Stats NZ
Tatauranga Aotearoa

COVID-19 Lessons Learnt:

Recommendations for improving the resilience of New Zealand's government data system

December 2020

New Zealand Government

Citation
Stats NZ (2021). *COVID-19 lessons learnt: recommendations for improving the resilience of New Zealand's government data system*.

Published in March 2021 by
Stats NZ Tatauranga Aotearoa
Wellington, New Zealand

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1. Executive summary

The COVID-19 pandemic, one of the most significant events to affect New Zealand in recent history, has shone a light on the New Zealand government data system, highlighting existing faults while also providing an impetus for new thinking and offering a pathway to increased resilience.

Taking the opportunity presented by the pandemic, and drawing on a mandate to direct common data capabilities and provide direction to State Sector Public Service Departments and Departmental Agencies (Stats NZ, 2018), the Government Chief Data Steward commissioned Stats NZ to develop a set of recommendations for improving government data system resilience.

In response, Stats NZ captured the experiences of government agencies and international organisations during the pandemic, and documented lessons learnt from those experiences. The synthesis and analysis of the learnings revealed consistent patterns, characterised as four high-level data themes:

1. Data adequacy
2. Accessibility, interoperability and infrastructure
3. Coordination, decision-making and governance
4. Literacy, capability and capacity.

The learnings also informed the identification of numerous interventions to increase the resilience of the government data system, and will support a forthcoming proposal for implementing the recommendations.

The government data system represents both the individual government agencies that manage and use data, and the collective of those agencies operating as a single system, with the recommendations designed to apply to both circumstances.

Final recommendations

Drawing upon the list of interventions, six recommendations for improving the resilience of New Zealand's government data system have been proposed:

- Develop and implement an action plan to improve the findability, access to, and sharing of the most important data.
- Identify the most important data needed to assess impacts, inform interventions and critical decisions, and measure progress, at both a national and community or subnational level. Develop a plan to fill identified data gaps.
- Provide collaboration tools and processes to support communication and collaboration between agencies.
- Clarify the responsibilities, scope and decision-making powers of data governance roles and groups, including any emergency powers that leadership roles (such as the Government Chief Data Steward) need in a crisis. Resolve identified duplications, ambiguities, or gaps.
- Establish and foster expertise-based networks to build relationships, share expertise and resources, and advocate good practice.
- Help data users find and navigate relevant privacy, security and ethical considerations and settings when sourcing and using data.

These recommendations provide a reasonable path forward to start, focussed on a shared outcome (strengthened resilience) benefitting both individual agencies and the collective data system, while creating opportunities for new thinking and innovation. Subsequent actions, drawing from the list of interventions, could further strengthen the level of resilience.

A resilient government data system

The project referenced six general characteristics of data resilience, garnered from a collection of domestic and international sources, to inform the development of the recommendations:

- Agility
- Fit-for-purpose data quality
- Explicit governance
- Inclusive data
- Efficient statistical production
- Strong networks and partnerships.

A crisis management resilience model, consisting of four time horizons – Response (short-term), Recovery (medium-term), Reframe (strategic-term), and Readiness (long-term) – was developed in conjunction with the recommendations, to facilitate their optimal implementation.

Three classes of government data system roles were designated to provide clarity about responsibilities associated with implementation of the recommendations. These classes consist of the Government Chief Data Steward, the collection of other relevant government system leadership roles (such as the Government Chief Digital Officer, Chief Archivist), and the collection of government agencies.

The way forward: implementation and investment

This paper represents a first step towards improved government data system resilience. Following acceptance of the recommendations, an implementation proposal will provide options for putting those recommendations into practice.

Implementation will involve further user research, close collaboration with Treaty partners and key stakeholders, investments in data and data infrastructure, and the development of a robust and efficient decision-making process with which to guide those investments. The decisions will be challenging, with implications extending into a highly uncertain future, but the analysis of government data system experiences during the pandemic provides valuable insights to inform those decisions.

2. The COVID-19 pandemic in New Zealand

The COVID-19 pandemic represents one of the most significant events to affect New Zealand in recent history. It has impacted nearly all aspects of life here and abroad, including physical and mental health, economics, travel, trade, housing, communication and politics. It has also revealed the existing disparities experienced by marginalised, at-risk and vulnerable communities. (Kendi, 2020)

New Zealand's ongoing response to the pandemic has been widely lauded as world-leading. (Koetsier, 2020) This success has been attributed to a number of factors, including our geographic isolation, which afforded us time to assess the pandemic as it unfolded and develop a national strategy in response.

The New Zealand Government also instituted a rapid and decisive move to lockdown, which limited the importation of cases and eliminated community transmission. Since that initial wave of the pandemic, the persistence of international border controls, a stringent approach to quarantining, and contact tracing with genomic sequencing has meant that, as a country, we have been generally successful identifying and isolating new cases and maintaining a level of control over community transmission.

2.1 The importance of data in a pandemic

> *"Starkly and powerfully, the COVID-19 pandemic illustrates how critical data use, with a human face, is to protecting lives and livelihoods. The crisis is a wake-up call."*
>
> *- António Guterres, UN Secretary-General* (2020)

In conjunction with a science-informed approach, data has played a critical role in shaping New Zealand's COVID-19 pandemic response and recovery efforts.

The wholly new set of conditions thrust upon the country by the pandemic, and the highly dynamic nature of those changes, highlighted the potential of data to an extent not experienced previously. As the pandemic unfolded and demands on them intensified, many government agencies quickly came to appreciate how accurate and trusted data could help them navigate through unfamiliar waters, and manage what was becoming an insatiable appetite for timely information.

In a crisis environment, easily accessible, readily available and trusted data is paramount to formulating a successful response. Decisions and resultant actions, especially during early stages, are often required with atypical urgency, and the availability of data to inform those decisions can either support or significantly impede outcomes, with serious consequences as a result.

The ways in which that data is applied and successfully leveraged during crisis conditions like the pandemic is highly dependent on the level of data maturity of the organisations managing the data.

The overall data maturity of agencies across the New Zealand government data system is currently relatively low and continues to develop. This includes, amongst other things, an increasing recognition that collectively, the data holdings of agencies represent a strategic national asset. It also includes acknowledgement of the accountabilities that come with data and acceptance of the responsibilities associated with those accountabilities.

While not all agencies have contributed to a lifting of data maturity at the data system level, many now do consider their own data as organisational assets with strategic potential. That awareness in

itself represents a step towards a more mature view of data, where data system participation is acknowledged and valued.

Under the conditions of the COVID-19 pandemic, and the increased demands on their data and the information produced from it, agencies were presented with a convincing case for their role as a participant in the wider government data system. Provided with direct and compelling evidence of the importance of data as a component of a successful response, their awareness of the contribution of data to national resilience (and of data as a national strategic asset) could likewise increase.

3. A resilient government data system

System resilience is defined as the ability of a system to anticipate, prepare for, respond, and adapt to incremental changes and sudden disruptions, in order to endure and evolve.[1] It therefore incorporates a range of actions, that are implemented before, during and after an event, with potential to disrupt the functioning of the system.

In the case of a wide-ranging and large-scale disruption, such as the COVID-19 pandemic, there is no single correct path to follow. Events in those circumstances don't typically play out in an orderly or expected way, and there is often little certainty about the appropriate response.

As a result, an effective approach is to increase resilience. If a data system is resilient, it will be well-prepared to react, respond, and iterate, including under conditions associated with a disrupted environment that is ambiguous, dynamic, and unpredictable. While uncertainty may not be eliminated, its negative effects in those conditions can be mitigated.

The COVID-19 pandemic has highlighted several key characteristics of a resilient data system:

- **Agility**: demonstrating the ability to respond quickly to constantly changing circumstances in a crisis, as well as the ability to more generally respond to unanticipated needs.
- **Fit-for-purpose data quality**: facilitating the production and use of data at different and appropriate levels of quality, to respond effectively to varying data needs.
- **Explicit governance**: including appropriate oversight and coordination with designation of clear, authoritative decision-making powers and well-established accountabilities.
- **Inclusive data**: incorporating collection and design models that ethically capture data for all members of the population. Emphasising the inclusion of at-risk and vulnerable communities and reflecting local geographies, these models avoid exacerbating existing inequities and the marginalisation of information and perspectives.
- **Efficient statistical production**: leveraging a statistical production system that is agile, generates highly consumable outputs, and exhibits a sufficient level of trustworthiness to maintain social licence.
- **Strong networks and partnerships**: enabling effective action and outcome-oriented collaboration and the efficient sharing of knowledge and expertise.

[1] Adapted from (Denyer, 2017)

3.1 A crisis management resilience model

Building and maintaining resilience in a data system requires the adoption of different perspectives and corresponding actions at different times, in relation to a disruption event. These can be depicted as four stages of crisis management, each associated with a corresponding outlook time horizon (Figure 1).

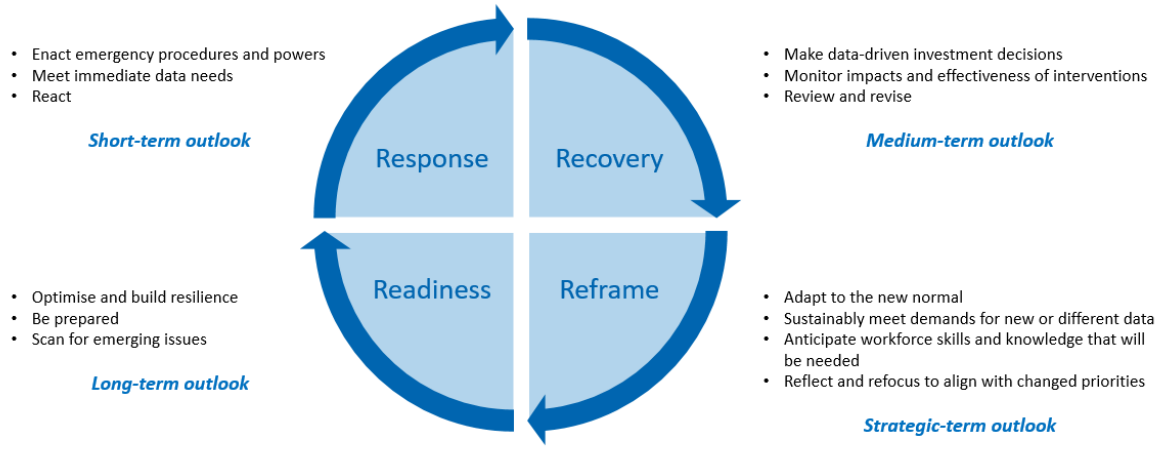

Figure 1. Four stages and outlook time horizons of a crisis management resilience model.

Response

This represents the earliest stage immediately following a disruption, characterised by a sense of urgency and the need to act rapidly. In a data system, the focus is on meeting immediate data needs to provide situational awareness, and quickly implementing short-term interventions. If available, emergency powers and procedures are enacted to provide strong leadership, as there is little time for consensus-building. In this stage, agility is key and the associated need for flexibility may mean relaxing consistency, standardisation or other data quality requirements to meet demand.

Recovery

In this stage the sense of urgency associated with response has started to abate, and the focus shifts to fixing what was affected by the disruption. In a data system, there can be a move towards data-driven investment decisions. Data is used to start monitoring the impacts of the disruption and the effectiveness of interventions. There is room now for investigating changes in data needs, understanding data-related barriers and issues, and identifying medium-term actions to improve resilience.

Reframe

This stage represents the opportunity to step back and take time for reflection. The disrupted system has started to adapt to a new normal and to changes in priorities. In a data system, demands for new data are being met sustainably, and the knowledge and skills of the workforce are evolving. Strategic planning guides the implementation of necessary long-term changes. With the shift to a focus on stability, the need for consistency and standardisation increases.

Readiness

In this stage strategic thinking is optimised, with a goal of strengthened resilience. The focus is on preparing for the next disruptive event, in a way that leverages previous learnings. Accordingly, environmental scanning is undertaken to identify emerging issues and opportunities. In a data system, new data and capabilities are developed and instituted where needed, and in response to identified issues and opportunities. Scenario modelling is used to test system responsiveness. Any emergency powers and procedures in place are adapted to reflect identified changes.

Roles and responsibilities

In addition to understanding the characteristics of the outlook time horizons and what types of actions are best implemented in association with each, it is also important to designate roles and responsibilities in relation to those four stages.

For the New Zealand government data system, the roles can be organised as follows:

- **Government Chief Data Steward (GCDS)**: a government functional leadership role with designated responsibility for government data, uniquely positioned to act as a central data authority in a crisis situation and head up data governance structures put in place. In addition to coordinating government agency data activity and providing clarity on best practice, the GCDS could also have a public-facing role, providing assurance to help strengthen the government's social licence for data.
- **System leadership roles**: representing the collection of functional leadership and other government system leadership roles, each with a remit that involves to some extent data and information. These might include the Government Statistician (GS), Government Chief Digital Officer (GCDO), Government Chief Privacy Officer (GCPO), Government Chief Information Security Officer (GCISO), Chief Archivist, Prime Minister's Chief Science Advisor, Human Rights Commissioners, the Privacy Commissioner, and the Children's Commissioner.
- **Government data system (agencies)**: consisting of the collection of agencies, across government, that participate in the data system. Their responsibilities involve operating in terms of what's relevant for their organisation, while also contributing to the wider data system for the benefit of all.

Beyond contributing leadership and accountability in their respective areas, active participation across all of these roles would also foster a more deliberate and consistent system-wide response, reducing uncertainty and ensuring a joined-up approach across key areas like data collection, privacy, human rights and security.

Figure *2* illustrates how these roles and responsibilities are situated across all four stages of the crisis management cycle, ensuring they contribute sustainable leadership and direction as part of an overall resilience approach.

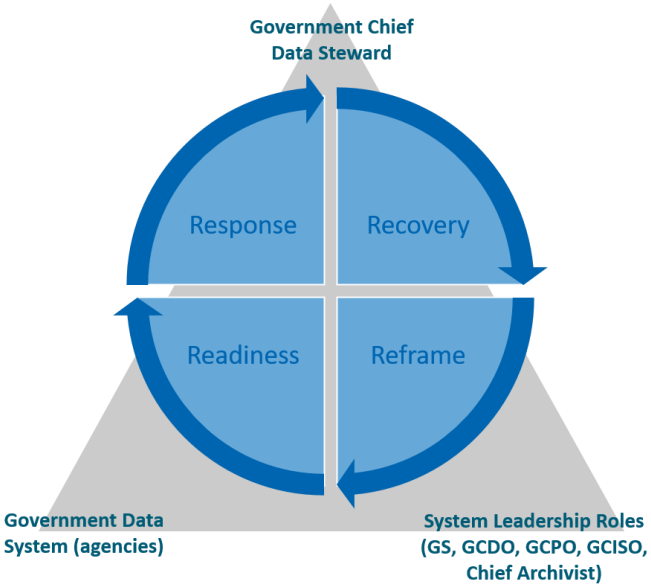

Figure 2. Government data system roles and responsibilities distributed across the four stages of crisis management.

4. An opportunity for change

The COVID-19 pandemic was and remains a particularly disruptive event for government data systems, both in New Zealand and globally. The speed with which it became a credible risk, combined with the reach it exerted into so many aspects of daily life, has been unprecedented in scale and impact. The pandemic also arrived at a time of expanded use of and reliance on data within government operations, and increasing acknowledgement of data as a critical asset.

All of this points to the COVID-19 pandemic as a particularly powerful agent of change. And as with any change event, disruptive or otherwise, it also carries with it the potential to deliver positive outcomes.

As the former New Zealand Prime Minister's Chief Science Advisor suggested, "Social, environmental, business and geostrategic impacts will echo for a long time and force both global and local change. We must seize this opportunity to have urgent reflection on many issues, not just to recover from the horrific disruption but to find the opportunities for a better future." (Gluckman & Bardsley, 2020)

Within the New Zealand government data system, the changes that the pandemic necessitated have affected the way agencies engage with data throughout its lifecycle, from planning and collection to analysis and publication, leading to the exposure of new data needs and gaps, a consideration of new approaches, and a reckoning of the ways those agencies engage with and share data.

If considered from the perspective of increasing resilience, the disruptions to the data system can be captured and catalogued to highlight and identify the shortcomings in our current approaches, as well as the innovations that either anticipated and or mitigated negative effects. With improved resilience as a driver, these lessons learnt can be applied across all crisis management time horizons, informing not only the immediate response, but long-term recovery efforts and planning as well.

4.1. Our approach

Recognising this potential, the GCDS commissioned Stats NZ to develop a set of recommendations for a more resilient government data system, drawing on lessons learnt by a range of central government agencies during the early stages of the COVID-19 pandemic.

The approach to develop the recommendations (Figure 3) involved four key stages:

1. environmental scanning
2. conducting interviews and focus groups
3. synthesis and analysis of results
4. publication of a recommendations report.

Though not in scope for this work, it was anticipated that there would be a follow-up effort, in consultation with government data system agencies, to develop an implementation proposal with details about how the agreed recommendations would be enacted.

It is also worth noting that the recommendations work was carried by Stats NZ as part of its data leadership role, associated with the GCDS, as well as part of its National Statistical Office role, associated with the Government Statistician. This meant maintaining a consistent view of the GCDS as the functional lead role responsible for collaboration and coordination across the government data system.

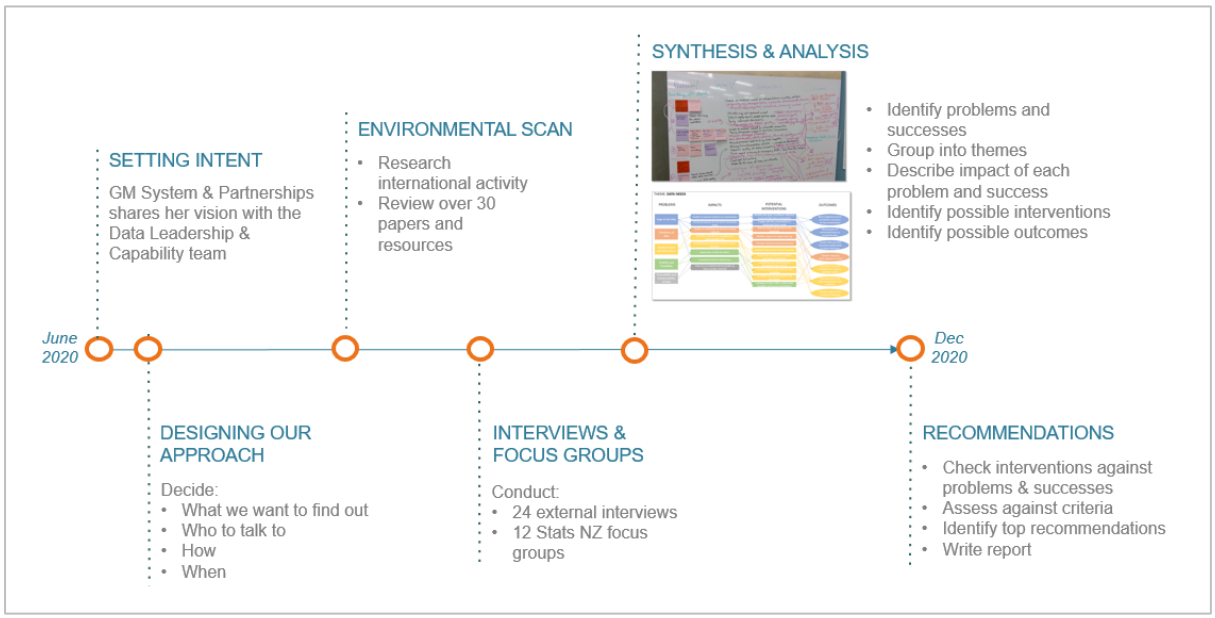

Figure 3. COVID-19 lessons learnt recommendations project approach.

4.1.1 Environmental scan

The initial phase of work comprised a review of available resources that detailed the data-related pandemic experiences and responses of other international and domestic organisations. The key data system characteristics that emerged from this review aligned with those uncovered by the analysis of our interview and focus group results, and are detailed and linked throughout the discussion in section 5.

4.1.2 Interviews and focus groups

Interviews were conducted with a range of central government agencies and other organisations that played an important role in the COVID-19 pandemic response and recovery effort, or otherwise had a keen interest in, or pressing need for, data during this time. Perspectives were sought from those working in critical areas of health, education, the economy, and population mobility, as well as those associated with at-risk and vulnerable communities.

The consideration of who to interview also took into account results from the environmental scanning, advice from senior leadership, and the extensive central government agency engagement experience of project team members.

In total, 24 interviews were completed, involving 22 agencies and other groups. (See *Appendix 1* for a list of participants.)

In addition to external organisation interviews, the project team also conducted a series of focus groups with 12 different teams within Stats NZ. (See *Appendix 1*.)

The focus group selection targeted those Stats NZ business units or functional areas with an externally facing role or with a strong customer focus, to capture a view of pandemic experiences from those parts of the data system reliant on central government data and information. It was felt this additional input would add depth to the subsequent results analysis and enhance the relevance of the final recommendations.

4.1.3 Synthesis, analysis and recommendations

Once the interviews and focus groups were completed, the resulting qualitative data was compiled and analysed to identify any consistencies and patterns. Four broad data themes were identified as a result, and a number of actions or interventions were developed within each theme.

The analysis methodology and the interventions were socialised with Stats NZ senior leadership for review and comment, and six final recommendations were identified.

These six recommendations provide benefits for individual agencies and the data system, helping address challenges highlighted by the COVID-19 pandemic, while serving as an impetus for new thinking and innovation. Enabling the data system to adapt to changing conditions, including disruptive events, will help ensure data can deliver to its potential and play a key role in national response and recovery efforts.

4.1.4 Next steps

Once the recommendations have been socialised and published, Stats NZ will work with agencies to develop an implementation approach and action plan. As part of that work, we anticipate situating the recommendations in terms of:

1. Suggested timeframes for implementation, based on the crisis management model illustrated in Figure 1, to distribute actions effectively and in a manner that best supports resilience.
2. Assignment across government data system roles and responsibilities (as shown in Figure 2), to help align expectations and situate agencies to best respond.
3. Options for participation in initiatives that contribute to increased data system resilience and are well-considered, practical, and support widespread buy-in.
4. The government's delivery of its obligations as a Treaty partner.

5. Close collaboration with Māori and iwi, communities, and organisations positioned outside of government.

Implementation of the recommendations will involve investments in data and data infrastructure by agencies across the government data system, so will therefore need to be realised in a coordinated manner. One means of facilitating that will be to ensure that implementation efforts reflect and draw from data system work currently under way at Stats NZ, including:

- development of a Data Investment Plan
- a refreshed Data Strategy and Roadmap
- application of the Data Investment Framework
- review and development of a GCDS operating model.

It is anticipated that the GCDS will oversee agency actions associated with implementing the proposed recommendations, as part of its data system leadership role to foster collaboration and coordination between agencies, and promote data best practice. The GCDS will also consider options for monitoring agency implementation efforts, with a goal of demonstrating and tracking real progress towards a more resilient government data system.

5. Lessons learnt and recommendations

This section provides the final set of recommendations, organised under four high-level data themes. Each data theme also includes additional information gleaned from the environmental scan and the collection of agency lessons learnt experience, to enable a more detailed understanding. This includes:

- what went well during the pandemic
- what could have been improved
- the international context for the data theme
- additional interventions to help build greater resilience.

5.1 Accessibility, interoperability and infrastructure

To support a rapid and effective response to a crisis, government data must be readily available, easy to use, and able to be shared between agencies and with the public as appropriate.

A robust and well embedded data infrastructure is paramount for facilitating this 'frictionless' flow of data. If adequate exchange mechanisms are not in place, there is a risk that sensitive data will not be managed securely. Without sufficient infrastructure, there is the added risk that the most relevant data will be missed, potentially impacting the quality of subsequent decision-making.

5.1.1 What went well

During the pandemic and under unprecedented demand, there were many examples of successful data exchanges between government agencies and the development of innovative approaches to facilitate sharing.

Data sharing agreements and relationships

Agencies with existing data sharing agreements and processes were able to employ those to source new data or establish a timelier data supply. Those with ties that extended outside of government found those relationships particularly valuable for accessing the full range of data needed to properly respond to demand.

Agencies in the transport sector, for instance, were able to efficiently access data from a range of sources, and use that data to provide timely advice to their Minister. This was only possible because they were able to leverage previous investments in agreed standards and other data infrastructure.

Use of private sector data

Some agencies also accessed data via analytics services such as Stats NZ Data Ventures, which brokers relationships between government and the private sector. The access to insights derived from private sector data increased the level and quality of information available to support subsequent decision-making.

Data access

In some cases, data fees were waived for the duration of lockdown, to support easier and more rapid access. Microdata access was provided remotely for approved researchers working at home, and some agencies were able to share their data lab space.

Help to understand the data

Several agencies quickly developed new data products and visualisations, using their existing toolsets, to provide insights on a range of topics.

When exploring the economic and social impacts of the pandemic, some agencies published additional commentary to describe new data sources or changes made to existing data. This was important to avoid misinterpretation of the results and provide trust and confidence in the data and processes used.

The Stats NZ COVID-19 data portal, quickly stood up to provide easy access to pandemic-related data and information, was well received and provided a useful one-stop shop and source of frequently updated private sector data.

Data infrastructure

Agencies that had already invested in data warehouses and analytics were able to quickly adapt their systems to create new reports, while agencies relying on legacy systems or with gaps in infrastructure were hindered in their response.

Inland Revenue, for instance, had started to invest in business intelligence capability as part of a business transformation initiative prior to the pandemic, which enabled them to quickly stand-up internal reporting tools to track impacts within their organisation and for the services they provide. (See *Establishing a self-service data portal* case study below.)

The National Crisis Management Centre (NCMC) utilised existing geospatial infrastructure and data, which allowed them to perform analysis using different geographic boundaries. The subsequent increase in the use of data helped highlight its importance and mark it as a focus for investment.

Case study: Establishing a self-service data and information portal

While the COVID-19 pandemic resulted in restrictive measures and a dramatic reduction in activity, it also empowered agencies to deliver what was needed, with freedom to explore creative solutions.

Senior leadership at Inland Revenue (IR) endorsed this approach, providing its staff the necessary licence to address the needs for data and information that was critical to managing their pandemic response. With a clear understanding of intent and boundaries, those in the organisation mobilised, focussed on delivering the most optimal means of satisfying data and information needs in the face of unprecedented demand.

Prior to the pandemic, IR had initiated a significant business transformation programme, which included a reassessment of existing data and information systems, and had helped increase awareness of the viability of infrastructure investment. One outcome had been a proposal for a centralised self-service portal to coordinate various internal reports and dashboards, improving access for senior leadership and staff across IR requiring easy access to trusted information. While it was already on track for development, this portal, the IR Intelligence Centre, was little more than a set of ideas when the COVID-19 pandemic landed in New Zealand.

The resultant demand for real-time data and information, heightened need for coordination across the organisation, and senior leadership licence for creative solutions combined to help fast-track the Intelligent Centre's development and implementation. COVID-19 was one of the first topics added to the newly established portal, opening it to content from the Ministry of Social Development and The Treasury initially, and transforming it from a solution focussed on internal business, to a rich information resource that included high quality externally sourced content.

Once operational, a state achieved in a few days, the portal provided key IR decision-makers with up to date, more complete and quality assessed information. This meant that more timely and better informed data-driven decisions could be made in response to pandemic conditions. It also provided analysts with references to external data that they could incorporate with IR data to conduct more comprehensive analysis. Content was organised by topic and source organisation, and users at IR could opt-in to receive notifications when new material matching their preferences was added.

Following its initial success, the IR Intelligence Centre has the potential to become enduring infrastructure, more widely available, and including additional sources of data and information. Having demonstrated the value of positioning externally sourced data and information alongside internally generated information, it has helped highlight the potential of continuing to expand such resources for decision-makers.

The ability to seamlessly access data and information from other organisations during the pandemic also meant that IR did not need to produce that information themselves, and could focus more of its efforts on effective use of that information. It expanded the scale of the data and information resources at the organisation's disposal, reflecting a wider distribution of sources, and facilitating a more resilient approach.

Key insights

- Organisational culture that endorses creative approaches to data and information
- The value of safe, efficient and timely data and information for decision-making
- The means to leverage the resources of other data system organisations to expand capacity
- Pre-existing business transformation infrastructure investment, for improved data resilience

5.1.2 What could be improved

Data sharing

A few agencies were unable to share data because they lacked a safe mechanism to do so. In other cases, data was shared despite these shortcomings, due to urgent need. Some agencies expressed confusion at the variety of exchange methods available and indicated they would welcome clearer guidance on which methods are considered secure or are preferred.

Agencies employed different risk profiles to establish new data sharing agreements during the pandemic, with some choosing to involve their legal teams. In some of those instances, the addition of a legal perspective shifted the agency to a highly risk-averse stance, which slowed or halted sharing efforts, impairing its ability to meet demand for timely and easily accessed data.

Several agencies noted that they were unsure what data could be shared under the Privacy Act, and the Government Chief Privacy Officer received numerous requests to help agencies navigate this issue. Despite the Privacy Commissioner publishing advice on the use of privacy codes to support data sharing during a state of emergency, many agencies remained unaware of these provisions. (Edwards, 2020)

In an environment of uncertainty, perceived and technical barriers associated with sharing sensitive data took on added significance, and in some cases resulted in an agency only sharing aggregated data. Because the mitigations needed to address crisis challenges are often most effectively applied at the local level and to specific challenges, they require granular data at a similar scale. Aggregated data proved to be of limited usefulness in those cases.

To address these challenges and facilitate effective data sharing during a crisis, one agency suggested that a consistent sharing framework be developed and implemented across government.

Microdata access

There was increased demand for access to microdata during the crisis which, despite prioritisation efforts, created a bottleneck in some parts of the system. Where microdata was shared, the lack of standards adoption (both across the system and within sectors) led to more work in wrangling the data.

In some cases, data could not be integrated. The lack of consistent collection of key attributes, like ethnicity for instance, made it difficult to integrate datasets for a pandemic view of at-risk communities. While new data related to the pandemic and in service of the government response was proactively released, it was not always made available in the most readily usable format.

Data infrastructure and capability

During the pandemic, smaller agencies suffered from their lack of infrastructure for collecting, sharing and analysing data. Some agencies managed to adapt existing operational systems to collect data, whereas others had to use publicly available cloud services to meet data needs.

Agencies that worked with community organisations and non-governmental organisations (NGOs) also reported ongoing gaps in the infrastructure required to collect data about the people for whom they provide services.

Some of the tools and processes developed by agencies in the urgency of the response are not sustainable, and would require either manual intervention or additional investment to be maintained in the medium term. What's more, existing system infrastructure like data.govt.nz was not used to its full potential during the crisis, potentially due to a lack of awareness.

5.1.3 International context

Internationally, governments are increasingly realising the value of integrated data in the fight against the COVID-19 pandemic and are investing in infrastructure projects in response, to build up their capability. (Berkowitz & Katz, 2020) The National Center for Advancing Translational Sciences (NCATS) in the United States recently announced investment in a platform to bring together and integrate health data from across the country, using a standard format. (National Center for Advancing Translational Sciences, 2020)

Providing access to data and transparency of impacts and responses has been a key focus of the open data community (OECD, 2020) as well as international cooperation organisations such as the OECD, IMF, WHO and UN. (United Nations, 2020) During the pandemic, the approach to open data has varied among countries, states and cities. Most governments provided public dashboards with daily updates to monitor the spread of the disease. Some governments also provided greater access to utility data, such as the location of essential services like supermarkets, pharmacies and petrol stations. (National Institute of Statistics and Geography, Mexico, 2020) In New Zealand, a few regional councils provided this type of data, but they were the exception rather than the norm.

New Zealand proactively released epidemiological modelling reports (Ministry of Health, 2020), as did other countries including Scotland, Ireland, Canada and some states in Australia. In Melbourne, which experienced a lengthy second wave of the COVID-19 coronavirus, the model used to inform city-wide lockdown decisions was published in a peer review journal and was the subject of much commentary and analysis. (Gans, 2020)

5.1.4 Recommendation for building greater resilience

Some of the perceived data gaps uncovered during the pandemic were due to users not being able to find or access existing relevant data. Information about data is currently held in several repositories located around the government data system. Efforts to make these repository resources more broadly visible and readily accessible would help address this gap. This would require a multi-dimensional approach, including improving findability, building data skills, enabling access, raising awareness, and developing a support network of key contacts and data experts.

Recommendation – improve data findability, access and sharing
Develop and implement an action plan to improve the findability, access to, and sharing of the most important data.

5.1.5 Additional interventions

Enable data sharing

- Invest in infrastructure to support data exchange. For the most part, the government was able to share and use data to inform its response. However, further investment in infrastructure to support data exchange would help make data sharing more seamless and secure. This would especially be the case for smaller agencies with limited access to data infrastructure.

- Revise existing data sharing agreements. Existing data sharing agreements tend to be designed for specific, narrowly defined purposes, with limited mechanisms for enforcement. These agreements need to be future-proofed to make it easier to share data in a crisis and consideration given to whether emergency provisions should be included.
- Investigate whether there is value in developing a more joined-up approach to public data dashboards, to improve discoverability and accessibility across the system.
- Explore using different types of mechanisms for making the valuable data in microdata datasets more accessible to a wider audience, and for providing aggregated data outputs from microdata.

Encourage adoption of standards

- While data standards are generally accessible, their widespread adoption is not common. Invest to increase the adoption of these standards, including raising awareness of their value proposition. Provide additional training to further increase support for their adoption and implementation.
- Define minimum standards for describing datasets and data formats so that potential users have adequate information to make an informed decision about data suitability.

Strengthen relationships

- Broaden and strengthen existing agency relationships to support a more open and accessible network operating at the government data system level. This in turn could help improve the visibility of data generally and improve equity of access, to benefit the full range of users.

Improve data findability

Some of the perceived data gaps uncovered during the pandemic were due to users not being able to find or access existing relevant data. Information about data is currently held in a number of repositories, located around the government data system. Efforts to make these repository resources more broadly visible and readily accessible would help address this gap. This would require a multi-dimensional approach, including improving findability, building data skills, enabling access, raising awareness, and developing a support network of key contacts and data experts.

- Where datasets already exist, work with the relevant government agencies to ensure those datasets are listed in the data catalogue published on data.govt.nz.
- Enhance the catalogue itself so that users can more easily distinguish between open, closed, and restricted access datasets (including administrative data), and know where to go to access the data.
- Develop guidance on how to access data and, where the data is accessed via a tool, ensure there is adequate help on how to use the tool or how to find additional support. This could be implemented through factsheets, training, videos, or in-person demonstrations. Building skills in accessing data will support increased self-service, which in turn would lead to a quicker turnaround on data requests, which is of particular value in a crisis situation.

Provide data brokering service

The Stats NZ Integrated Data Infrastructure (IDI) enjoys a high profile amongst the user community, illustrated by the increased demand for IDI data during the response. However, many of the requests for data directed to the IDI could also be met through other tools and services, perhaps

more efficiently, acknowledging that source agencies have different protocols and processes for providing access to their data.

- Develop a triage-style brokering service to help users find the data they are looking for. This service will need to be staffed by those with knowledge of government datasets (data navigators) and supported by a knowledge base that users could interrogate. A triage service is especially important in a crisis where a rapid turnaround is needed.

Evaluate alternative data sources

- Explore the use of Stats NZ microdata as a source for new data products and identify the tools and infrastructure needed, to evaluate the feasibility of providing an alternative to data lab access for the less data savvy or the time-pressured. The valuable data in microdata datasets could be made more accessible to a wider audience, through the use of different types of access mechanisms and through the provision of aggregated data outputs.
- In many instances, highly valued real-time and near real-time (hourly and daily) data is currently held by the private sector, so ongoing arrangements may be required to secure access. Evaluate the various means available for obtaining this private sector data (for example, commercial agreements, emergency agreements, paying for data, restricted use agreements) and determine how and when each could be used to best effect.

Improve data sharing mechanisms

There are multiple, and sometimes ad hoc, ways that data is currently shared between agencies, and it isn't always evident how these methods protect privacy, confidentiality and security of the data.

- Review the adequacy of existing data sharing mechanisms and advocate for investment in additional infrastructure to address any gaps.
- Review existing sharing agreements to ensure there are suitable provisions for more openly and freely sharing data (with appropriate governance and controls), as required to meet demand in a crisis.

5.2 Data adequacy

This theme describes the successes and problems government agencies experienced when using data to meet information needs arising from the COVID-19 pandemic.

Data is needed in any crisis to help understand the impacts of the crisis and the proposed interventions. Timely, local data on specific communities, especially those most at risk of adverse impacts, needs to be readily available, exhibit the appropriate coverage and level of quality, and be well-described.

Data can be more efficiently and effectively leveraged if users can easily locate the data they need, are aware of available data collection mechanisms, and can readily assess data quality.

Agency pandemic responses included examples of innovations, where new data was used or existing data was used in new ways, and data gaps, where data was either missing, not timely enough, or not of adequate or fit for purpose quality.

Data adequacy gaps included:

- lack of coverage of particular communities (iwi and Māori, Pasifika, women, people with disabilities, rainbow, elderly, aged care workers)
- lack of relevant geographic breakdowns

- insufficient description to support interpretation of the data.

Having the right data at the right time helps decision-makers to make more informed decisions more quickly. If the data is late, missing altogether, or of inadequate quality, this can reduce the confidence in the decisions made based on that data, and potentially cause adverse or unintended impacts for communities associated with the data.

While these data adequacy issues were not new, the nature of the pandemic crisis and the associated need to respond quickly at a local or community level tended to give added prominence to the issues and exacerbate their effects.

> *"Without good data, planners can't plan, epidemiologists can't model, policy makers can't make policy, and citizens don't trust what we're told."*[2]

The identification of those considered at risk will vary, depending on the nature of a crisis or disruption. For example, those adversely impacted by widespread drought may be different from those impacted by a pandemic. The definition of vulnerability can also change as more is learned during the transition from response to recovery. For example, those aged over 70 years were considered most at risk in the initial stages of the COVID-19 pandemic; this has now changed to those aged over 80 years.

5.2.1 What went well

Sourcing data

During the pandemic, agencies used numerous data sources, from different domains and often in innovative ways, to understand health and economic impacts, and wider social and cultural implications. (Davenport, Godfrey, & Redman, 2020)

Some data needs were met in an efficient and collaborative manner, by adding new questions to existing collection surveys. In other cases, new data sources and methods were used to supplement data that couldn't be collected using traditional means, due to social distancing restrictions or the desire to avoid burdening people and businesses already under stress. For example, traffic volume data was used in a new way to create an economic indicator.

More timely data

New data was sourced from both the public and private sectors to provide hourly and daily updates, and this data proved highly valuable for measuring behaviours during the different alert levels. Updates to existing data were also supplied at greater frequency, although often with additional quality caveats.

Infrastructure and capability

Pre-pandemic investment in data infrastructure and capability enabled more mature government agencies to leverage data to quickly create new views, publish dashboards, and create data products used to inform reporting and decision-making.

[2] (Davenport, Godfrey, & Redman, 2020)

5.2.2 What could be improved

Data coverage

In addition to the coverage issues noted above, there were other data gaps identified, including but not limited to, data on international students, foreign nationals, the digitally excluded, and data related to services provided by NGOs.

When data did exist about at-risk communities, the disaggregation required to make it useful was often not possible. This made it difficult to understand and measure impacts on local communities. In the case of New Zealand's disabled population, data gaps were increased by the collection methods used or digital services implemented, as these were not designed to be accessible to many members of that community.

Gaps in wellbeing data, especially data reflecting mental health, were difficult to fill from administrative data sources.

Geographic breakdowns tended to be based on available administrative boundaries, which did not necessarily reflect or effectively capture the mobility patterns associated with people's everyday lives. The private sector in some instances was willing to provide data to address these gaps and support the 'public good,' but the sustainability of these arrangements beyond the context of the pandemic response remains unclear.

For government agencies that operate with a decentralised model, data collection can be inconsistent across offices, resulting in patchy coverage and unreliable levels of quality. During the pandemic, this made it difficult to collate data into a national view.

Timeliness

Real-time and near real-time data was of particular value to agencies during the initial response of the pandemic, as it was required to capture the highly dynamic changes that characterised early stages of the crisis. While some data of this frequency was available, many agencies expressed a desire for more, particularly in the economic domain.

Data collection

During the initial stages of the pandemic, many agencies independently developed surveys to collect data that would help them understand impacts on their constituents and customers. While this approach enabled rapid gathering of useful data, the lack of coordination between agencies resulted in some duplicated efforts and at times, increased respondent burden. It also meant that content standards which support the collection of interoperable and properly disaggregated data were not implemented consistently, or in some cases, at all.

Since then, the GCDS has provided collection guidance to increase coordination and interoperability across the government data system. (Stats NZ, 2020)

Data sourcing

Agencies with a good knowledge of what data exists in the system, and options to leverage networks and relationships with other agencies, were able to source data relatively easily. However, some agencies struggled to know who held what data or what data they needed. Some of the new data sources used in the pandemic were untested and not well documented, so analysts had to spend additional time cleaning the data and assessing its quality.

Case study: Reflecting communities of iwi and Māori, Pasifika, people with disabilities

Crisis events like the COVID-19 pandemic highlight the criticality of data for an effective response and as part of a long-term national strategy, and that is particularly evident at the local or community level.

The effects of a crisis, and the solutions to which data can contribute, resonate in local contexts and for specific groups of people, with some of those groups more disadvantaged than others. In New Zealand, iwi and Māori, Pasifika, and people with disabilities represented three such populations at risk and adversely affected by COVID-19. The pandemic perpetuated and, in some cases, exacerbated existing data-related deficiencies.

A challenge for the communities associated with these three groups is the persistence of a government data collection approach that does not ensure sufficient visibility. A lack of visibility in data can manifest as the omission of populations altogether, or as collection at an inadequate level of quality, improper scale, or with insufficient consultation, such that the results are not available or do not reflect the data needs of communities representing those populations.

In contrast, a collection approach of inclusivity will most likely result in greater visibility in the data, which in turn allows that data to do its job and properly inform policies, interventions and other actions associated with community response and resilience in a crisis. An inclusive approach can contribute to trust and improved relationships with these communities, allowing them to fully and more equitably engage with government and other data partners.

Of particular importance in the case of indigenous populations and communities, an inclusive data collection approach can provide a means of promoting their perspectives, rights and inherent data authority, thereby facilitating data sovereignty and supporting increased self-sufficiency.

Under pressure from unprecedented demands imposed by COVID-19, government agencies, including those that did recognise the value of data reflecting disadvantaged populations, were not able to address existing shortcomings in their data collection strategies. The crisis conditions challenged their ability to implement proper planning, conduct sufficient consultation, or establish necessary design parameters to ensure widespread visibility of the communities reflecting at-risk populations. This resulted in a range of adverse effects.

Iwi and Māori: Iwi representatives reported that their communities experienced an uptick in government data collection with the arrival of the COVID-19 pandemic but, without an expected level of cohesion or coordination, this resulted in increased respondent burden. Additionally, the government's data collection efforts were perceived as only serving its own needs and delivered to its own standards, different from those of the local communities. This led to situations where data already collected by communities was re-collected by government. The result was a diminishing of trust, as it appeared Māori data sovereignty had been overlooked, and an undermining of the ability of local communities to leverage data analysis to inform local responses to the pandemic.

Pasifika: During the pandemic, Pasifika communities also experienced a lack of visibility in the data collected by government. This data adequacy gap was attributed initially to the government's challenge accessing international Pasifika populations during the first wave of COVID-19. Subsequently, that gap was more likely associated with deficiencies in collection approaches. Ethnicity for instance was not reflected at a specific enough level to capture the full range of diverse Pasifika populations. As with iwi and Māori communities, a lack of consultation with Pasifika

community representatives on things like collection planning, quality assurance, data sharing, and the dissemination of analysis results, led to increased respondent burden, a limiting of community relevant analysis opportunities, and an erosion of trust.

People with disabilities: Despite representing almost one-quarter of the national population (Stats NZ, 2014), there were no efforts made to capture disability status from respondents as part of initial government pandemic data collection. The resulting lack of data visibility of people with disabilities perpetuated an ongoing trend, meaning there was little to no way of justifying funding to support this segment of the population during the pandemic, or develop informed policy for longer term resilience. In the context of a crisis, this increased levels of risk for the disabled population, which is highly reliant on support.

And as is the case for iwi and Māori and Pasifika, data that does properly reflect people with disabilities often resides at the local level, administered by community providers maintaining a trusted relationship with members of this population. But in lieu of coordination with government, these small providers were overwhelmed by the need for data and unable to meet demand, further highlighting the need for a coordinated approach in conjunction with government.

The effort required to ensure that iwi and Māori, Pasifika, disabled, and other at-risk and vulnerable populations are sufficiently visible in data through well-designed and standardised models, coordinated and inclusive collection approaches, and engagement with local communities reflecting these populations, is essential. The results support the use of data for effective decision-making and mitigation efforts, particularly in a time of crisis. The adoption of a more deliberately inclusive approach moreover represents an opportunity for government to develop meaningful partnerships with local communities, contributing to increased levels of trust.

Key insights

- Insufficient government data collection coordination with local communities, resulting in increased respondent burden and a lack of visibility.
- Lack of standardised and sufficiently granular variables in data design, resulting in missed populations and an inability to inform policy and facilitate support for at-risk communities.
- Inadequate government consultation and collaboration with local community representatives, resulting in an erosion of trust and social licence.
- An opportunity to establish government-local community data collection partnerships, to improve resilience, strengthen levels of trust, and support data sovereignty.

5.2.3 International context

The adequacy of data to reflect at-risk communities is highlighted in the international literature on the COVID-19 pandemic. In particular, it has been noted that access to information about at-risk communities was needed to both inform the government response and to help those communities look after their own people. The city of Chicago, for instance, used data broken down by ethnicity and geography to help understand disparities in case rates and address misinformation about who was vulnerable to the virus. (Lucius, 2020)

The mis-categorisation of indigenous and minority populations was also cited as a factor in exacerbating existing inequalities in services. (Russo Carroll, Rodriguez-Lonebear, Akee, Lucchesi, & Richards, 2020) Many countries used experimental data sources (such as mobility data), and provided additional commentary to help customers understand the changes in official statistics

(including excess mortality) or the quality of new data sources. (Statistics Netherlands, 2020) Some countries also created bespoke data products to understand the pandemic's impact on at-risk communities. (Office for National Statistics, 2020)

5.2.4 Recommendation for building greater resilience

The pandemic has demonstrated that work is needed to improve the coverage and quality of data within the government data system so that it is genuinely inclusive, and that this is best done in collaboration with stakeholders and communities.

This collaboration will inform decisions about what data is needed and collected and for what purpose, and will lead to increased understanding about data needs in the response stage versus the recovery stage. For example, while initial response data needs might focus on quantifying impacts (often in real-time), the recovery stage's needs might focus instead on measuring progress.

Recommendation – identify the most important data

Identify the most important data needed to assess impacts, inform interventions and critical decisions, and measure progress, at both a national and community or subnational level. Develop a plan to fill identified data gaps.

Increasing data coverage in this way requires lead-in time before collection improvements are realised, to establish relationships, and collaboratively plan and design. That lead-in time needs to be factored into investment decisions.

Work on a Data Investment Plan is currently underway at Stats NZ, with the aim of ensuring government has the data it needs to assess the wellbeing of New Zealanders and the state of our economy and environment. The data needs that surfaced during the pandemic response and those that result from implementation of the recommendation listed above will need to be reflected in this data plan.

5.2.5 Additional interventions

Strengthen relationships

- Agencies participating in the government data system need to strengthen their relationships and practice of reciprocity with those stakeholders and communities, especially iwi and Māori, Pasifika, people with disabilities, NGOs, the digitally excluded, and other populations identified as at-risk for a given crisis event.
- Leveraging those relationships, government agencies need to continue to work with their Treaty partners, stakeholders and communities, including using mechanisms already in place, to identify the most important data (including key characteristics, geographies and variables) for the country.

Mandate data collection

- As one option, government might mandate the collection, across government, of what it deems the most important data so that both data system needs and individual agency needs are addressed, data is genuinely inclusive, and national resilience is strengthened.

Ensure data is consistent

- Ensure data that is sourced and made available is sufficiently consistent within its context, adequately described, and meets relevant standards to support its effective use and interoperability. This includes ensuring the basic measurements units within the data are consistent.

  Data consistency will make data integration easier and enable comparative decision-making.
- Fill identified data gaps in a coordinated and systematic way, to facilitate data consistency and reduce duplication of effort.
- Coordinate and prioritise data brokering and the cleaning of new data sources across the data system.
- Scope possible data sources (including private sector data and administrative data) to understand data structure, coverage, and quality, and determining what would be required to clean the data or integrate it with other data.
- Leverage existing GCDS guidance (Stats NZ, 2020) to support agencies as they implement data content requirements and follow data collection best practice.

Improve data descriptions

Data needs to be described adequately and in a standardised way, to help users to understand and interpret it, and more easily make informed decisions when using it. Key to this understanding is knowing when data is fit for purpose.

- Develop guidance on how to describe data well, how to capture that metadata in a consistent way, and explain what other metadata is helpful.
- Help users assess the quality of data and judge whether it is fit for purpose and sufficiently robust for the intended use. For example, consider adoption of an all-of-government data quality framework that provides an agreed set of quality dimensions and clarity on the meaning of those dimensions. Such a framework would also include a consistent system for measuring quality and suggestions for putting those measures to use, for instance via a system of easily interpreted quality tags that are attached to government data.

5.3 Coordination, decision-making and governance

Coordination and robust governance are essential for enabling government to respond effectively and decisively to a crisis, while maintaining public trust.

The limited resources of government, combined with the additional pressures that the COVID-19 pandemic placed on the country, means increased coordination between government agencies is required to minimise burden for constituents and customers, and maximise effort and impacts.

The processes for decision-making also need to be efficient and consistent to support a quick response and ensure risks are considered appropriately. The increased use of new and existing data sources for new purposes requires good governance at both the strategic and operational level.

"Conditions of high uncertainty require effective interorganisational communication and collaboration to help more holistic sense of poorly understood and evolving new circumstances."[3]

5.3.1 What went well

Relationships

Many agencies formed new relationships or strengthened existing ones with their data suppliers, stakeholders and customers, in response to the pandemic. This resulted in more timely data supply and a better understanding of data needs, both immediate and ongoing. (Lips & Eppel, 2020)

Some of these emergent needs were met through collaborations implemented across government, such as the New Zealand Activity Index (a joint effort between The Treasury, the Reserve Bank, and Stats NZ) which provided more timely economic data. (The Treasury, 2020) In some agencies, the pandemic has created a new focus on continuing relationship-building, or expanding existing operational relationships to foster strategic cooperation.

Case study: Pooling agency capabilities and data to meet demand

Conditions associated with the COVID-19 pandemic gave rise to new requirements and intensified demand for government data and information, amplifying the need for cross-agency coordination and collaboration.

The Ministry for Social Development (MSD), Ministry of Business, Innovation and Employment (MBIE), and Inland Revenue (IR) all experienced these new demands on data and responded in ways that increased and strengthened existing cross-agency coordination, and in some instances opened up new channels for collaboration.

During initial stages of the pandemic, MSD identified a need for data analytics to help them understand and report on the impact of COVID-19 and the related National Alert Levels on their stakeholders and customer-base. This necessitated access to a wide range of source data, including that reflecting household information, inter-regional travel, tax information, and labour markets, and in some cases required new forms of analysis.

MSD was generally successful acquiring the data they needed, representing a combination of that which was already in their possession and administrative data from other agencies, but lacked sufficient staff capabilities with which to properly analyse and report on that data.

In response and to address this gap, they leveraged existing networks to develop a joint analytics capability and pool of resources with MBIE. As part of that arrangement, relevant data was also shared between MSD and MBIE, increasing the information available to the newly developed joint analytics capability.

To support the national wage subsidy scheme that was developed to mitigate some effects of the national lockdown, MSD also coordinated with IR, re-purposing existing tax data to develop a new wage subsidy data product. This innovative use of pre-existing data has helped facilitate a wage subsidy that was a critical component of New Zealand's response, has supported over one million

[3] (Lips & Eppel, 2020)

New Zealanders (Robertson & Sepuloni, 2020), and has resulted in plans for development of additional solutions to improve data access.

The rapid development of a joint data analytics capability and pooling of resources by MSD, MBIE and IR in the face of unanticipated demand, demonstrates the importance and potential of coordination between agencies in the government data system. A well-coordinated data system is a particularly important element of rapid and successful government response, which in turn contributes to sustainable data resilience.

Key insights

- Leveraging networks to quickly ramp up coordinated efforts
- Pooling resources to address data capability gaps
- Applying new thinking to re-purpose existing data
- Supporting solution development to increase efficiency of data sharing and strengthen resilience

Governance and advisory groups

Existing data governance and advisory groups were used to share information about agency activity during the crisis, and helped to prioritise microdata access requests and the sourcing of new datasets for the Integrated Data Infrastructure (IDI). New data sources were provided to agencies through a service provided by Stats NZ Data Ventures, which also helped broker new private data sources on behalf of the public sector. This avoided the use of multiple, redundant approaches.

Decision-making

Within some agencies, decision-making and processes to approve new uses of data were streamlined.

Across government, many data-related groups continued to meet online during lockdown and share information about their activities and the challenges they faced. The GCDS provided a collaboration site to improve visibility of agency data activities and encourage cooperation across the data system, which was well-received during the response stage of the pandemic.

5.3.2 What could be improved

Visibility and coordination

Especially at the very onset of the pandemic, many agencies lacked visibility of data-related activities happening across the government data system. In the initial rush for data, duplicate data requests were not uncommon. All requests were considered urgent, so it was difficult to prioritise.

While some agencies cooperated with one another to facilitate joined-up data collection, there were also numerous surveys employed by individual agencies to meet their own specific data needs, particularly in the wellbeing space.

The resultant siloed, and in some cases redundant, approach to data collection increased the burden on respondents in some instances and negatively impacted their trust and confidence in the government. In one case, a hasty approach to collection was linked to poor quality results.

One agency suggested that having ready access to clear guidelines or standards for survey collection would have allowed them to quickly apply that advice during the pandemic.

Data governance

Agencies were also conscious of issues of data governance and social licence during the pandemic, but were uncertain about when and how to address them. Some agencies commented that it was difficult to know who had authority to make decisions in the data governance space. The NCMC approached existing data governance groups to see if they could provide authority for data-related decisions, but found they were not set up to do so.

Accessing authoritative advice

There was some confusion about who to go to for advice on data issues, with agencies approaching the Privacy Commissioner, Government Chief Privacy Officer (GCPO), Government Chief Digital Officer (GCDO) and Government Chief Data Steward (GCDS). This meant in some cases that requests had to be redirected to the appropriate agency, slowing their resolution.

Despite the call for help across government, some agencies felt their expertise was not well understood or was underutilised. Advice services such as the Data Ethics Advisory Group were also undersubscribed during the crisis.

Unable to access clear advice or an authoritative body, agencies defaulted out of caution to a highly risk-adverse position, fearful of losing social licence. This in turn may have restricted or limited the application of innovative solutions that could have better met needs during the pandemic.

Maintaining trust and social licence

Work is required to understand the social licence implications of data sharing during a crisis, particularly when short-term arrangements enacted in a response stage are extended into the recovery period. This will lead to increased understanding of the ongoing impacts of the crisis.

Transparency in providing open access to data about the government's response to a crisis is essential for maintaining trust and holding the government to account. This is particularly important during a crisis like the pandemic, since the government's decisions in those circumstances can have significant and long-term impacts on the lives and livelihoods of a large portion of the population.

5.3.3 International context

The COVID-19 pandemic has forced several countries to rethink how they collect data. The Canadian National Statistics Office has been exploring a range of new data sourcing models such as crowdsourcing, and working with other agencies to develop new approaches. (Hunt, 2020)

The NYC Recovery Data Partnership was established in New York City to coordinate and facilitate data sharing between community, non-profit, and private organisations, resulting in valuable data for use by the municipal government. (Mayor's Office of Data Analytics)

Numerous commentators in the data and technology space have highlighted the importance of data governance, and the role of Chief Data Officers in helping their organisations navigate and respond to the opportunities and risks presented by the COVID-19 pandemic. (Vincent, 2020)

In the UK and Europe, agencies have published privacy statements about how they are managing contact tracing data in accordance with the General Data Protection Regulation (GDPR). (NHS Digital) Legal consulting firms have also published guidance on how to meet privacy obligations during the pandemic. (PwC Legal, 2020)

In the academic community, the ethical implications of new data sources such as contact tracing are under review, with emerging awareness that, in addition to privacy, issues of autonomy and inequality also need to be considered. (Gasser, Ienca, Scheibner, Sleigh, & Vayena, 2020) Others

have argued that the pandemic crisis is compelling us to move beyond individual-based consent approaches to data governance. (Renieris, 2020)

5.3.4 Recommendations for building greater resilience

Reacting quickly and decisively to a disruptive event like the pandemic requires working together, and pooling resources and expertise. Knowing who makes decisions, who to approach for advice, or where to inquire about data availability, and getting a timely response, is critical. Without this awareness there is a risk that subsequent actions are taken with incomplete information, have a narrow focus of only resolving the problem at hand without considering the wider context, or duplicate the actions of others.

Recommendation – support collaboration
Provide collaboration tools and processes to support communication and collaboration between agencies.

During the pandemic, there was an appetite for unequivocal leadership and improved guidance on data governance arrangements designed to empower agencies to act quickly while meeting legal and ethical obligations. More clarity is needed on the responsibilities and authority of the different data governance roles and groups, particularly during the initial stage of a crisis event.

Recommendation – clarify governance roles
Clarify the responsibilities, scope and decision-making powers of data governance roles and groups, including any emergency powers that leadership roles (such as the Government Chief Data Steward) need in a crisis. Resolve identified duplications, ambiguities, or gaps.

Map and rationalise the key data governance arrangements within the government data system, and develop a means of maintaining and sharing this information.

This work would include defining responsibilities and powers during the response stage, and providing advice on whether or how these roles might change in the transition to subsequent crisis management stages.

5.3.5 Additional interventions

Facilitate coordination and collaboration

- Continue to provide the collaboration mechanisms established during the pandemic to encourage more regular information sharing and contribute to continuing relationship building within and across sectors.

  Clearly identified the purpose of collaboration mechanisms, noting that the purpose might change depending on the stage of a crisis response. For example, during the reframe or readiness stages, the platforms are likely to be used for sharing good practice and experiences, rather than during an earlier response stage, when they would be used for collaboration on shared initiatives.

The collaboration mechanisms or platforms also need to include a code of conduct, processes for moderating content, and guidelines for when they should be decommissioned. Consideration should also be given to how to raise awareness of them.

- If a collaboration mechanism is decommissioned, ensure there is a process for making key information about it (such as lists of related subject matter experts, associated key initiatives and contacts) remains available. This could be accomplished by migrating this information to a website.
- The coordination overseen by the GCDS was well-received during the pandemic, and there is an opportunity to expand this to provide more direction for the collection of new data and the brokering of new data sources, to help minimise both supplier and respondent burden.
- Investigate a more joined-up approach to data requests to avoid the need for agencies to approach several suppliers to meet their data needs.
- Explore whether a catalogue of existing surveys, including information on the populations and variables they each cover, would help facilitate data collection and minimise respondent burden, when data about specific communities is required (especially in the response stage).
- Better coordinate government agency engagement and data collection with communities, to reduce respondent burden.
- Evaluate the effort required to maintain a cross-government catalogue of relationships and relationship managers, which would help facilitate access to new data sources and reduce duplication.

  A catalogue resource like this could be used to answer questions like: Who should someone talk to when trying to source new data? Who should coordinate engagement when trying to source data from the private sector? How might government ensure a broader perspective so that the needs of the wider data system are considered?

Centralise some functions

- Centralise sample design and management across the government data system, to improve data quality and consistency and alleviate respondent burden. This would also support the sustainable development of expertise in this field.
- Centralise data harmonisation and standardise data descriptions, to improve the quality and consistency of data and metadata, and better enable data interoperability and sharing.
- Consider the inclusion of data governance roles within more general government decision-making groups, positioning the data agenda prominently within government and raising the visibility of data as a national asset.

Clarify data governance

- Explore scenario modelling to test the scope, effectiveness, and agility of data governance roles in an emergency situation. This might involve expanded responsibilities for the GCDS or Government Statistician to direct and approve new data collection initiatives, thereby improving coordination and visibility, reducing duplication, and ensuring fit for purpose data quality.
- To improve levels of inclusivity associated with government data, also evaluate expanding the remit of the GCDS in an emergency to include a role as advocate for at-risk and vulnerable communities.

Improve transparency

- Work to understand the social licence implications of data sharing during a crisis.
- Those in governance roles and groups should consider making their decision-making processes and results transparent, as this will foster and maintain social licence and enable New Zealanders to hold decision-makers to account.
- Explore how government could improve the transparency of methodologies and more readily acknowledge any weaknesses in government data. This might include publishing and explaining data inputs for decisions, and describing the models and algorithms used. The increased transparency will support a more informed debate about decisions.

5.4 Literacy, capability and capacity

This theme captures the problems and successes associated with what can be broadly characterised as people skills.

To empower people to use data, they need to have the capability to understand, assess, analyse and communicate the data. Without these skills, data may be misinterpreted, or an inherent bias may be undetected - what's wrong in the data may be obvious, but what's missing may not be.

The COVID-19 pandemic has reaffirmed the increasing understanding that it is not just data analysts that need to be data literate, but also policy analysts and decision-makers using the data.

Government agencies exhibit varying levels of capability and capacity for data analytics and other data-related skills. Consequently, the government needs to carefully manage its resources to ensure it can meet data needs when required.

5.4.1 What went well

Sharing expertise

Data expertise was shared across government, as a result of the wider call for assistance that went out to agencies, and through informal sharing of staff between those agencies already working closely together.

While a relatively minor factor, the beneficial results of the sharing of expertise between agencies were diminished somewhat due to the challenges of shared staff working in unfamiliar environments and their associated lack of domain knowledge.

Within agencies, prioritisation models were developed to help manage staff workloads, particularly for those providing skills in high demand.

More timely data

The need for more timely data led to innovation in how agencies shared, processed, used and published data, which in turn resulted in new resourcing approaches. As a smaller agency with limited capacity, and in response to a high level of demand, the Ministry for Women for instance outsourced their policy research to help provide context and commentary on the impacts of the pandemic on women.

Overall, the pandemic crisis provided a strong impetus for the rapid upskilling of staff and helped to lift capability in less data mature agencies.

Existing guidance

There were some examples where existing system guidance and expertise were leveraged to support data literacy during the pandemic response. The Ministry of Education incorporated the Data Protection and Use Policy (DPUP), developed by the Social Wellbeing Agency, as part of their data management framework. (Social Wellbeing Agency, n.d.)

The GCDO and GCDS functional leads were approached for their advice on data sharing, although in general these services were undersubscribed, possibly due to a lack of awareness.

5.4.2 What could be improved

Data quality

While agencies recognised the need to prioritise timeliness over quality, some agencies were not sure whether the quality of data they did use was adequate, and didn't have time to sufficiently consider the data from a quality perspective. There was concern that this could erode confidence in the data over time.

As a solution, one agency suggested the use of a quality matrix to convey the level of risk associated with different data sources, and the appropriate uses of that data.

Data timeliness trade-offs

In the early stages of the pandemic crisis, some agencies struggled with having to 'make do' with the data that they had to collect under high demands for decision-making, which was of lesser quality due to inadequacies in the data itself or their difficulty accessing the data.

Agencies with higher levels of analytical capability tended to be more confident with the quality versus timeliness trade-offs they had to make, whereas agencies who were still developing their analytical skills experienced persistent uncertainty.

Capability gaps and pressures

A few agencies were not sure of what data skills they needed, and some agencies were unsure about what data could be collected or shared while still meeting privacy obligations. Limited capabilities in data analytics, data visualisation and data storytelling were the most often cited skills gaps, particularly to support communications from decision-makers.

The additional effort required to understand new data and new analytics on top of regular work contributed in some instances to increased pressures and workload for staff. Some agencies struggled to optimise their processes, due to legacy systems or lack of capability in automation, which meant more manual work was required, especially for frequently updated datasets.

The redeployment of staff also contributed to greater work pressures in their usual teams by increasing workloads and creating skill gaps, especially when those teams had to continue with their business-as-usual work.

Community organisations, especially those delivering services on behalf of government, need to be better resourced to build their own data capability and make effective use of data.

Data related policies and legislation

There are a number of frameworks, legislation and policies of relevance across the government data system (for example, PHRaE[4], DPUP, Ngā Tikanga Paihere[5], Privacy Act), and navigation of them can be difficult and time-consuming for data users trying to understand what should and shouldn't or can and can't be done with data. Proper awareness of these frameworks and policies and their appropriate use currently varies across government agencies.

5.4.3 International context

Internationally, demand for data analysis and modelling skills has increased during the pandemic. In response, several governments have collaborated with the academic and private sectors to boost their capabilities in these areas.

The UK government partnered with the Royal Society, which put out a general call for data modellers. (Royal Society, 2020)

The Canadian government worked with a firm specialising in artificial intelligence (AI), which was one of the first to identify the threat of the virus. (Vendeville, 2020)

Some countries also held data hackathons to harness the talent of the wider data community and get citizen input to help address community issues. In the United States, several state governments have been actively recruiting to increase their data capability in response to the COVID-19 pandemic. (Lally, Valenta, & Jogesh, 2020)

5.4.4 Recommendations for building greater resilience

The pandemic highlighted the need to build data skills and knowledge across government, in areas such as analytics, data ethics, privacy, security, and storytelling. Leadership and training are needed to help develop a culture where data safety and ethics is embedded in data use and governance. This is a requirement for agencies also supporting agile ways of working, including the ability to switch between operating contexts that require different quality standards.

Possible options for addressing these needs include developing guidelines and resources, providing access to experts and training, and facilitating the sharing of knowledge.

Recommendation – foster expertise-based networks
Establish and foster expertise-based networks to build relationships, share expertise and resources, and advocate good practice.

The Government Economic Network (GEN) and Government Analytics Network (GAN) represent two examples of existing expertise-based government networks, though the GAN is currently inactive.

Additional networks or communities of practice may also be beneficial. For example, data visualisation and storytelling, data quality, data wrangling, and data collection are all areas of need

[4] PHRaE is the Privacy, Human Rights and Ethics Framework developed by the Ministry of Social Development. (Ministry of Social Development)

[5] Ngā Tikanga Paihere is a Māori tikanga framework developed by Stats NZ to support ethical and culturally sensitive use of data. (Stats NZ)

that could benefit from a practitioner community. Any networks that are established need to be adequately resourced to maintain them and keep them viable.

Recommendation – help navigate privacy, security and ethics
Help data users find and navigate relevant privacy, security, and ethical considerations and settings when sourcing and using data.

Having the appropriate knowledge plus supporting guidelines and checklists is essential to ensure the correct security, privacy, and ethics checks and balances are maintained, while agencies work at pace in the response stage.

In implementing this recommendation it's necessary to identify what's needed to ensure that, across the government data system, at least a minimum level of data ethics, privacy, security, and safety checks and balances are in use.

Initially this work could involve the development of a set of guidelines and checklists, which could then be expanded based on feedback. Also needed are resources that provide a compelling case for why these data considerations are important. Knowing that this documentation exists, is readily accessible, and promoted within agencies, will contribute to increased public trust.

Because these considerations shouldn't be set aside in a crisis, also explore how best to refer to them during the response stage of a crisis. For example, consider and agree what items like this might be included in a relevant data checklist for use in these situations.

5.4.5 Additional interventions

Understand existing capability

To make the best use of talent, a more coordinated approach to capability management could help with sharing expertise and domain knowledge across agencies.

- Map existing data capability across government to identify where expertise is currently located, to inform planning, and help target efforts to address data capability gaps.
- Explore what new capabilities will be needed to help us recognise and respond to emerging issues, problems and threats more quickly, and to help us better engage with others to develop the data and capabilities needed to mitigate those issues.

Build data skills and knowledge

Possible options for answering this need include developing guidelines and resources, providing access to experts and training, and facilitating the sharing of knowledge.

- Provide a collaboration platform to support and enable the activities resulting from these networks. These platforms could provide access to guidance resources, lists of experts, case studies and examples.
- Consider including experts and participants from outside government, noting that to do so requires the articulation of a benefit proposition for those non-government participants as well.
- Over time, extend the scope of these networks and establish working groups to evaluate the needs of each network and identify approaches for meeting those needs. The working

groups could be used to develop codes of practice and help embed them within the culture of agencies.

Working groups could also be leveraged to help identify skill gaps, provide advice on how these gaps could be filled, and prioritise efforts to fill those gaps. For example, they could address questions like: Should sample design and management be centralised to improve data quality and consistency, enable better coordination, and reduce respondent burden? Or, should data harmonisation and description be centralised to improve the quality of metadata, and better enable interoperability?

- Explore whether cross-discipline, sector-based or domain-based networks would be an effective approach, given there are common needs and shared operational contexts within given sectors and domains. Sector or domain-based networks could also include non-government organisations and perspectives, and could provide overall leadership or representation. Occupying a niche between the government data system and individual agencies, they could represent an important bridge, helping to join up and align the data goals of each.

  Advisory groups or peer services could also play a role in providing expertise on specific aspects such as practicing data ethics, ensuring fit for purpose data quality, delivering to Treaty obligations and incorporating Te Ao Māori perspectives.

Provide guidance on policies and legislation

- Revise the guidelines for accessing sensitive data or microdata remotely and managing the related risks, to improve data practices, especially in a crisis.

Improve data collection practices

- Provide guidance on the appropriate tools, platforms and practices when collecting data. This will enable consistency, good practice and robust data, and help reduce respondent burden.

  Ongoing promotion and education are needed to make agencies aware of the guidance and support that exists in the data system. Additional guidance may be required to help 'reduce the cost of entry' for agencies developing their data maturity.

6. Reflections

The recommendations and additional interventions proposed in this paper are meant to guide those agencies participating in the New Zealand government data system towards increased resilience. A genuinely resilient data system will be well placed to adapt to changing conditions, including new disruptive events that might affect New Zealand in the future, ensuring data can deliver to its potential and play a key role in our national response and recovery.

6.1 Recommendations across time horizons

The efforts that will be required to implement these recommendations, and the changes within agencies and the broader data system that could result from those efforts, need to be considered within each of the crisis management resilience model time horizons (section 3.1). This promotes a holistic view of the way data can contribute to the national agenda, and it is through that approach that a persistent and sustainable resilience will be achieved.

The recommendations and interventions proposed in this paper reflect a mix of those linked directly to the results of interviews and focus group sessions, and those the project team contributed based on their extensive experience in the government data system and their roles as data thought leaders.

Recommendations that most significantly draw from specific experiences of agencies operating during the early lockdown stages of the pandemic are likely to be more amenable to response and recovery time horizons. Other recommendations, incorporating less of a situational and a more of an inherently sustainability-based perspective, are likely to map naturally to the reframe and readiness time horizons. Therefore, when considered in full, the list of recommendations and additional interventions should provide a means of delivering value across all of the resilience model time horizons.

6.2 Leveraging the key characteristics

As the implementation of these recommendations is considered, it is important to keep in mind the key characteristics of a resilient data system noted in Section 3. These characteristics reflect the experience and lessons learnt from organisations in different contexts around the world, also struggling with the new post-pandemic reality.

These characteristics can serve as a reference, helping to confirm the viability of the recommendations that are adopted, and characterising the progress of implementation plans that result. More strategically, they offer direction for developing a consistent and targeted set of goals to apply across the government data system. If leveraged in this way, they could potentially save time and effort on the journey towards resilience.

6.3 The value of data as a national asset

If the recommendations are to be successful as drivers of change for increased resilience, they need to be implemented in an environment where data is considered a national asset. This requires proper socialisation of that view across the New Zealand context, including at the highest levels of government, so that messaging about the inherent importance of government data emanates from the top.

This is especially important in a crisis. The COVID-19 pandemic as an example has already demonstrated the immeasurable contribution of data to a successful crisis response, even before the understanding of data as a national asset has been widely adopted in New Zealand.

As it happens, government has an established mechanism – a national emergency management system – at our disposal to more deliberately promote the role of data as a strategic asset in a crisis, and as a key to strengthening resilience. During the COVID-19 pandemic, and with little advanced planning, that emergency management system was leveraged to implement useful innovations, including the development of a 4-level Alert System, and daily leadership communication briefings.

Likewise, the administration and promotion of government data could readily become part of that emergency management system, bolting onto existing infrastructure. Constituent elements like a centralised data authority could be activated, potentially under emergency powers, to help manage the collection and use of government data as part of a national crisis response.

In this scenario the GCDS, as the government's functional lead for data, would have an authoritative role to direct and coordinate data-related activities across the government data system. Alongside that leadership role across government agencies, there is also the potential for a public-facing component, similar to that of the Director-General of Health during a health pandemic.

Public briefings by the GCDS could be used to promote data as a national asset, as critical as other, more familiar national infrastructure, and especially important in managing our response to a crisis. These briefings could also provide the public with a level of government transparency, offering assurance about how data is being used responsibly, with protections in place.

This is an especially important message during a crisis response, helping to maintain social licence when there is higher demand for data. This sort of public communication could help the GCDS proactively address trust issues, like those that have affected uptake of the NZ COVID Tracer app.

6.4 Informing investments in data

Ultimately, the outcomes resulting from the adoption of the recommendations proposed in this paper will manifest as investments in data and data infrastructure, and in the development of a decision-making process for those investments. It is with that lens that the recommendations should be considered.

The challenge facing government agencies in this regard will be associated with developing sufficient confidence in their investment decisions, and supporting resultant investments in a manner that clearly contributes to strengthened resilience. It is no easy task to move ahead with investment decisions based on future scenarios that, as the COVID-19 pandemic has driven home, are highly uncertain.

More specifically, it is difficult to know how to distribute investments between those that can be used to generate sustainable change, applicable and effective during both crisis and peacetime, and those that need only deliver to demands unique and limited to the immediate response stage. Too much emphasis on long-term change can result in wasted spending, while too much emphasis on short-term needs risks spending on the same issue multiple times and with each crisis event.

Faced with the need to make investment decisions that extend into an unpredictable future, one reasonable option for agencies is to investigate and learn from what has happened in the past. It is from that position that the work to develop these lessons learnt recommendations was initiated and is offered for consideration.

It is the hope that the proposed recommendations can provide a level of direction and guidance to agencies in the government data system in support of successful investments, and in a broader sense demonstrate the inherent value of data to New Zealand's national resilience.

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Appendix 1: Interviews and focus groups

External interviews

July 2020	• Kāinga Ora – Homes and Communities • Ministry of Business, Innovation and Employment • Ministry of Foreign Affairs and Trade • Ministry of Health • Ministry of Transport • National Crisis Management Centre (NCMC), Department of the Prime Minister and Cabinet (DPMC) • Oranga Tamariki
August 2020	• All-of-government COVID-19 Operations Centre, DPMC • Data Iwi Leaders Group • Data Ventures, Stats NZ • Disability Rights Commissioner, Human Rights Commission • Inland Revenue • Ministry for Pacific Peoples • Ministry for Women • Ministry of Education • Ministry of Housing and Urban Development • Ministry of Social Development • NZ Defence Force (NCMC)
September 2020	• Government Chief Privacy Officer, Department of Internal Affairs • Ministry for Primary Industries • Reserve Bank of NZ

Stats NZ focus groups

- 2018 Census Engagement
- COVID-19 Data Team
- Customer Service Delivery
- Data Standards and Design
- Data Strategy and Policy
- Data Ventures
- Integrated Data
- International and Business Performance
- Labour Market and Household Statistics
- National Accounts
- Population Insights
- Prices, Accommodation & Construction

Appendix 2: Recommendations and additional interventions

Access, interoperability and infrastructure

Recommendation – improve data findability, access and sharing

Develop and implement an action plan to improve the findability, access to, and sharing of the most important data.

Additional interventions

- Invest in infrastructure to support data exchange and help make data sharing more seamless and secure.
- Revise existing data sharing agreements. Enhance and future-proof data sharing agreements to make it easier to share data in a crisis. Consider what emergency provisions may be needed.
- Investigate whether there is value in developing a more joined-up approach to public data dashboards, to improve discoverability and accessibility across the system.
- Explore using different types of mechanisms for accessing microdata and providing aggregated data outputs from microdata.
- Invest to increase the awareness and adoption of data standards, including training to support adoption.
- Broaden and strengthen existing agency relationships to support a more open and accessible system-wide network.
- Ensure existing datasets are listed in the data catalogue published on data.govt.nz.
- Enhance the data catalogue so that users can distinguish between open and closed or shared datasets (including administrative data) and know where to go to access the data.
- Define minimum standards for describing datasets and data formats so that potential users have adequate information to make an informed decision about data suitability.
- Develop guidance on how to access the data and, where the data is accessed via a tool, ensure there is adequate help on how to use the tool, or how to find additional support.
- Develop a triage-style brokering service to help users find the data they are looking for.
- Explore the use of Stats NZ microdata as a source for new data products and identify what tools and infrastructure would be needed to understand the feasibility of providing an alternative to data lab access for the less data savvy or time pressured.
- Evaluate the various means available for accessing private sector data (commercial agreements, emergency agreements, paying for data, restricted use agreements) and determine how and when each could be used to best effect.
- Review the adequacy of existing data sharing mechanisms and advocate for investment in additional infrastructure to address any gaps.

- Review existing sharing agreements to determine if there are suitable provisions for more openly and freely sharing data, as required to meet demand in a crisis.

Data adequacy

Recommendation – identify the most important data

Identify the most important data needed to assess impacts, inform interventions and critical decisions, and measure progress, at both a national and community or subnational level. Develop a plan to fill identified data gaps.

Additional interventions

- Strengthen government's relationships and practice of reciprocity with Treaty partners, stakeholders and communities, and other populations identified as at-risk for a given crisis event.
- Continue to work with Treaty partners, stakeholders, and communities, including using mechanisms already in place, to identify the most important data (including key characteristics, geographies and variables) for the country.
- Mandate the collection, across government, of what is deemed the most important data, so that both data system needs and individual agency needs are addressed, data is genuinely inclusive, and national resilience is strengthened.
- Ensure data that is sourced and made available is consistent, adequately described, and meets relevant standards to support its effective use and interoperability.
- Fill identified data gaps in a coordinated and systematic way.
- Coordinate and prioritise data brokering and the cleaning of new data sources across the data system.
- Scope possible sources of data (including private sector data and administrative data) to understand data structure, coverage, and quality, and determine what would be required to clean the data or integrate it with other data.
- Leverage existing GCDS guidance to support agencies as they implement data content requirements and follow data collection best practice.
- Develop guidance on how to describe data well, how to articulate what other metadata is helpful, and how to capture that metadata in a consistent way.
- Help users assess the quality of data and judge whether it is fit for purpose and sufficiently robust for the intended use.

Coordination, decision-making and governance

Recommendation – support collaboration

Provide collaboration tools and processes to support communication and collaboration between agencies.

Recommendation – clarify governance roles

Clarify the responsibilities, scope and decision-making powers of data governance roles and groups, including any emergency powers that leadership roles (such as the Government Chief Data Steward) need in a crisis. Resolve identified duplications, ambiguities, or gaps.

Additional interventions

- Continue to provide the collaboration mechanisms established during the pandemic, clarifying their purpose and defining processes and a code of conduct.
- Define processes for providing access to key information when collaboration mechanisms are decommissioned.
- Expand the coordination overseen by the GCDS to provide more direction for collecting and brokering new data.
- Investigate a more joined-up approach to data requests.
- Explore whether a catalogue of existing surveys, and the populations and variables these cover, would help facilitate data collection and minimise respondent burden.
- Coordinate agency government engagement and data collection with communities, reducing respondent burden.
- Evaluate the effort required to maintain a cross-government catalogue of relationships and relationship managers, to help facilitate access to new data sources and reduce duplication.
- Centralise sample design and management to improve data quality and consistency and alleviate respondent burden.
- Centralise data harmonisation and standardise data descriptions, to improve the quality and consistency of data and metadata, and better enable data interoperability and sharing.
- Consider the inclusion of data governance roles within centralised decision-making groups.
- Explore scenario modelling to test the scope, effectiveness, and agility of governance roles in an emergency. This might include the role of the GCDS or Government Statistician to direct and approve new data collection initiatives, for improving coordination and visibility, reducing duplication, and ensuring fit for purpose data quality.
- Evaluate extending the role of the Government Chief Data Steward in an emergency to include advocating for at-risk communities.
- Work to understand the social licence implications of data sharing during a crisis.
- Make the decision-making processes and the decisions made by data governance groups transparent, to foster and maintain social licence and enable New Zealanders to hold the decision-makers to account.
- Explore how we could improve the transparency of methodologies and more readily acknowledge any weaknesses in government data.

Literacy, capability and capacity

Recommendation – foster expertise-based networks

Establish and foster expertise-based networks to build relationships, share expertise and resources, and advocate good practice.

Recommendation – help navigate privacy, security and ethics

Help data users find and navigate relevant privacy, security, and ethical considerations and settings when sourcing and using data.

Additional interventions

- Map existing data capability across government to identify where expertise is currently located, to inform planning, and help target efforts to address data capability gaps.
- Explore what new capabilities will be needed to help us recognise and respond to emerging issues, problems and threats more quickly, and help us better engage with others to develop the data and capabilities needed to mitigate those issues.
- Provide a collaboration platform to support and enable the activities resulting from these networks. These platforms could provide access to guidance resources, lists of experts, case studies and examples.
- Consider including experts and participants from outside government, noting that to do so requires the articulation of a benefit proposition for those non-government participants as well.
- Over time, extend the scope of expertise-based networks to help establish working groups to evaluate the needs of each network and identify approaches for meeting those needs.
- Explore whether cross-discipline, sector-based, or domain-based networks would be an effective approach.
- Revise the guidelines for accessing sensitive data or microdata remotely, and managing the related risks, to improve data practices, especially in a crisis.
- Provide guidance on the appropriate tools, platforms and practices when collecting data.