Primary Prevention Practice in Environmental Health: Report 1

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		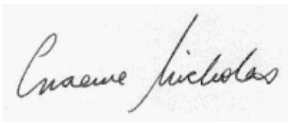
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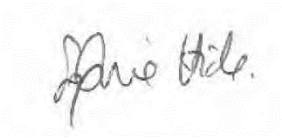	
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EXECUTIVE SUMMARY

This is the first report of a two-year study on how public health personnel can be effective in influencing decisions, made either by other agencies or individuals, which will reduce or prevent risks to public health. The aim of the project is to describe examples of good practice and to set such examples in one or more useful theoretical frameworks so that key principles can be generalised as practice guidelines.

This report reviews selected literature and the first of three proposed case studies. A subsequent report will provide two further case studies and a synthesis of findings from the whole project.

The focus has been on public health influence on decision-making, rather than on situations in which public health officials have opportunity for direct impact. In other words, we have excluded from our study responses to the outbreak of disease, and occasions that involve public health personnel with a clear mandate to act. The intention is to consider opportunities for public health personnel to identify and respond to potential threats to public health and to act prospectively. Thus, we are applying the concept of primary prevention to the work of public health units (PHUs) in New Zealand.

Our approach is to seek examples of good practice and identify opportunities for good practice through interviewing local authority and regional council officials and PHU personnel, and by researching the impact of public health thinking and submissions on local policy and decision-making. We have drawn on international literature to identify frameworks to interpret collaboration practices used by PHUs to influence public health.

The case study reported here concerned submissions made in response to an application for resource consent by Harakeke 2015 Ltd. The application was to develop 177 hectares of land, between Ruby Bay and Tasman Village on the coastal highway to Motueka, into a new housing and commercial development.

The report summarises insights from the interviews under three headings: collaboration and relationships; experience, expertise and robust processes; and working upstream.

The case study shows public health personnel drawing on motivation, expertise and legitimacy that could largely be taken for granted because it had been internalised through years of experience. In seeking insights to guide primary prevention practice for environmental health, however, such experience and confidence cannot be taken for granted. Explicit frameworks may be useful to guide public health decisions and interventions in situations of indirect influence on ‘non-health’ actors.

We see the case study in this report as an example of practicing public health within a boundary not defined by a public health discourse. There was no formal voice or position for public health as of right. The current case, then, highlights the need for public health practice to have frameworks to support and guide interventions beyond the bounds of direct action and mandated power or influence.

Established models for assessing health impacts of policies offer useful frameworks for policy development to ensure that health implications are considered. Such models, however, envisage a ‘non-health’ decision-maker conscientiously factoring in health thinking as part of policy design and implementation. The case study reported here illustrates a situation in which ‘non-health’ decision-makers are constrained by a formal process that weighs submissions against planning and consent criteria set out in law and regulation.

Models to guide decision-making in public health similarly would not provide an adequate way to understand or structure the public health activity described in this case study. Such

models envisage a system in which they are used by decision-makers to choose and design appropriate interventions or actions. In the current case, the only intervention or action they could assist public health personnel to undertake was to make a submission to a distal decision-maker. No direct public health intervention was available.

Public health actors, then, need to establish for themselves and others the basis of their input to 'non-health' decision-making, as this cannot be taken for granted, and may not be seen as relevant or cogent alongside other claims. In situations that provide no or little protected or agree place to stand, public health professionals need to establish a defensible position from which to make their contribution.

We have developed a provisional framework for supporting indirect public health interventions. The provisional framework will be tested and refined in the light of subsequent case studies in the current project. The model features three core qualities that need to be established as a 'place to stand' for public health expertise to be received by 'non-health' decision-makers: salience, credibility and legitimacy.

Future case studies planned for the current project will test the conceptual model for its utility to guide and critique primary prevention practice for public health actors.

1. Introduction

1.1 PURPOSE AND BACKGROUND

This is the first report of a two-year project on how public health personnel can be effective in influencing decisions, made either by other agencies or individuals, which will reduce or prevent risks to public health. The key objectives of this study are to:

- Find and describe examples of good practice: namely, where public health units (PHUs) have influenced policy or the design of interventions in ways that were likely to prevent or reduce threats to public health
- Identify opportunities for PHUs for effective practice in influencing policy or intervention design
- Produce recommendations, guidelines or advice on how to improve public health outcomes through primary prevention collaborations involving PHUs.

This report reviews selected literature and presents findings of the first of three proposed case studies. A subsequent report will provide two further case studies and a synthesis of findings from the whole project.

1.2 APPROACH

The aim of the project is to describe examples of good practice and to set such examples in one or more useful theoretical frameworks so that key principles can be generalised as practice guidelines. Good practice, for the sake of this project, means that PHU personnel carried out a fit-for-purpose action to influence 'non-health' actors[1] in ways that are likely to prevent or reduce threats to public health.

We seek to set public health prevention in an 'eco-system' of health-oriented and 'non-health' actors. The focus has been on public health influence on decision-making, rather than on situations in which public health officials have opportunity for direct impact. In other words, we have excluded from our study the delivery of health programmes, responses to the outbreak of disease, and occasions that involve public health personnel intervening directly to promote health. The intention is to consider opportunities for public health personnel to identify and respond to potential threats to public health and to act prospectively in situations that require influence of 'non-health' actors. In this, we are applying the concept of primary prevention[2] to the work of PHUs.

Our approach is to seek examples of good practice and identify opportunities for good practice through interviewing local authority and regional council officials and PHU personnel, and by researching the impact of public health thinking and submissions on local policy and decision-making.

We have drawn on international literature to identify frameworks to interpret collaboration practices used by PHUs to influence public health.

[1] In this report we use the term 'non-health actors' to mean decision-makers for whom health is not their principle purpose or framework.

[2] Primary prevention refers to "a program of activities directed at improving general well-being while also involving specific protection for selected diseases". primary prevention. (n.d.) *Mosby's Medical Dictionary, 8th edition*. (2009). Retrieved June 19 2017 from http://medical-dictionary.thefreedictionary.com/primary+prevention.

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2. POTENTIAL MODELS TO GUIDE PREVENTIVE PUBLIC HEALTH

2.1 LITERATURE SEARCH

We searched international literature to identify useable frameworks to guide public health practice in influencing public health outcomes through engaging with non-health decision-makers. We have selected four commonly referenced models as relevant to our purpose, plus a framework specifically developed for New Zealand. As will be discussed later, however, none of these models provides sufficient framework to guide public health practice in the situations at the focus of this project.

2.2 FIVE HEALTH ORIENTED MODELS

2.2.1 Health in all policies

At a government / policy level an overarching strategy is in the application of healthy public policy. This initiative was first launched in 1986 within the Ottawa Charter, arising from the First International Conference on Health Promotion. It has since developed into the 'Health in all policies' (HIAP) approach (Kickbusch and Buckett 2010; Ministry of Health 2009; Rudolph et al 2013; Sihto et al 2006; Stevenson et al 2014), and was defined during the Eighth Global Conference on Health Promotion in Helsinki:

> "Health in All Policies is an approach to public policies across sectors that systematically takes into account the health implications of decisions, seeks synergies, and avoids harmful health impacts in order to improve population health and health equity. It improves accountability of policymakers for health impacts at all levels of policy-making. It includes an emphasis on the consequences of public policies on health systems, determinants of health and well-being" (World Health Organisation 2013).

As attendees at the Helsinki Conference, Signal and Winnard (2013) commented that both Ottawa and Helsinki are 'persuasive as seminal documents', but are not a Treaty or Charter. Nevertheless they do give examples of strong HIAP initiatives within NZ, such as for the Christchurch rebuild, and programmes for Housing and Health Research, and tobacco control. The most recent update on this 31 year initiative is 'the Adelaide Statement', arising from the 2017 International Conference Health in All Policies: Progressing the Sustainable Development Goals, which reinforces ongoing commitment to building on the Health in all Policies approach (World Health Organisation 2017).

2.2.2 DPSEEA

As a framework which accommodates intervention at government and policy levels DPSEEA (pronounced deepsea) appeared the most consistently supported within review of a range of such approaches (Hambling et al 2011; Ministry of Health 2009). DPSEEA is an acronym for driving force, pressure, state, exposure, effect, and action. This model was developed on behalf of the WHO and has been used in the development of environmental health indicators for climate change (see Figure 1). DPSEEA recognises 'the links from the state of the environment through exposures to health effects'. It is a tool for analysing environmental health hazards and designing indicators for use in decision making.

As a graphic the DPSEEA framework presents a clear synopsis of the successive environmental influencers and the relative effectiveness of varied remedial actions. In practice it has been used in New Zealand for a case study of environmental health indicators in NZ drinking water (Khan et al 2007). A further example, an applied study in a Canadian

PHU, used DPSEEA to assess the state of the environment (SoE). They appeared to find it relatively straightforward to find some measures (eg, in relation to water quality), but struggled to find other data (such as economic growth and local exposure data to certain contaminants (Lam Steven et al 2015).

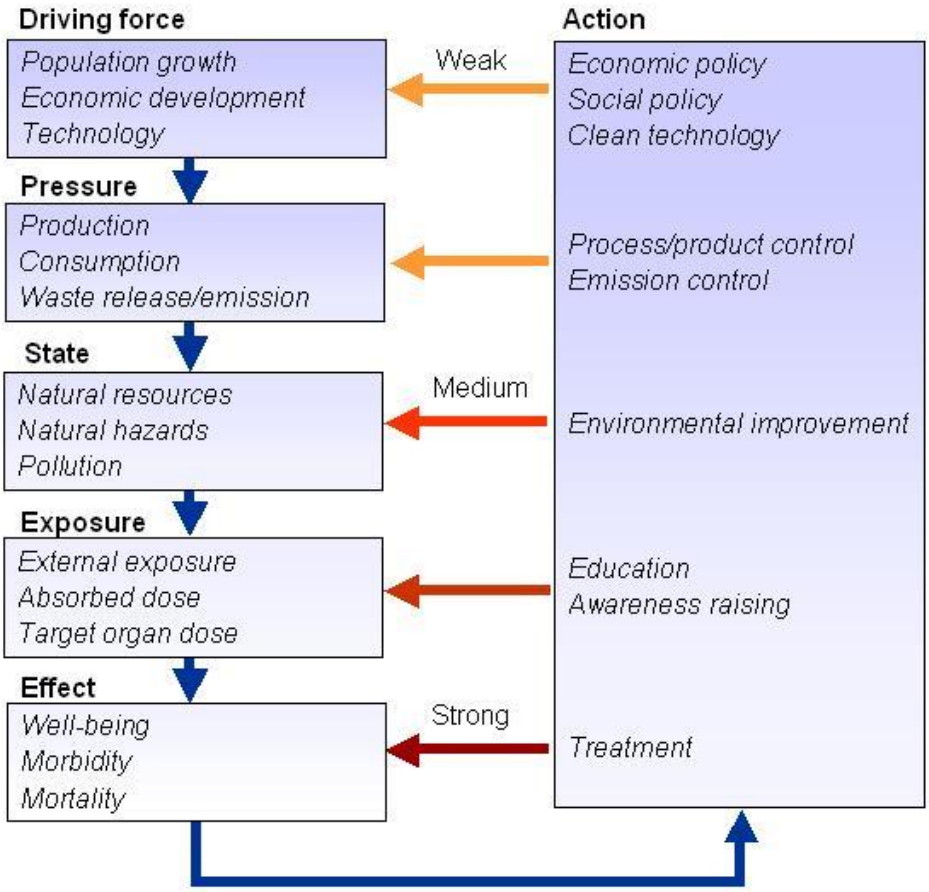

Figure 1: DPSEEA framework

(Source: IEHIAS)

2.2.3 New Zealand environmental health indicators

New Zealand environmental health indicators (EHINZ) have, in contrast, moved away from DPSEEA to indicators considered relevant to New Zealand. The indicators are evaluated on a six monthly basis and linked to programmes monitoring the environment and health in New Zealand. They address ten different aspects – air quality; recreational water; drinking water quality; indoor environment; climate change; hazardous substances; transport; UV exposure; border health, and population information. These indicators,

> "describe the link between the environment and health. They are based on known or plausible cause-and-effect relationships between the environment and health. The indicators provide information for action. They provide key evidence to help decision-makers, and raise awareness of environmental health risks, to improve human health." [3]

[3] http://www.ehinz.ac.nz/indicators

As such EHINZ stands alongside DPSEEA as a framework for identifying and considering various risks to human health.

2.2.4 Evidence informed decision making

Also prevalent in the literature are initiatives directed at the enabling of and the undertaking of 'evidence informed decision making' (EIDM) within public health units. At its simplest EIDM concerns making decisions based on the best available evidence. However, to achieve this, there are underlying conditions and operational contexts that are necessary to enable such decision making. In their review of knowledge translation strategies Armstrong et al (2013) summarise these as community preferences, local issues (eg, health, social), political preferences, and public health resources. An example that encompasses such an approach is the 'model for evidence informed decision making in public health' (National Collaborating Centre for Methods and Tools 2012) (Table 1).

Table 1: A model for evidence informed decision making in public health

Sources of Evidence	Examples of evidence for consideration
Evidence from research	Quality qualitative / quantitative evidence
	Sourced from varied PH relevant disciplines / sectors
	Data from health surveillance & community health monitoring to identify magnitude of health issue
Evidence about the frequency causes and modifying factors of local community health issues	Significance of issue in context of community health concerns
	Community needs & interests
Evidence from people about community and political preferences and actions	Public / govt. official support / opposition
	Political climate (local, regional, national)
	Organisational climate
Evidence from various governments and programmes about public health resources	Financial resources
	Human resources (staffing / admin / mgmt. support)
	Materials (work conditions – space, facilities, technology)

Here they explore the direct evidence that might be assimilated, the range of sources from which such evidence might be derived and the community and political context in which it is effected. As a final component they consider 'public health resources', and these might also be considered as the organisational capacity needed to enable EIDM. (Peirson et al 2012) also considered these issues, summarising critical factors and dynamics for building EIDM capacity as 'leadership, the organisational structure and climate, human resources, knowledge management, communication and change management'. A final component, not obviously apparent in the model is that of tools (eg, Yost et al 2014), processes and decision support tools that practitioners might adopt for effective EIDM.

2.2.5 Health impact assessment

The final model, **health impact assessment** (HIA) (Lock 2000; Ministry of Health 1999) can be applied at both policy and practitioner levels. Health impact assessment has been defined as 'a combination of procedures, methods and tools that systematically judges the potential, and sometimes unintended, effects of a policy, plan, programme or project on both the health of a population and the distribution of those effects within the population. HIA identifies appropriate actions to manage those effects' (Ministry of Health 2010). Component steps for HIA are generally regarded as screening, determination of the assessment scope and depth of study, using necessary methods to assess the significance of health impacts, reporting, and evaluation (PHAC 2005).

Although the range and techniques are not explored here it is noted that the overarching emphasis of HIA is in contributing to a process of risk assessment, control and management (Ministry of Health 1999). Advice to health protection personnel in New Zealand sets HIA in a framework of risk assessment (including hazard identification, dose-response assessment, exposure assessment, and risk characterisation), risk communication, and risk management (Ministry of Health 1999).

Allied to HIA, but with an apparently wider scope, is **Integrated Environmental Health Impact Assessment (IEHIA).** The intention here is that IEHIA aims to support policy making by comprehensively assessing environmental health effects, while taking account of underlying complexities (Knol et al 2010). Lebret (2016) reinforces the wider consideration of multiple impacts from multiple stressors and this this approach. This would appear to be more allied to the DPSEEA approach, but further literature search would be needed to establish this and to identify example application of IEHIA in practice.

2.3 SYSTEMS MODELS

2.3.1 Critical Systems Heuristics (CSH)

CSH is a framework for reflective practice based on practical philosophy and systems thinking. It provides a structured way of making assumptions, that may be implicit in claims or assertions, explicit. It is useful in demonstrating that claims of what is relevant or valid rest on assumptions about what is included in-scope (boundary judgements) and what is deemed to matter from particular perspectives (value judgements). CSH uses a schema for making explicit judgements about sources of motivation, power, expertise and legitimacy (Ulrich 1983; 2005; Ulrich and Reynolds 2010). Ulrich claims that when someone makes claims about a situation four "critical" issues need to be addressed "in an open and transparent way"; otherwise, "our claims are neither clear (regarding their meaning and relevance) nor valid (regarding their rationality and ethical acceptability)" (Ulrich 2005). His schema is a way of addressing the critical issues. It asks of any claim:

- Where the sense of purposefulness and value comes from (source of motivation)
- Who has control and what is needed for success (source of power)
- What experience and expertise support the claim (source of knowledge)

- How values, concerns, and perspectives of different actors are considered (source of legitimacy)[4].

  "Critical heuristics proposes that these four issues are essential for reflective practice in most (if not all) situations of problem solving, decision-making, or professional intervention. They are essential since without considering them, we do not really understand what a claim means and whether or to what extent we should recognise it as valid, that is, as a basis for action" (Ulrich 2005).

Ulrich's critical heuristics schema is presented in Appendix B.

2.3.2 Salience, credibility and legitimacy

Cash et al (2002; 2004; Mitchell et al 2004; Mitchell et al 2006) have studied the interface between science and policy. Their work provides useful insights into what is needed to influence policy from a technical or science background.

> "Managing boundaries between disciplines, across scales of geography and jurisdiction, and between different forms of knowledge is also often critical to transferring information" (Cash et al 2002).

The authors propose three attributes as important in negotiating the inter-disciplinary boundary: salience, credibility and legitimacy. "What makes boundary crossing difficult is that actors on different sides of a boundary perceive and value salience, credibility, and legitimacy differently" (Cash et al 2002).

[4] This understanding of legitimacy, while true to Ulrich's concept, has been drawn from: Cash, Clark, Alcock, Dickson, Eckley and Jager. *Salience, Credibility, Legitimacy and Boundaries: Linking Research, Assessment and Decision Making.* Research Working Paper 02-046. Harvard University, John F. Kennedy School of Government

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3. CASE STUDY: SUBMISSION ON HARAKEKE DEVELOPMENT

3.1 CASE STUDY

3.1.1 The Harakeke project

The case study concerned submissions made in response to an application for resource consent under the Resource Management Act (RMA) by Harakeke 2015 Ltd. The application was to develop 177 hectares of land, between Ruby Bay and Tasman Village on the coastal highway to Motueka, into a new housing and commercial development[5]. The timeline of the submission and consent hearings spanned 18 months. Eighty submissions were received, of which 24 were in support, 44 opposed, and of the six neutral respondents' three wished to be heard: the Nelson Marlborough District Health Board (NMDHB) Public Health Service (PHS), Nelson Tasman Cycle Trail Trust, and the NZ Transport Agency. Table 2 summarises the timeline of the application for resource consent.

Table 2: Timeline for Harakeke 2015 Limited application for resource consent

June 2015 -	The initial application was submitted
August 2015 -	The Consent Planner for Tasman District Council issued a request for further information. In a 7-page document, the key issues to be addressed spanned: wastewater discharge, storm water management, road engineering, sustainable water lifecycle management, water supply viability, and gaining further details on land use (commercial, slope stability and reserves) and environmental quality details entered by the applicant's resource scientist
November 2015 –	Submission by NMDHB Public Health Service concerning contaminated land, wastewater disposal, and water supply
March - May 2016 –	First Commissioner (resource consent) hearing
May 2016 –	The applicant deferred their hearing in order to amend their application to reduce the number of residential lots and increase productive land.
July 2016 –	The revised application was submitted.
September 2016 –	Second Commissioner (resource consent) hearing.
December 2016 –	Final decision and conditions of the Hearing Commissioners. Ultimately there was approval for a reduced number but larger sized residential allotments, but the intended commercial buildings and residential apartments were removed.

[5] 130 residential allotments; 55 two-storey apartments; 2000 square metres of leasable commercial tenancy space; two stand-alone commercial buildings that will form the anchor of the commercial development; a new public through road between Aporo Road and Horton Road.

3.2 METHODOLOGY

3.2.1 Criteria for case study selection

The choice of the case-study site was based on three criteria:

- Preliminary evidence of a proactive public health intervention by PHU personnel that involved engagement with non-health decision-makers
- A co-operative relationship with key personnel in the PHU concerned
- Agreement with the Ministry of Health as to the suitability of the case for the project purpose.

In consultation with Ministry officials the Nelson Marlborough region was chosen. This combined geographical convenience to the Christchurch-based researchers, with a history of relationship between the unit and the lead researcher, and *prima facie* potential for a range of suitable cases. Consultation between the lead researcher and health protection officers (HPOs) at the PHS identified seven interventions that seemed to meet the criteria of potential to learn about primary prevention practices in environmental health.

The choice of the Harakeke consent processes was chosen by the researchers as a first case study for its apparent simplicity while representing a discretionary intervention to influence non-health decision making. It was deemed a good example of attempting public health influence at a consenting stage of development, and thus within the 'prevention' scope. In the face of a significant property development with potential health impacts there appeared to be no provision for public health officials to have input as independent public health experts. The unit chose to make its submission within a public process. The concerns of the PHS were aspects of environmental health: provision of safe drinking water, issues of waste water disposal, and contaminated land.

3.2.2 Development of data collection materials

The core enquiry concerned the context, decisions and process behind making a submission on the Harakeke application. Questions were generated to elicit the trajectory of their contributions, including establishing their role, how they became aware of the public health risk potential, information gathering, and the nature of their consultation, communication, eventual decision-making and interventions. Additionally, and in order to also canvass their opinions on the effectiveness (or not) of their involvement, further enquiry was made as to their perceptions of any specific successes, barriers or failures.

An interview guide was developed to serve as a prompt during interviews (see Appendix A). It was not intended that all questions should be posed, but that they might be available to enable deeper exploration of any issues raised spontaneously during conversation. They were worded in a way that would enable interviewees to also describe their practice beyond that directly associated with the case study (should pertinent information have come to light during the discussion).

3.2.3 Case study interviews

Data were collected from six interviewees representing (equally) Tasman District Council (TDC) (planner, environmental health officer, and resource scientist) and NMDHB PHS (health protection officers and a medical officer of health). Interviews were undertaken in April 2017. All interviews, excepting one, were undertaken in person and were conducted at the interviewee's work premises, the remaining interview was conducted by phone. Two participants chose to be interviewed together. Interviewees were encouraged to talk around the issues covered in the interview guide, following an 'in-depth interview' approach (Johnson 2002). Interview durations ranged from 50 – 100 minutes. Interviewees gave informed consent for participation; all were recorded and transcribed for later analysis.

Interviews were analysed for themes to understand enablers and indicators of good primary prevention practice for public health officials.

3.2.4 Document analyses

We have reviewed the PHS submission alongside the documents available from TDC relating to the hearing process and findings.

3.3 FINDINGS

The interviews demonstrated evidence of factors that were important in decisions, preparation and presentation of the submission at the heart of our case study. These factors are illustrated here under three themes: the importance of collaboration and relationships; experience, expertise and robust processes; and working upstream.

3.3.1 Collaboration and relationships

The population that the PHS covers is relatively small, compared to cities such as Christchurch and Auckland. The HPO's are, therefore, generalists working across a breadth of public health issues, although they do have their own specialist areas.

> *… although we do specialise, we also have to try and keep our generalist approach up because there's so many issues that come in that we run an on-call system for our heath protection officers after hours.* [Interviewee A]

Because the HPOs work as generalists they understand how important it is to collaborate with others with expertise in the issue they are dealing with. This approach was also reflected by the EHO who worked for TDC.

It was also noted that collaboration was best practice when the issue may be contentious.

Having strong relationships with people across an array of specialist areas and different agencies was seen as a key element to developing sound submissions on public health issues.

One element that supported those robust relationships was there was a very low turnover in staff across the agencies and therefore this enabled people to sustain relationships over a long period of time.

> *We try and maintain good relationships with the councils, we have contact with the councils over sewage spills, over water supplies and so the Public Health Service is known to the councils…they approached me because I had done quite a bit of work on the Picton one, so they knew of my existence. They also know of [HPO colleague] existence over in Marlborough and he's been there for years so there's a lot of – what's the word I'm looking for – not culture, but there's a relationship, if you like, that's been going on there for years, so we've built relationships up and so they know us.* [Interviewee A]

However, there were questions raised about succession planning, given the age and low turn-over of HPOs.

One way to overcome this was to introduce new staff to the current staff's professional networks.

> *I'm a great one for building relationships, talking to people, meeting people, putting a name to a face and around the whole thing of – we have our recreational water programme which is run by the councils every year over the bathing seasons. We've just had a meeting with their resource management scientists and ourselves and I introduced…the two new staff…so that [relationship] is passed on that way.* [Interviewee A]

3.3.2 Experience, expertise and robust processes

Public health personnel knowing their limitations in knowledge and skill area and bringing in other expertise was identified as a key element to writing robust submissions.

> *…we have another one of our analysts here is, he's part-time, three days a week, but he's an epidemiologist. He can add value to our service with his epidemiological skills in terms of using computerised programmes for disease outbreaks and all those. Pick up the data, feed it all in and that, and that's what I call those two examples of that epidemiologist and the policy analysts around submissions, they're what I call "adding value to the service we get". And so, for me, "patch protection", if you like, is bullshit, we're now in the 21st century and we have to have a skill set that gives us the best result.* [Interviewee A]

This was evident in how the Harakeke submission was developed.

> *Because I don't have [drinking water] qualifications. So I went to him for advice and he gave me advice, I pulled the story together, ran it by him for a peer review again and he said, "Yeah, that's all good." Our policy analysts, once I had written it up, I put it through them, the submission analysts, they had a look at this, you know, one of them has got a background in resource management and had a look at this, so I did that. Everything else around sewage disposal, there's not a lot of people here have got expertise on that, I'm the most – I've probably got the most confident on that. No one will have the expertise on the hazardous substances, in terms of the disposal to land, there's some more generalist stuff there, so I had to go and do homework on that and get my head all around that*. [Interviewee A]

Peer review was also seen as a crucial part of making the process of preparing the submission robust.

> *I reckon [what] helps [is], number one, not just one person involved from the Public Health Service, so there's … either a small team of two or a bigger thing, three or four, so you can be working … sharing ideas, checking, doing the peer review stuff,* [Interviewee E].

The lead HPO talked about how his depth of experience in the job also made him part of the 'process'

> *Does this concern us or not? A down and dirty risk assessment, if you like, and a lot of that comes back from my knowledge and what I have got, and to be able to do that. So, in terms of "the" process, if you like, I've been doing this for so long, I am the process, in a way, if that makes sense?* [Interviewee A]

Experience was identified as a factor in knowing when to write a submission or not on a public health issue.

> *…experience plays a fairly big part in it, so I think they were proposing bore water or a combination of things, bore water. So, immediately, you'd raise questions around, have they tested that water for, you know, chemical contaminants or biological, so do they know what they're actually going to be taking out of the ground, have they thought about that and, you know, are they going to put any treatment in? All that stuff that you've got a background knowledge [in]…* [Interviewee B]

Other factors that would trigger their interest in an application and consider submitting on it were noted, such as looking at legislation to see if the application breaches any laws and having dedicated staff who would scan the current situations to see if there was anything that they should be submitting on.

> *…we've had someone …, usually in our health promotion team, who's kind of scanning work coming up so they're actively looking for where there are opportunities where we should be submitting…to a council or to some national health issue. So a part of their job in health promotion was, if you like, submissions coordinator.* [Interviewee E]

In the case of the Harakeke submission, the applicant came to TDC and requested public notification, which was somewhat unusual. This is how it came to the notice of the PHU.

Some triggers or red flags that alerted the PHU to submitting on the Harakeke application were related to legislation.

> *And they have to be – sewage systems, to be successful, have to be well managed and there's obligations on owners to manage them, and so there's the formation of an entity to oversee that, and they were going to have a reticulated water supply for those apartments and the village, too. The same sort of thing, what's the quality and the quantity of water like, is it going to be treated, how's it going to be treated? And so there's all these triggers that were set off in terms of public health and legislation about how they were going to be approached*. [Interviewee A]

> *So I read through the clauses around drinking water and looked at what they proposed, or developers were proposing, in terms of drinking water. The first, yeah, just sort of working through, is what they're proposing lawful, for a start, under the Health Act drinking water provisions, from what they're proposing, do they actually come under the Health Act in terms of being a drinking water supplier? So, for example, an individual house which gets their own water off the roof, for example, or out of a bore isn't under the Health Act, it's under the Building Act.* [Interviewee B]

The council planner noted that the PHS submission on the Harakeke development was an excellent example as it contained facts in the evidence supporting their position and it was clear on what they were commenting on.

> *Look, the quality of information that is contributed is a key. Like, if we have good quality information that's backed up by good evidence then it makes the job so much easier for us because a lot of our job is just wading through things that we can - bits of information that we can or we can't use. So submissions like this [Harakeke submission], I found were excellent because it broke it down into sections of concern, broke it down to the paragraphs or the pages of the application that they were concerned about and he gave very specific points about the issues*. [Interviewee C]

The interviewees also talked about useful tools they had access to, to help them in making decisions and making submissions. One such tool for drinking water that was talked about often was the H2O Database. This database had a list of previous questions and answers that you could compare your question to and it also allowed you to enter a new question that you would get an answer to.

> *I should tease that out a wee bit as well, but sort of supporting that and feeding into that is what's called the H2O Inquiry website or database. So if we have a question around interpretation or a technical question around drinking water we fire through on this database. So you fill in the fields, ask what your question is, attach any documents to it, you fire that off…it goes to Allen and Clarke, who are contractors to the Ministry. They direct the inquiry according to its relevance.* [Interviewee B]

The same interviewee said they would love to see a similar database for other public health issues such as hazardous substances.

> *In terms of drinking water, I think the setup is good. A different area of my work, the hazardous substances stuff, especially the 1080 and whatnot, I would – and I*

proposed it – I would love to see a similar database inquiry system as we have for drinking water, but for hazardous substances….So I'd love to see that in there and I guess, similarly for other areas of work, as well, …but that would be in an ideal world, that sort of thing. [Interviewee B]

Interviewees noted other useful processes/tools that keep them informed and up-to-date for their work and with legislation they may need to draw on for submissions. These were the regular meetings they had in-house and also South Island wide and the on-going training they received.

Additionally they also had the Health Protection Forum that is held twice a year in Wellington which keeps them informed.

The DHB having policy positions on certain public health issues was seen by the HPOs as good practice. It was viewed as a useful tool/process when it came to writing submissions.

And so we went on to develop position statements for our Board or draft position statements for our Board to consider on a number of areas…[they] have all gone up to the Board and they discuss them, they might have tweaked them a bit but effectively accepted them and then from a Public Health Service point of view, if people keep making submissions and we're sticking to these position statements and using those position statements as, if you like, leverage, "hey, this is the District Health Board's position and we are voicing it in this submission", really that's easy to get the tick off so to speak, because they've already been approached. So I think that's actually quite good if the Board does have position statements on issues that can then be used by the Public Health Service and their work. [Interviewee E]

As well as an organisation having policy positions, establishing a high profile for public health with local authorities was also viewed as helpful.

So I think there's something about the importance of public health profile in the organisation and, if you like, it's back to those position statements and so on and how the organisation sees itself in the public health world. I know, for example, Christchurch DHB has got quite a high connection with the Christchurch City Council through the Public Health Service which is great, I mean…the organisations which see their role as having a strong community side to them, I think that's a really helpful thing. [Interviewee E]

Attending the consent hearing was perceived as an important part of the submission process, even though it did take up a lot of people's time.

The first hearing for that was a full week and the second one was four days, so nine days in a hearing and that's right but it does suck up a lot of time. But, yeah, it is kind of, I suppose, going forward for you guys if you do think that something does require that kind of, requires a certain degree of debate and discussion it's better to be there and be part of it. [Interviewee C]

3.3.3 Working upstream

Working upstream was used by interviewees to refer to pro-active initiatives in preventive health. Working upstream was viewed as good practice. It was thought that the Ministry of Health had pushed for working upstream and the interviewees were unanimous that this was good practice. One of the interviewees noted how, over the years, it had changed from a 'big stick' approach to a more collegial approach.

So, for them to go and meet those people, and to have a meeting and a discussion about issues …, that's how we like to work, and I think Canterbury work the same way. So, once upon a time, like, when I started this job in 1973, or whenever it was, it

was very much more "the" Department of Health and we came with the big stick, where now, it's more a collegial, if you like, approach. [Interviewee A]

And these working parties only meet three or four times, it might be over two or three years, but what they're doing is we're getting in, it's what we call "working upstream", we're working upstream with the council. We'll get what we want around public health in relation to the upgrades, in relation to effluent quality done, in on the ground on the working party, so when it comes to doing a, they have to apply for a new consent, instead of opposing it, or making a submission in opposition, we can actually make a submission in support. So we turn the whole process around to a positive rather than having to be a sort of a negative. [Interviewee A]

It was noted that working upstream required the willingness of the local councils to work with the PHU.

…we deal with three councils up here: Marlborough District Council, Tasman District Council and Nelson City Council. I think the trick, if you can work it, is a good relationship primarily with council staff and then, because of course the politicians turn over with them as do the chief executives actually. So a part of it does require a willingness on the part of council to want to work more upstream with public health units. [Interviewee E]

A barrier to working upstream was seen by HPOs in terms of workload that could lead them to being reactive instead of proactive.

So resourcing is one, so if you've got a lot on anyway you have limited time to put in say submissions. And so on one hand we know it's really good to work upstream and be proactive but you've got so much reactive work going on, clearly that's hard. And if you just don't have enough resources that is a problem. [Interviewee E]

This view of working upstream was also reflected in the response of the HPOs when they were asked whether they saw the submission they wrote for the Harakeke development as a success. They said they didn't see it as a success or a failure as they were just wanting the best public health outcome.

That's not really a success or a failure, that's just them changing their proposal. It may have been for the things that I said or it may not have been, it might be entirely different. So, yeah, I don't know if that's a success. I wouldn't call that a success, we're not trying to shut developments down, we're just trying to make sure that what they do has good public health outcomes. [Interviewee B]

It was unclear to the HPOs whether it was their submission that made the applicant withdraw the apartment and village parts of the application.

…the key thing for me, in terms of if it was a success, you could say, yeah, it was a success, but they made the problem go away, if you like. Like, it wasn't, yes, this is going to go ahead and you're going to be tied down to the conditions. It was, this was all too hard. The question I don't know is, was my submission and evidence one of the issues that made them pull the apartment and the wee village application, I don't know that. Yeah, there were other issues around that. If it was, we could say, yes, it's been a real success because it's made them change their thinking, but I don't know that. [Interviewee A]

However the planner from the council noted that, had that part of the application not been withdrawn, the PHU's submission would have been very useful.

So that was a bit of a different situation but in the end they scrapped that whole thing. But I suppose it would have been useful if they didn't scrap that for the Public Health component to have been there to talk about, I suppose, what they plan to do and why

> *it would or wouldn't work and here are some things that we suggest might work better or not.* [Interviewee C]

We did note what appears to be a structural constraint on how public health officials can influence up-stream decisions in a resource consenting process. A planner who analysed submissions and resourced the consent hearing was clear that central government agencies, including PHU personnel, would not be regarded by TDC as independent experts to serve the council and commissioners. They are seen as having a particular interest. This contrasts with the practice of TDC contracting external consultants as experts to advise a consenting process.

> *in terms of just a resource consenting perspective, we won't go beyond [our in-house EHO] to seek that information just like, for example, we won't go to DoC to get conservation advice because I suppose every - external departments and government departments have their own mandates and agendas to work for and I mentioned before we will always go to our in-house experts as our first points of call.* [Interviewee C]

When asked about how this compared with contracting external expertise, for example for engineering advice, the response was,

> *a memorandum or a contract with some of the engineering firms to provide specific stormwater advice, for example, and they're contracted by council to provide technical reviews of reports just purely on their expertise and their own scientific background and knowledge. But it is still contracting for council and, yeah, our first point of call and it is procedures and I think you'll find most councils around the country are the same.* [Interviewee C]

4. DISCUSSION

4.1 PUBLIC HEALTH AT THE TABLE

4.1.1 A matter of boundaries

We see the case study in this report as an example of practicing public health within a boundary not defined by a public health discourse; that is, within a setting that does not share public health assumptions, language and logic. The specifics of the case study may serve to accentuate this point. The study focuses on public health influence within the very particular processes required by the RMA. There was no formal voice or position for public health as of right. Public health was a voluntary voice among others in a context in which the determinative decisions lay with other actors in a system much broader than health. While the public health presence was welcome as a submitter, it was neither required nor given a distinct status. Indeed, our study suggests that it was seen as if it were an 'affected party' with a self-interest analogous to affected neighbours of the proposed development or a nearby business concerned about impacts on them.

4.1.2 Beyond personal motivation and credibility

The case study reported here demonstrates the influence of practitioners mature in their practice. The submission from PHS was led by a highly experienced HPO, confident in his own expertise and working in a supportive context of management and colleagues. He had a ready community of practice to draw on to supplement and peer review his own expertise. Long-standing relationships within PHS and between PHS personnel and TDC personnel contributed to the opportunity, decision-making and implementation around the submission. We found evidence that the HPO and his colleagues were trusted by officials at TDC. The case study shows public health personnel drawing on motivation, expertise and legitimacy that could largely be taken for granted because it had been internalised through years of experience.

In seeking insights to guide primary prevention practice for environmental health, however, such experience and confidence cannot be taken for granted. Explicit frameworks may be useful to guide public health decisions and interventions in situations of indirect influence on 'non-health' actors.

The current case, then, highlights the need for public health practice to have frameworks to support and guide interventions beyond the bounds of direct action and mandated power or influence.

4.1.3 Beyond HIA, HIAP, EIDM, EHINZ and DPSEEA

Established models for assessing health impacts of policies (eg, HIA and HIAP) offer useful frameworks for policy development to ensure that health implications are considered. Such models, however, envisage a 'non-health' decision-maker conscientiously factoring in health thinking as part of policy design and implementation. The case study reported here illustrates a situation in which 'non-health' decision-makers are constrained by a formal process that weighs submissions against planning and consent criteria set out in law and regulation. In considering a resource consent application the local authority and the hearing commissioners cannot be thought of as designing policy, they are implementing policy on what activities can be permitted. The burden of considering potential health impacts, then, fell to external submitters to the process. While it would be possible for a public health submission to the consent hearing to be framed as a HIA[6], or be guided by principles such

[6] The concept behind the terminology of 'framing' is that a case can be made using differing language and models, and that these constitute a 'frame' that influences how the subject is viewed. The idea

as HIAP, this case study suggests that such framing would not be considered a cogent submission within the terms of a formal process that favour argumentation closely aligned with relevant legislation, plans and regulation.

Models to guide decision-making in public health (eg, EIDM, EHINZ and DPSEEA) similarly would not provide an adequate way to understand or structure the public health activity described in this case study. Such models envisage a system in which they are used by decision-makers to choose and design appropriate interventions or actions. In the current case, the only intervention or action they could assist public health personnel to undertake was to make a submission to a distal decision-maker. No direct public health intervention was available. We do see potential for the use of EIDM, EHINZ and DPSEEA frameworks in helping public health services assess when to commit resources to indirect influence such as in this case study. DPSEEA may also be useful in locating and explaining the nature of a public health motivation in a given case. However, EIDM, EHINZ nor DPSEEA appears adequate to guide public health practice where no direct intervention is envisaged.

4.1.4 Sources of motivation, power, expertise and legitimacy

In the absence of a clear public health imperative and scope to act, public health actors need to discover and draw on sources of motivation, power, expertise and legitimacy that may not be immediately recognised by those they seek to influence. No 'universal' discourse validating a public health perspective is available. What is indicated is what Ulrich (2005) refers to as a way to "make it clear to ourselves and to everyone else in what way our evaluation [of the situation and what is needed] depends on a specific reference system that others need not share." For Ulrich, a 'reference system' simply means the thing that is being dealt with. His point is that different participants or affected parties view the system under discussion differently: "in many discussions we fail to achieve mutual understanding, since due to divergent reference systems, we actually speak about different subjects" (Ulrich 2005).

The framework developed by Ulrich to guide critical thinking about such issues is CSH, and was introduced in Section 2.3 above.

4.2 TOWARD A PLACE TO STAND

Public health actors, then, need to establish for themselves and others the basis of their input to 'non-health' decision-making, as this cannot be taken for granted, and may not be seen as relevant or cogent alongside other claims. In situations that provide no or little protected or agree place to stand, public health needs to establish a defensible position from which to make its contribution.

We have developed a provisional framework (Figure 2) for supporting indirect public health interventions. The provisional framework will be tested and refined in the light of subsequent case studies in the current project. The framework in Figure 2 draws on the critical heuristics insights of Ulrich (outlined above) and a framework for connecting science to decision-making published by Cash et al (2002; Mitchell et al 2006).

The work by Cash et al provides a way to understand situations of information transfer across disciplinary, jurisdictional and other conceptual boundaries. They find (Cash et al 2002) that

> "information requires three (not mutually exclusive) attributes – salience, credibility and legitimacy – and that what makes boundary crossing difficult is that actors on

draws on the metaphor of a picture frame or a window frame and the way in which the nature of the frame can influence the perception of the view.

different sides of a boundary perceive and value salience, credibility, and legitimacy differently."

And,

"effective boundary work involves creating salient, credible, and legitimate information simultaneously for multiple audiences."

Building on these insights we offer the provisional model, depicted in Figure 2 and explained below.

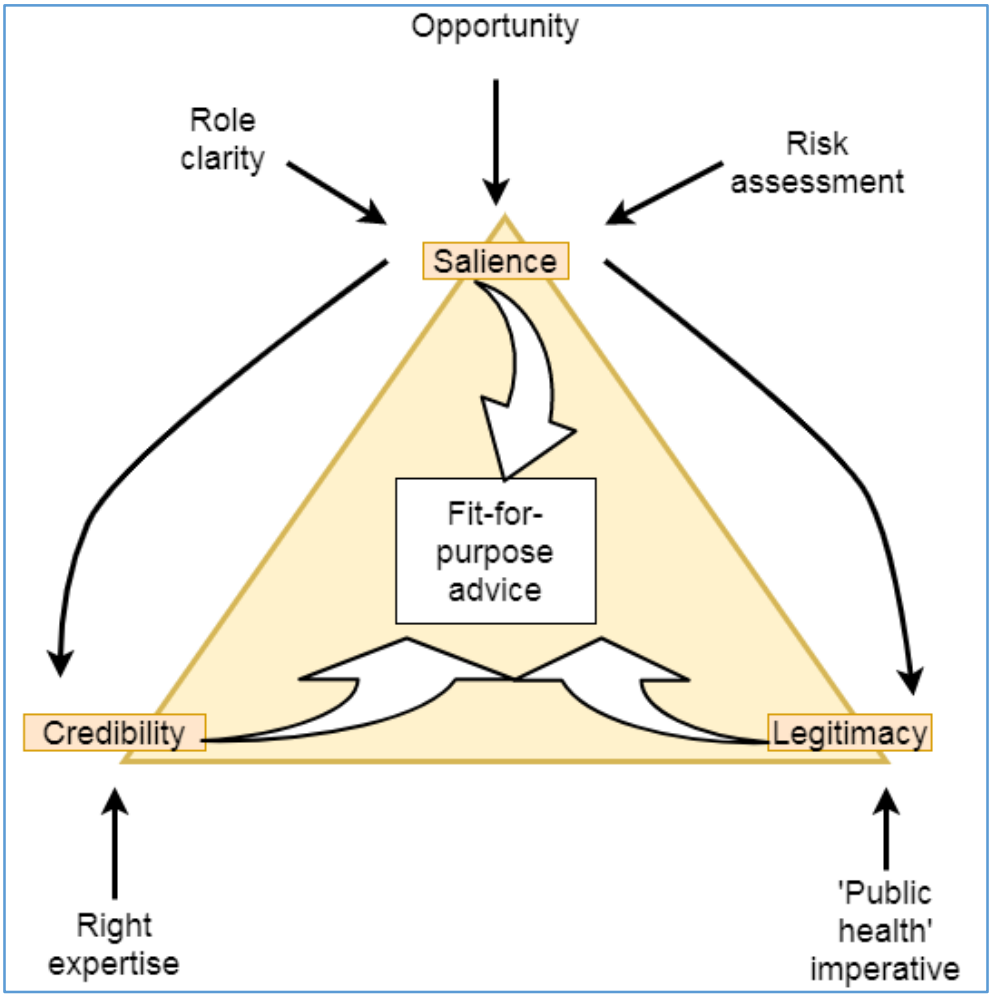

Figure 2: Provisional model for public health claims

4.2.1 Establishing salience

Salience refers to how relevant information is to decision-making bodies or other audiences (Cash et al 2002); in other words, what makes a particular claim or viewpoint compelling for consideration by an actor? There are at least two levels on which a public health claim needs to be salient: it needs to be salient to the public health actors themselves, and it needs to be salient to those they intend to influence.

In situations where public health assumptions about what is important may not be shared by other actors, public health actors need to assure themselves of the importance of their actions. In practice this means, at least, that public health actors can answer to their own

satisfaction three questions: is this recognisable as public health activity (role clarity); is the situation important enough (an assessment of risk and potential to mitigate the risk); and, is it likely we [public health actors] can exercise credible and legitimate influence on this situation?

Similarly, in such situations, public health actors need to convey to those they intend to influence the salience of public health activity. Without some sense of the relevance to the situation of a public health perspective, decision-makers may neglect or block opportunity for that input.

4.2.2 Establishing credibility

Credibility refers to the quality of information: "how to create authoritative, believable, and trusted information" (Cash et al 2002). Within any profession or discourse credibility is assessed by peers against agreed criteria. However, in a situation where public health is not the only or dominant discourse, public health actors need to establish their own credibility to the satisfaction of other actors. In our case study, credibility of the public health submission, from the perspective of the planning and consenting actors, was assisted by the formatting and style of the submission made. What was recognised by the TDC planning analyst was that the submission fitted the criteria and style that made it easy and clear to process. This had been achieved by the public health submitter by using a person with policy and planning experience as part of the preparation of the submission. The submission was also peer reviewed from more than one perspective within PHS. In other words, public health credibility was established by a mix of public health disciplines and by inclusion of planning and policy expertise. Public health expertise is not necessarily sufficient. For credibility sake it may need to be supplemented, and it will need to be communicated in ways that are compelling to the relevant decision-makers. The generic question about credibility is, what combination of expertise do we need to ensure that the public health advice we are giving is authoritative, believable and trusted both within our own profession and by those we seek to influence?

Key concepts, demonstrated in the case study, in establishing credibility are division of labour (according to experience and expertise), a community of practice (external relationships to consult), and depth and breadth of experience. It is likely that what matters is the combination of these factors sufficient to achieve credibility. Each factor has the potential to balance or compensate for other factors. In addition, PHU personnel access expert advice through Ministry of Health contracts (eg, with ESR).

Credibility, then, is the result of appropriately resourced and robust processes of division of labour, access to a wider community of practice, and access to a range and depth of experience.

4.2.3 Establishing legitimacy

Legitimacy refers to "whether an actor perceives the process in a system as unbiased and meeting standards of political and procedural fairness" (Cash et al 2002).

> "How problems are framed, how concerns are addressed and how policy options are considered all affect how the various decision makers view the system of connecting knowledge to action as more or less 'fair' (Cash et al 2002)

In the case study, the analyst at TDC did not accord the expertise at PHS legitimacy of independence. PHS was treated as an interested or affected party, not as an independent expert consultant or advisor. This contrasted with the willingness of TDC to engage commercial suppliers for 'independent' expertise (eg, engineering). We see this as a framing issue: how PHS is framed by TDC. But it may also reflect historic attitudes and tensions.

Public health actors need to establish legitimacy at some level with those they seek to influence. In the case study they were legitimate submitters, but lacked any special status.

We suggest that key to establishing legitimacy is a clear articulation of the public health imperative, and a transparent discipline of remaining true to that imperative. The role of public health in participating in 'up-stream' preventative activities needs to be publicly mandated and supported by central and local government.

4.2.4 Conveying salience, credibility and legitimacy

Having outlined a framework for the basis of public health input to 'non-health' decision-making, we note the importance of establishing that basis with the relevant audiences. Again, conveying appropriate salience, credibility and legitimacy cannot be taken for granted; it may require particular attributes and practices. We have identified some indications from the current case study; for example, depth of relationships, division of labour, community of practice and personal trust. Further work will be required before suggesting a more general list of attributes and practices useful in establishing the qualities of salience, credibility and legitimacy to underpin public health input in 'non-health' contexts.

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5. CONCLUSION

This report has described a case study and its findings and placed that in the context of selected literature. The case study has served to highlight key issues facing public health actors in New Zealand when they seek to influence decisions by others that may have public health implications. In particular, the case study focused on the preparation and submission of public health advice to inform a resource consent for housing and commercial development. The case shows the importance of accessing a depth and breadth of public health expertise, and framing that expertise in ways that can be readily considered by the 'non-health' decision-makers.

In the case study, the public health actors could not assume that their sense of salience and their credibility and legitimacy would be shared by others. While the case study shows public health actors preparing a submission with skill and presenting it well, the experience and processes required to do this cannot be taken for granted.

We have developed a conceptual model with a view to supporting and guiding public health actors in primary prevention activities such as that reviewed in our case study. The model features three core qualities that need to be established as a 'place to stand' for public health expertise to be received by 'non-health' decision-makers: salience, credibility and legitimacy.

Future case studies planned for the current project will test the conceptual model for its utility to guide and critique primary prevention practice for public health actors.

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APPENDIX A: INTERVIEW GUIDE

Case study - Tasman District Council *(NB: italic = comments just for us)*

We would like to start with a few general questions to introduce the PHU and your work, and then will then explore the casework you undertook on the new housing and commercial development, Harakeke. This will be followed by a few further general questions

General 1. Can you provide some background information about the PHU

a. Could you provide a little information about this catchment area – such as identifying features or any peculiarities (eg population numbers • socio-economic factors of those catered for • geography & travel demands on you • ease of recruitment to PHU and associate roles • more??)
b. What are your goals and priorities here in this PHU?

General 2. Can you provide some background information about your role here

a. What is your job title, professional education and on the job experience (years)?
b. Do you have any specific areas of expertise / interests?
c. Have you undertaken any additional education (special interest / general)?
d. What responsibilities are uniquely yours and which do you share with others (eg EHO?)
e. What is a typical day … how do you spend your time?

……..

Case study: Describe the Harakeke project

Can you tell the story of how the PHS reponse to the Harakeke application came about? – What made it important enough to work on? *We explore through discussion to answer the following*:

a. How did you become aware of the issue
b. Was this case unusual or have there been other similar examples?
c. How did you identify and understand the risks concerning provision of drinking water, issues of waste water disposal, and contaminated land? (such as existing knowledge, previous similar experience, PHU priority area, investigation / measurement data, 3rd party alert, etc.)
d. Which other parties did you collaborate with ... who, how and usefulness?
e. How did you decide what to do (applied existing knowledge, following procedure, guidance from Manager, collaborative decision (*with who?),* literature search, consulted knowledge broker) & did any priorities drive your behaviour?
f. Did you need external input such as data from other agencies (eg Landcare, DHB, other council), or specialist knowledge (eg legal, planner, hygienist) etc..?
g. Did you experience any barriers in the process, such as: (*describe)*
    i. Lack of access to information / people
    ii. Difficulties in decision-making
    iii. Difficulties emanating from the organisation (PHU/ DHB etc.)
    iv. Problems direct from the general public (eg social issues)
h. What eventually happened?
i. Did you get any feedback - was your intervention supported by the PHU / your employer / the community?
j. Was there an evaluation or review of PHU practice / protocol as a result of your experiences?
k. What were the successes / failures of this case … with the gift of hindsight could anything have been done in a better way?

How did this case fit in terms of meaning and significance with the rest of your work programme?

……..

Building on this we are also interested in gaining a little more information on the nature of 'prevention' in your work and how you operate.

General 3. How do you see your role in "prevention"?

a. What are your key areas of work? (plus those you're less frequently involved in)
b. What type of things are straightforward and go well and what are more of a challenge?
c. What influences the varied successes and failures?
d. How do these aspects fulfil your accountabilities to both the DHB & PHU – are their needs compatible to your way of working and what you are trying to do?
e. Could anything be done better / improved?

General 4. For your 'prevention' work how do you become alert to potential health hazards or risks where you need to act? (*and rough proportion of each?)*

a. Who would consult you directly for advice or to raise concerns (eg EHO, general public, knowledge broker, collaborating agencies)
b. What monitoring do you undertake and how?
    i. following a set down schedule of assessments and analysis (*how was/ is the set- down schedule / programme determined?)*
    ii. responding to data alerting you to problems … perhaps your own or those compiled by o/s agencies (*examples ??)*
c. *Any other means?*
d. Do you have any thoughts on how the 'alert' process could be improved

General 5. Which collaborations are most useful and why?

a. Who is your team in-house and third-party (such as outside agency)?
b. Who is easiest to deal with and why? (eg *personality, communication means, common purpose, supportive policy etc…)*
c. Does means of communication have any impact on success (eg F2F, phone, email, skype, shared message board / platform (*cloud*), others???
d. Do you have any thoughts on how 'collaborations' could be improved?

General 6. In deciding what to do which methods (below) do you use and in what order (and rough proportion *of each?)*

a. Follow procedures, legislation, Standards
b. d/w colleagues in house
c. d/w community members
d. access and assimilate research evidence
e. Use decision support tools
f. d/w a researcher / knowledge broker / trusted expert
g. d/w a 'network' or peer support groups
h. *any other means*

General 7. Regarding these methods – are there any reasons why some are any better / worse for you? *Example reasons*

a. Accessibility
b. Trust
c. Easier of understanding
d. Speed of gaining results
e. Traceability of outcome to support action
f. Suitability for the type of enquiry
g. Most up to date
h. any more reasons?
i. Do you have any thoughts on how decision-making resources could be improved?

General 8. What sort of range of intervention do you feel is within the remit of your role?

a. Respond to findings* (*generated in F) by giving advice / making plans etc. independently
b. Respond to findings* by working collaboratively with colleagues / o/s agencies to agree an action plan
c. Respond to findings* by reporting problems to your manager [for their decision]
d. [*more]*
e. Do you have any thoughts on how 'intervention' practice could be improved?

General 9. In deciding what to do are there any boundaries or restrictions that 'influence' your actions (such as)

a. Political influences
b. Community needs
c. Financial pressures
d. Concerning your organisation /workload / workspace / time/ capability / work culture etc.
e. Do you have any thoughts on how the impact of these 'influences' could be improved?

General 10. When you have made decisions or plans do you know whether or not they have been successful? Such as through:

a. Feedback on performance (in-house, external agencies, clients)
b. Data gathered through active monitoring
c. Evaluation
d. Other?
e. Does this match your own perception of 'success'?
f. Do you have any thoughts on how your 'feedback' role could be improved?

General 11. Are you ever involved in developing the strategies [protocols / guidance / procedures] that guide your work? (*through in-house consultation, mock-up exercises etc*.)

General 12. Are there any elements of DM and planning that you would welcome more input on? Such as:

a. Own education and understanding research
b. How to apply findings in practical terms
c. How to manage conflicting actions (perhaps when there are cross-purposes with other initiatives in terms of manpower, time, finances etc.)
d. How to deal with ambiguity / uncertainty:- when data is incomplete &/OR when there are no definitive actions
e. How to manage work conditions and pressures upon your job (eg targets and workload)
f. How to manage differing expectations upon you from different sources (eg Manager, PHU. MoH, outside agencies, general public …)
g. How to enhance public / client interactions
h. How to gain additional professional support
i. *Other*

[Intentionally Blank]

APPENDIX B: SCHEMA OF CRITICAL HEURISTICS

This is a checklist of boundary questions. Note: the second part of each question, beginning with 'That is, ...' defines the boundary category in question.

SOURCES OF MOTIVATION

(1) Who is (ought to be) the **client** or beneficiary? That is, whose interests are (should be) served?

(2) What is (ought to be) the **purpose**? That is, what are (should be) the consequences?

(3) What is (ought to be) the **measure of improvement** or measure of success? That is, how can (should) we determine that the consequences, taken together, constitute an improvement?

SOURCES OF POWER

(4) Who is (ought to be) the **decision-maker**? That is, who is (should be) in a position to change the measure of improvement?

(5) What **resources** and other conditions of success are (ought to be) controlled by the decision-maker? That is, what conditions of success can (should) those involved control?

(6) What conditions of success are (ought to be) part of the **decision environment**? That is, what conditions can (should) the decision-maker *not* control (eg from the viewpoint of those not involved)?

SOURCES OF KNOWLEDGE

(7) Who is (ought to be) considered a **professional** or further **expert**? That is, who is (should be) involved as competent provider of experience and expertise?

(8) What kind **expertise** is (ought to be) consulted? That is, what counts (should count) as relevant knowledge?

(9) What or who is (ought to be) assumed to be the **guarantor** of success? That is, where do (should) those involved seek some guarantee that improvement will be achieved – for example, consensus among experts, the involvement of stakeholders, the experience and intuition of those involved, political support?

SOURCES OF LEGITIMATION

(10) Who is (ought to be) **witness** to the interests of those affected but not involved? That is, who is (should be) treated as a legitimate stakeholder, and who argues (should argue) the case of those stakeholders who cannot speak for themselves, including future generations and non-human nature?

(11) What secures (ought to secure) the **emancipation** of those affected from the premises and promises of those involved? That is, where does (should) legitimacy lie?

(12) What **worldview** is (ought to be) determining? That is, what different visions of 'improvement' are (should be) considered, and how are they (should they be) reconciled**?**

(Source: Ulrich 2000, p.258, originally in Ulrich 1987, p.279f; quoted from Ulrich 2005)

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