vet would be capable of, in terms of input. We had the Australian Veterinary Association giving some evidence earlier today, expressing a desire and an interest to encourage the other stakeholders, if I could use that phrase, in the area of animal experimentation to give consideration to engaging more with the Australian Veterinary Association to have more involvement of vets.

Is there a sense that any of you can give that the involvement of vets in this area of animal research has been something that has been declining over time or is stable? Do any of you have general observations? Certainly the Australian Veterinary Association was putting its hand up and saying, "We're keen to see how more could be involved." As I said, there has been some evidence where some committees seem to be well represented with vets on them and others, perhaps, may be a bit light on. I would be interested in your observations.

KIM FILMER: I guess I could probably answer some of that question. The animal ethics membership is determined—there is a set formula, I guess. There is a category A, B, C and D member as a minimum. You must have one of each of those. A category A member is a veterinarian.

The CHAIR: Okay, so there has got to be at least one.

KIM FILMER: Each animal ethics committee must have one veterinarian. There are also other rules around—the category C and D members must also make up one-third of the membership. You can have more than four members but you can't have five As, one B, one C and one D. That gives an unequal balance.

The CHAIR: That is helpful. I didn't know that.

KIM FILMER: There was reference to some committees having two As, two Bs, two Cs and two Ds. But whatever the formula ends up as, you must have one-third of C and D members so that you don't get an over-representation of vets or researchers. The category B members are animal researchers.

ANNEMARIE HENNESSY: The change in personnel of those committees has to be endorsed by ARRP. There is a second endorsement of that ratio and the CV of the proposed addition. It would not be uncommon at ARRP for us to vet out and vet in applicants for those committees.

The CHAIR: That is helpful. I am sure we could go on, but you have been very generous with your time. I know you all have very busy roles and we appreciate you making yourselves available this afternoon. Thank you very much on behalf of the Committee. We will study the *Hansard* after it is produced and I am sure there will be some supplementary questions. If you are agreeable, through the secretariat we will liaise with you over the questions and the return of those questions. Once again, thank you very much for making yourselves available this afternoon. With respect to the formal hearing today, I thank those participating via the internet. That concludes this afternoon's proceedings.

(The witnesses withdrew.)

The Committee adjourned at 17:16.