

Embedding social science into public health and disease control: Informing best practice for the Australian Centre for Disease Control

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About the Collaboration on Social Science and Immunisation (COSSI)

An initiative of National Centre for Immunisation Research and Surveillance (NCIRS) and the University of Sydney, COSSI was established in 2016 to better inform Australian immunisation policy and practice with high quality evidence from the social sciences by supporting capacity in research and evaluation, collaborations, and translations.

Further information: <https://cossi.org.au>

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Executive summary

The Australian Government's COVID-19 Response Inquiry found that experts outside government lacked a clear pathway to share their expertise with decisions-makers, resulting in underutilisation of key data, including from behavioural and social science. To address this shortfall, the Inquiry called for the finalising of the Australian Centre for Disease Control (CDC) within the next 12–18 months, with specific prioritisation of in-house behavioural insights capability and for behavioural science experts to have a more prominent advisory role in future pandemics.¹

Inclusion of social science disciplines in the Australian CDC aligns with increasing global recognition of the importance of behavioural and social science expertise in effective disease control,² and the need for sustainable, coordinated, interdisciplinary approaches to public health management, both routinely and in times of crisis.³ To inform how social and behavioural science can be best incorporated into the newly established Australian CDC, we gathered evidence on global best practice.

We explored how countries with comparable health systems use social sciences in public health decision-making. We considered organisational structures, functional outputs, and expert reflections and suggestions. We synthesised data from:

- a desk review of the use of social sciences by public health agencies in 37 Organisation for Economic Co-operation and Development (OECD) countries
- eleven qualitative key informant interviews with government professionals and academics from ten countries who had insight into the use of social science in public health decision-making.

The approaches used in other countries and relevant actors' experiences during the COVID response illustrate what Australia should consider when embedding social science in the new Australian CDC.

Three organisational models of including social science in public health agencies were identified. All models were highly dependent on each country's context and successful to varying degrees.

1. **Embedded** (social science within the public health agency)
2. **Hub and spoke** (social science data collection, analysis, synthesis and sometimes translation conducted externally)
3. **Hybrid** (a combination of Embedded and Hub and spoke), which we see as the most appropriate model for embedding social science into the Australian CDC

Three pillars of important considerations for embedding social science into a newly established Australian CDC were also identified.

People – The right expertise and capacity for social science are essential and include personnel who can translate data into practical advice for decision-makers as well as a combination of subject-specific and methodological expertise. This requires extending beyond the biomedical paradigm and accessing interdisciplinary expertise, avoiding disciplinary silos and creating collaborative environments.

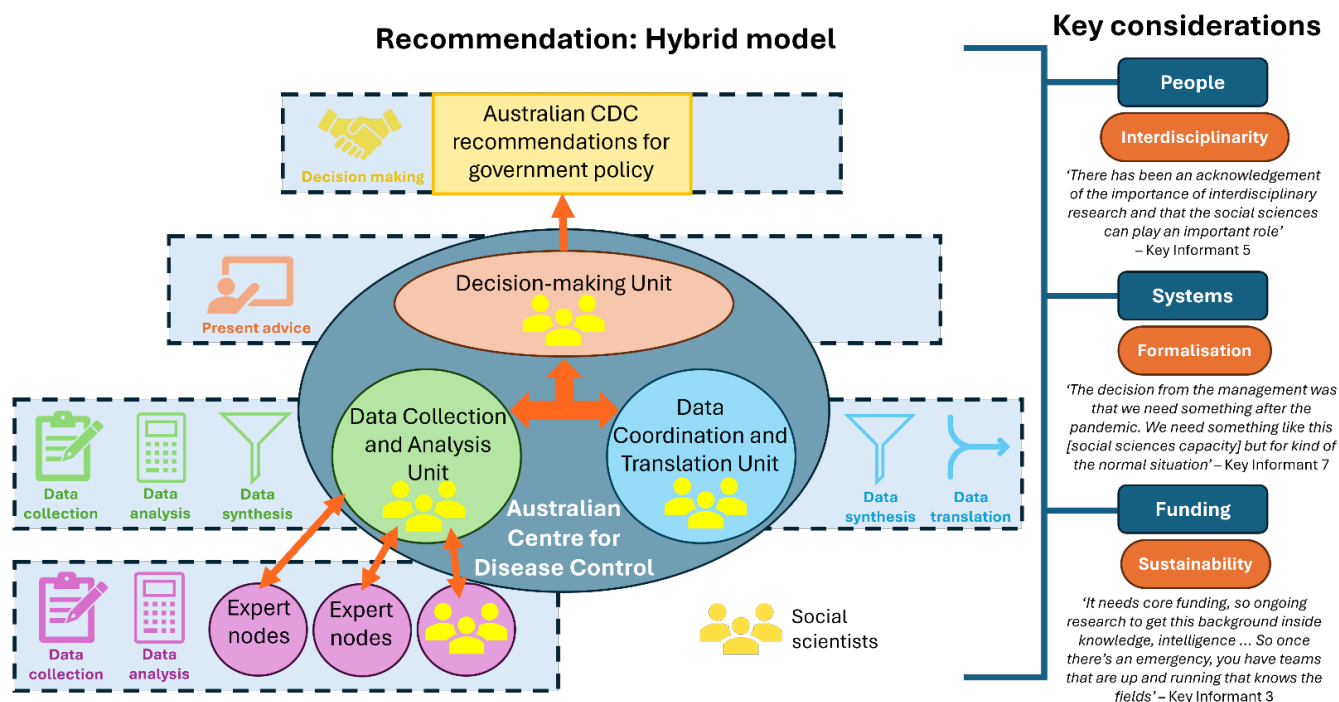
Systems – Formalised institutional structures and processes that embed social science are needed, including transparent data collection processes, and institutional relationships and systems to support a sustainable workforce with surge capacity. Inclusion of social science experts at the decision-making table is also key.

Funding – Secure, consistent funding systems that support and sustain a social science workforce and systems under both normal circumstances and during crises are essential.

Recommendations

Based on these findings, COSSI makes the following recommendations regarding the new Australian CDC (see Figure).

- 1. Employ a hybrid organisational model.** Embed social sciences expertise and data by leveraging existing expertise in external institutions across Australia. Maintain internal core functions to collate and synthesise social sciences data with other forms of data and translate to decision-makers.
- 2. Embed social science expertise** from a variety of disciplines at all levels of the data to decision-making process, alongside traditional biomedical expertise.
- 3. Establish processes** for data generation and sharing between external expert organisations and internal core functional units. Sustain workforce and systems to meet data needs in routine and emergency settings.
- 4. Formalise funding pathways** and establish agreements between external expert nodes and the Australian CDC. This will ensure sufficient capacity to collect and analyse social science data to formulate advice during both routine and crisis response.



1. Background

The COVID-19 pandemic challenged every country, putting extensive pressure on public health systems globally and demonstrating a clear need for nationally coordinated approaches to public health. Australia was the only OECD country lacking a national public health agency, with public health measures and advice differing across jurisdictions. This led to repeated calls from a spectrum of sectors for ‘consistent and timely advice from government’. The technical expertise required for a pandemic response was overburdened for extended periods of time, highlighting the need for a ‘more dedicated and sustainable model for obtaining expert guidance both routinely, and during crises’.³

In response, the Australian Federal Labor Government committed to establishing an Australian Centre for Disease Control (CDC), designating \$90.9 million in the 2023–24 Budget,⁴ and launching the first phase of the interim Australian CDC in January 2024.⁴ The scoping and consultation process identified the need to consider wider determinants of health in national public health policy, as well as the need for strong interdisciplinary collaboration to support comprehensive solutions to public health challenges.³

The critical importance of including social, behavioural and communication sciences in an interdisciplinary approach is recognised internationally. The behaviour changes needed at the individual and population level for successful disease management and pandemic response require more than clinical and epidemiological expertise alone.² Decades of research show the impact of social context and behavioural biases on individual and community actions and how messages are assimilated. An understanding of these can inform appropriate interventions and risk communication that encourages individuals and communities to engage in desired public health behaviours. Addressing these challenges necessitates a holistic approach to disease prevention and control that makes full use of all tools available, including social, behavioural and communication science.⁵

Social science is not a single discipline. It is a group of disciplines with attendant theories and methodologies that seek to understand how and why people behave and interact as individuals, communities and societies in and across different contexts.⁶ Social sciences contribute research methods that enable close examination and deep understanding of complex social systems. These methods are of key importance in providing contextual insight to the more quantitative methods of the biomedically-centered disciplines often used in public health decision-making. Relevant social science disciplines include psychology, anthropology, sociology, communication science, economics, political science and demography.

We use the umbrella term ‘social, behavioural and communications science’ (henceforth referred to as ‘social sciences’) to encompass the breadth of social science disciplines used in public health. Social science helps us to engage with three interconnected themes that are paramount to disease prevention and control: (i) how health and disease impact individuals, communities and society; (ii) how individuals, communities and societies behave as a result of those impacts; and (iii) how information is received, assimilated and acted on by those individuals, communities and society.

What is the best way to ensure that the Australian CDC's interdisciplinary model includes social sciences in its structure and function? How can social sciences be embedded in public health decision-making in ways that clinical science and epidemiology currently are? We have a unique opportunity to answer these questions in ways that will serve the health and well-being of Australians as we emerge from the COVID-19 pandemic and plan for the next pandemic.

We sought to identify global best practice for the inclusion of social sciences in the structure and function of public health agencies in contexts comparable to Australia. We then developed evidence-based recommendations on how to best include social science into public health and disease control decision-making processes of the emerging Australian Centre for Disease Control.

2. Methods

We used a combination of desk review and qualitative key informant interviews to identify global best practice for inclusion of behavioural and social science into the structure and function of public health agencies. We focused on comparable settings to assess the most appropriate approaches for Australian context.

2.1 Desk review

To assess how and to what extent other countries with comparable health systems use social sciences in public health decision-making and identify best practices, we reviewed key peer-reviewed publications and the grey literature for the inclusion of social science in 37 OECD countries' public health agencies.⁷ The review was conducted between 16 February and 20 June 2023 and updated regularly. The review included sources, such as government websites, published government reports, conference materials, and research organisation websites and materials, that gave insight into how social science was functionally or structurally included in the agencies' public health decision-making mechanisms.

2.2 Key informant interviews

To complement the desk review, we sought insights from key informants through semi-structured qualitative interviews. We purposively sampled international government and academic experts who worked in, and collaborated with, international public health agencies and were experienced in using social science data in public health decision-making. We sought participants from different types of public health agencies, from countries with formalised, highly developed organisations to countries with no formal mechanisms for using social science in public health decisions. For detailed methods see Appendix 2.

The key informant interview study was approved by the Human Research Ethics Committee of the University of Sydney, approval number 2022/837.

3. Results

3.1 Desk review

Eleven key peer-reviewed publications published between 1997 and 2023,⁸⁻¹⁸ 11 government or other agency reports published between 2020 and 2023,^{3,5,19-27} and one online recorded seminar from 2022²⁸ were reviewed, along with public health agency websites of 37 OECD countries. Of those countries, 19 reported using social science within their public health agency, although the extent to which it was used varied. Eighteen countries appeared to not include social science or had insufficient data to indicate whether social science data were used in decision-making.

3.2 Key informant interviews

Eleven participants from 10 countries were interviewed, including Canada, Denmark, Finland, France, Ireland, Italy, the Netherlands, Singapore, Sweden and the United States of America. Interviews were conducted between June and December 2023 and were of between 24 and 61 minutes in duration. Participants included three academics, seven government professionals and one individual with dual academic and government responsibilities. Seven participants reported having national level responsibilities, one participant had subnational level responsibilities, one participant had global level responsibilities and two had combined national and global responsibility levels. All participants drew on their experiences with their current and previous roles when discussing how social science is used.

3.3 Triangulated findings of desk review and key informant interviews

Triangulation of data from the thematic analysis of key informant interviews and the desk review provided a synthesised understanding of how social sciences are incorporated into public health decision-making in different international settings. We focused on eight countries as cases to illustrate a range of approaches with relevance to the Australian context. For a detailed description of these focus case countries, refer to Appendix 1.

The desk review included publications from before, during and just after the COVID-19 pandemic. Almost all publications recognised the importance of social science in public health decision-making, while simultaneously describing public health agencies' general failure to use it.^{8-12,16,17,20} The reviewed public health agency websites yielded variable levels of detail on how social science is used. Many did not necessarily capture or distinguish adjustments made in response to the COVID-19 pandemic, or any changes made since. Key informants' descriptions of their experiences in using social science varied according to both their role and the organisations in which they currently or previously have worked. While we didn't specifically frame interview questions around COVID-induced changes in the use of social sciences, many of the participant's narratives covered COVID-19 and lessons learned.

We organised our findings into three overarching themes:

- The data to decision process: six functional process points
- Three organisational structure models
- Key considerations for a new Australian CDC.

3.3.1 The data to decision process: six functional process points

We identified a 6-point common process for collecting and analysing social science data for routine and crisis public health decision-making (Figure 1), enabling us to compare how and where social science was used across different organisations.

1. **Data collection:** gathering social science data
2. **Data analysis:** examining data to gain social science insights
3. **Data synthesis:** compiling and connecting insights from analyses of multiple data types
4. **Data translation to policy advice:** putting social science data into an understandable, actionable form for policy makers
5. **Present advice:** assess, prioritise and communicate this advice to policy makers
6. **Decision-making:** come to a policy decision informed by social science advice

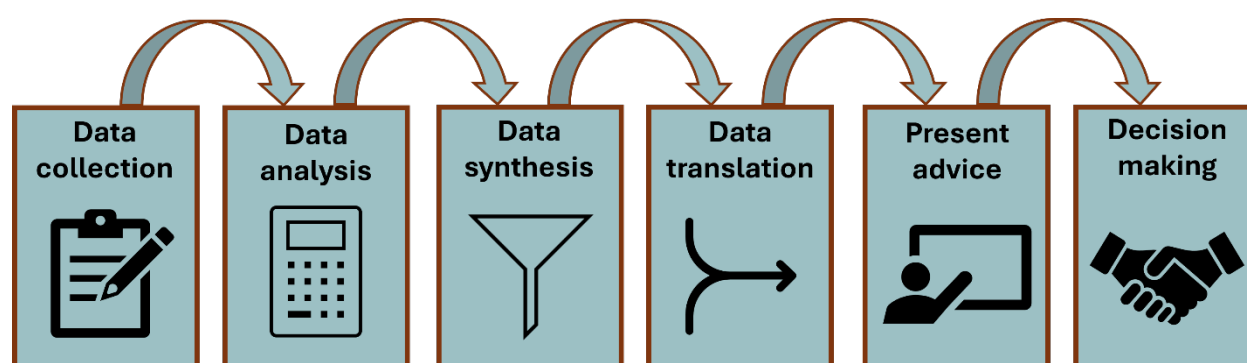


Figure 1. The data-to-decision process for using social science data in public health decision-making

3.3.2 Three organisational structure models

We identified three general organisational structural models used by different countries to include social science in their public health decision-making. We differentiated these models based on where the data-to-decision process points occur in relation to the structure of public health agencies (Figure 2).

1. **Embedded:** The entire social science data-to-decision process occurs within the public health agency. Data are generated and synthesised to support several functions, including provision of technical support to implementing agencies, program evaluation and policy advice.

‘It does evidence synthesis, also generates evidence, is the scientific body to inform public health decision-making’ – Key Informant 1

2. **Hub and spoke:** Social science data collection, analysis and synthesis occurs outside the public health agency, and often, an independent research advisory group will perform the translation to policy advice process steps, feeding directly into public health agency decision-making mechanisms.

‘The experts remained with their primary affiliation to their university, so they weren’t employed by the government. They weren’t part of political groupings, so they were able to retain quite a high level of scientific objectivity’ – Key Informant 4

3. **Hybrid:** A combination of the hub and spoke model and the embedded model. The data-to-decision process points can occur in any order inside or outside public health agency structures, rather than being conducted entirely within or mostly outside.

‘We [within the organization] want to have people with the methodological expertise from doing social sciences ... and then we are there, kind of to support the subject matters ... we’re kind of your internal partners in that sense’ – Key Informant 7

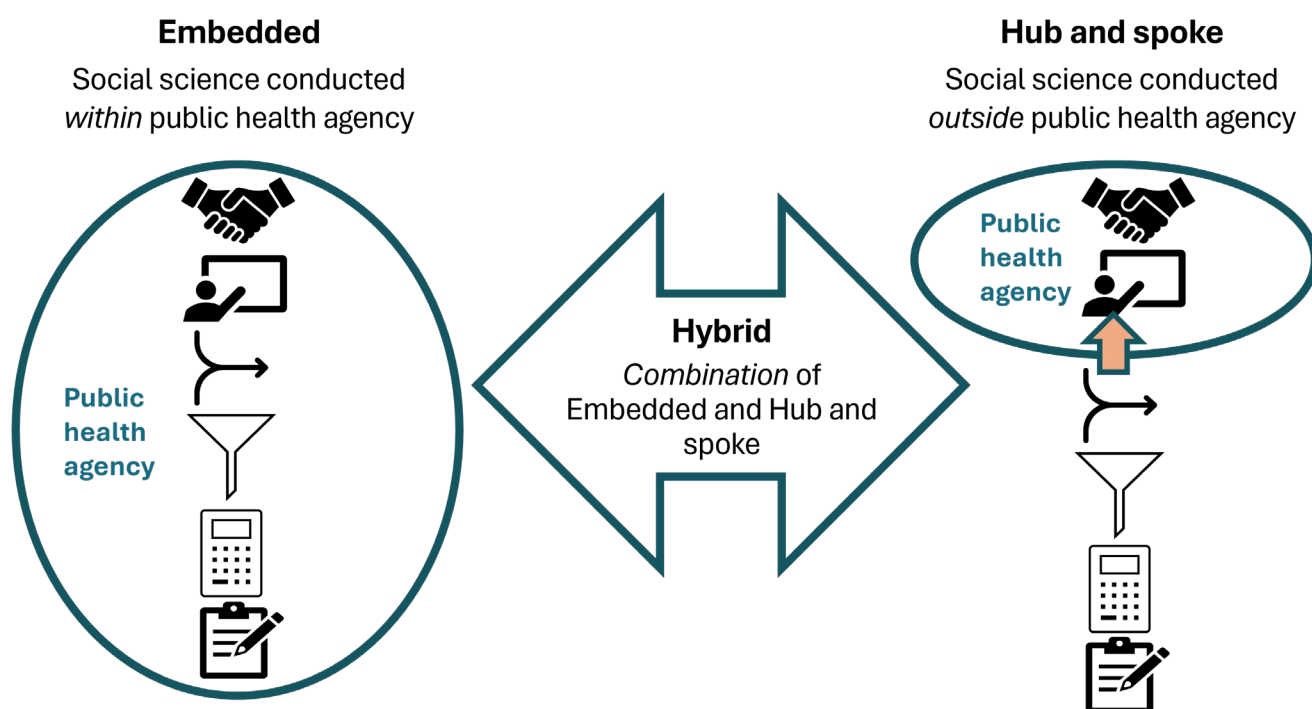


Figure 2. Three identified structural ways in which social sciences are embedded in public health decision-making

These organisational structures align with other research undertaken in the European context.¹⁹ de Vries and colleagues from the Netherlands National Institute for Public Health and the Environment defined the different organisational structures according to the following four 'routes' by which social science advice was generated: (i) rapid response behavioural science teams within government; (ii) independent scientific teams (with varying degrees of inclusion of behavioural science); (iii) units at independent public health institutions; and (iv) external advice through the wider community such as media, publishing and networking. The researchers also found that varying combinations of these routes can function at the same time or as hybrid forms.¹⁹

3.4 Key components needed for including social science in a public health agency

Three key thematic components were identified as required for sustained, effective inclusion of social science in public health agency structure and function: **People**, **Systems** and **Funding** (Figure 3). These themes were grounded in key informants' insights and recommendations, and the consistent recognition in the literature that social science is a critical yet often underutilised component of routine and emergency public health responses.^{8,20,26,28}

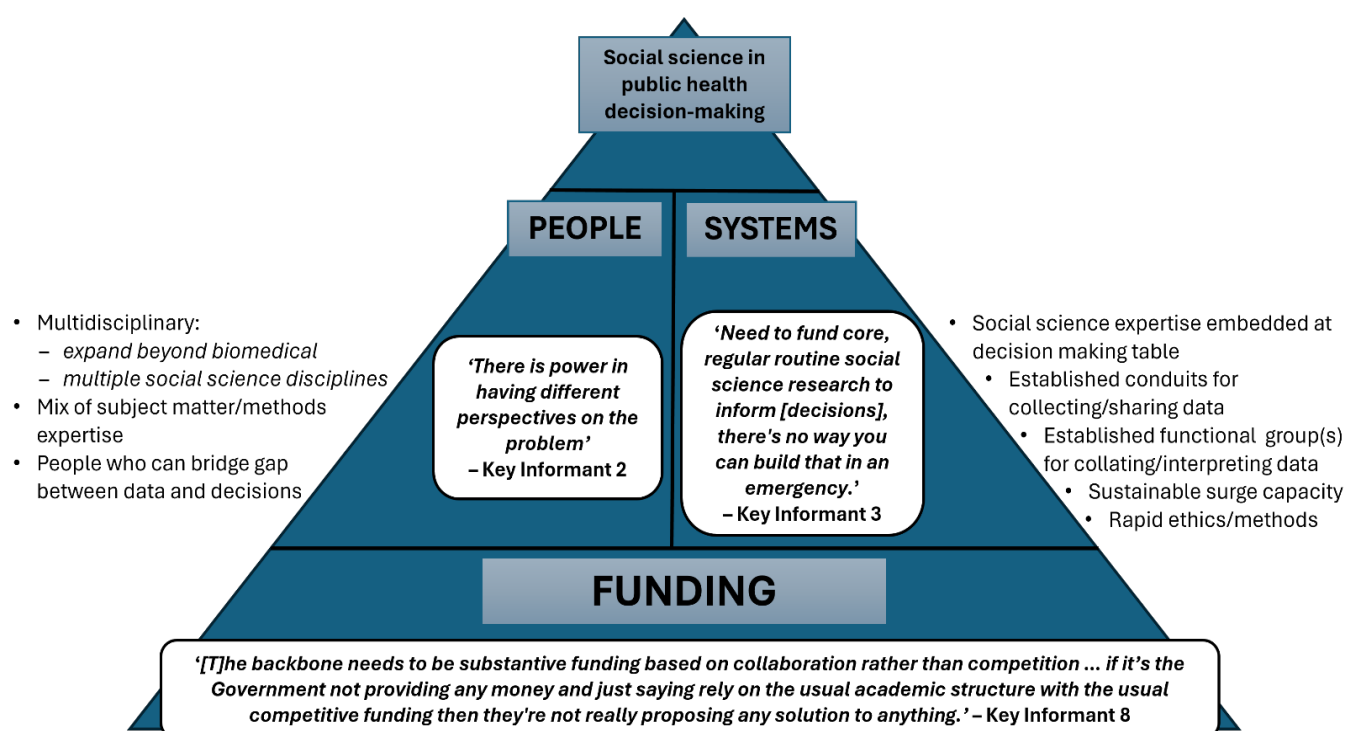


Figure 3. Key considerations for effectively including social sciences in the structure and function of a new public health agency

3.4.1 People – The importance of interdisciplinarity

The right expertise and capacity for social science can improve both routine and emergency public health responses.^{5,8,17,20} Social science covers a wide range of disciplines used by various professions including, but not limited to, health professionals, government agencies, community groups and academics. The following four 'People' considerations were identified as important: (i) include personnel who can translate data into practical policy advice; (ii) ensure a balance of subject-specific and methodological expertise; (iii) create collaborative environments that discourage silos; (iv) address the prevailing biomedical paradigm to improve the effective use of social science. These are presented in more detail below.

(i) Include personnel who can translate data into concrete, practical advice for decision-makers

It is important to include personnel with experience in translating research outputs into practical advice for decision-making.^{19,20}

‘There’s so much diversity within the discipline that I find that often the research oriented social scientists are less comfortable thinking about the application or the translational pieces’ – Key Informant 2

Public health research is often highly applied. Key informants favoured skills-based hiring of those with experience in applied research across a variety of disciplines, as these individuals are best suited to synthesise and translate data from multiple fields. However, participants acknowledged the scarceness of people with such broad-ranging experience and that a team-based approach can produce similar results.

‘So ideally, you have synthetic [thinking] people who have that applied experience. If you don’t have that, I do think that a team-based approach is the way to go. Because there is power in having different perspectives on the problem’ – Key Informant 2

Organisational capacity to synthesise data from wide range of disciplines and methodologies enables institutions to develop more targeted and sustainable public health solutions.¹⁹

(ii) Ensure a balance of subject-specific expertise and social science methodological expertise

There is a strong need to balance the varying skillsets of social science personnel within public health agencies. These include *methodological expertise* (different social science methods and approaches applicable to multiple disciplines) and *subject-specific expertise* (knowledge on social and behavioural aspects of specific public health topics).^{10,17,24} Very few countries use subject-specific expertise only. Most use either solely methodological expertise or a combination of both for smoother integration of social science, particularly in advisory capacities.

‘People with both the methodological expertise and the subject expertise, I think people like that would be ideally placed to ... working within an advisory role’ – Key Informant 4

Subject-specific expertise tended to be used for specific ongoing health challenges, such as HIV/AIDS and tuberculosis. Its use in some countries also increased during and after the COVID-19 pandemic. However, this was dependent on factors such as country size, level of health system centralisation and expertise capacity. For example, smaller countries like Ireland were well connected via existing professional networks and had capacity to engage subject-specific expertise through existing institutions such as the Health Behaviour Change research group.^{5,20}

When specifically asked what kind of expertise is needed to embed social science into a public health agency, key informants expressed a need to balance both qualitative and quantitative data skills:

'I think I would go with a person who has a pretty broad methodological skill set and able to work both quantitative and qualitative because you need both. I think to really get proper evidence' – Key Informant 5

While quantitative methods such as surveys were routinely deployed in many countries, qualitative research was lacking, particularly during the COVID-19 pandemic. This was put down to limited capacity, time and expertise,⁵ a sentiment shared by Key Informant 3:

'A better recognition of the importance of qualitative research approach within public health [is needed] ... but there's not many people that do have the technical skills to apply such research' – Key Informant 3

(iii) Create collaborative environments that avoid disciplinary silos

There is a vital need for public health agencies to understand the complex inter- and intradisciplinary nature of the social sciences as a field.^{6,8,13} Echoing the literature, key informants argued that including various social science disciplines alongside biomedical disciplines and using integrated data generates more holistic, effective outcomes.^{8,19,24} Key Informant 9 conveyed how including a range of disciplinary lenses can contribute meaningfully to public health decision-making:

'[You need] someone who's interested in attitudes and behaviours, whether it's a sociologist, an anthropologist, an economist, a psychologist, what matters less is the discipline. What matters more is whether that person is open to a range of disciplines that talk about this issue' – Key Informant 9

Similarly, Key Informant 1 described how current pandemic responses could be made more holistic by synthesising various social science disciplines:

'It's not considering the deep, rich context of people's lives and how that influences their reactions to things, just not seeing things in, like, the most holistic manner' – Key Informant 1

Informants also conveyed the importance of institution-builders to 'try to avoid creating silos' (Key Informant 6) to produce more collaborative outcomes, as well as suggesting 'to mix people so that you don't get one section on HIV and other section on alcohol abuse.' (Key Informant 6). One informant's organisation has a behavioural insights team that collaborates with individuals and teams in different departments to better integrate social science into their work.

'If you have kind of questions or plans or you would like to collaborate within something a project or an activity then you're able to come and talk

to us. I think this is something that we will try out now, because we like to be more effective with reaching people’ – Key Informant 7

Participants also noted the importance of open-minded flexibility on the part of individual interdisciplinary team members. The literature confirms the strengths of viewing an issue through multiple disciplinary lenses rather than trying to fix it with a single field's solution.²⁴

‘An interdisciplinary team is key within public health, so if you are too sticking on your metres and your ways and your theories, it won’t fly within public health. You need to adapt to just be able to understand other colleagues’ perspective’ – Key Informant 3

(iv) Address the prevailing biomedical paradigm to improve the effective use of social science

The dominant biomedical paradigm is a strong barrier to effective use of social science in public health agencies.¹⁸⁻²⁰ Many key informants experienced issues working in organisations that placed a higher value on expertise such as epidemiology, biostatistics and immunology, compared to social science. As Key Informant 3 noted:

‘Public health is really driven by epidemiology, big data and quantitative science’ – Key Informant 3

Some organisations described by key informants and the literature appeared to have a limited understanding, and therefore limited inclusion, of social science.¹⁸⁻²⁰

‘If you just happened then to get a lead in that role, who is, you know, maybe much more narrowly focused from more of a traditional medical background, then the social science stuff will just be ignored’ – Key Informant 4

Other key informants felt that decision-makers did not value social science as they were unaware of the nuanced understanding it brings to elevate pandemic preparedness and response measures.

‘The role of interdisciplinarity is to point to the blind spots of the medical profession’ – Key Informant 5

The literature and key informants consistently reported resistance by decision-makers to using social science.^{5,18-20} Some believed decision-makers considered it too time consuming to produce data that keep up with rapidly changing public health circumstances.

‘I’ve attended 2 or 3 [outbreak management meetings] and it was very inclusive, and people were very much invited, but inclusive for the biomedical professions, right? Because they thought, it’s already complex enough what we’re doing. If we also get the anthropologists, the sociologists, the ethicists, the psychologists involved, we’re never going to be able to provide advice in 3 or 4 days’ time’ – Key Informant 8

The combined undervaluing of social science data and perceived timeliness issues limited government and institutional investment in mechanisms that could address the latter.^{5,28} The continued omission of social science in ‘a very medical model type place’ (Key Informant 1) and corresponding policy landscape furthers current knowledge gaps.

Prior to the COVID-19 pandemic, most organisations used minimal to no social science data.^{8,19,20} However, some informants detailed positive momentum toward including social science during and after the pandemic, a sentiment echoed in literature.²⁰ It was noted that the requirement for an open-minded, interdisciplinary approach to embedding social science will allow for comprehensive public health responses.¹⁸

‘Whatever happens in the pandemic is definitely not only dependent on biomedical circumstances, but very much on human behaviour and perceptions and interaction. And all this kind of made them understand that it’s not only about the virus as such in the scientific sense, but how the virus is carried in society and all the complexities that have to do with human behaviour’ – Key Informant 7

3.4.2 Systems – Formalisation of enabling processes

The need to formalise processes to embed social sciences are multifaceted. Key informants and the literature identified the following four ‘Systems’ considerations as particularly important:^{19,20,22} (i) formalise relationships and data collection systems with external partners; (ii) connect social science data and expertise more closely to decision-makers; (iii) ensure transparency in the policy development and recommendation process; (iv) support a sustainable workforce and surge capacity. These are detailed below.

(i) Formalise institutional relationships and data collection processes to ensure crisis surge capacity

Many participants in our study and in others^{19,22} suggest that when using external experts in organisational models, programs must be resilient and equipped for surge capacity:

‘It needs core funding, so ongoing research to get this background inside knowledge, intelligence, [and] the context [of] that different group, the programme functioning. So once there’s an emergency, you have teams that are up and running that knows the fields’ – Key Informant 3

Formalised processes should include continuous data collection and research that could be upscaled during a crisis, rather than being reactive.^{19,22} Greater understanding of the public’s baseline attitudes is important for pandemic preparedness. Formalising this can ensure strong, tailored and quicker surge capacity in emergencies. Policy and program creation can also be improved when grounded in easily accessible and up-to-date data, as prioritised by the World Health Organization.²¹

‘We have a standing system in place to do clearance on data collection, both internally and externally, before we do this, especially this registry fusion kind of things’ – Key Informant 6

(ii) Bring social science experts to the decision-making table to embed social science in policy decisions

A key lesson from the pandemic was the need to formalise the connection of social scientists with decision-makers to translate data into advice for policy.^{19,20} Key Informant 8 described the situation in their country with the unfolding COVID-19 pandemic.

‘This is where you really need our knowledge and skill set, but it wasn’t embedded in a crisis structure.’ – Key Informant 8

Governments accessing social sciences expertise employed multiple approaches. These included:

- informal use of individual experts
- adapting existing functional groups (which were later stood down)
- formalising new mechanisms created in response to the COVID-19 pandemic for sustainable inclusion of social science in ongoing public health decisions,^{19,22} described by Key Informant 7.

‘The decision from the management was that we need something after the pandemic. We need something like this [social sciences capacity] but for kind of the normal situation’ – Key Informant 7

A strong finding was the importance of formalising how social science is integrated into decision-making structures. Depending on organisational structure, this formalisation could be through internal or externally located advisory groups, or partnerships with academic institutions.^{19,20,23} Regardless of mechanism, participants emphasised that social science experts who can translate and communicate social science for policy decisions must be at the decision-making table.^{8,19}

‘There should be a role for behavioural sciences at the director level ... You need people who understand the core behavioural science but also can speak in a way that other people understand what it means and how you use it’ – Key Informant 1

(iii) Create systems for a sustainable workforce for usual operations and crisis response

Participants noted difficulties balancing agendas when working as an external expert and for a government public health agency, especially in a crisis. They described working voluntarily to advise decision-makers, a loss of boundaries around their work hours (as this workload was often additional to their usual paid work) and experiences of decision-makers expecting this workload to continue after the pandemic.

‘During the pandemic ... I don’t think I missed any of the meetings. I might have missed one, but that’s really exceptional and others [experts] were the exact same ... So, I feel that it’s probably unrealistic to expect that level of commitment ... I think the rewards and the contingencies would need to be just a little bit different to motivate people’ – Key Informant 4

Participants who were external experts to government public health agencies during the pandemic reported an initial widespread willingness to contribute. However, they also experienced professional burnout due to sustained high level of commitment and lack of appropriate compensation or support systems. The rapidly evolving pandemic compounded short timeframes set by government.

‘A lot of people from academia were willing [for me to] call them up and say, I need a survey on drivers of adherence behaviours, and you’ve got a lot of experience. Can you help out? When do you need it? Well, actually, tomorrow noon’ – Key Informant 8

The need for formal funding agreements with external institutions is essential for sustainable working arrangements during usual operations and for surge capacity during a crisis (see Funding section below).^{19,23}

‘If I were within a group within the Department of Health that could be highly compatible with my current work, I suppose I would need some kind of buyout time to do that ... I could be bought out a third of my time and so relieved of some teaching commitment or whatever here, I would be delighted to spend time contributing to a group like that’ – Key Informant 4

(iv) Build transparent systems to increase public trust in recommendations

Decision-making is not purely data driven. Politics and competing agendas of different stakeholders impact the preparation and execution of policy advice. The literature^{19,20,22} and key informants' experiences reflect this:

'I wouldn't say that it's because they don't understand what we've been delivering. It's more about that politics dictate that it's not possible to do it, or that it needs to be done in a slightly different kind of way' – Key Informant 6

These factors underscore the need for transparency in who formulates recommendations and how, to help maintain public trust in and adherence to recommendations. Maintaining public trust and scientific integrity were crucial lessons from the pandemic response. Politics and misinformation compounded difficulties in government representatives communicating scientific uncertainties. Key informants recounted politicians saying they were 'following the science' to justify their decisions while avoiding accountability. Extreme examples included politicians completely disregarding scientific advice in favour of propagating misinformation driven by personal belief or potential personal gain.²² Key informants related personal experiences in this regard:

'Sometimes I've felt that decision-makers wanted to turn political decisions into scientific decisions, and we were at times fighting against that' – Key Informant 5

The respective responsibilities of political and scientific roles (including social science experts) in the process of policy recommendation and decision-making should be defined and transparent.²²

3.4.3 Funding – An important enabling process that must be consistent

Social science data are historically less well-funded than biomedically focused disciplines, despite being recognised as integral to disease control and prevention.^{13,28} Funding sources are connected to the organisational model. For example, hub and spoke and hybrid models that rely on academic institutions frequently fund social science work through external funding bodies, often competitively awarded grants.^{12,23,24}

The source of funding can affect strategic agenda setting, particularly if external funding is used for government outputs:

'If you have the luxury of working with institutional funding then of course you can be as strategic as you want to, but if you're not, if you're in this hybrid version where a part comes from the Institute and then the big part comes from external funders, then you need to be more aware of what is strategic and what is opportunistic' – Key Informant 7

A lack of formalised funding restricts academics' ability to balance conflicting priorities while working for government. Public health agencies require specific, rapidly produced outputs which often do not meet criteria for competitively funded research nor conditions for professional development.^{19,23}

The functional instability that arose from precarious institutional funding was also noted. Temporary processes established during the pandemic were often dismantled once the immediate threat passed. Funding was reallocated elsewhere, and newly developed capacity was lost:

'The funding's drying up, the supports drying up, the systems that were put in place and no longer there are being dismantled' – Key Informant 4

Losing this capacity means systems cannot immediately scale up to integrate social science data into future emergency responses.^{19,23}

4. Recommendations for the Australian context

Based on the triangulated findings from our desk review and key informant interviews, COSSI make the following recommendations for incorporating social science into the Australian CDC. These align with global best practice and are tailored for the Australian context.

1. Employ a hybrid organisational model. Embed social sciences expertise and data by leveraging existing expertise in external institutions across Australia. Maintain internal core functions to collate and synthesise social sciences data with other forms of data and translate to decision-makers.

A hybrid model will play to Australia's public health strength of a vast and deep research landscape. The use of external expert nodes, internal data collation and synthesis functions, and decision-making teams will create a strong organisational model (Figure 4).

Expert nodes would include research institutions and universities with subject-specific social science expertise and research portfolios. The expert nodes would generate, analyse and share independent research with internal functional groups within the Australian CDC that coordinate data for policy decisions.

An internal data collection and analysis function would collect, analyse and synthesise data obtained from internal and external data sources. An internal data coordination and translation function would synthesise and translate outputs from the data collection and analysis function, creating recommendations to decision-makers that are easily comprehensible and justified. These will then shape policy recommendations for government.

These functional components will need to be set up in a way that avoids silos in favour of interdisciplinarity at all levels; facilitated by straightforward and swift progression from data to decisions; and transparent and explicit in the respective roles of science and politics in how recommendations are formulated and acted upon.

2. Embed social science expertise from a variety of disciplines at all levels of the data to decision-making process, alongside traditional biomedical expertise.

External expert nodes with subject-matter experts from various social science disciplines should be included alongside other biomedically-focused expert nodes. The Australian CDC's internal data collection and analysis functions should be staffed with various disciplinary and methodological social sciences expertise. This expertise should include social psychology, behavioural and political sciences, anthropology, sociology and communication sciences, and a mix of strong qualitative and quantitative methodological skills.

The Australian CDC's internal data coordination and translation functions should similarly include a range of social science disciplines and methodological expertise, as well as

experts in institutional systems who are well connected to the Australian research landscape. These relationships with other units within the CDC and to external expert nodes need to be formalised to ensure they can provide surge capacity in a crisis.

The decision-making function within the CDC also requires an interdisciplinary team that includes social science expertise as a permanent component to ensure policy recommendations take into account social attitudes and practices.

3. Establish processes for data generation and sharing between external expert nodes and internal core functional units. Sustain workforce and systems to meet data needs in routine and emergency settings.

There should be formalised processes between the expert nodes and functional units within the Australian CDC to meet data needs of policy makers both in routine circumstances and times of crisis. This process should include formal conduits between all groups to ensure clear communication and balance of agendas between academia and government. This will also allow for better management of surge capacity if greater amounts of, or more targeted, data are required.

4. Formalise funding pathways and establish agreements between external expert nodes and the Australian CDC. This will ensure sufficient capacity to collect and analyse social science data to formulate advice both during routine and crisis response.

Formalised funding pathways must support external experts to sustainably allocate their time to providing advice. This support will assist in balancing competing priorities between independent funding agencies and Australian CDC research agendas. This balance could be reached by leveraging existing competitive funding schemes (e.g. targeted NHMRC calls in response to specific CDC needs), or by providing parallel funding for baseline ongoing data collection, analysis and advice that can be quickly stood up as part of a crisis response.

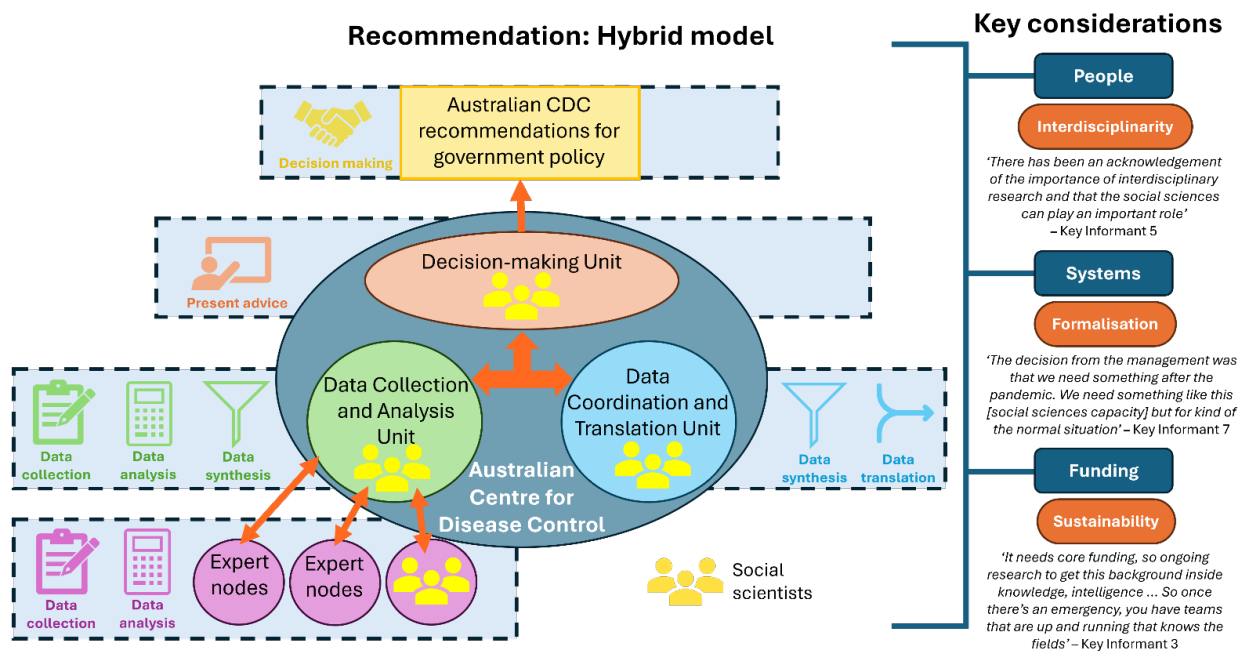


Figure 4. Recommended Hybrid organisational model for including social sciences in a new Australian Centre for Disease Control

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Appendix 1. Focus case country descriptions in the context of key considerations for the Australian CDC

The information contained in these tables is based on publicly available websites, peer reviewed and other publications, as well as from key informant interviews. For some countries, this information may be incomplete; however, efforts were made to confirm the accuracy of each table with the relevant key informant interview participants.

Canada – Single province also examined in detail (Québec)

| Public health system structure, decision-making and population | Organisational model of social science use in public health decisions | People <i>The social science expertise and capacity described</i> | Systems <i>The systems and processes described for incorporating social science data and expertise in the public health decision-making process</i> | Funding <i>The funding sources described for supporting social science expertise and data use</i> |
|--|---|--|---|---|
| <ul style="list-style-type: none"> • Population: 39.06 million (9.1 million in Québec) • Structure: Highly decentralised at the national level, with various 'regionalised' degrees of centralisation among provinces and territories.²⁹ On a national level, the Public Health Agency of Canada (PHAC) takes an advisory role towards provinces. Provinces and territories make the majority of the decisions through various local or regional organisations. | <ul style="list-style-type: none"> • Hybrid at the national level^{30,31} • Embedded in province studied, Institut national de santé publique du Québec (INSPQ).³² | <ul style="list-style-type: none"> • National level (Behavioural Science Office, PHAC): Behavioural scientists with expertise in policy analysis, quantitative and qualitative research, and knowledge translation³³ • Provincial example: Behavioural science experts integrated into provincial government public health agency groups that generate data to translate into policy responses using skills in both qualitative and quantitative methods³⁴ | <ul style="list-style-type: none"> • National level: Behavioural Science Office established by PHAC,³³ and behavioural science research partnership with the Privy Council Office.³⁰ These data are shared through collaborative relationships with academia and government organisations. The federal government also funds a Canadian Research Network comprising independent researchers who complete agendas set by PHAC, with a similar network established for future pandemic preparedness. • Provincial example: INSPQ Bureau of Population Health Information and Studies³⁴ produces program evaluation on deployment, what groups are missed, barriers to acceptance. Role is to advise government not to legislate. | <ul style="list-style-type: none"> • Government funded (both national and provincial). |

The United States of America

| Public health system structure, decision-making and population | Organisational model of social science use in public health decisions | People <i>The social science expertise and capacity described</i> | Systems <i>The systems and processes described for incorporating social science data and expertise in the public health decision-making process</i> | Funding <i>The funding sources described for supporting social science expertise and data use</i> |
|--|---|---|--|--|
| <ul style="list-style-type: none"> • Population: 341.60 million • Structure: Health system is decentralised, with state health authorities primarily responsible for public health with varying levels of delegation to local jurisdictions.^{10,35} A central Federal public health agency, the US Centers for Disease Control and Prevention (CDC)³⁶ detects and responds to health threats, and coordinates and encourages the use of data in public health assessments and decisions.^{10,37} | <ul style="list-style-type: none"> • Embedded | <ul style="list-style-type: none"> • For almost three decades, social science experts who are focused on specific diseases and health issues have been integrated into multiple departments/technical areas throughout the CDC.¹⁰ Social science disciplinary expertise includes psychology, sociology, anthropology, health communications and economics.³⁸ No formal, centralised governing mechanism for social sciences exists across the organisation; however, a Behavioral and Social Sciences Working Group disseminates social science information throughout the organisation.³⁹ • An internal Advisory Committee to the Director (ACD) was established in 2022 to collect advice from external partners to advise CDC Director on organisational priorities.^{40,41} The ACD consists of several working groups, including the Communications and Public Engagement Working Group (CPEW) that convenes subject matter experts in communications, public health science and practice, community engagement, and behavioral science/behavior change campaigns.⁴² | <ul style="list-style-type: none"> • Social science data generated within specific technical areas of the CDC through cooperative agreements, grants and partnerships with state and local health and private organisations.⁴³ • Through these technical areas and partnerships, external stakeholders can apply social science data to the CDC Policy Process for specific policy issues, noting that US federal law prohibits lobbying related activities by the CDC at the federal, state and local level. The CDC can assist with various steps in this process, including collecting and analysing data, reviewing literature for policy analysis, providing evidence for policy development, drafting federal guidelines, regulations and organisational standards, monitor policy enactment and build state and community capacity for policy implementation.³⁷ | <ul style="list-style-type: none"> • Government funded |

Denmark

| Public health system structure, decision-making and population | Organisational model of social science use in public health decisions | People <i>The social science expertise and capacity described</i> | Systems <i>The systems and processes described for incorporating social science data and expertise in the public health decision-making process</i> | Funding <i>The funding sources described for supporting social science expertise and data use</i> |
|---|---|---|--|--|
| <ul style="list-style-type: none"> • Population: 5.9 million • Structure: Relatively decentralised health system. Public health is dispersed between different sectors, with responsibility mainly at municipality level, involving government and non-government organisations. • Federally, the Danish Health Authority (under the Ministry of Health) also carries out public health functions, including providing advice on health promotion and disease prevention and the child vaccination program. It also assesses the national screening program and contributes to managing emergencies, disease outbreaks and other infectious diseases.⁴⁴ | <ul style="list-style-type: none"> • Hub and spoke | <ul style="list-style-type: none"> • The Ministry of Health works with the National Institute of Public Health, University of Southern Denmark, which has a multidisciplinary team covering public health science, anthropology, sociology, medicine and philosophy.⁴⁵ • The Danish Health Authority also works ad-hoc with individual academics and external private organisations, such as iNudgeYou⁴⁶ and the Danish Nudging Network,⁴⁷ which both consist of behavioural scientists. They collaborate on specific projects to provide advice and guidance on behavioural insights. | <ul style="list-style-type: none"> • Denmark has a 35-year history of using health survey data in public health decision-making.⁴⁸ The National Institute of Public Health has a formal agreement with the Danish Ministry of Health for public sector tasks including population surveys and the National Health Profile, a publicly available database of national and regional health surveys.^{49,50} • Additionally, prior to and at the start of the COVID-19 pandemic, individual academics working in social science disciplines connected ad-hoc and informally with government health officials. These relationships and roles were formalised during the pandemic, with the establishment of advisory groups that included behavioural psychologists and ethicists. For example, dialogue groups between experts from multiple disciplines and journalists were enacted to improve the consistency and accuracy of public health messaging disseminated by the media.²² Post pandemic, some of these advisory groups are now dormant or dismantled. | <ul style="list-style-type: none"> • Combination of government and private foundation funding |

Ireland

| Public health system structure, decision-making and population | Organisational model of social science use in public health decisions | People <i>The social science expertise and capacity described</i> | Systems <i>The systems and processes described for incorporating social science data and expertise in the public health decision-making process</i> | Funding <i>The funding sources described for supporting social science expertise and data use</i> |
|---|---|--|---|--|
| <ul style="list-style-type: none"> • Population: 5.06 million • Structure: Following a restructure in 2024, six health regions provide decentralised, localised care to citizens. At a national level, the Department of Health provides oversight, policy direction and funding, while the Health Service Executive (HSE) is responsible for managing and delivering health and social services.⁵¹ Under the HSE falls the National Health Protection Service, a nationally integrated health protection service currently being implemented under the HSE Health Protection Strategy 2022–2027.⁵² | <ul style="list-style-type: none"> • Hub and spoke | <ul style="list-style-type: none"> • Social scientists from a variety of disciplines work in external, independent research organisations, such as the Behavioural Research Unit at the Economic and Social Research Institute,⁵³ and in academic units, such as the Health Behaviour Change Research Group at the University of Galway.⁵⁴ These organisations provide data and advice via relationships with various levels of health department and government, such as the Institute of Public Health and the Research Services and Policy Unit (see Systems). | <ul style="list-style-type: none"> • The Research Services and Policy Unit was established within the Research and Development and Health Analytics Division of the Department of Health in 2015 to support evidence-based policy making, including the use of social science.⁵ • Additionally, the Institute of Public Health, jointly funded by the Departments of Health in Ireland and Northern Ireland, creates and synthesises evidence to inform public health policy, in partnership with other national and international organisations.⁵⁵ • At the start of the pandemic, a COVID-19 behaviour change sub-group was created to support the use of social science and providing advice and analysis to the National Public Health Emergency Team (NPHE).^{5,56} Recommendations provided by social science advisors were often quickly implemented via this channel. However, these processes were dismantled once the emergency phase of the pandemic had passed.¹⁹ | <ul style="list-style-type: none"> • Combination of government and academic competitive scheme funded |

Finland

| Public health system structure, decision-making and population | Organisational model of social science use in public health decisions | People <i>The social science expertise and capacity described</i> | Systems <i>The systems and processes described for incorporating social science data and expertise in the public health decision-making process</i> | Funding <i>The funding sources described for supporting social science expertise and data use</i> |
|---|---|---|--|--|
| <ul style="list-style-type: none"> • Population: 5.56 million • Structure: Following major reforms in 2023, health services are centralised through 22 Well-being service counties, each governed by democratically elected councils and funded by state government. Prior to this, the health system was highly decentralised with 300 municipalities managing their own jurisdictions. Following the 2022 reforms, these municipalities retained responsibility for public health (i.e. public health remains relatively decentralised).⁵⁷ | <ul style="list-style-type: none"> • Hybrid | <ul style="list-style-type: none"> • Building on previous work and formalising existing networks, The Cultural, Behavioural and Media Insights Centre (CUBE) was established in 2022, under the Communications and Influencing Unit of the Finnish Institute for Health and Welfare (THL). A core multidisciplinary group with a variety of social science disciplinary and methodological expertise located within CUBE work with a network of external national and international social scientists across multiple projects. Combined, disciplinary expertise includes (but is not limited to) media and communication science, sociology, anthropology cultural studies, psychology/social psychology, cognitive science. Similarly, a wide variety of methodological expertise is also leveraged.^{58,59} | <ul style="list-style-type: none"> • CUBE's work is divided into four pillars: Communications, Culture and Society, Behaviour and Policy. Work is undertaken both independently (within the CUBE group) and horizontally across other THL functional areas, and in partnership with external network collaborators. Data and research findings inform policy and practice, as well as policy-making processes and science-advice models.⁵⁸ | <ul style="list-style-type: none"> • Combination of government and academic competitive scheme funded |

France

| Public health system structure, decision-making and population | Organisational model of social science use in public health decisions | People <i>The social science expertise and capacity described</i> | Systems <i>The systems and processes described for incorporating social science data and expertise in the public health decision-making process</i> | Funding <i>The funding sources described for supporting social science expertise and data use</i> |
|---|---|---|--|--|
| <ul style="list-style-type: none"> • Population: 67.97 million • Structure: Centralised health system with regionally deconcentrated responsibilities. The Ministry of Health (MoH) has substantial control over the health system, with regional health authorities (agences régionales de santé, ARS) responsible for public health. • During the COVID-19 pandemic, major decisions were made at executive and federal levels. Post pandemic, decision-making was shared between federal and regional authorities.⁶⁰ | <ul style="list-style-type: none"> • Hybrid | <ul style="list-style-type: none"> • Behavioural scientists located in state-funded research organisations, such as Institut national de la santé et de la recherche médicale (INSERM), École des hautes études en santé publique (EHESP), Institut Pasteur, Centre national de la recherche scientifique (CNRS) and Universities independently generate data on attitudes, behaviour and policy. These independent researchers can be part of advisory groups and collaborative networks that contribute to policy advice via the Systems described. • Government organisations, such as Santé Publique France and Service d'Information du Gouvernement, also generate routine survey data. | <ul style="list-style-type: none"> • Social science expertise was incorporated into different government and independent groups, including the National Immunisation Technical Advisory Group (NITAG) and santé publique France, for some time prior to the COVID-19 response. • During the COVID-19 pandemic, the Government created a scientific council to manage all pandemic-related activities. This was dismantled post pandemic, but a new committee of preparedness was created for future pandemics.⁶¹ • INSERM coordinates the REACTing consortium (REsearch and ACTion targeting emerging infectious diseases), a national collaborative network of existing organisations and research groups including surveillance, mathematical modelling, diagnosis and pathogen characterisation, clinical research, social science, and ethics. | <ul style="list-style-type: none"> • Government funded |

Netherlands

| Public health system structure, decision-making and population | Organisational model of social science use in public health decisions | People <i>The social science expertise and capacity described</i> | Systems <i>The systems and processes described for incorporating social science data and expertise in the public health decision-making process</i> | Funding <i>The funding sources described for supporting social science expertise and data use</i> |
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| <ul style="list-style-type: none"> • Population: 17.6 million • Structure: Federalised system that links closely with private and non-profit organisations through compulsory insurance schemes to provide comprehensive health care and public health to all citizens. Public health is overseen by the federal government under the Public Health Act but is seen as a shared responsibility between federal government, local government and the private sector.⁶² As such, the Ministry of Health, Welfare and Sport develop policy, legislation and regulations.²⁵ Regional public health services are coordinated between municipal (local) public health services for services delivery.⁶³ | <ul style="list-style-type: none"> • Hybrid | <ul style="list-style-type: none"> • Social scientists located within the Behavioural Unit of the National Institute for Public Health and the Environment (RIVM) include a variety of social science disciplinary and methodological expertise, with network links to external national and international collaborators.⁶⁴ | <ul style="list-style-type: none"> • At the beginning of the pandemic, a Behavioural Unit was established within the independent National Institute for Public Health and the Environment (RIVM), under the Federal Ministry of Health, Welfare and Sport. The Ministry commissioned social science work with the Behavioural Unit, which completes the research and makes recommendations.⁶⁴ RIVM Behavioural Unit also conducted non-Ministry commissioned independent research funded through alternative grants. • All research was collated and communicated with federal, regional and municipal health institutions to inform policy and implementing bodies.⁶⁵ Research was also communicated via formal contact points between RIVM BU and various committees and advisory roles such as Ministry of Health, Welfare and Sport, The internal RIVM Response Team, RIVM Social Impact Team (in an advisory capacity). • The RIVM Behavioural Unit was supported by an independent Scientific Advisory Council comprised of internal and external expertise, with the goal of providing independent recommendations to decision-makers. • Post pandemic, the Behavioural Unit has been dissolved and two new departments have been created to cover their work. One in the domain of Infectious Disease and another in Lifestyle and Healthcare. | <ul style="list-style-type: none"> • Mostly government funded, however, some RIVM departments receive competitive funding. |

Sweden

| Public health system structure, decision-making and population | Organisational model of social science use in public health decisions | People <i>The social science expertise and capacity described</i> | Systems <i>The systems and processes described for incorporating social science data and expertise in the public health decision-making process</i> | Funding <i>The funding sources described for supporting social science expertise and data use</i> |
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| <ul style="list-style-type: none"> • Population: 10.66 million • Structure: Decentralised to three levels of national, regional and municipal. • The federal Ministry of Health and Social Affairs is responsible for health care policy and oversight. Responsibility for financing, organising and delivery of health services lies with 21 regions, divided into 290 municipalities. Operational responsibility for public health and communicable disease control is coordinated between the National Public Health Agency of Sweden, an agency of the federal Ministry of Health and Social Affairs, and the regions and municipalities. The Public Health Agency collaborates closely with 21 Regional Infection Control Units.⁶⁶ | <ul style="list-style-type: none"> • Elements of Hybrid | <ul style="list-style-type: none"> • Social and communications science subject matter experts and methodological experts operate within the various work streams of the Public Health Agency of Sweden. There is also collaboration with external experts such as academics. • An agency-wide behavioural insights working group was established within the Public Health Agency of Sweden. Their duties include the institutionalisation of behavioural science methods across the Agency and collaboration with other organisations based within the government and externally.⁶⁷ | <ul style="list-style-type: none"> • Sweden's systems are described as more goal-oriented and very flexible regarding the processes and structure required to reach these goals. The Public Health Agency of Sweden assigns work and funds for internal and external teams to conduct data collection and analysis. They then provide results, solutions and recommendations to the Public Health Agency of Sweden. The agency then further analyses recommendations and develops their own recommendations to provide to relevant stakeholders including the federal government, regions and civil societies. • The Agency is responsible for routine data collection through the National Public Health Survey and the National Environmental Health Survey, data from which are made publicly available to anyone including government, regions and academia. The Agency also publish their own periodic formal reports.⁶⁸ | <ul style="list-style-type: none"> • Government funded |

Appendix 2. Qualitative key informant interviews detailed methods

We sought insights from key informants through semi-structured qualitative interviews. We purposively sampled international government and academic experts who worked in and collaborated with international public health agencies and were experienced in using social science data in public health decision-making. We sought participants from different types of public health agencies, from countries with formalised, highly developed organisations to countries with no formal mechanisms for using social science in public health decisions.

Participants were identified through three pathways: the desk review; professional network contacts of the COSSI research team members; and snowballing via participants identifying others in their field. Identified individuals were contacted by email and invited to participate. Interested participants then took part in an online audio-recorded interview following informed consent.

The semi-structured interview guide was informed by the findings of the desk review. It covered general questions about the participants' role, institution, functional and structural use of social science in public health decision-making within their role and institution, reflections on its use, and how they would go about embedding social science into public health decision-making in a new CDC organisation.

The interview guide was iteratively optimised as the study progressed. Online interviews were recorded, deidentified, transcribed and coded. Transcripts were checked by researchers against original recordings to ensure accuracy. Interviews were thematically analysed using a framework method⁶⁹ to examine perceived strengths and lessons learned in other comparable settings and gather insights into what would be beneficial in the creation of a new CDC in Australia.

We began with data familiarisation. Two researchers (EC and KW) independently coded the transcripts line-by-line, deductively using the interview guide and desk review thematic findings, as well identifying new themes emerging inductively from interviews. Following discussion with the broader research team, they developed an analytical framework that synthesised identified themes into broader categories and concepts. They charted remaining interview data into a matrix spreadsheet, with the analytical framework finalised when thematic saturation was reached. The team remained aware of divergent cases throughout the coding and analysis process.

The research team sought to remain aware of our own positions, views and experiences throughout the data collection and analysis process. We journalled our reflections on researching a topic that we are also advocating for policy, allowing us to critically assess our interpretation of the data. We regularly discussed the data with the wider team and sought independent comment.