

# WORKSHOP 3

## NHMRC initiatives in rural health

Chair: Philip Callan

**PHILIP CALLAN:** I'm Phil Callan. I'm the Director of the Health Advisory Section of NHMRC. We have a unique presentation, or series of presentations this afternoon. The Health Advisory Committee, you might be aware, is the arm of NHMRC that is responsible for developing health advice on a range of health issues, public health and clinical practice guidelines and a range of consumer and information booklets. We have two interesting projects under way the current triennium: one is looking at cardiac rehabilitation of Indigenous communities; and the second project is looking at managing water supplies in small rural and remote communities.

We're fortunate this afternoon to have the chairs of the two working groups managing those two projects. We have Noel Hayman and Mark Wenitong, who are both co-chairs to the Cardiac Rehabilitation Group and David Cunliffe here for Rural and Remote Water. So at this stage, I'd like to invite Noel to come up. Noel is the manager of the Indigenous Health Services, Inala Health and Medical Services up in Brisbane, and is a senior lecturer with the University of Queensland. He will be followed by Mark Wenitong who is senior medical officer at Wotropa Medical Service – I think I got that right – in Cairns, and is also a senior lecturer with the James Cook University. It's all yours.

**NOEL HAYMAN:** Thanks, Phil. Before I start my talk, I'd just like to acknowledge country. What we're going to do this afternoon, Mark and I will take turns in talking, but I'll do the first bit. What we want to do is give chunks of information and the information will be about the population demographics of aboriginal people across Australia, and a statement about the diversity of Aboriginal culture and how that affects service delivery. And we'll talk about why did the NHMRC take up a project on cardiac rehab in Aboriginal and Torres Strait Islander people. And we actually did some consultation across Australia about this rehab process that we're doing and I'll talk about the consultation process.

Then Mark will talk and finish off our talk with talking about a literature review that we conducted. He'll talk about a GIS survey. He'll also talk about what product we're going to produce at the end. We're looking at producing a manual that will inform health care providers about cardiac rehab. And at the end probably Mark will sum up and talk about where to from here.

So, first of all, I mean, I'm involved in teaching at a lot of forums I'm at there's still – and a lot of people don't know actually how many Aboriginal people there are in Australia. And if you just look at this table here, it's the most recent, there's about 460 000 Aboriginal people. And you can see, New South Wales has the most, 135 000, but only 2 per cent of the population. And all states have between about a half a per cent and three and half per cent, except for NT alone, and you see there it's nearly 30 per cent of the population here in the NT is actually Indigenous. And that is a problem when it comes to about good service delivery, and I'll talk about that in a tick.

If you look at this graph here, it's about the population count at the last four censi, and you can see back in 1986 that the population for Aboriginal people was just over 200 000. That rose dramatically in the 1990s right up until now where you saw there's 460 000. So over that time period, the Indigenous population has actually doubled, and we just can't account for that just

by natural increase, so there's other areas where – you know, what accounts for the population increase. And one is about enumeration, counting Aboriginal people. So now we have better methods of enumeration, you know, going to remote communities on census and counting people there.

The other one, which is a big one, is identification. So a lot of Aboriginal people now are actually identifying as being Indigenous when the census forms come out. And there's a whole range of reasons there. One of the big ones people from the stolen generation started to actually identify as being an Indigenous is probably around that 1990 where you see the curve takes off quite dramatically about the increase in Indigenous population.

Now, just about the population pyramid for Aboriginal people. As you see there, it's quite a young population, a lot down there in the lower age groups and very few up the top. Now, that's very problematic too because a lot of those old people are our, you know, grannies and a lot of research has referred to the burnout granny syndrome, because a lot of those old Aboriginal women usually didn't smoke or drink, and they take on a lot of the problems of the community. And a lot of those grannies are actually dying in their fifties and sixties, which makes it very much for young kids growing up with role models.

Now, if you look here, as I said, the Indigenous population is quite young, median year is 20 years, compared to the non-Indigenous it's 34. So 40 per cent of the Indigenous population is aged less than 15 years compared to 21 of the total population, and only 2.6 per cent of the Indigenous population is actually greater than 65. Now, here this is the big problem about the Northern Territory because it's actually the reverse when you look at demographics to the other states across Australia.

In the Northern Territory, two-thirds of Aboriginal people actually live in rural and remote communities and only a third in big towns like Alice Springs and Darwin. In Queensland and other states, as I said, it's actually the reverse. In Queensland where I come from only a third of our Indigenous population live in our – like, our DOGET community, what we call deed and grant and trust communities, and two-thirds in the bigger cities. So when you're looking at supplying quality health service delivery, it's really problematic in NT.

Now, just a statement about diversity of Aboriginal culture. And the people who were at Beyond Blue about depression, Helen Milroy, talked about a certificate of exemption. Well, this is actually my granddad's certification of exemption. So if you look at there, he actually was on Hirgar Mission back in the 1920s. And pop didn't like mission life. So he actually applied for a certificate of exemption to actually leave the mission, but that was meant about assimilation and loss of culture. So, it's just to show that when you actually see Aboriginal people, you've got to look beyond that and see the diversity of Aboriginal culture because, to me, the diversity of Aboriginal culture has actually impacted on service delivery and barriers to service access.

And you see back then, I mean, Aboriginal people were put under the Aboriginals Protection and Restriction of the Sale of Opium Act 1897 to 1901. And my pop left the mission actually in 1926, so I grew up away from mission life. But because you left, it doesn't mean you're still didn't have people looking out over you. So what they used to do is do spot checks on Aboriginal people that actually left the mission to see if they were doing the right thing. And the things that they used to actually say is – my grandpop was Roy Smith and he's a Waka Waka, he's out near Cherbourg." And my grandmother, Daisy Smith, was a Kalkadoon up from around Cloncurry. And people were taken in Queensland from, you know, places very apart and put on missions.

And what they said about my pop when he left is, "Smith is employed by Martin Snelling and Company as a station-hand on a property at Holleywell via Eidsvoll. He lives in a house on the

property with his family. His wife is receiving the child endowment for her children and he's an intelligent person and capable of utilising endowment to the benefit of the children." I mean, that's a good one. Some reports were just bad. If they were bad, they were actually put – in Queensland they were put on Palm Island and other communities. So just a statement about the diversity of Aboriginal culture and, as I said, about the impact on the service delivery. You know, people think because you're black everyone is the same, but it's very much the opposite. It's a very heterogeneous culture.

Now, getting on to, why did the NHMRC do a project and cardiac rehab. Well, the biggest reasons why is because Aboriginal people utilise cardiac rehab at really a poor rate. There's only been a few studies around but one was done up around Townsville by Traven Lea, who is an Aboriginal guy that was doing a Master of Applied Epidemiology. And he found that only 5 per cent of Indigenous people enrolled – actually, 5 per cent of eligible Indigenous people enrolled in a cardiac rehabilitation program up there, compared to 31 per cent of non-Indigenous.

And as you see there, I mean, non-Indigenous do pretty poor too about accessing cardiac rehab, you know, 30 to 40 per cent. Evidence-based – we know cardiac rehab works. So if you do a cardiac rehab program, you're less likely to have another cardiac event. And because of the low statistics that's why the NHMRC saw it as necessary to actually do a project and try and identify the barriers, why Aboriginal people aren't accessing cardiac rehab.

So, as I was saying, evidence-based, we know it works, so all patients should be off the cardiac rehabilitation, you know, when increases are poor, training and guidelines for health care providers, for cardiac rehabilitation for Aboriginal and Torres Strait Islander people.

Now, as probably most people know, cardiac rehab is divided up into three phases: phase one is about inpatient; phase two, outpatient; and phase three, maintenance. In phase one, as an inpatient, there's basic information about support and counselling, guidelines for mobilisation and discharge planning, and referral to a cardiac rehab. Now, what we found when we were doing these consultations, which I'll talk a bit more about later, is that interface between hospital and general practice, we found a lot of people were actually not referred or discharge planning actually didn't get to the GP. Phase two as an outpatient – assessment, review and follow up, things about physical activity, education about risk factor profile, discussion and counselling.

But I think probably the one that needs a bit of work is maintenance. I mean, it's very easy to change people's lifestyle for a short while. But with behaviour, it's sort of a long term thing, and if you can change behaviour in the long term you do much better. Because these people here, we want to keep them off smoking, because a lot would actually be smokers.

So what we did in the consultation process, we actually did workshops around Australia. We did one up in Darwin, one in Townsville, and one in New South Wales. And at these workshops, we actually divided the day up in the morning. We had a session with health professionals, those who we thought that were involved in cardiac rehab and could give us advice about how they see the system working and the barriers they perceived.

The afternoon session was very interesting because it actually had consumers, Aboriginal people who actually had a heart attack and they told us their problems about navigating through the system. There was some positive feedback from the consumer group, and I emphasise the greater self-management by consumers. The use of buddy systems, someone that has had a heart attack, that he could actually buddy up and trying to convince or convert about giving up smoking and all those risk factor profiles.

Actually, what came out of the workshop strongly was the use of Aboriginal health workers. In classic cardiac rehab, it starts in the hospital, usually done in the hospital, some are done in the divisions of general practice, but Aboriginal health workers aren't actually involved.

And the big thing that came from the consumers was that, "We'd probably be more engaged if an Aboriginal health worker was actually recognised to actually help out and that." And I can see there's a transition with Aboriginal health workers because when they first came along, they were usually generalist, worked in all sorts of areas. Now, we're getting specialised health workers, especially in nutrition. Especially in Queensland we have nutrition health workers now. We've got sexual health workers. You know, they're quite specific. But now I see a need to have actually health workers trained in cardiac rehab.

Communication issues. Now, that's a big issue here in the NT. If you're having a heart attack in a remote community, boy, it's a bit dangerous. Besides the barriers about language, because a lot of those people, English is probably a second or third language, and if you need angioplasty, you can't get it done in NT. You've got to South Australia. So for some Aboriginal person having a cardiac event in a remote community, they've got to navigate their way through the system, ours to South Australia, through the hospital system getting consent even from one patient. One patient said he wasn't going to have angioplasty because of the way the surgeon said it to him, you know, very poorly, and it just sounded like, you know, "You're going to die." So there's a lot of things that came out of this.

Also, acceptance of Aboriginal people of actual need for cardiac care, acceptance for activities to improve recovery. And the thing we found a big problem with is about co-ordination of care and how that went from the hospital to the GP and through cardiac rehab programs. So a lot of it, especially, those people who actually went to South Australia, all that problem they had navigating through the system, to come back and actually end up on a cardiac rehab program, it didn't happen that much. The next bit is Dr Mark.

**MARK WENITONG:** Thanks, Noel. So my role there as the co-chair was around overseeing the literature review. And I'll also talk a little bit about some of the findings in that, some of the barriers that came up in that, a little bit about this GOS process map that we're doing, and a little bit about the manual itself. Some interesting stuff there that Noel talked about, actually, I can't help commenting on. One is the little piece of paper that said that his mum was capable of taking care of the kids and stuff like that, sounds a lot like mutual obligation to me, and I'm not sure we've come very far since 1897.

And the other thing, I guess, which is interesting for us is that if 50 per cent of the population is under 18, we don't have very much voting power. So even if Indigenous people do vote, it's only a certain proportion of that 400 000 that can, so – just comments.

Now, the actual working party that we pulled together, I thought I'd better let you know the make-up of that. We included – obviously, Noel and I sit on HAC – which is the health advisory for the NHMRC. We have a council person sitting on this working party as well, somebody who represents RACGP, OATSI, Population Health Division of Commonwealth Health, the Cardiac Society with the cardiologist, Warren Walsh, a cardiac rehab nurse who also represents the Australian Cardiac Rehab Association, NACCHO, and a National Heart Foundation and a consumer rep who's an Aboriginal man from North Queensland who's had a valve replacement.

So the literature review itself, we had these grand ideas that we wanted to look at, but we already had an idea that there's not going to be much out there. And the literature review basically said this, there's not much out there. So what we can report back from that is very little.

What the consultants looked at, there's a few programs around that are non-specific for cardiac rehab that are for Indigenous people around vascular programs and stuff like that, like in New South Wales and on the south coast of New South Wales; a great program, so we could learn from principles from them, but they are not specific for cardiac rehab and also not evaluated. And the same goes for – some of the other programs that looked a little bit at cardiac rehab only looked at certain aspects of cardiac rehabilitation, such as the study that Noel mentioned around Northern Queensland. There's also another one in Townsville as well that looked at patient's perceptions – Indigenous patient's perceptions of cardiac care. And there's also another small study that was done in Yarrabar as well looking at Indigenous perspectives, but with very small numbers. So, there wasn't really a lot of information around that.

Eventually, the reviewers looked at some of the other issues around principles of good management around some of the chronic disease programs that are being run that sort of have that connection to cardiac care. This is just some of the stats around, you know, why cardiac rehabilitation in Indigenous populations, and it speaks for itself pretty much – it's the biggest killer, cardiovascular disease, and particularly if you look at the younger populations there, in the 25 to 54 year old age group, it's eight to ten times prevalence and the death rates are seven to ten times in that particular age group.

There's quite a few things now that are looking at prevention and this program also looks at prevention, but it had become evident to me as a clinician in primary health care, that there was this group of people who were having bypasses and other cardiac instrumentation or surgery and were not being followed up properly, were not fitting into the cardiac rehab, the standard cardiac rehab kind of programs and were being very quickly lost to follow up and were having poor outcomes, very poor outcomes. So that's basically the stats behind this.

The literature review also looked at a few of the barriers, most of which actually came up again in the consultations. A couple of them though, particularly the one that was looking at the role of Aboriginal workers in cardiac rehab up in North Queensland, a lot of the people in that reported that there wasn't a black face involved in the cardiac rehab program. They were less likely to be involved in it. It was something like out of the 3 per cent that did get involved, another 32 per cent said they would have been involved in cardiac rehab if there had of been an Aboriginal worker that was trained that, or that worked with them in that.

There were also comments about the training of the Aboriginal health worker, particularly the Aboriginal health worker workforce in cardiac rehabilitation. And the other issues that came up were the lack of referrals in the literature review, lack of referrals to cardiac rehab. A lot of these other things that we're talking about here – poverty there was just relating to access to general practice, and stuff like that, in places where GPs don't bulk bill, and a few other issues around that, particularly, transport, getting to and from the hospital-based part of cardiac rehabilitation. The linkages in the health care system once again referred to referral pathways more than anything else.

And the cultural understanding stuff, was the stuff that Noel was talking about earlier. Some of the recommendations that came up were particularly around – from the literature review came from some of the more generic programs around healthier lifestyles and vascular programs and things like that, so rather than specific cardiac rehab programs. And incidentally, in the international trawl of literature there was very little as well. In fact, the consultants didn't find anything on specific cardiac rehab programs for Indigenous people internationally. So self-management came up as a big issue, and more and better data, that's an issue across the whole of Aboriginal health.

Strengthening the role of the Aboriginal health worker was a big issue, and that's problematic in itself in that some of the recommendations were around issues like referral to the Aboriginal

liaison person in the hospital when somebody has a cardiac event and they're in there. Unfortunately in hospitals there's usually only one or two Aboriginal liaison officers, and in quite a lot of hospitals, there's no Aboriginal health workers. They work in more community-based work places. So there's big issues there around workforce and capacity and resourcing that needs to be looked at as well. And ultimately we'd like the end product for this particular project, which is a manual, to be practical and not something that people can't actually implement, so we're looking at some of those issues around that. And then the need for better programs that are better evaluated so we can get some real data.

The mapping process is a geographic information system, and I'm not sure everybody's across these, but they're ways of mapping out graphically geographical locations, like, Australia and overlaying prevalence data, and other things. So we're looking at mapping out where cardiac rehabilitation's programs exist, and we're looking at the areas where there's eligible Indigenous people, for a start. And we're actually were just discussing about how far we're going to take that because there's lot of other stuff that you can overlay on those kind of those systems, and they give you a good graphical illustration of what's happening across Australia, and it can progress policy and planning issues.

The manual itself is, basically aimed at two groups of people, the first being health professionals, and particularly cardiac rehabilitation units and the hospital-based side of that and the professionals, so that they've got an understanding of what the issues are and barriers are for Indigenous people. The second part is more for community-based health workers so they have an understanding of what the head cardiac rehabilitation is and for community organisations – Aboriginal medical services, for instance.

There's a couple of issues that actually that came up with that. The manual has been put together in such a way in that there's tools and there's resources and referrals to other resources. The tool, kind of things, are like a checklist, so that a cardiac rehab unit can tick off whether they've approached, whether they're getting a community Aboriginal health worker involved, whether they've got linkages, formal linkages with the Aboriginal Medical Service or the community medical service that's going to take care of this patient later. A whole lot of just practical things that we think will be useful. And it's at a very, very, very early stage in its development at the moment. It's being developed. It'll go out for consultation soon.

We're going to have a workshop in Adelaide in May and present it to different stakeholders, including a lot of the consumers for this kind of manual. Then it goes through that process and gets feedback through all the stakeholders, plus the professional organisation such as the Heart Foundation and others come back to NHMRC for endorsement and publication.

The thing that we're really hoping to do, which is a step more than what HAC usually does, is to look a bit at dissemination of this and how we'll get this document out there so it's not just something that is sitting on a shelf. And we're looking at strategies for that, and we've got a lot of the bases covered in the people that are on the reference committee, and particularly the Cardiac Rehab Association and their conferences and workshops and things, and NACCHO being on there as well is useful for that.

And I guess part of what we're doing today is just a bit of that dissemination of information just letting people know that this is an NHMRC project that's going ahead. It's probably going to be finalised by September or so this year, and it'll be available for health services and health workers and those professionals that work within the cardiac rehabilitation area. That's about it, I think. Thanks.

**PHILIP CALLAN:** Thanks, Mark and Noel, that was very, very good. This really is a project which the Health Advisory Committee has as one of its major priorities this current triennium.

We are certainly pushing to get it finished by the end of this year. We have a few minutes spare, if anyone has any questions at all.

**MALE SPEAKER:** I can't see here where the system is breaking down. When you go into hospital for any sort of a procedure, you'll have a medical care plan, you'll have a nursing care plan and you'll have a discharge plan. So where are these people escaping from that system?

**MALE SPEAKER:** Well, some have stated that the discharge summary didn't get back to their doctor. Some weren't even informed about cardiac rehab, which we say that should happen ...(inaudible)... should be told about cardiac rehab.

**NOEL HAYMAN:** A few areas, particularly when there's a tertiary referral hospital that does the surgery and then the patients go back to a regional centre, there is often a miscommunication or problems with discharge information getting to there and then getting to the primary health care provider that actually takes care of them, and that's come up commonly. The other thing is that even when patients are being referred to cardiac rehab programs, either don't go, or they go once and go, like, you know, "I'm 34, and the rest of the people there are 68. Now, I don't fit in here. They're talking in a language that I don't understand", and they just don't go back. So there's age, there's gender. There's a few other cultural issues about that and transport, and stuff like that.

**MALE SPEAKER:** I was going to say, transport was one, too, that came up.

**PHILIP CALLAN:** Any more questions?

**FEMALE SPEAKER:** Sorry, just going on from that, would you recommend that you try and do it like even on one-on-one cardiac rehab if you had ...(inaudible)...

**MALE SPEAKER:** We were looking at those, you know, different types ...(inaudible)... yes, and that actually did come up, with that one-on-one.

**NOEL HAYMAN:** And some of the stuff that came up was around a more flexible delivery and more community-based programs. So, for instance, a model might look like the allied health people and the people who are involved in the education part, doing that at an Aboriginal Community Centre with a group of Aboriginal people, rather than being at the hospital in that environment, so just those kind of things, you know. They're actually quite simple things, you know.

**MALE SPEAKER:** Some patients did say that they preferred one-on-one rather than a group.

**PHILIP CALLAN:** Question down the back?

**MALE SPEAKER:** I was just wondering about some linkages with other chronic disease management because if you've got small communities and small numbers of patients, a lot of those patients have multiple problems including diabetes, hypertension, some even had renal failure. And it would be ...(inaudible) to tie the rehabilitation to a chronic disease management ...(inaudible)... And also I don't know what your experience or what the Aboriginal communities experience has been with ...(inaudible)... rehab. We have the same problems in the Caucasian rural population ...(inaudible)... Do you have any thoughts about that?

**NOEL HAYMAN:** Well, actually, some of what we're trying to progress with this is hanging on that, on the fact that some of the preventative stuff — and there's common stuff with the chronic disease management programs and the chronic disease programs that are happening all over the place, and trying to tie that in to provide a lot more sustainability, and particularly

from maintenance phase onwards tying people into chronic disease programs and projects. So, yes, and hopefully that will give us a lot more efficiency and a lot more to continue it on.

**MALE SPEAKER:** But in Queensland health, I mean, in my ... (inaudible)... just employing a person and look at cardiac rehab and how that fits in with chronic diseases.

**PHILIP CALLAN:** Any more questions? I think I've got one. You mentioned the literature review didn't actually come out with any clear evidence. Is this group going to make recommendations to NHMRC for further research at all?

**NOEL HAYMAN:** Yes, that came up, but there's gaps. There needs to be some of the piloting of different models that have come up from the consultation phase, particularly, I'm pressing that. There'll be recommendations about those gaps and research that needs to be done on those gaps.

**PHILIP CALLAN:** A question?

**FEMALE SPEAKER:** Can I just ask you a question about screening? I mean, it's all right to talk about ... (inaudible)... allocation when we we're losing too many people, you know, through lack of screening or identifying them as being at risk. I missed the first part when you addressed it.

**MARK WENITONG:** Early detection of chronic diseases is very important and, I mean ... (inaudible)... standard practice, you know, when someone comes in they will actually do screening. In my clinic, we always screen DSL, blood pressure, and so forth. I think in a way screening in certain settings is done well, and in other ones probably not so well.

**MALE SPEAKER:** The problem is that with the project was actually cardiac rehabilitation, so it was really post-event that we were looking at, and that's what the strict definition is. But we've broadened that out a fair bit, so we really are relying a lot on, what are chronic disease programs which are early detection and better management of those patients with chronic disease. So it needs to fit in with that, and if that's not happening, then we're not going to get too far with it.

**FEMALE SPEAKER:** Maybe a good ... (inaudible)...

**MALE SPEAKER:** Yes, those linkages, yes.

**PHILIP CALLAN:** No further questions? If you would join me in thanking Noel and Mark. Our next presenter is Dr David Cunliffe. David, is the principal water quality officer from the South Australian Department of Health. He's also the Chair of NHMRC's Rural and Remote Water Quality Working Party. He's been responsible for putting together a decision tool to assist small communities in better managing their water quality. David.

**DAVID CUNLIFFE:** Thank you. I'm going to talk about the rural and remote water quality project. It's in an area we're dealing with drinking water. People take drinking water for granted and forget that the provision of sanitation and safe drinking water has had the greatest impact on population health, both in terms of reducing illness and extending life expectancy. Nothing else, including antibiotics, has had a greater impact, but we do tend to ignore issues of water quality and it gets submerged behind water quantity on a lot of occasions, for good reason.

So the background to the project. The background is based on the premise that application of preventive risk management systems is by far the most effective means of ensuring drinking

water quality before delivery to consumers. The traditional approach is just to monitor drinking water quality, take tests back to a laboratory and then make an assessment. Well, it's too late. People have already drunk the water. All you can do is tell them, "We know why you got ill" or in some cases, "We know why you died."

So to improve the Australian drinking water guidelines, the framework for management of drinking water quality has been added to approve quality assurance for drinking water. And that was published in December of 2004. The framework is a risk management system. It incorporates HACCP principles and features from other risk management systems such as ISO9001 and the Australian and New Zealand Standard 4360.

The World Health Organization has taken a similar approach. They called theirs "Water Safety Plans." And like the Australian framework, the WHO water safety plans are purpose-designed for drinking water supplies. This is just an overview of the framework. It contains 12 elements divided into four areas – and I'm not going to go through these in any detail – starting with commitment to drinking water quality down through system analysis and management where most of the hard work is done, through supporting requirements, and then finally review. And this is a continual improvement program. So this is the framework that's in the Australian Drinking Water Guidelines.

Now, in terms of application of the framework, there's been very strong support from water suppliers and health agencies in Australia for implementation. Major cities have implemented risk management systems. Some started with ISO or HACCP accreditation, but then moved to full implementation of the framework. Implementations also commenced in other urban centres. In Victoria, implementation of risk management plans will be required by legislation, but there's a gap in all of this. Although the framework applies to all supplies, irrespective of size, operators or rural and remote supplies need additional support.

For a start, the framework has to deal with everything. It has to deal with everything from the tiniest supply up to Sydney, so it contains all the detail to enable that to happen. That means that the framework in the Drinking Water Guidelines is about 130 pages long. But 130 pages of documentation on the desk of an operator of a small rural and remote community, he's not going to open it, let alone try and implement it. It is likely to be overwhelming. And halfway through the development of the framework, this became very evident that this was going to be a gap and that we needed to develop something specific for the operators and managers of small supplies.

It was augmented by findings of a survey that was conducted in 2001 and 2003 of over 2000 rural and remote drinking water supplies across Australia. That survey found that inadequate management represented the largest threat to drinking water quality. It was a larger threat than poor quality source water. Less than 33 per cent of community supplies indicated that they had a management plan or were in the process of developing a plan, and that's a plan of any type, not a plan that necessarily complied with the new framework. Internationally, similar concerns have been identified with the management of small systems. It applies in Bangladesh, Ghana. The United States have a huge problem with small supplies. It applies in Canada. It applies throughout the South Pacific and South East Asia.

A common problem is often these systems are operated by personnel with very limited expertise and resources. They often have multiple jobs; drinking water is just one of the things that they do. So that's how and why we came to the project, the rural and remote project supported by NHMRC which was to develop an electronic tool to facilitate improved management of drinking water quality in rural and remote communities, including Indigenous communities. Originally, our target was communities of the order between – well, anywhere down to 10 and 20 people up to a 1000, but I think now we're getting evidence back that

communities of 10 000 are finding the tool to be very useful, and some of the larger authorities want to use it as well.

The tool will produce customised management plans from fairly basic information provided by system operators, and I'll go through that in a moment. It will also provide an assessment of whether systems are likely to provide safe drinking water and an assessment of whether systems will provide enough water for basic hygiene and drinking water supply. Importantly, the plans are entirely consistent with the framework, the management of drinking water quality. All 12 elements are listed. What it does is, it plucks out specific information for the particular supply. It means that the operator doesn't have to go to the 130 pages and delve through all that detail to find the information that applies to them. This tool does it for them.

So, the inputs. The inputs are reasonably basic and they're described in framework element two which was the system analysis element. So it requires an input of the structure of the system which includes the nature of the catchment. So is the community supplied with ground water, or water from a lake, a river, a stream, or even rain water tanks. And potential impacts: are the water sources impacted by agricultural waste, by livestock waste? Is it impacted by human waste, so septic effluent or waste water? Is it impacted by mining? It then requires an input of whether the system has a reservoir or a dam. What type of treatment is applied? Is the water filtered? Is it disinfected? Then input on whether there are service reservoirs or storage in the system.

And then finally some detail about the distribution system and the population densities and distribution. It also requires input about water availability and restrictions. Is supply restricted in summer in the hot months? Is it restricted during the dry season? And then, finally, population size.

The outputs, as I said, the producers of risk management that lists information in three basic tables. The first table lists the hazards, risks and preventive measures associated specifically with the infrastructure associated with that supply. So if you've got a bore water supply, it's the hazards and risks associated with bore water. You don't get the information on surface water because it doesn't apply to your system. The second set of tables deals with operational monitoring and also if you're going to monitor, what are the target criteria and the corrective actions if something goes wrong? And then the third set of tables, verification, monitoring, the old compliance monitoring, the testing of drinking water for ecoli.

The outputs include a schematic of a system and the assessments of water availability and the likelihood of the systems supplying safe water, subject to good management. So this is an example of a schematic of a semi-mythical system, Tokema Station, which has got some bores at Oak Valley. It's got a chlorinator. It's got two tanks, a distribution system, and then that supplies water to the township. This type of schematic – this was taken from a management plan; the management plan develops that. And you have a box that you have to tick to say, "Yes, this is my supply." This is an example from the hazards, risks and prevention table for the Oak Valley bores. This is just one of the hazards. If protection against livestock or human activity fails, there's a potential for harmful micro-organisms or chemicals to enter the water body. The risk is illness from the micro-organisms, and the chemicals can also have a health or aesthetic impact.

Preventive measures – keep the livestock and the people away, and the number of mechanisms that you can apply to achieve that. So protection zones, fencing, deny access, limits on agriculture, and so on. And there are a list of hazards and risks, and a list of the preventative measures. And a list for each one of the elements of your supply.

So the operational monitoring — and I've chosen an example for the chlorinator — it lists requirements for daily monitoring, weekly monitoring, monthly and annual monitoring. So for the chlorinator, for example, monitor free chlorine residuals in a distribution system targets chlorine residual grade and .2 milligrams per litre at a set monitoring location within the system, and there's an upper limit of 5 milligrams per litre. Corrective action: flush the distribution system to remove unchlorinated or over-chlorinated water. If you can't do that, then you may have to issue a bore water notice. In some places, water can be too precious for that type of activity.

And verification distribution system: we come back to our old favourite, testing for ecoli, but also monitoring and reviewing public complaints. The public can be a very good barometer of how safe a system or how acceptable a water supply is for consumption. Responses are also provided if ecoli detected, the type of response you institute. And if you get public complaints about odour or change in appearance, then that can be an indication of faults in the distribution system which, again leads to corrective action.

What I'm going to try and do now is just change over computers — which could be fun — and just show you the decision tool, which is this disk, and there are copies here if anybody wants them. It goes out for public consultation tomorrow, so you can grab one today and be a day ahead of everybody else.

I'm just going to show you very quickly the electronic tool, and this is how it starts, with an introduction. At the bottom of each screen, there's a Next button. I'm not going to develop a plan; it'll just take just a little bit long, although we had an example, the Katherine water supply, just north of here, used this tool and said it took them a morning to develop a management plan for the Katherine water supply which has got a population of 10 000 people and about 20 elements in it. He said he found it very simple to use, and this was from somebody who wasn't involved in our working party. So I'll just choose another semi-mythical supply.

Down the far side, there are all the screens that are contained in the management plan, and you can take a shortcut by going to those headings. There's also a How To guide associated with the plan. There is a user guide. So for the Mornington station supply, information listed wherever there's an asterisk associated with a box, that's compulsory information that you must provide, and the tool won't let you go any further until you do that. So what are quantity requirements, population size that I talked about, total number of dwellings, extent of the reticulation system, how many dwelling are supplied with water, how many temporary dwellings are there, and the numbers generated — numbers of dwellings not supplied are generated automatically.

Production of water supply. So the total volume produced by the supply, including rain water, tank augmentation, for example. And this is the first of the warnings. The judgment is that this supply won't provide enough water for the public health and hygiene of the community. The estimate is that the average Australian requires about 160 litres per person per day. You can get away with lower volumes if you're just going to use the water purely for drinking. But for total household use, we're working on a 160 litres per day. WHO works on about 100 litres per person per day.

Water availability. I won't go through this slide because of time. It deals with average rainfall, reasons for low availability, and water restrictions. And then we come on to the catchment, so it asks you to describe your system. So in this one, again I've used Oak Valley. We've got some bores and it's asked for information, so just saying where the bores are, three kilometres to the north of the town. And you can add more. If you've got other sources of water, you can add those in as well. Storage reservoir for bores, you're not going to have one, in general.

So, the treatment systems. Now, in this case, for reasons that will become evident, in a moment, we've said it doesn't have any treatment at all. Then there's tank number one, which is a protective service reservoir and the information is where it is. And then there's tank number two. And then finally there's a distribution system, so all of those have been marked off. And anybody who's developing a management plan should have this basic information about their system.

And then finally, the consumer type. So, a permanent population for this supply. As I said, this is just a simple example.

And then finally you go to the next screen and you're asked to show the linkages between the supplies, so in this case we've said the bores go to the two tanks, the two tanks each independently go to the distribution systems, the distribution system then goes to the population.

And then finally in this section the tool, hopefully, will develop a schematic for you. And there it is. And this is the second of the warnings. When we put in the fact that Oak Valley had bores, we also signalled that it was impacted by agricultural waste. So the tool has now come up with a warning saying, "Based on the information provided" – it says "chemical quality". We've changed that. It's meant to be microbial quality. This version says "microbial quality." It says that, "Quality cannot be assured. Contact your health department."

Then the final warning is also on this page. It asks you some questions about testing for chemical quality, "Has it been tested by an accredited laboratory? Did it comply". If you answer "No", then you get a warning saying this time the chemical quality isn't good enough or may not be good enough. And it won't let me move on because I must tick that box saying that's an accurate depiction of my water supply.

Then finally, once you've put all that information in, it produces a management plan, and what I'll do is I'll just take a shortcut to one I prepared earlier so we don't go too long. This is the type of management plan that comes out in a PDF for the Mornington Station and it lists all that information. It also lists emergency contacts that you put into the plan. So you then have this document and on the front page it asks you to indicate who prepared the plan, who audited the plan, when it was generated, and we've added now prompts for saying when you must review the plan, which is – the default is 12 months later.

Just to go down, so all this information, there's the schematic appearing in the plan, so that's there, every piece of information and here's an example of the type of table. So, Hazards and Risks and Preventive Measures. And that's where I'll stop. We have examples of management plans that I can show you if you want to see them. They range from about 25, 30 pages for a small supply. The Katherine supply went to just over 70 pages, but they've got 10 000 people, they've got about 20 elements in their supply. So I will close.

**PHILIP CALLAN:** Thank you, David. Now, when you consider the Australian Drinking Water Guidelines as a full document, it's about 600 pages, even turning Katherine's supply management plan into a 60 or 70 page document, it's not a bad feat. Does anyone have any questions for David?

**MALE SPEAKER:** David Laurie from ... (inaudible) ... Toowoomba. I've actually read the document. I'm very excited with your CD because ...

**DAVID CUNLIFFE:** You don't need it, you've read the document.

**MALE SPEAKER:** One of the things – we arrived here two days ago and actually had a look at ...(inaudible)... water treatment for the region ...(inaudible)... They've got problems with temperature and if we could develop like the CD that could implement what water treatment you need for ...(inaudible)... similar to what you've done here, it would be ...(inaudible)...

**DAVID CUNLIFFE:** This is adaptable. I didn't say, and I should have said, that we're discussing this management plan too with WHO and looking at international adaptation of this management plan. They're very interested because this is a worldwide problem, but equally, it could have other applications in specific areas as well, using the same kind of information. NHMRC has been terrific in funding this program, but everybody who asks about how much did it actually cost to develop the software tool, is very surprised about how relatively inexpensive it was. It was about \$70 000 for the tool. So to adapt something that's already there, hopefully it could be even cheaper.

**MALE SPEAKER:** I commend you on it, it's very good.

**DAVID CUNLIFFE:** Thank you.

**FEMALE SPEAKER:** I apologise if I've ...(inaudible)... information, but does it give you any indications on what components certain people would need to bring it to drinking standard?

**DAVID CUNLIFFE:** No. It's relatively standard, but what the warning does is it says go talk to your State Health Department and they should be able to give you that advice. That advice is in the Australian Drinking Water Guidelines and other documentation, but they'll know. Mostly for – well, that example I had up there with the ground water supply impacted by agriculture, it needs a chlorinator. If you've got human waste, then you're probably going to need a filtration plant. There are experts in Australia, quite a number of them who can give you that information. So, yes, but it doesn't give you the information specifically.

**FEMALE SPEAKER:** Can I just express a concern that we found in our catchment area?

**DAVID CUNLIFFE:** Yes.

**FEMALE SPEAKER:** And I don't know if it's in other areas, but that is with pesticides.

**MALE SPEAKER:** Also with blue-green algae and chloride and high conductivity in this one water source, which is actually surface water blended with bore water and it makes the dialysis an extremely difficult challenge ...(inaudible)...

**DAVID CUNLIFFE:** And that's why you're going to need a separate – you'll need to modify an adaptor for the renal dialysis situation because of the sensitivity to the chemical contamination and while I really liked your question and your comments before, I must admit that drinking water has a rider that it doesn't apply to renal dialysis because of the particular needs. But I can see that you could easily adapt this tool for that purpose. We have a warning system in South Australia where if chemical concentrations increase in the water supply, we tell our renal dialysis centres and we tell the co-ordinator of home dialysis units that there might be a problem, specifically for them. You know, chemicals like alum which aren't going to affect the normal population, but may be an issue for renal dialysis patients.

**MALE SPEAKER:** ...(inaudible)... It's only when something sneaks through that we don't ...

**DAVID CUNLIFFE:** Yes, and we're worried about things sneaking through. One of the greatest outbreaks – well, number of fatalities associated with blue-green algae was in renal dialysis patients in Brazil, and that snuck through, sadly. But what we're looking at is

improving management so things don't sneak through. Where you have outbreaks, they generally were preventable. Seven people died from poor management – basically because of poor management. That's what we want to avoid.

**MALE SPEAKER:** I know you were talking about this before, but is there going to be any international type of model that you can fit international parameters so you can plan international aid type programs for water supply?

**DAVID CUNLIFFE:** I'm glad you asked that question. I could have almost planted you. I didn't show the timeline. This project will be completed by the end of this year and the disk will be ready for Australia. We've had one meeting with WHO in Iceland in January, it wasn't that cold, but it was very dark. We have another one planned in Australia in probably August/September of this year to talk about this same project and looking at basically adapting the Australian model for international use. In the Australian conference we'll be inviting a lot of our neighbours, basically from WPRO region, so the South Pacific, New Zealand, the Philippines, South-East Asia to attend. The intent is that AUSAID will attend and the World Bank should attend as well.

So we're looking at developing an international tool that at this stage could very well be based on the Australian model. I think it's fair to say we're leading the world in the development of this type of tool at the moment. So, yes, we are.

**PHILIP CALLAN:** If I could just add, it's currently being tested in – I'll get these right, Morocco, Ghana, the UK, Iceland, in Canada, Bangladesh, China, I think I've covered them all, and New Zealand at the moment. So we certainly are looking at spreading it around the world.

**MALE SPEAKER:** With respect to that, can you change things like the litres of water that you expect the population to use, because obviously in say Ghana, they're not going to be working on 160 litres ...(inaudible)...

**DAVID CUNLIFFE:** Yes. No, we will need to look at changes. We have identified microbial quality is by far the greatest challenge in Australia because that is the case, but in countries like Bangladesh, arsenic is a huge problem. So we're going to have to look at adaptations for the international arena. But they're going to be more to detail because we have the common basis that the Australian Drinking Water Guidelines are based on, our risk management framework, WHO's is based on what their risk management framework or water safety plans – they are very common. So we're starting with the same metric, but there are issues of detail that we will need to look at and details of complexity as well in terms of how water is delivered in a small community in a developing country. So, yes, we will be looking at that.

**FEMALE SPEAKER:** ...(inaudible)...

**DAVID CUNLIFFE:** How will depend on us getting the information out and I think this is going to be a success story and you'll hear about success stories. So we ...

**FEMALE SPEAKER:** ...(inaudible)... public consultation tomorrow.

**DAVID CUNLIFFE:** Yes.

**FEMALE SPEAKER:** ...(inaudible)...

**DAVID CUNLIFFE:** That disk, you mean an international disk?

**FEMALE SPEAKER:** Yes. ...(inaudible)...

**DAVID CUNLIFFE:** Okay, yes. The Australian one comes out — you'll hear about that, very well advertised. WHO has a website and they have the same policy as NHMRC in providing all their drafts on the website, disseminating it to anybody who wants it, they have bulletins that they put out, they have a water and sanitation site that you can access and anything that's new is listed there. They will put out media and they will ask NHMRC and water agencies in Australia to support dissemination of information when that happens. So that will happen.

We see this as a very very important step, the developing of the tool for the small community is vital and whenever we're in a meeting on drinking water and we mention small communities' supplies and projects, people stick their hands up and say yes, we want to be involved, which is why when we went to Iceland, we took copies and people took them away and they're trialing them.

**PHILIP CALLAN:** No further questions? Okay. David, the consultation concludes about the 27<sup>th</sup> of May, I think, is that about right? I'm putting you on the spot now, I know.

**DAVID CUNLIFFE:** Yes, the three months' consultations are end of May. We have to go out for consultation now, we have to conclude it then, so we can assure that we complete it by December 2005. We believe that's very realistic, but because it's so important, we don't want this — we want this to be very finite to come out at that time. We do have an opportunity to look at further improvements in the future, but we think it will be a very very good tool at that time, once we get the feedback.

I should add one note. I've given this presentation as a chairman of a working party, a lot of people have put a lot of work into this. Every State in Australia has been represented either on the working party or in the steering committee. Noel is a member of our steering committee and Phil and NHMRC have been tremendous in the support of developing this tool.

**PHILIP CALLAN:** Okay. Well, it appears we finished a little early this afternoon, but it is Friday, so have an early mark. If you'd join me in thanking certainly David and Noel and Mark for their presentations. And I'd like to thank you all for making that long trek down through the heat to join us this afternoon. Thanks very much.