New Zealand’s journey toward an admin-first ‘census’ future

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1. (verb) to count, calculate, add up, enumerate, tally

2. (noun) number, count, figure, tally, total, score
Outline

• Our context – New Zealand census & history of census transformation
• Our research programme – our admin data & where quality is at
• Our combined census – the 2023 Census ‘by design’
• Our environment – legislation & Māori expectations
• Our transformation – the admin-first future is here...
Our context...
The New Zealand five yearly census

2011: Drivers for change
- Increasing cost of Census
- Sustainability of current model
- Opportunities from new technologies
- Availability of admin data
- Govt. push for integrated data to improve govt. services

2012: Census Transformation Strategy (our research programme):

Vision: Administrative census, with survey support

Short-medium term: modernise current census model
Long term: investigate census based on administrative data
# New Zealand Census & use of administrative data

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>2011</td>
<td>2011 Census cancelled due to Christchurch earthquake</td>
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<tr>
<td>2012</td>
<td>Census transformation strategy agreed with government</td>
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<tr>
<td>2013</td>
<td>2013 Census (delayed) – traditional full field enumeration model</td>
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<tr>
<td>2015</td>
<td>Rapid expansion of Stats NZ’s Integrated Data Infrastructure <a href="https://www.statsnz.govt.nz">Stats NZ (IDI)</a></td>
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<td>2018</td>
<td>2018 Census – planned modernised traditional model, combined model as mitigation</td>
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<td>2023</td>
<td>2023 Census – respondent-first combined model ‘by design’</td>
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<td>2028</td>
<td>The next census will be admin-first…</td>
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Our research programme...
Using admin data means a transformation

How do you know when admin data is good enough?

Quality of admin data:

Understand your sources

Define your statistical purpose

Administrative data

What are the strengths & limitations?

What transformations are needed?

Statistical uses

Use of admin data:

Right to privacy

Balancing privacy & benefits

Can we? Should we?

Right to live in an informed society
Administration Resident Population

Linked administrative data: Integrated Data Infrastructure (IDI)

Administrative NZ resident population
- **Begin** with IDI spine (‘ever-resident’ population)
  - **Include** all individuals with **activity** in admin data sources (tax and benefits, health, education) within the previous two years
  - **Remove** individuals
    - who died before reference date
    - who migrated overseas before reference date
    - remove the non-residents (border movements data)

The IDI Spine
- “Ever-resident in NZ”
- **Births**
- **Tax Registrations**
- **Visa**

SPINE
- **Deaths, Marriages**
- **Benefits**
- **Health**
- **Surveys Stats NZ**
- **2013 Census Stats NZ**
- **2018 Census Stats NZ**
- **Education**
- **Justice**
- **Border movements**
- **…. and more**
What does the admin resident population look like?

Admin resident population (APC) is close to official estimated resident population (ERP).

- Small undercount, fairly even across ages
- Admin population is higher than the census counts

Source: Stats NZ

![Graph showing the NZ usual resident population for APC and ERP at 30 June 2018 and 2018 Census. The graph compares the total population across different age groups, with a decrease in population from 75 years onwards.]
Where the administrative data sources come from

All data sources are linked in and sourced from the Stats NZ Integrated Data Infrastructure (IDI)

IDI Spine:

- Historic censuses
- Deaths
- Births
- Visas
- Tax
- Border movements
- Benefits
- Health
- Education
- Transport

Around 10m individuals ‘ever resident in NZ’

Source: Stats NZ
Admin data quality frameworks guide assessment of variables

Quality Dimensions
- Relevance
- Accuracy
- Timeliness
- Accessibility
- Coherence and Consistency
- Interpretability

Accuracy Dimensions
- Representation (units)
  - coverage
  - unit error
- Measurement (variables)
  - validity error
  - measurement error
  (consistency with census)

Statistics New Zealand (2016) Guide to reporting on administrative data quality | Stats NZ
Quality assessment of admin sources

As at Aug 2023
- subject to change

Metadata analysis
Detailed analysis
Output in experimental Admin Population Census (APC)
Our combined census...
Combined Census ‘by design’ – admin data scope statements:

“Administrative and alternative data sources will be used to make improvements to existing data processes and output quality, to reduce or resolve known issues in processing, and to support the processing of data under a combined model approach.

The specific uses of administrative and alternative data sources for units and characteristics will be determined by the ‘combined model’ design.

Administrative and alternative data sources will also be used in the development of interim population estimates to support analysis and quality assurance.”
The combined census model ‘by design’ combines an admin population list, equivalent to the Admin Population Census (APC), with census collected response data to achieve high coverage and quality, including rich attributes information.
Use alternative data to fill in missing information

No previous census or admin data available:
Use statistical imputation?

Use previous census and admin data to fill in missing information;
Statistical imputation if neither available

Prioritised sources for filling in a variable:

2023 Census Response

Response from 2013 or 2018 Census?

Admin Data?

Statistical Imputation?
Our future...
Our future:

Drivers for change:

- Changing data landscape
- Data collection challenges
- Low response rates
- Māori data sovereignty
- Demands on data
- Expectations on data processing power
- Democratization of data

Goal: Become an organisation that uses administrative data first

Admin first priorities:

- Ensuring our digital infrastructure sets us up for the future incl. statistical registers
- Researching, designing and developing methodologies to inform future census models
- Working with data suppliers, our te Tiriti partners
- Ensure our internal capability and operating model sets us up for the future
Modernised legislation
(previously the Statistics Act 1975)

It’s now easier for Stats NZ to make use of public sector data for official statistics:
• The Statistician can require a public sector agency to provide data
• Agencies must proactively inform us of changes to data or concerns about quality
• Requires Census to be five-yearly but is non-prescriptive of how the data is collected

Our new Act speaks directly to the requirement for the Crown to give effect to the principles of te Tiriti o Waitangi / the Treaty of Waitangi.
Our Tiriti o Waitangi relationship – delivering for and with Māori, Iwi & Hapū

For Māori, iwi, and hapū, data is taonga (treasured/sacred)

The commitment we make to Māori:
• Progressing Māori data aspirations and enabling self-determination
• Openness to different perspectives, an informed understanding of what long-term inter-generational wellbeing looks like for Māori
• Working for and with Māori, Iwi and Hapū to improve the quality and quantity of data about Māori
• Stats NZ is investing in its people to upskill in Māori Crown relations

Ngā Tikanga Paihere – maturing our ability to apply Nga Tikanga Paihere principles to our data practices (ethical and cultural practices for data as taonga)

Te Kāhui Raraunga (Māori Data Governance Model) – Māori’s expectations of the crown (Te Kāhui Raraunga)
Future census models

Survey more of the population

Survey first combined model with full enumeration

2023 model

Admin first combined model with full enumeration

Admin first combined model with sample survey/s

Admin first + survey for some attributes

What balance of admin data and surveying should there be?

Admin first + expanded social survey programme

Survey less of the population

Population counts and some variables from admin data + expanded social & population survey programme for other variables

Expanded Social
Readiness for admin-first

Internal readiness:
• Internal uncertainty – how do we feel about this potential change now?
• Internal barriers & resistance to change
• Change management & capability building is required
• 2023 Census has taken so much of everyone’s focus, next Census is hard

Methodological feasibility:
• we are well-placed from a population data perspective
• working on household & families – it is harder
• our ability to produce dwellings is less developed, people
• data sources for iwi (Māori tribe) affiliation are unresolved
• there are no major barriers

Technology Infrastructure readiness:
• to combine administrative, survey and modelled data we require linked statistical registers (SR) in a production environment outside of the IDI
• and processes to link survey & admin data to these

Our current maturity:
Admin-first opportunities & challenges...

**Opportunities**
- Frequency & detail – Outputs every year, already have an experimental 16-year time series 2006-2021
- Quality – More precise, more detailed information, or accurate for some variables – not constrained by respondent’s ability to answer questions.
- Resilience – Inherently less exposed to extreme risks or system failure.
  - For example, easier to recover from earthquakes, pandemics.
- Longitudinal – The unit record data is longitudinal – this is immensely powerful and largely untapped.
  - For example, detailed analysis of flows, cohorts, generational effects.
- Synergies with other research – Potential to be a multiplier for other research providing common baselines for researchers in the IDI.

**Challenges**
- Customer acceptance – how do we talk to customers in a different way and help them understand the trade-offs
- Tiriti o Waitangi obligations – how do we work with and for Māori, and meet their expectations
- Readiness for an attribute survey – how prepared do we need to be?
- Trust and confidence in use of admin data – how will we know?
- Will Stats NZ be ready – it’s a huge change to population measurement and the way a census has worked!
- Authorising environment – how do we take ministers along for the journey?
Questions?