



# **Climate Health WA Inquiry**

## **Inquiry into the impacts of climate change on health in Western Australia**

**Inquiry Lead:**  
**Dr Tarun Weeramanthri**

**Witnesses:**

**Dr Helen Brown**  
**Curtin University**

**Ms Dianne Katscherian**  
**Curtin University**

**Thursday, 3 October 2019, 1.00 pm**

HEARING COMMENCED

DR WEERAMANTHRI: Dr Brown, Dr Katscherian, I'd like to thank you both for your interest in the Inquiry and for your appearance at today's hearing. The purpose of this hearing is to assist me in gathering evidence for the Climate Health WA Inquiry into the impacts of climate change on health in Western Australia. My name is Tarun Weeramanthri and I've been appointed by the Chief Health Officer to undertake the Inquiry. Beside me is Dr Sarah Joyce, the Inquiry's Project Manager. Could everyone please be aware that the use of mobile phones and other recording devices is not permitted in this room, so please make sure that your phone is on silent or switched off.

This hearing is a formal procedure convened under section 231 of the *Public Health Act 2016*. While you are being asked to give your evidence under oath or affirmation – sorry, let me state that again. While you are not being asked to give your evidence under oath or affirmation, it is important you understand that there are penalties under the Act for knowingly providing a response or information that is false or misleading. This is a public hearing and a transcript of your evidence will be made for the public record. If you wish to make a confidential statement during today's proceedings, you should request that that part of your evidence be taken in private. You have previously been provided with the Inquiry's terms of reference and information on giving evidence to the Inquiry. Before we begin, do either of you have any questions about today's hearing? Thank you.

MS KATSCHERIAN: Just to note, it's not doctor.

DR WEERAMANTHRI: Okay. For the transcript, can I ask you both to state your name and the capacity in which you are here today, and also ask that throughout the hearing you briefly state your name prior to speaking for audio recording purposes. Thank you.

DR BROWN: Dr Helen Brown from the WHO Collaborating Centre for Environmental Health Impact Assessment at Curtin University.

MS KATSCHERIAN: I'm Dianne Katscherian from the WHO Collaborating Centre for Environmental Health Impact Assessment at Curtin University.

DR WEERAMANTHRI: Thank you. Would you like to make a brief opening statement?

DR BROWN: Yes, I would. In view of the questions of the session and the focus on health impact assessment, we thought it was important to recognise that in general, the application of health impact assessment in WA in the near future is going to be affected by the regulations that are currently being developed as part of the public health assessments under the *Public Health Act* of 2016. And we'd like to highlight that, in our opinion, these public health assessments provide an opportunity for really

5 ensuring that the health impacts associated with developments and with links to climate change in terms of production of greenhouse gases and health impacts is very important. The ability of these assessments to consider how proposals also affect our ability to respond to health impacts of climate change is also critical.

10 Including climate change in these types of assessments, we think, will be an important part of ensuring that development in general in WA moves towards a more sustainable, more climate resilient system. And I think our original submission – because we were focusing on climate change rather than the regulations – probably didn't pick that up. Also, in relation to that, we think that the use of public health assessments is a little bit of a game-changer and will need to be supported by increase capacity, both within the Department of Health, but also in academic institutions and organisations, particularly where peer reviewers for major projects along the lines of the EPA process, may be required with respect to considerations of climate change.

20 DR WEERAMANTHRI: Thanks, Dr Brown. So you're referring to a specific part of the *Public Health Act 2016* - - -

DR BROWN: Yes.

25 DR WEERAMANTHRI: - - - on public health assessments. Have you got reference to the specific section in front of you?

DR BROWN: No.

30 DR WEERAMANTHRI: No, okay. So just again, for the record, there is a specific part of the *Public Health Act 2016* which covers off on public health assessments. But I believe that those assessments are only triggered under regulations.

DR BROWN: Yes.

35 DR WEERAMANTHRI: The regulations have not yet been developed, is that correct?

40 DR BROWN: Yes, yes. And I guess that's – the nature of those regulations will influence the way in which health impact assessment may be used in the future to take into consideration issues around health and climate change. So it's a little bit of an unknown, other than the fact, I guess, that it will potentially have an influence on how we can use HIA in that context.

45 DR WEERAMANTHRI: Okay. But HIA can also be used, obviously, outside of a statutory process?

DR BROWN: Yes, yes.

DR WEERAMANTHRI: So we'll focus on that today.

DR BROWN: Yes, yes, that's all right.

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DR WEERAMANTHRI: That's fine. And can I just ask you to consider – you can either answer it now or consider it later – one of the terms of reference of the Inquiry is to recommend the terms of reference scope and preferred methods for undertaking a climate change vulnerability assessment for the health sector. Could that, in your opinion, fit under the regulations – or be prescribed under the regulations covering the public health assessments? Could you link those two things together? I'm just asking.

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DR BROWN: Yes, I think it could be. I mean, it would be a similar process to the previous health impact assessment of climate change in WA that was commissioned by the Health Department, which was essentially a health impact assessment framework. So HIA, I guess, is traditionally used for proposals for projects and plans, et cetera. So the broad application to climate change is a little different, it's an application to an issue. But you just need to approach it in a slightly different way. So we're doing quite a bit of work at the moment in Malaysia, for example, that are looking at vulnerability and adaptation assessments of health impacts of climate change. And so that's really, again, using an HIA framework.

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MS KATSCHERIAN: Yes. I'd also like to add - - -

DR WEERAMANTHRI: Do you mind just stating your name for the recording?

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MS KATSCHERIAN: Yes, I'm Dianne here – Dianne Katscherian here. I'd just like to add that the framework that we used for the assessment in WA was also used for vulnerability and adaptation assessments for the United Nations training program, which was undertaken in 2012 and 2015 for Non-Annex 1 countries, and the basis for it was what we've been using, and also was adopted in part by WHO in their development – their assessment.

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DR WEERAMANTHRI: Do you mind explaining what Non-Annex 1 countries are?

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MS KATSCHERIAN: They're all the non-developed countries. I mean, they're – yes, they're all the non-developed countries. So those countries that, under the UN, are classified as Annex I countries are countries like Australia and the US and so on, European countries. All of the other countries that regard themselves as developing countries are classed as Non-Annex I countries.

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DR WEERAMANTHRI: Okay, thank you. So we'll come to the HIA process in a second. Just before we do, could you explain the difference between primary, secondary and tertiary adaptation?

5 DR BROWN: I'll handle that. Helen Brown from Curtin University. So these terms really, I guess, reflect that climate change is going to affect health, if we're talking in a health context, via a large number of pathways. So some of those pathways are going to be relatively direct and obvious. And the most common example would be with direct impacts of  
10 extreme events such as heat waves and flooding. But there's a whole range of other impacts that will occur when climate variables affect a range of determinants of health, so whether that's environmental determinants of health or social determinants of health. And so if we examine those pathways from the climate variable to the health outcome, we can help to identify  
15 opportunities where we can basically apply adaptation strategies.

And this is where the terms primary, secondary and tertiary usually come in. So primary adaptation is usually applied early in the pathway and tends to be more preventative in nature and focus on avoiding or actually reducing  
20 exposure to the climate-related hazard. So, by way of example, we might think about flood prevention strategies that now integrate new information about the effect that climate change may have on flood zones in the area, and that information would help to, I guess, direct future planning. So that would be a primary adaptation that's occurring very early on in the pathway.

25 Secondary adaptation strategies usually are applied a little bit further along the pathway and focus actually on reducing the impact of that climate-related exposure. So, again, if we use the example of flooding, examples would be improving our disaster response and recovery, perhaps early monitoring and  
30 surveillance of things like water-borne pathogens or other things like vector-borne diseases that can flow on from flooding. And these strategies, I guess you'd look at them as a mix of both preventative and reactive strategies, and they often involve the health sector but also the other sectors as well.

35 And then finally, tertiary adaptation is really occurring more towards the end of the pathway where we assume the exposure has occurred and even some adverse health effects have already appeared, and it's really about aiming to minimise those adverse health effects. So they can include measures such as better diagnosis, better treatment of health outcomes. So they tend to be more  
40 reactive than preventative. And they tend to be more likely to be the responsibility of the health sector than some of those primary and secondary adaptation strategies. I'd also just like to mention that there are other ways to consider adaptation strategies. So, for example, in the previous HIA of climate change that was published back in 2007 in WA, the adaptation strategies were  
45 divided into eight main categories, which was not so much about where in the pathway they were applied, but it was more about the type of adaptation strategy, whether it was legislative or monitoring or surveillance or research, et cetera.

5 And, I mean, I always feel that when we talk about adaptation, it's very  
important that we need to be mindful that both the extent and type of  
adaptation that is needed, as well as the cost and likely success of that  
10 adaptation, will clearly depend on the level of climate change we are talking  
about and that we're needing to address. And that in some circumstances, or  
many circumstances, there will be, you know, clear limits to what we can adapt  
to, so we should always be having this conversation of adaptation alongside the  
conversation of mitigation. Sometimes I find the division between the two not  
15 so helpful.

DR WEERAMANTHRI: Okay, thank you. Your publication, you  
refer to that you are co-authors on with Jeff Spickett as the first author, titled  
15 *Health impacts of climate change: Adaptation strategies for Western Australia*,  
was produced by the Department of Health of Western Australia in 2008, I  
think.

DR BROWN: The work was done in 2007 – six or  
20 seven - - -

MS KATSCHERIAN: Yes.

DR BROWN: - - - but I think the formal date on the  
25 publication is 2008, yes.

DR WEERAMANTHRI: So just noting that many people have  
pointed to this work has been very thorough and probably ahead of its time,  
and still relevant today in terms of a resource to look at adaptation strategies,  
30 so just - - -

DR BROWN: Right, that's nice to know.

MS KATSCHERIAN: Thank you.

DR BROWN: Thank you.

MS KATSCHERIAN: Thank you.

DR WEERAMANTHRI: So you've explained why impact  
40 pathways are important to understand where various adaptation strategies can  
come in, primary, secondary and tertiary, along the impact pathway. Could  
you now please step us through the HIA process?

MS KATSCHERIAN: Sure. Dianne Katscherian. The steps in  
45 the HIA process have been cited in various forms internationally. We would  
like to refer the Inquiry to the Australian National Health Impact Assessment  
Guidelines of 2017, which are available on the Federal Government's health  
website. The WHO Collaborating Centre was the lead author for that

document. And the process used in that document is the one that I'll refer to now. I might add that, while we were the lead authors, it was reviewed by every State and Territory in its development process. So the process is pretty straightforward and it's very similar to other impact assessment procedures.

5 The first component is to decide whether or not you actually need to undertake a health impact assessment. And usually, what occurs is that whatever the activity might be is reviewed by health experts, who then will look to see whether or not there are any health implications associated with it.

10 Depending on the degree or the depth or the type of health issues, this might be an opportunity, actually, to say, particularly if it's a proposal – and I'm getting away here slightly from climate change – but if it's a proposal, there is the opportunity to be able to give a decision on whether or not that should actually go ahead, based on the health issues that are involved. This particular stage is

15 called screening. If a decision is made to go ahead with doing an assessment, then the factors and issues that need to be considered related to it are determined, and this is called scoping. And the extent and the type and all of the health implications are considered, and all aspects of health pathways, including the potential population and its environment.

20 And when we talk about the environment, we're talking not only about the biophysical environment, but we're talking about the social and the economic, and any other components that might be related to it. We need to have an understanding of the potentially affected population, and we need to know as

25 much as we can about that particular population, including its current health status. And then we need to look within that population to see if there are groups that can be identified that might be particularly vulnerable or sensitive to any of the activities that are related to the original issue. And that whole session is called scoping. In that session, you also identify all the health

30 impacts that might arise associated with those environmental components.

The next stage is a component called assessment. Traditionally, we've called it risk assessment, but because we're looking at benefits to health as well as risks, we need to have a term that encompasses that – which nobody's come up with yet, but anyway – so we continue to call it risk assessment, and we look at it

35 from the perspective of, “Well, if you don't do this, maybe then that's the risk rather than the actual benefit that can come from it”. So all of the identified health impacts are subject to a risk-benefit assessment and take into account, to some degree, the current management strategies for those benefits and risks

40 within the potentially affected population. Part of what also happens after that is that, although you are required to look at all of the impacts and therefore all of the risks, often there is a need to prioritise the more severe risks and the more beneficial benefits—for want of a better word there.

45 Once those [the health impacts] are identified and the risks have been ranked, you need to come up with a strategy to manage them, and so the next stage is called management, and it provides the opportunity for the development of options for their management. And usually, that is done in consultation with a

range of people, and it depends on who is driving the particular assessment. And then recommendations are formed that are provided, then, for some sort of decision-making. And decision-making is usually based on expert evaluation of all of these. Usually, it's within the health sector, but it can also be from the  
5 broader community and broader health sector, as well as the Health Department. And it's evaluated as to whether or not the activity will mitigate any adverse potential health outcomes and provide health benefits to the potentially affected community. And the decisions, then, are similar to what might happen with other impact assessments, whether it be a yes, a yes with  
10 conditions or a no, type of thing.

Once a decision is made, and whatever it is, something needs to happen. And if it's a proposal, then that goes straight through. If it's something like an evaluation of climate change then, obviously, there's a lot of decisions to be  
15 made as to which elements are going to be selected to be progressed. But once they're progressed, then there needs to be a process in place to monitor their effects and to evaluate the outcomes, so that over the life of whatever period might be chosen for this assessment duration, the evaluation needs to be understood. And it considers both the conditions and the general health aspects  
20 of the community in relation to it.

Concurrent with all of this—and this is a key element of the process—is community and stakeholder engagement that occurs at all stages. And it is starting collaboration with communities. And because HIA is a democratic  
25 process, we believe that it's really important that people be engaged and involved in the decisions that may affect them.

DR WEERAMANTHRI: Thank you very much. You've talked about the risk assessment coming in during the health impact assessment  
30 process.

MS KATSCHERIAN: Yes.

DR WEERAMANTHRI: So can we see health risk assessment as a  
35 component of the HIA process?

MS KATSCHERIAN: Yes, yes.

DR WEERAMANTHRI: Okay, thank you. And could you explain  
40 the similarities and differences between the health impact assessment process and an environmental impact assessment process, such as the EPA, Environmental Protection Authority, might use.

MS KATSCHERIAN: Okay, it's Dianne Katscherian again. The  
45 HIA and EIA, if I can use the abbreviated forms, are predictive processes. And the idea is to try to determine potential environmental impacts – and I again use the word environmental as I described it before – that could arise from a proposed activity. HIA assesses the potential impacts to health associated with



an activity in the context of the potentially affected communities and its environment. EIA assesses the potential impacts predominantly to the biophysical environment. Although in WA, we have a clarification in the EP Act that refers to a relationship between people and their environment in both directions. It does not include the social and the economic components in the EIA process, apart from when they're directly related to those environmental impacts.

There are many components of both processes that are aligned, such as there is community consultation and transparency. Community consultation is prescribed in the EIA process, if we're talking about WA. HIA presumably will have some requirement for that under legislation, but when it's being used independently, as I said, it's an assumption that it will be used all the way through, and that includes stakeholder engagement, not just community engagement. Transparency is also another key aspect of it. We believe that it is really important that everybody knows what's going on all the way through.

EIA tends to focus on the negative impacts to the environment and, of course, that is really important, but HIA considers the potential health benefits, as I've mentioned earlier, and it has a focus on addressing the health needs of the most vulnerable in the communities. And we found that if you focus on the most vulnerable or the most sensitive, there are usually flow-on effects to the rest of the community. And the other component of the question that you asked me was the distinction between HIA and HRA. HIA is the overall process and it's used to assess all of the health effects, and health risk assessment is the process used to assess the health risks associated with each specific health impact.

And we would like to refer the Inquiry to, also, a number of risk assessment documents. There are a number where the WHO Collaborating Centre was involved in the development of for the Department of Health. And there also is a national guide for environmental health risk assessment, which is also on the Federal Department of Health websites. And we'd been involved with the update of that document as well.<sup>1</sup>

DR WEERAMANTHRI: Could the HIA and EIA process be better integrated? Are people looking at that?

MS KATSCHERIAN: Yes and no, if I may say that. If the EPA, under its current structure and its current requirements, were to take responsibility for HIA, it might limit the ability of HIA to do its job the way it is normally done. However, there is no reason why it couldn't be done that way, it's perfectly feasible. It's just there may be restrictions and constraints. For example, particularly the public community engagement component or the community involvement, is done only at two stages throughout the process. And the opportunities for people to have involvement in decision-making may be a little bit constrained.

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<sup>1</sup> The WHO Collaborating Centre was engaged to assist with the development of the DOH Health Risk Assessment documents.

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DR WEERAMANTHRI: So I might just ask Dr Brown if she has any comments. If you take away the organisations from the question – the specific organisations – and even take away the legislation, is there a theoretical advantage of better integrating the HIA and EIA process?  
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DR BROWN: Yes, I mean, I think, in some jurisdictions, HIA is typically conducted within EIA, and others, they're separate. But whether or not there's a formal integration, or they're done somewhat separately, I think there's always room for better integration, I mean, in terms of – particularly EIA is very strong on looking at those environmental determinants of health, the biophysical determinants of health, and they would, as a matter, of course, be considered as part of an HIA. So whether they're done in a single process or separate processes, I think that integration between the two is important. So, for example, if an EIA has already been done and a health impact – then there's a decision that a health impact assessment should be done, the first port of call is the EIA, say, what information has already been collected on the environmental determinants of health, we may need to reinterpret that information with respect to human health, because that data is not necessarily always collected with that kind of lens. And so, yes, I think there is room for integration, but it depends. You know, it can be formally integrated in one process or separately, but there should always be some form of integration between the two, in my opinion, particularly from an efficiency and a resource perspective.  
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MS KATSCHERIAN: May I add something else? Many years ago, within government, there was an integrated project approval system. It was in 2005, six, around about then. And that worked in a way where all of the agencies were involved in considering their issues, worked together as a team. So it has been trying to work here in WA anyway.  
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DR WEERAMANTHRI: Okay, well, thank you. We'll move onto the next question. So you've talked about how important vulnerability is to a health impact assessment. So can I just ask how would you define vulnerability, and how is it included in the HIA process?  
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DR BROWN: Helen Brown, Curtin University. So when we think about vulnerability, it's basically the degree to which communities or systems or individuals are susceptible to the effects of a particular activity that can lead to poor health outcomes. And so, in the context of climate change, we'd be talking about vulnerability to health impacts linked to both climate variability, sea level increase and extreme weather events. So vulnerability is actually integrated, really, across the entire HIA process. And if I run through the key elements that define vulnerability, it might help to explain that. So generally, when we're looking at vulnerability in the context of HIA, we tend to look at three things. The first is exposure. So if we look at, say, an example of heat waves in a situation like WA, it's a big state, there's a lot of simple geographical variations with respect to whether you're living in  
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the southwest or whether you're living in the northwest, in terms of the frequency and intensity of heat waves, in terms of a combination with humidity, et cetera. So they're just fundamental differences in exposure that will affect vulnerability.

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Even within specific communities, if we take Perth, there's even differences within those communities, whether you're living in the coastal communities or inland, out near the airport, and also other reasons, such as some occupational factors, such as outdoor workers, homelessness, these will all affect that fundamental thing of how much an individual or a population is exposed to a particular variable. The second element is then sensitivity, where we think everyone in this room may be exposed to a similar extent. And again, we'll use the example of heat waves. But we may, due to different sensitivities, experience different health effects. And so with heat waves, sensitive groups would include the young, the elderly, people with some pre-existing medical conditions or taking some certain medications, and this can be said not just for heat but a wide range of things like, say athletics being more sensitive to exposure to air pollutants.

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So they're the first two. The third element of vulnerability, which is really important, is what we call adaptive capacity, and it's basically the ability of a person, or even a system or a population, to be able to respond to that exposure given their sensitivity. So, again, if we use the example of heat waves, and we can have a group of people with the same exposure and just say the same level of sensitivity, how they are able to adapt to, say, a heat wave can be very different. So we may have a person who is living alone, we may have a person who has very little support, we may have a person who has very little understanding of the potential health impacts of heat waves, or indeed what to do about them. And they may simply not have the resources to respond. So, for example, they don't have air conditioning or they can't afford air conditioning, in contrasted with, really, the opposite, someone with a good social support system, someone who understands what to do in a heat wave, someone who can, you know, access a cool environment, whether it's the flick of a switch on aircon, or going to a cooling centre or whatever. So same exposure and sensitivity, but the final outcome can be very different. So that's the final element.

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So all of those examples that I've given have focused on people, but it's important to remember, if we think back to that health impact pathway, that there's also going to be infrastructure and services that we can apply exactly the same equation to. So if we think about a heat wave again, as well as the health sector, which has obviously got to think about what's going to be the impact on them in terms of their – not just the hospital system, but some of their environmental health areas and a range of other things, but how will the energy sector, the planning sector and the transport sector be affected by these heat waves? And we've seen examples in recent times of power cuts, disruptions to transport, disruptions to communication systems, et cetera. So that's really important. Groups that are often vulnerable across what you would call, kind

of, multiple exposures do tend to include, you know, children, the elderly, indigenous groups, people on low incomes or low socio-economic status. And many of those vulnerabilities are really linked to what we would call underlying issues of inequity in terms of health status and general adaptive capacity. So basically, in an HIA, we want to identify who is vulnerable, what is vulnerable, how and why people in the systems are vulnerable. And so once we've identified that, we have a much better understanding of where the significant level of risk is, and we can, therefore, design and target our adaptation strategies or the management step of HIA there, where the highest risk is.

DR WEERAMANTHRI: We've got just under 10 minutes left.

DR BROWN: Yes.

DR WEERAMANTHRI: So I've got about four quick questions to ask you - - -

DR BROWN: Yes.

DR WEERAMANTHRI: - - - if that's okay. The first is, can a formal cost-benefit analysis be included in the HIA process, and if so, at what step?

DR BROWN: Helen Brown, Curtin University. So yes, that can be included in several steps. The most common one is in the management step, and also the decision-making step where, really, you have a health impact that you want to address, either improving benefits or reducing the level of risk, and there will be a range of different management options on the table. And what we would look at is the cost of those management actions, and also, obviously, the benefits they deliver. And that allows us a comparison between what really is the best option. So that's often included in, or typically included in, the management step.

It could also be included further down the path at the evaluation step, where we're really looking at comparing the overall cost of the HIA, and the implementation of the management strategies that it's recommended, against the longer-term costs and benefits to the community. So in terms of those health costs, of course, the issue is that many of those will be borne not only by the community, but also over the health sector and over, you know, an extended period of time, so it's, kind of, challenging to assess them, and it's probably an area that's, kind of, underdone in many ways in HIA, but it's important that the costs are accounted for. The HIA process could also play a better role here in that once a proposal has been approved or implemented, you can actually ask the ongoing monitoring of those risk factors and health outcomes are included as part of the management strategies.

And a final point on this, in terms of measuring the benefits, we obviously have to try and estimate the costs that are avoided as a result of management strategies. And that can be – obviously, it's very difficult to know what you've avoided, but if we take some local examples, if we consider some of the potential costs of when things do go wrong. So, for example, situations like the Bellevue fire and Esperance that led to more formal recommendations for the implementation of HIA, these obviously lead to significant costs that were borne by the community and the government. But they're difficult to, you know, kind of, factor into your early cost-benefit analysis, because you can never really tell when they're going to happen.

DR WEERAMANTHRI: So the reviews of both those two incidents specifically recommended greater use of HIA processes?

DR BROWN: Yes.

DR WEERAMANTHRI: Can mitigation options be assessed within an HIA in the same way as adaptation options?

MS KATSCHERIAN: Dianne Katscherian. An impact assessment framework, such as that used in HIA, can be used to undertake assessments of mitigation options or activities, and can be carried out by expertise, and actually is being done under some circumstances already. Many greenhouse gas mitigation strategies will also have health benefits, and HIA and the health sector have a role in identifying these. Also, for the assessment to include health considerations, the evidence linking the health implications of the changes is growing, and for some options, may not yet be fully developed. So, in some ways, we have a concern, and so we would recommend the application of the precautionary principle, which is, as we know, is an inherent component of the *Public Health Act* as well. And it can be applied where expert review – and I emphasis expert there – would indicate the potential for health benefits or risks, but where the evidence may not be sufficient, or may be potentially insufficient.

And, obviously, this could be an area for further discussion across the health sector with the aim of developing research and evidence to support any new applications or components that may arise through the work that has been done. In terms of reducing emissions, it may be important for the Department of Health to have an overall position about the management of cumulative impacts of projects and activities at the local, state-wide and global levels. I know that sounds pretty extensive, but much of this – and obviously much of this is beyond the scope of what the Department can respond to, but we believe it may be useful to provide an indication of the gravity of the potential health implications of climate change if emissions continue to rise.

DR WEERAMANTHRI: Okay. I'll ask my question in two parts, just bear with me. In your 2008 work around health effects of climate change and adaptation strategies, you utilised scenario modelling and looked at what

was projected over a decade after the report, or something like that. And so there's two questions. One is, what role is there for regional WA data? So sub-jurisdictional data within future scenario modelling. And secondly, if someone came to you and said, "Well, it's been 11 or 12 years since you last did it, we want you to do it again", would that be a useful exercise and how would you do it differently now, compared to then?

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DR BROWN: Okay. Yes, Helen Brown. So in terms of the role for regional scenarios, most definitely. And I think we've identified that was perhaps a shortfall of the original work, was that it tended to be predominantly, kind of, a southwest focus, although not exclusively. And really, that just goes back to the points I've made before about, it's a big state, there's clear differences in terms of not just the climate, but the environments and the population. So most definitely, I think there's a role for future scenario modelling, not just with respect to climate change, but then all the flow-on effects, so what happens with dengue, what happens with other things that can be modelled, like vector-borne diseases, et cetera.

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MS KATSCHERIAN: And re your second component, Dianne Katscherian. If we were to redo it, there are a couple of things that probably, just thinking off the top of my head here, one of the things is yes, we would localise. We would look at more specific regions, rather than just to the whole state. We were being a bit ambitious at the time, but it was really to, at least, make a start. We had reasonably good scenarios for the projected climates. We know now that was incredibly conservative. We'd need, obviously, much more up-to-date information. We also found that, while we had great engagement from other sectors as well as within the health sector on the project, we missed out a few sectors. There were a few who just didn't feel that was part of their area of work and didn't understand how they could contribute themselves, and so therefore weren't involved. And even when the document went out for public comment, we got very little response.

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However, those people who had been involved from other sectors that were not the traditional environmental ones, which were the ones that were most enthusiastic, because they were already seeing the changes. They started looking at how they could be involved and how they could start looking at their own things, but we have no idea about where that's gone since then. And the other one is, we would look very carefully at – we would need to find out what actually has been implemented, and how effective those things have been, and whether or not we would need to look differently at the management options, or the adaptations if you want to call them, of climate change, how effective they've been. And whether we can learn from those applications, management, things that have been put in place, whether or not they could advise a new assessment, or number of assessments. I actually think it would be very valuable to look at particularly vulnerable areas within the state and do assessments for them. Anything else you would like - - -

DR BROWN: Yes, Helen Brown. I just wanted to add that – I mean, one thing we would be very mindful of is not just starting again from scratch.

5 MS KATSCHERIAN: No.

DR BROWN: I mean, we really want to take that document and talk to the people who were involved. It's over a decade old now, and I don't think we would do it the same way. We wouldn't start at the beginning of the process.

MS KATSCHERIAN: No.

DR BROWN: I think a lot of that information – you know, we know where we're at now in terms of some of the key health impacts, and let's just, kind of, start, you know, midway through the process and springboard off what's already been done.

MS KATSCHERIAN: Yes, yes.

DR WEERAMANTHRI: You may be interested to know that the risks that you identified as high and extreme in your report, pretty much are the same risks that came through to us in the public forums and through our reading. They're still the same, kind of, top-level priorities.

DR BROWN: Yes, so in some ways there's not so much of a need to revisit the assessment stage of it, but rather the other stage, more the adaptation end.

DR WEERAMANTHRI: Okay, we'll close it there. Can I thank you both for your attendance at today's hearing. A transcript of this hearing will be sent to you so that you can correct minor factual errors before it is placed on the public record. If you could please return the transcript within 10 working days of the date of the covering letter or email, otherwise it will be deemed to be correct. While you cannot amend your evidence, if you would like to explain particular points in more detail or present further information, you can provide this as an addition to your submission to the Inquiry when you return the transcript. Once again, I thank you both very much for your evidence.

MS KATSCHERIAN: You're welcome, thank you.

DR BROWN: Thank you, Tarun.

45 HEARING CONCLUDED