

The Statistical Adventures of a non-Statistician: why statistical literacy is the real data revolution

Statistics Teachers' Day
November 2020.

Andrew Sporle

iNZight Analytics Ltd

Epidemiology in Aotearoa New Zealand – Te Timatanga



Te Rangi Hiroa – Sir Peter Buck
(Ngati Mutunga)

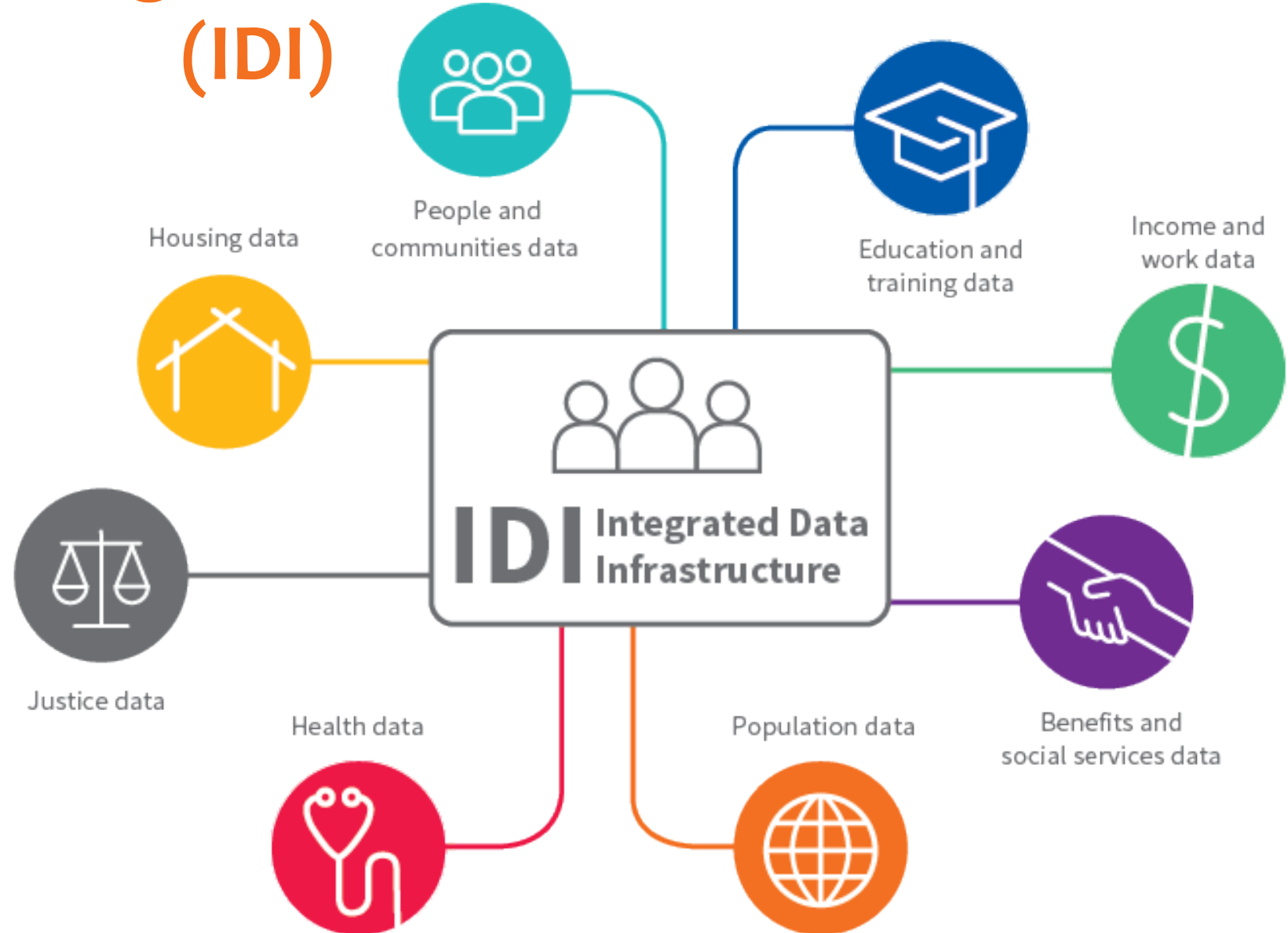
First Māori doctor to graduate in NZ
Young Māori Party – political change

First modern style epidemiological
article in Aotearoa NZ (1914)

(cited in Pool DI 1991 and 2015)

New Zealand's Integrated Data Infrastructure (IDI)

An integrated database containing de-identified longitudinal microdata about people, households, & businesses.



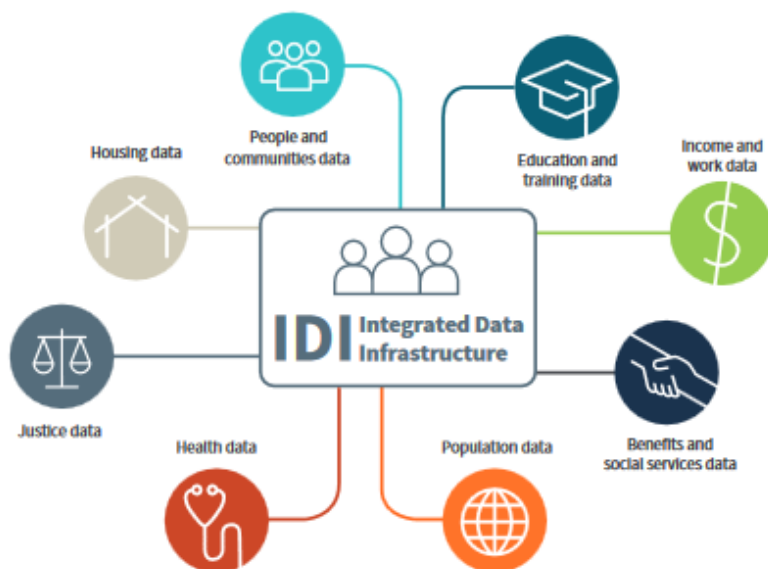
For a full list of data, go to www.stats.govt.nz/idi

Data in the IDI

September 2018

Stats NZ
Tatauranga Aotearoa

Stats NZ's Integrated Data Infrastructure (IDI) is a large research database containing de-identified microdata about people and households.



The IDI contains person-centred microdata from a range of government agencies, Stats NZ surveys including the 2013 Census, and non-government organisations. For more information about data in the IDI, see www.stats.govt.nz/integrated-data/integrated-data-infrastructure

The Longitudinal Business Database (LBD) complements the IDI with microdata about businesses. For more information about data in the LBD, see www.stats.govt.nz/integrated-data/longitudinal-business-database

Health data

- B4 School Checks – from 2011
- Cancer registrations – from 1995
- Chronic conditions – from 2007
- General medical services claims – from 2002
- Health tracker – 2006-13
- Laboratory claims – from 2003
- Mortality – from 1988
- Immunisation – from 2006
- National non-admitted patient collection – from 2007
- Pharmaceuticals – from 2005
- PHO enrolments – from 2003
- Population cohort demographics and addresses – from 2004
- Mental health and addiction – from 2008
- Publicly funded hospital discharges – from 1988
- National Needs Assessment and Service Coordination Information System (SOCRATES)
- Maternity – from 2003

Health

Education and training data

- Early childhood education participation – from 2006
- Primary education – from 2007
- Secondary education – from 2004
- Tertiary education – from 1994
- Industry training – from 2001
- Targeted training – from 2001
- Adult competency assessments – from 2014

Education

Benefits and social services

- Benefits – from 1990
- Youth services – from 2007
- Children's Action Plan – from 1996
- Working for Families – from 2003
- Child, Youth, and Family – from 1991
- Student loans and allowances – from 2008
- ACC injury claims – from 1994
- Family Start – from 2008

Benefits / Social services

Student loans

Justice data

- Recorded crime: offenders – from 2009
- Recorded crime: victims – from 2014
- Court charges – from 1992
- Sentencing and remand – from 1998

Justice

People and communities data

- Auckland City Mission – from 1990
- Migrant Survey – from 2012
- Driver licence and motor vehicle registers
- Longitudinal Immigration Survey of NZ – 2005-09
- General Social Survey – 2008-2016
- Disability Survey – 2013
- Te Kupenga – 2013

Community

Population data

- Border movements – from 1997
- Visa applications – from 1997
- Departure and arrival cards – from 1997
- 2013 Census
- Births, deaths, marriages, and civil unions – from 1840

Travel / Migration

Income and work data

- Tax and Income – from 1999
- NZ Income Survey – from 2006
- Household Labour Force Survey – from 2006
- Survey of Family, Income, and Employment – 2002-10
- Household Economic Survey – from 2006

Tax / Income

Housing data

- Tenancy – from 2000
- Social housing – from 1980

Hous

60+ data sets and counting

IDI dataset coverage

1980

1990

2000

2010

Health

Education

Benefits / Social services

Justice

Community

Population

Income

Housing

Scope is being continuously extended

1840 is earliest. Births, Deaths and Marriages

How the IDI is being used

Compare Study Options

Bachelors with Bachelors

in Performing Arts in Pharmacy **Compare**

Bachelors: Performing Arts

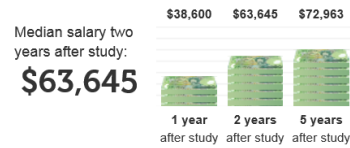


60% Employment rate two years after study

Status one year after study



Bachelors: Pharmacy



88% Employment rate two years after study

Status one year after study



MINISTRY OF BUSINESS,
INNOVATION & EMPLOYMENT
HĀKINA WHAKATUTUKI

Temporary Migrants as Vulnerable Workers: A literature review

March 2014

Giving children the best start in life...

Family Start

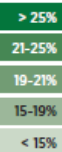


15%
MOST AT
RISK BY
REGION

We know where these young people are:

Regional Council	At risk	
	Number	% of pop.
Gisborne/East Coast	1,944	28.7%
Northland	5,577	27.5%
Hawke's Bay	4,533	22.1%
Bay of Plenty	7,941	21.6%
Manawatu-Wanganui	6,363	20.1%
West Coast	732	19.3%
Waikato	10,307	18.6%
Southland	2,274	18.2%
Nelson	1,086	18.2%
Marlborough	858	17.9%
Taranaki	2,517	17.3%
Canterbury	8,820	12.4%
Wellington	7,932	12.3%
Tasman	642	11.9%
Auckland	22,998	11.5%
(- South Auckland)	10,017	15.4%
Otago	2,940	10.7%
NEW ZEALAND	87,250	15.0%

Map Key:
Proportion
of the
population
at risk



HOMELESS
No Family or Support
Health Problems
Could use Some Compassion
Really Need The Help.



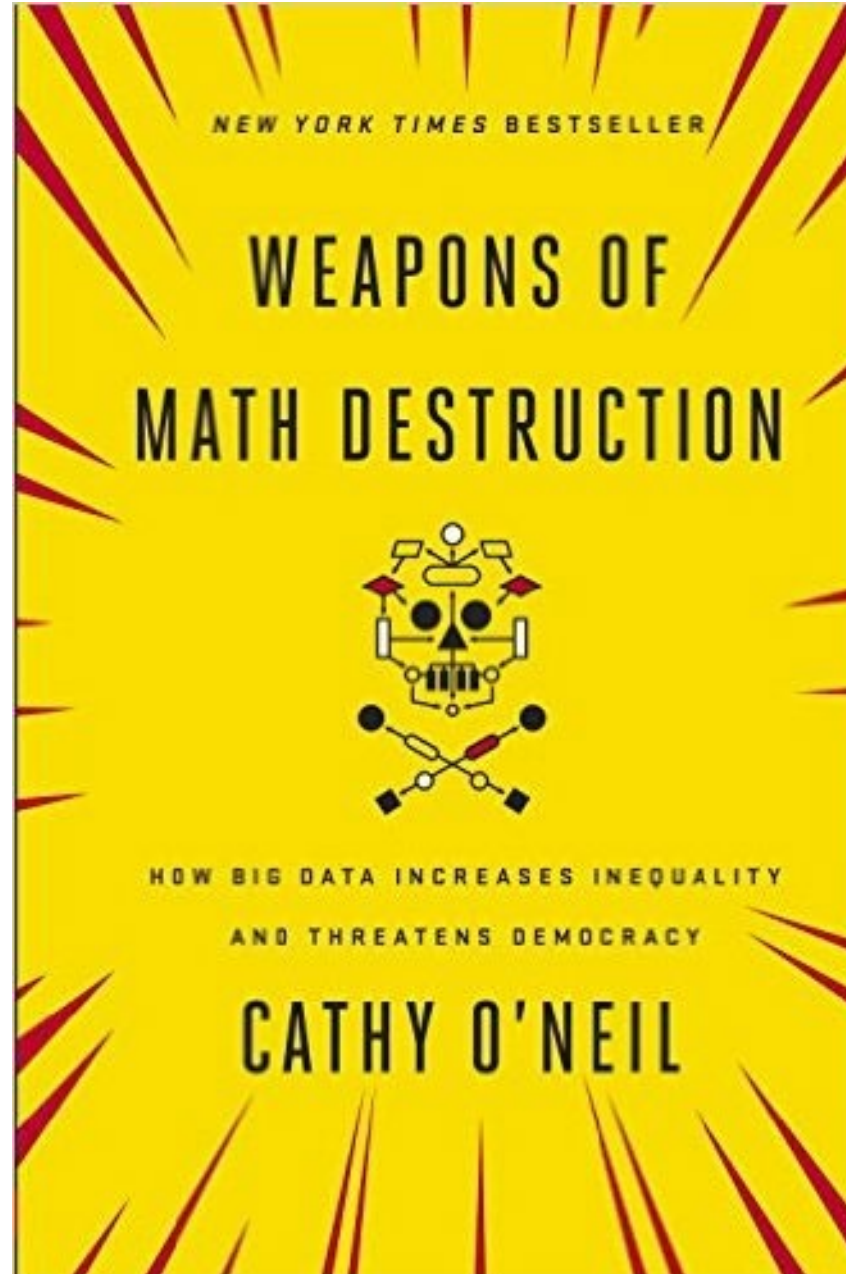
Data is a social product – and so is analysis

Imperfect data, imperfect models, embedded values can create self-fulfilling feedback loops.



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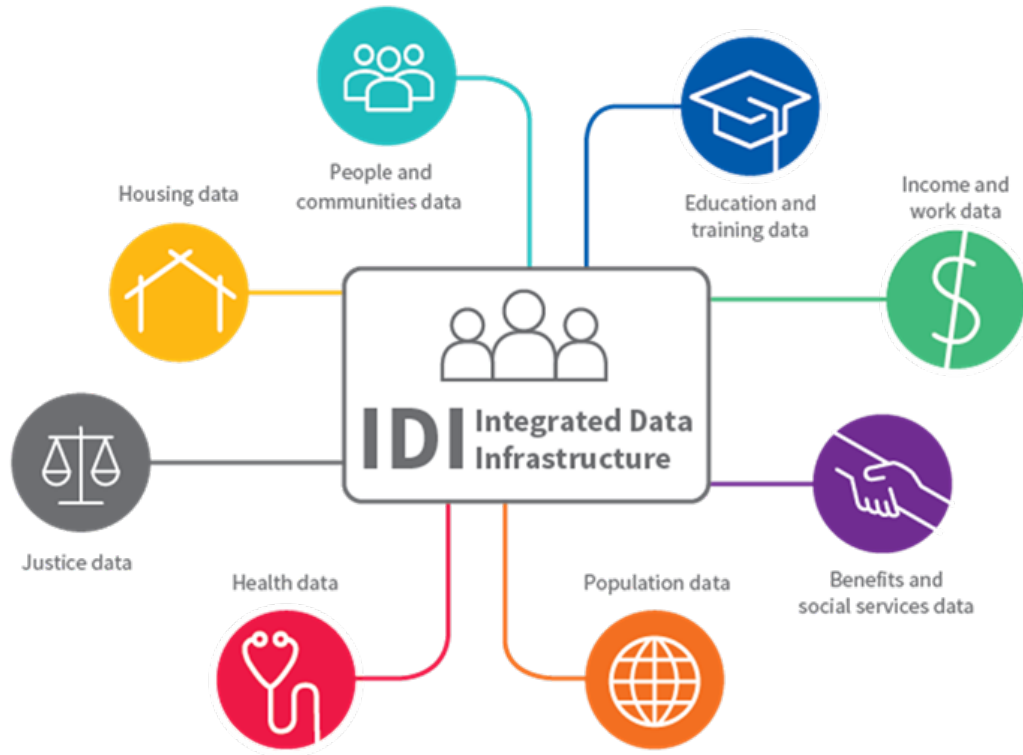
"big data increases inequality and threatens democracy."

Solution:

- transparency
- engagement
- explicability
- accessibility

Elements
of due
process

The Problem



Statistical resources are increasingly complex and decreasingly accessible

Awareness
of data
value

Demand
for access
to data

High
technical
barriers to
access

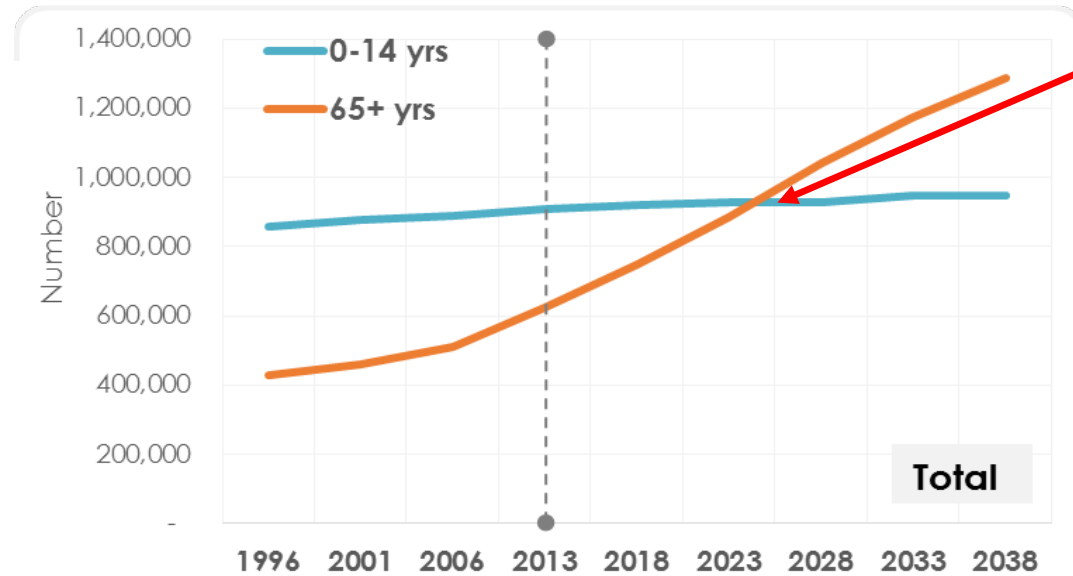
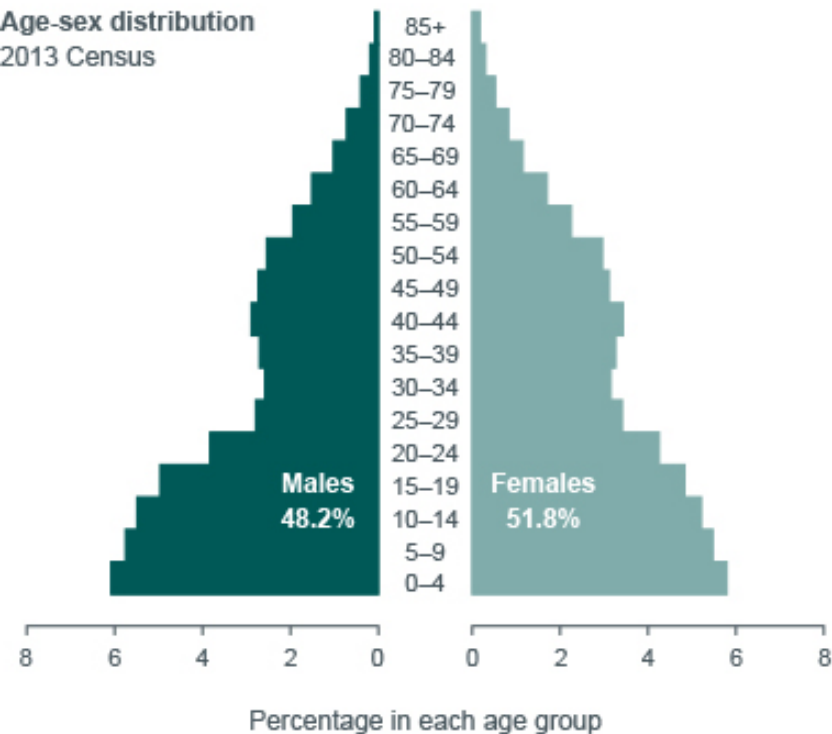
Are data relevant to informing local solutions?

Are official statistics for us
or about us?

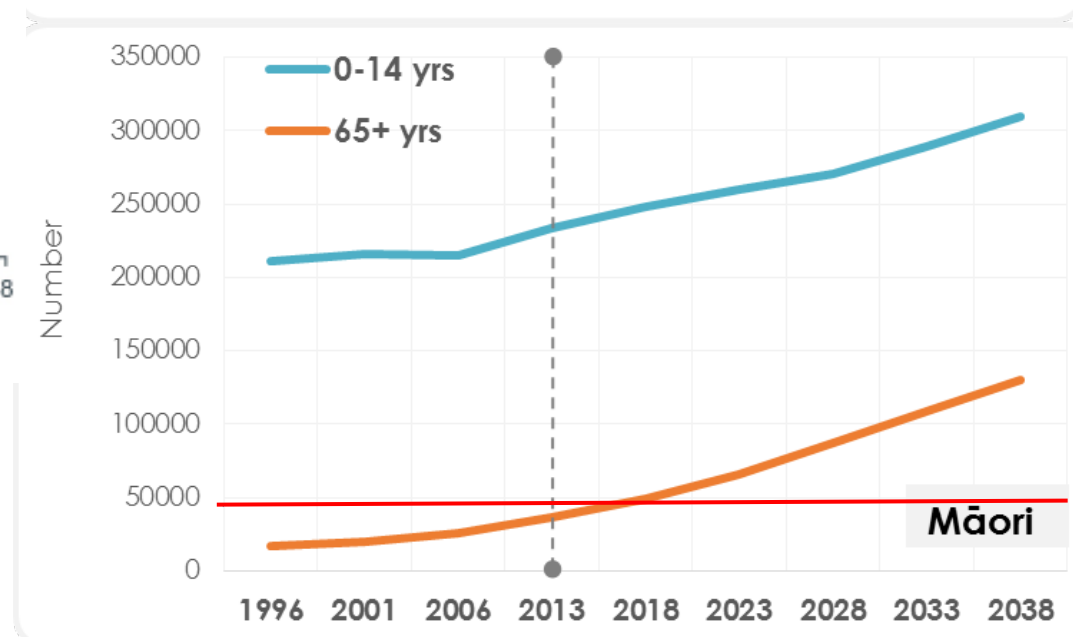
The 'potential' demographic dividend

Māori

Age-sex distribution
2013 Census



More older people
than kids



Prevention will
remain a key focus.
Ageing population
with **social and
health** needs



A Locally Based Initiative to Support People and Communities by Transformative Use of Data

□ SHARE

| JULIA LANE, DAVID C. KENDRICK, DAVID T. ELLWOOD

The data revolution is transforming how executives manage operations and businesses deliver goods and services. Yet when it comes to helping people escape poverty, the revolution has barely begun.

www.mobilitypartnership.org/

DOWNLOAD THIS PAPER

Full Idea Paper

[Summary >](#)

Some good data-driven news stories...

Te Reo o te Ora



Second Edition (Including the Six Year Follow-up)

Wairarapa Asthma Project

Community intervention.

Very brief duration.

New approach.

Long term reduction in
admissions

Focused local effort for
national level policies.
Research partnerships
= **NEW** solutions.

Wahakura

Community intervention.

Just as safe as bassinets.



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Some MORE good data-driven news stories...



CHD1 Gene Discovery and Service Development



Māori-driven data-informed community development

KEY DIRECTIONS				
WHANGATANGA	RANGITIRANGA	MANAUITANGA	WAIKATANGA	KAITIAKTANGA
DEVELOP VIBRANT COMMUNITIES "A kaupapa that can be shared, shared, shared and experienced."	ENHANCE LEADERSHIP & PARTICIPATION "People engaged in their communities."	IMPROVE QUALITY OF LIFE "Sustainable with our environment and standard of living."	PROMOTE DISTINCTIVE IDENTITY "Recognise and celebrate of identity, uniqueness and belonging."	ENSURE SUSTAINABLE FUTURES "Sustainable prosperity."
CULTURAL Māori communities are culturally vibrant across Tairāwhiti. The use and significance of marae. Accessibility to Māori culture.	Māori are actively participating and demonstrating leadership in the community. Māori Whānau as Treaty partners. Māori as Treaty partners. Youth participation and leadership.	Māori communities are culturally strong and healthy. Māori cultural values and heritage. Sense of pride and belonging. Contribution to the future.	Māori heritage of Tairāwhiti is valued and protected. Māori cultural values and heritage. Sense of pride and belonging.	Māori cultural wellbeing is future proofed. Investment in Māori arts and culture. Wellbeing, Māori and Whānau is a key.
SOCIAL Māori communities are connected and safe. Access to transport and public facilities. Safe and secure whānau and communities. Participation in decision making.	Māori are active across all sectors of the economy. Māori representation in public institutions. Trust in public institutions. Participation in decision making.	Māori enjoy a high quality of life. Health and wellbeing. Access to health services. Participation in mainstream education.	Māori social institutions and networks. Urban Māori authorities and Māori NGOs. Sport and leisure.	Māori wellbeing and resilience is strengthened. Social equity. Wellbeing. Wellbeing.
ECONOMIC Māori have the skills to realise economic opportunities. Māori business study. Māori business capability. Māori in management and leadership positions.	Māori are active across all sectors of the economy. Māori business study. Māori business capability. Māori in management and leadership positions.	Māori are earning income and return that will be shared with Māori. Income - individual and whānau. High quality and affordable housing. Māori and assets.	Māori businesses are uniquely identifiable, visible and prosperous. Māori business. Māori involvement in networks.	Māori businesses are improving and growing. Māori business. Māori involvement in networks. New opportunities and markets.
ENVIRONMENT To Tairāwhiti is able to support its own whānau. Making Māori and public impact. Wellbeing and wellbeing.	Māori are actively involved in decision making and management of natural resources. Co-governance of natural resources. Māori management planning. Māori and natural resources.	The Māori of Tairāwhiti are enhanced or restored for all people. Access to clean water and resources. Sustainable energy use. Water quality.	Tairāwhiti Māori are enhanced or restored in other areas. Māori and design principles. Indigenous flora and fauna.	Māori are leaders of the environment movement in Māori. Māori involvement in research. Capacity of Māori to support the environment.

Independent Māori Statutory Board of Auckland Council



genomics
aotearoa

New variome focused on addressing inequity



Whānau Tahī
NAVIGATING WAYS TO ASPIRATIONAL OUTCOMES

Whānau-orientated data systems

National
Science
Challenges

SCIENCE FOR
TECHNOLOGICAL
INNOVATION

Kia kotahi mai –
Te Ao Pūtaiao me
Te Ao Hangarau

Technology to support Māori data and data sovereignty

Culturally Centred Data Sharing and Analytics

Rangi McLeod, Maybelle McLeod, Pauline Harawira

(Ngai Te Rangi)



Hereditary Gastric Cancer Project

- Discovered gene (CDH-1) for Hereditary Diffuse Gastric Cancer
- Now ~500 kindreds worldwide
- Transformed cancer detection, treatment and survival



Combining **two** sources of knowledge

But analytics and protections determined by cultural practices



Government Data Sharing Agreements

 nzherald.co.nz

More progress for Te Hiku Social Accord for iwi in Far North

26 Jun, 2018 10:00am
3 minutes to read



Nanaia Mahuta greeting Te Hiku iwi leader Haami Piripi to Wellington

Northland Age


Data access in formal agreements between government and iwi

**BUT
access needs
resources to store
and use**

Māori Data Governance Structures

Iwi Chairs Forum


[Home](#)[Tikanga](#)[Kaupapa](#)[Pānui](#)[Contact](#)[Login](#)




Sharing the vision of Kotahitanga

Nau mai, haere mai, tauti mai
He waka kōtuia kāhore e tukutukua ngā mimira.

*A canoe that is interlaced will not become separated at the bow.
In unity there is strength.*



Fresh Water
[View kaupapa](#)



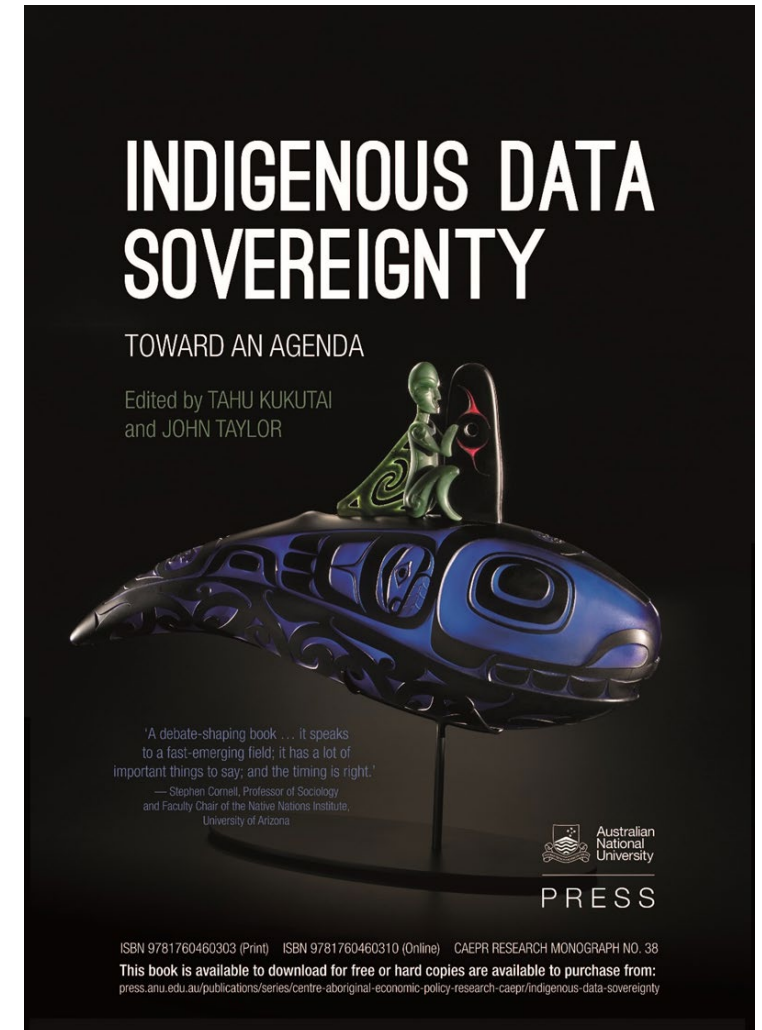
Constitutional Working Group

Leading co-governance and co-design discussions with Govt

Indigenous Data Sovereignty

Data Sovereignty states that data is subject to the laws of the nation **within which it is stored**

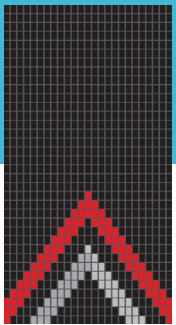
Indigenous Data Sovereignty states that data is subject to the laws of the nation **from which it is collected** (including Tribal nations)

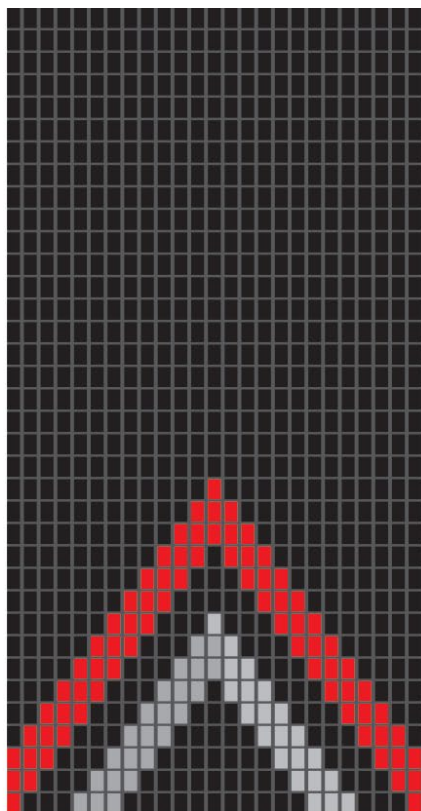


**Free to download
From ANU press**

Māori Data Sovereignty

**Is the right of Māori to access, to
use, to have governance and control
over Māori Data.**





TE MANA RARAUNGA

Māori Data Sovereignty Network

**“He whenua hou,
Te Ao Raraunga
Te Ao Raraunga,
He whenua hou”**

Kirikowhai Mikaere

(Data is the new land)

**Data is a valuable strategic
resource**

<https://www.temanararaunga.maori.nz/>

HOME

Our Data, Our Sovereignty, Our Future

Resources:

e.g. Māori Data Audit Tools

- Charter
- Principles

Nga mihi ki a koutou katoa

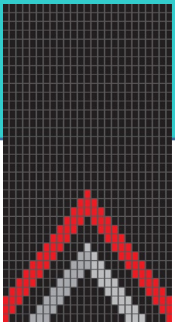
Our data, our sovereignty, our future. This vision drove the establishment of Te Mana Raraunga as the Māori Data Sovereignty Network. We advocate for Māori rights and interests in data to be protected as the world moves into an increasingly open data environment.

Contact us

For information or advice

te.mana.raraunga@gmail.com

Indigenous Data Sovereignty is supported by International Policy



2007 UN Declaration on the Rights of Indigenous Peoples – Article 15

“Indigenous peoples have the right to the dignity and diversity of their cultures, traditions, histories and aspirations which shall be appropriately reflected in education and public information”

2008 WHO's Commission on the Social Determinants of Health

a 'Minimum Health Equity Surveillance System'. As part of the system, 'good-quality data on the health of Indigenous Peoples should be available, where applicable'.

Research Data Alliance section

Open Data Charter revision

IEEE working group

A COMMITMENT TO INDIGENOUS DATA SOVEREIGNTY (IDS) SPANS THE GLOBE

NATION-STATE BASED, INDIGENOUS LED COMMUNITIES OF PRACTICE

- TE MANA RARAUNGA MĀORI DATA SOVEREIGNTY NETWORK in Aotearoa/New Zealand



- UNITED STATES INDIGENOUS DATA SOVEREIGNTY NETWORK



- MAIAM NAYRI WINGARA ABORIGINAL AND TORRES STRAIT ISLANDER DATA SOVEREIGNTY COLLECTIVE in Australia

- EMERGING NETWORKS:
FIRST NATIONS, INUIT AND MÉTIS in Canada,
SAMI/SÁPMI in Sweden



GIDA THE GLOBAL INDIGENOUS DATA ALLIANCE

Promoting Indigenous Control of Indigenous Data



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gida-global.org

Be

FAIR

Findable

Accessible

Interoperable

Reusable

and

CARE

**Collective
Benefit**

**Authority
to Control**

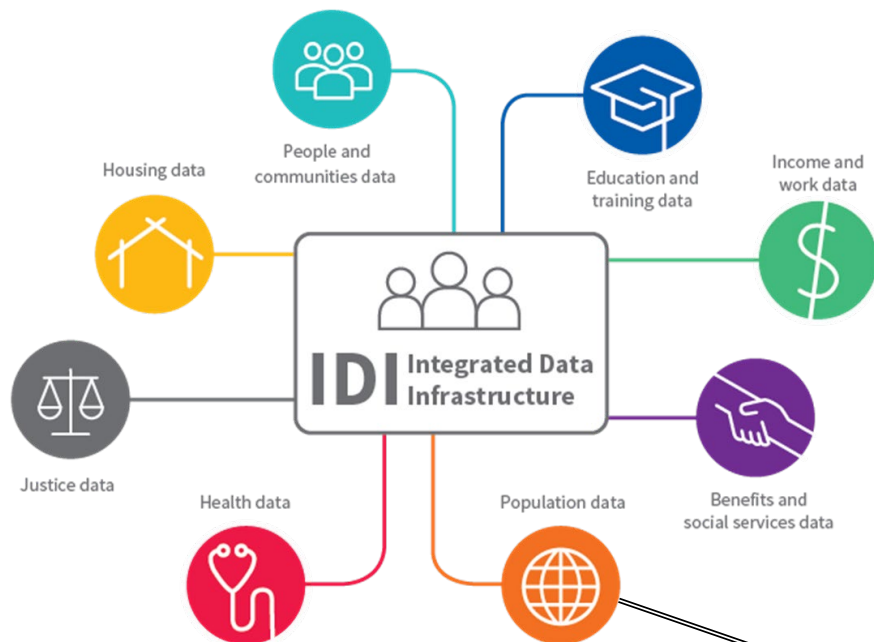
Responsibility

Ethics

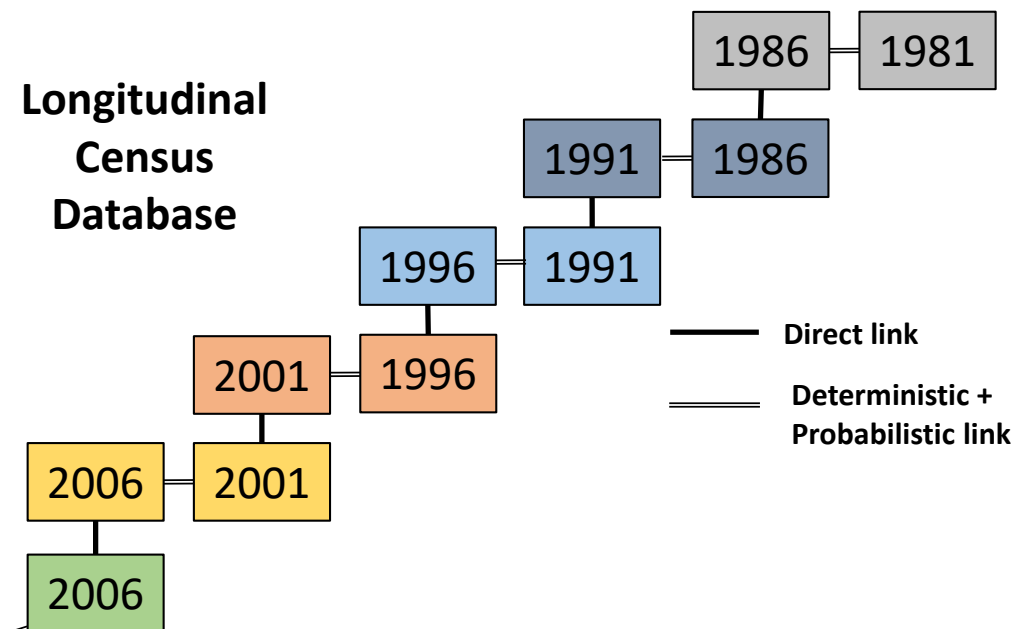
Data Initiatives			Source	Status	Scope
	DATA USE	Data driven regional development	Community	✓	1 region
		Local Govt Policy monitoring	Statute	✓	1 region
	GOVERNANCE	Iwi Chairs’ Forum Data Group	Tribes	✓	1 region
		Co-governance of Official Stats	Govt / Tribes	pending	
	RELEVANCE	Tribal data boundaries	Govt/Research	✓	pilot
		Māori Wellbeing Survey	Govt	✓	National
		Māori regional capabilities index	Govt/Research	Under development	scope
	ACCESS	Māori longitudinal study	Research	Started	National
		Undercount visualiser	Research	Complete	National
		Inequality visualiser	Research	Final Testing	International
		Data Analyser	Research	Complete	International

Data Access

Māori Data and Data Access

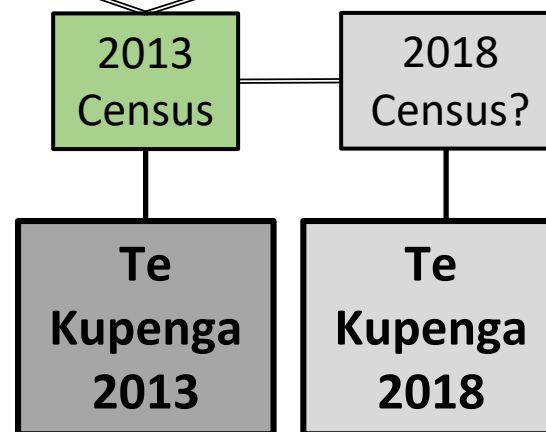


Longitudinal Census Database



Source of wellbeing info:

- subjective wellbeing
 - whanau
 - self-reported health status
- social
- cultural
- economic wellbeing



Permanent longitudinal study
+ Tribal

- Geographies
- Identifications
- ? Data repositories

Identifying GAPS
and Informing new
data collection



Data Relevance 1

Māori determined data boundaries

Stats NZ
Tatauranga Aotearoa

StatsMaps



Geographic Boundary Viewer

Census Area

Layers Legend Results

Search: Address ▼

Enter a search phrase

- ☐ Area Units 2015 with Labels
- ☐ Area Units 2015
- ☐ Area Units 2014 with Labels
- ☐ Area Units 2014
- ☐ Area Units 2013 with Labels
- ☒ Area Units 2013
- ☐ Area Units 2006 with Labels
- ☐ Area Units 2006
- ☐ Area Units 2001 with Labels
- ☐ Area Units 2001
- ☐ Area Units 1996 with Labels
- ☐ Area Units 1996
- ☐ Area Units 1991 with Labels
- ☐ Area Units 1991
- ☒ Local government boundaries
 - ☐ Community Boards
 - ☐ Wards
 - ☒ Territorial Authorities

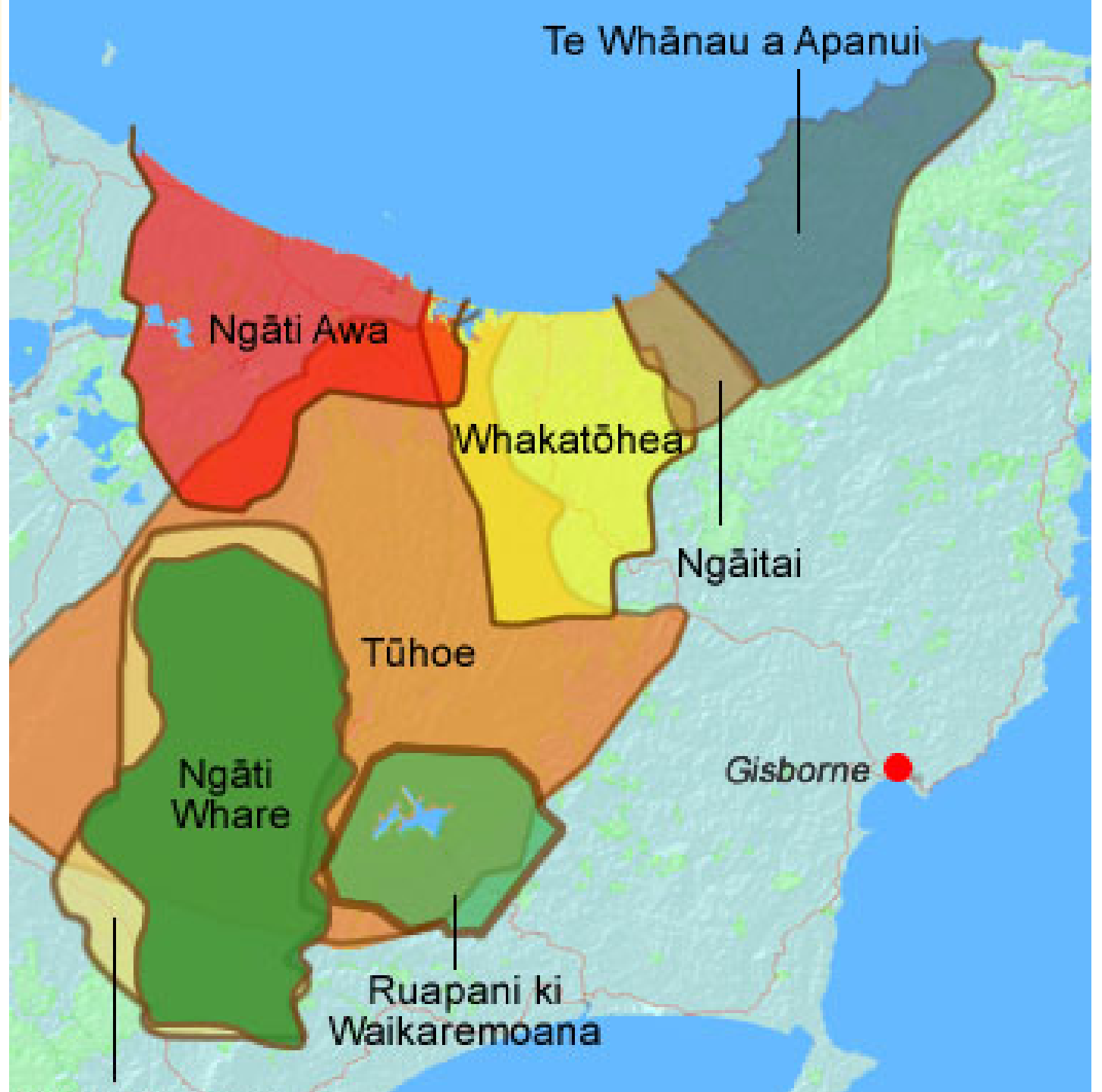
Māori Data by Statistical Area?

- Really don't match tribal boundary descriptions
- Too large
- Some rural tribal areas invisible
- **Meshblocks** too small, changeable and non-traditional boundaries

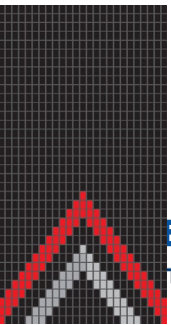
Data Relevance 2

A Māori GIS capability to the Official Statistics System

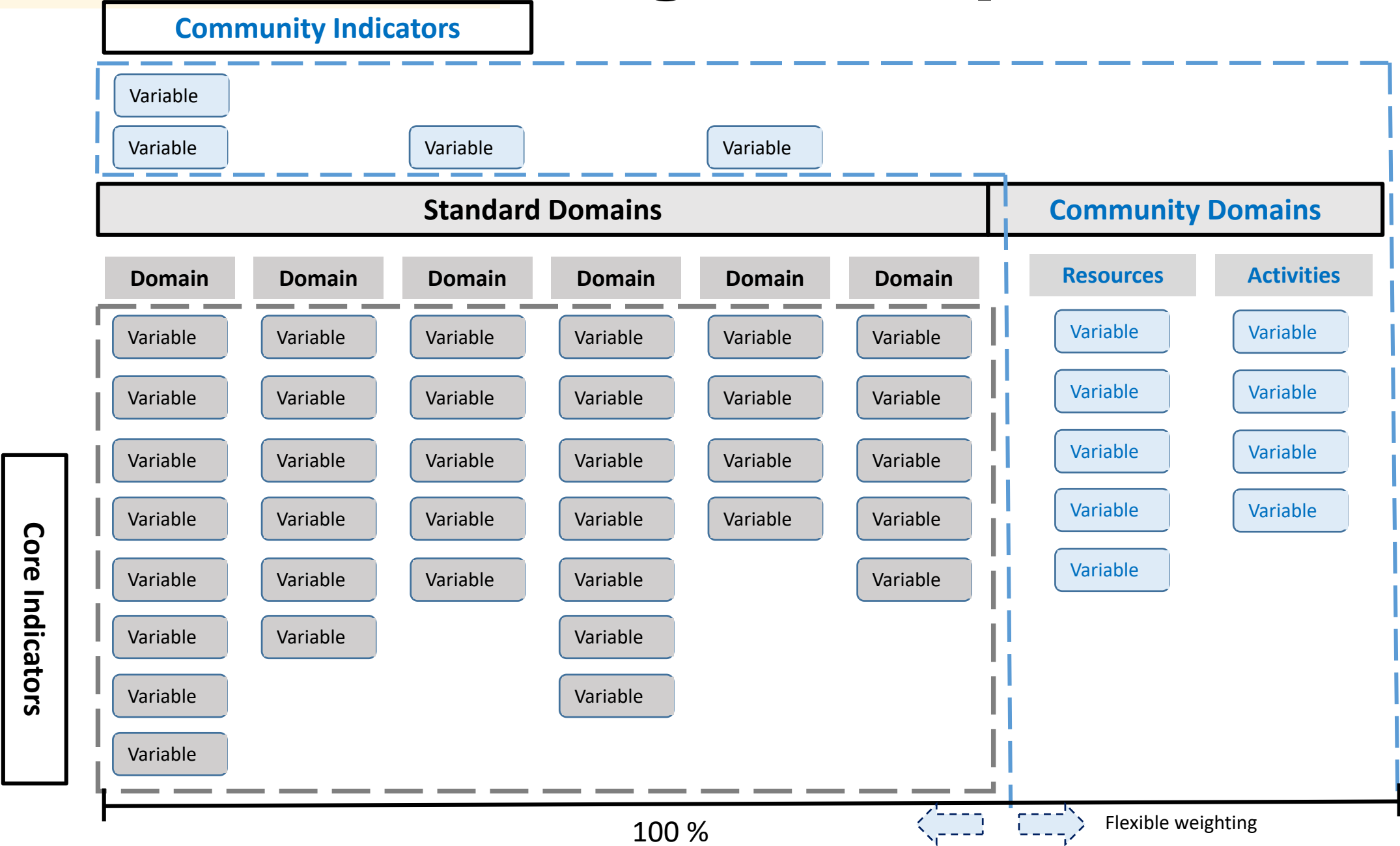
A permanent structural change



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Data Relevance 4 The Impact of Indigenous Undercounts

The Impact of Census Undercount on Age-Adjusted Rates

Introduction

This app is designed to show the effect of Census undercount on age-adjusted rates. We use age-adjusted rates as the comparison as they are a commonly reported statistic in official health statistics and are important for assessing the well-being of communities. If the underlying Census data used for these rates is unreliable, this has significant consequences on the ability to use these to help communities.

Start Tutorial 

Methodology



Instructions



Select Data



<https://daniel-barnett.github.io/census-undercount/>

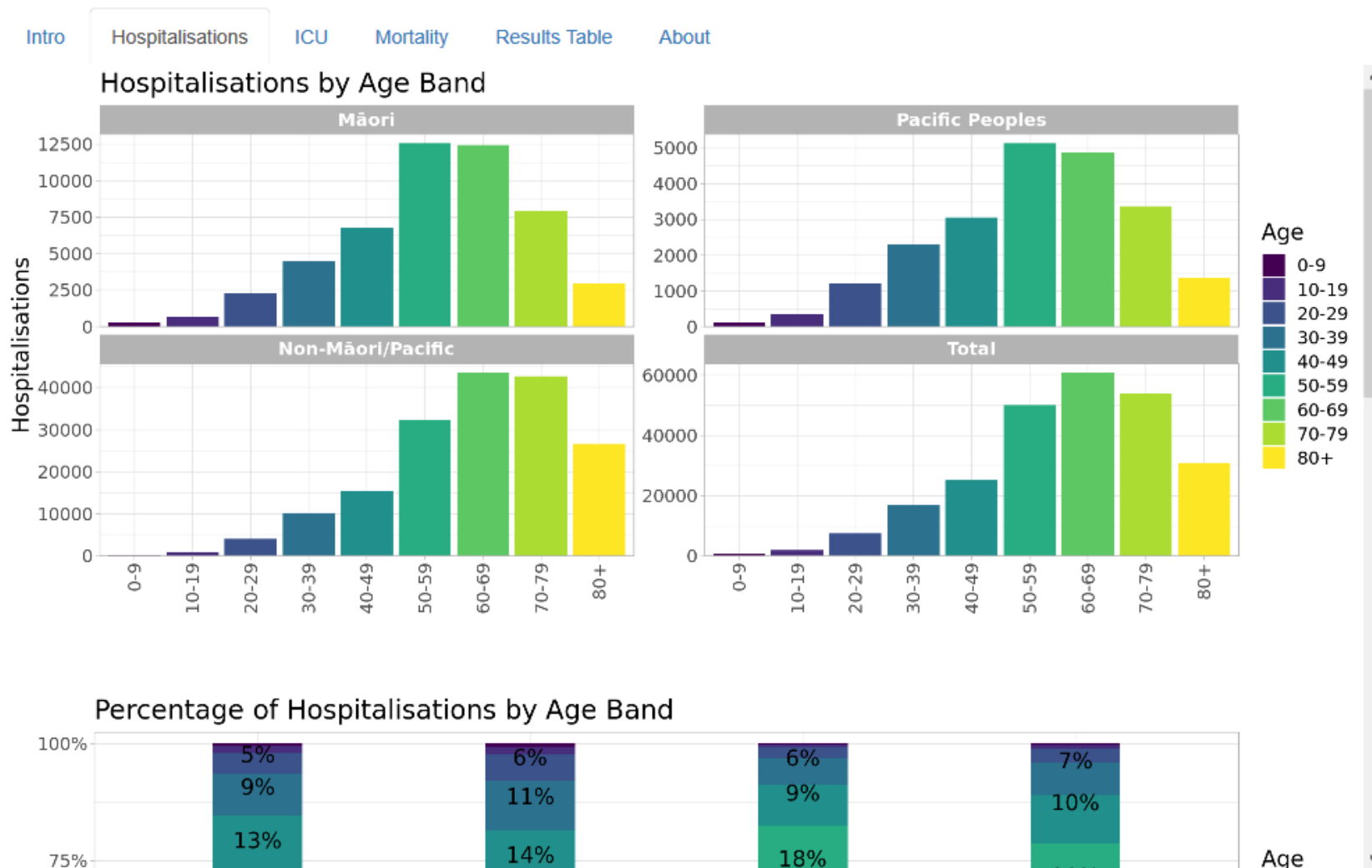
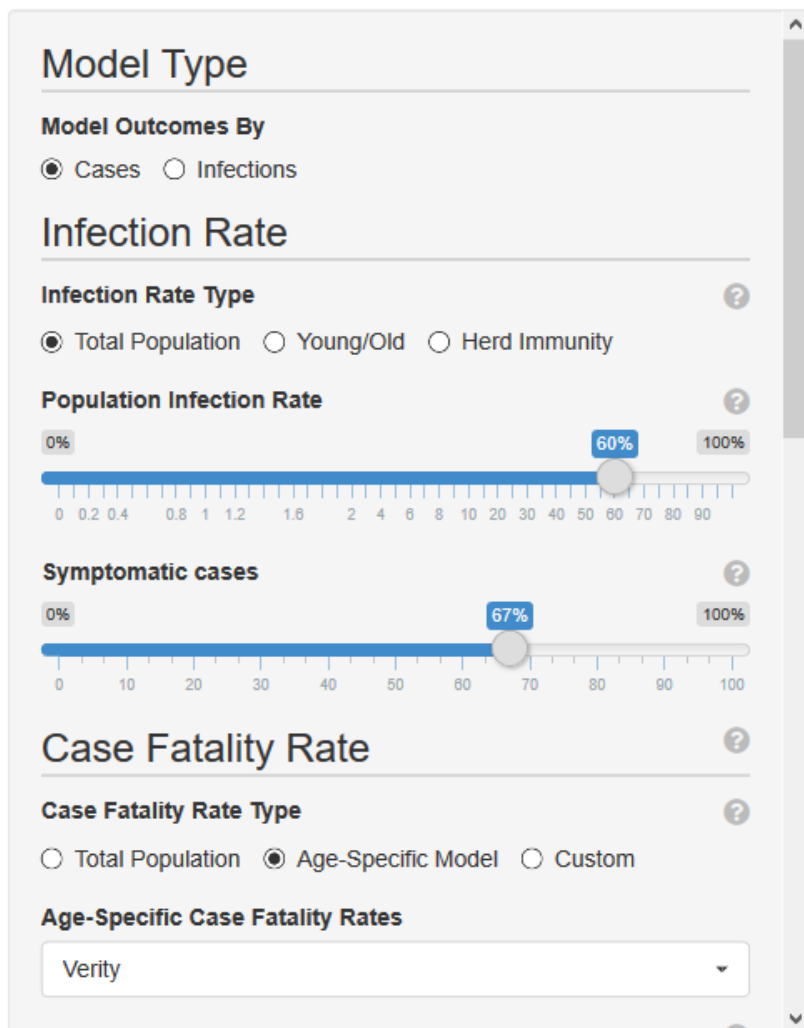
 Input Data



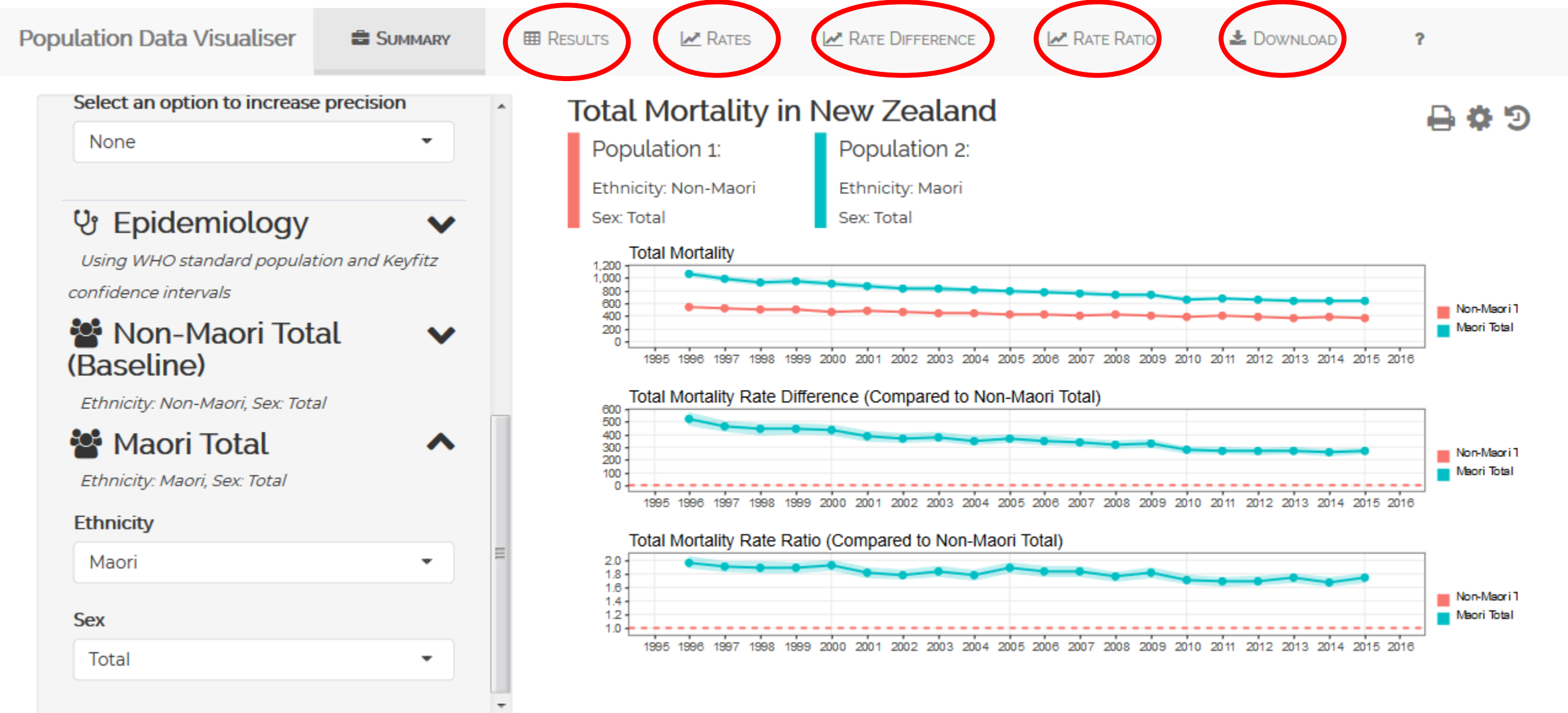
Data Relevance 5

Epidemic Inequity at the Regional Level

COVID-19: New Zealand Outcome Modelling and Visualisation



Mātau: point and click outcome visualisation



Interactive regional maps:

Mātau

SUMMARY

RESULTS

RATES

RATE DIFFERENCE

RATE RATIO

DOWNLOAD

?

Non-Māori Total (Baseline)

Ethnicity: Non-Māori, Sex: Total

Ethnicity

Non-Māori

Sex

Total

Māori Total

Ethnicity: Māori, Sex: Total

Ethnicity

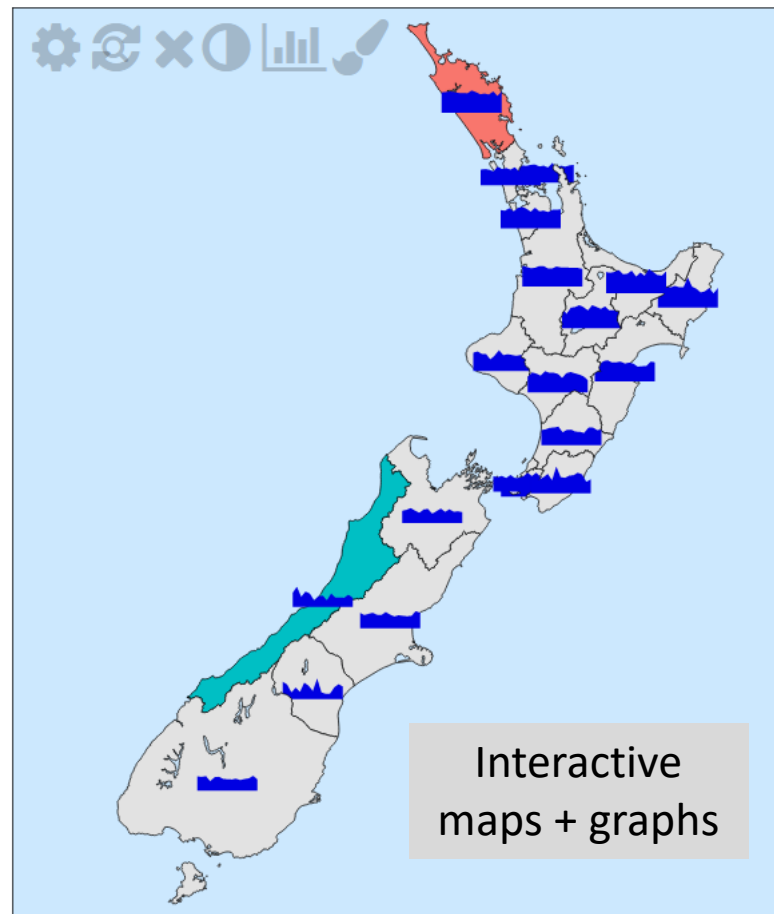
Māori

Sex

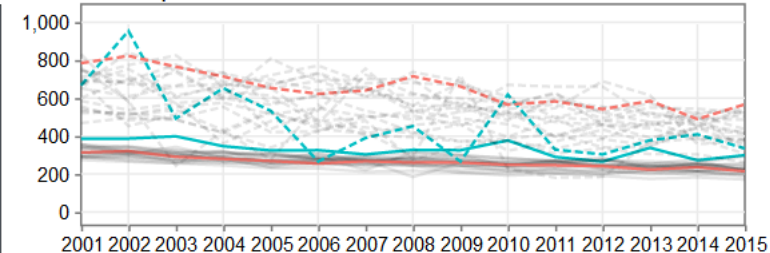
Total

Total Mortality in New Zealand

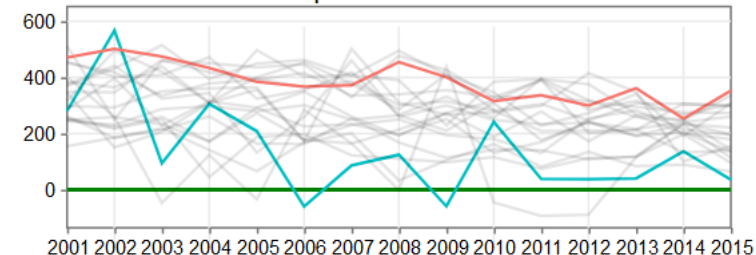
Rate Ratio



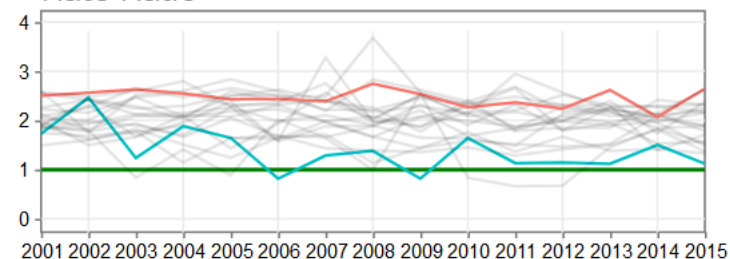
Rate per 100,000



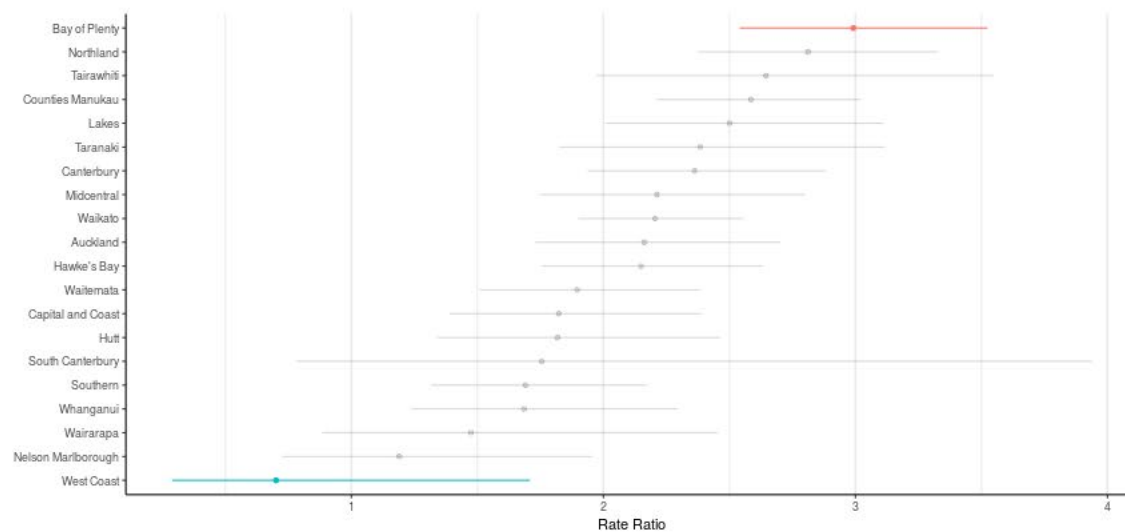
Rate Difference per 100,000



Rate Ratio



Last Year Ranking - Rate Ratio



Number of populations

1

2

Year range

2001

2001 2002 2003 2005 2006 2008 2009 2010 2012

Age Groups

Total

Select an option to increase precision

None

Epidemiology

WHO standard population and Keyfitz confidence intervals

Non-Maori Total (Baseline)

Ethnicity: Non-Maori, Sex: Total

Ethnicity

Non-Maori

Sex

Total

Maori Total

Ethnicity: Maori, Sex: Total

Ethnicity

Maori

Sex

Total

<https://dbarnett.shinyapps.io/matau-test-action/><https://dbarnett.shinyapps.io/popvis2/>

Emerging solutions in NZ

Data Use

Regional data informed development

Local Govt policy monitoring

Data Governance

Iwi Chairs Forum Data Leadership

Co-Governance Discussions

Data Relevance

Indigenous boundaries

Supplementary variables

Regional Capabilities Index

Data Access

New studies

New Data Tools



How do we
get there?

Information: access and governance

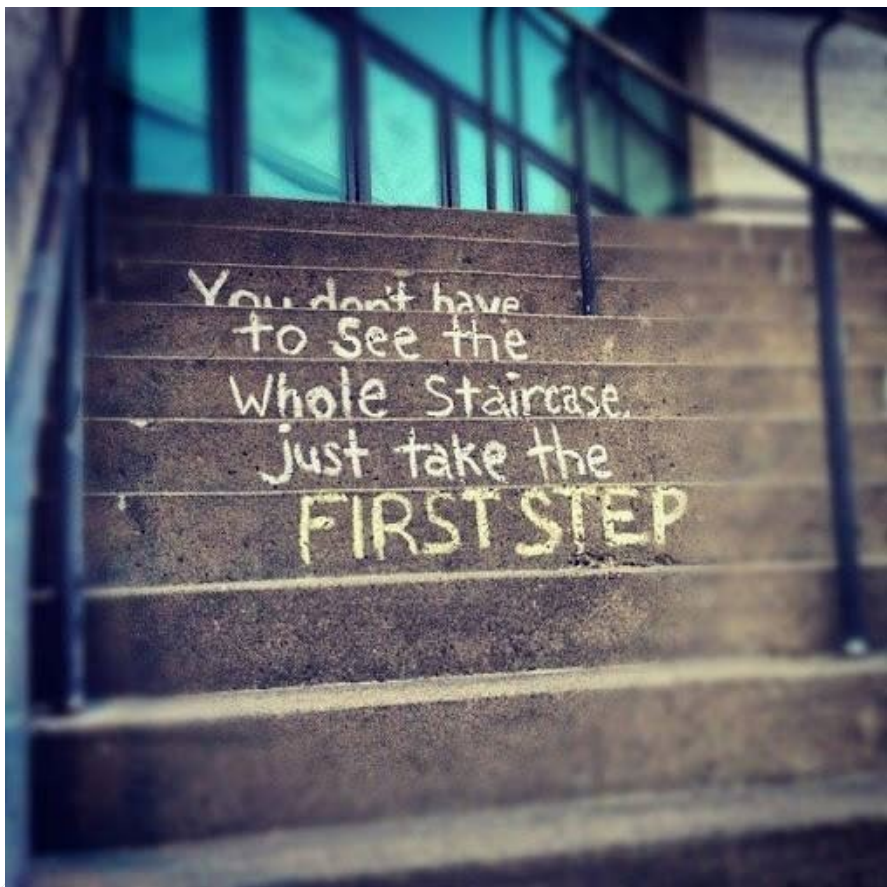
Translators: capability to use

Infrastructure: control and design the future

*"Whāia te **ITI** kahurangi, ki te tūohu koe, me he maunga teitei"*

Seek the treasure you value most dearly; if you bow your head, let
it be to a lofty mountain

Re-orientating the Data System to inform Advancement



Combined commitment to change

Māori Specific Outcomes:

Supporting locally driven innovation to match need

Universal Outcomes:
Data system monitoring of local and national inequity

Changing

What is measured
Who can access it
How it is accessed
How it is analysed

Māori data capability
- Workforce
- Technology



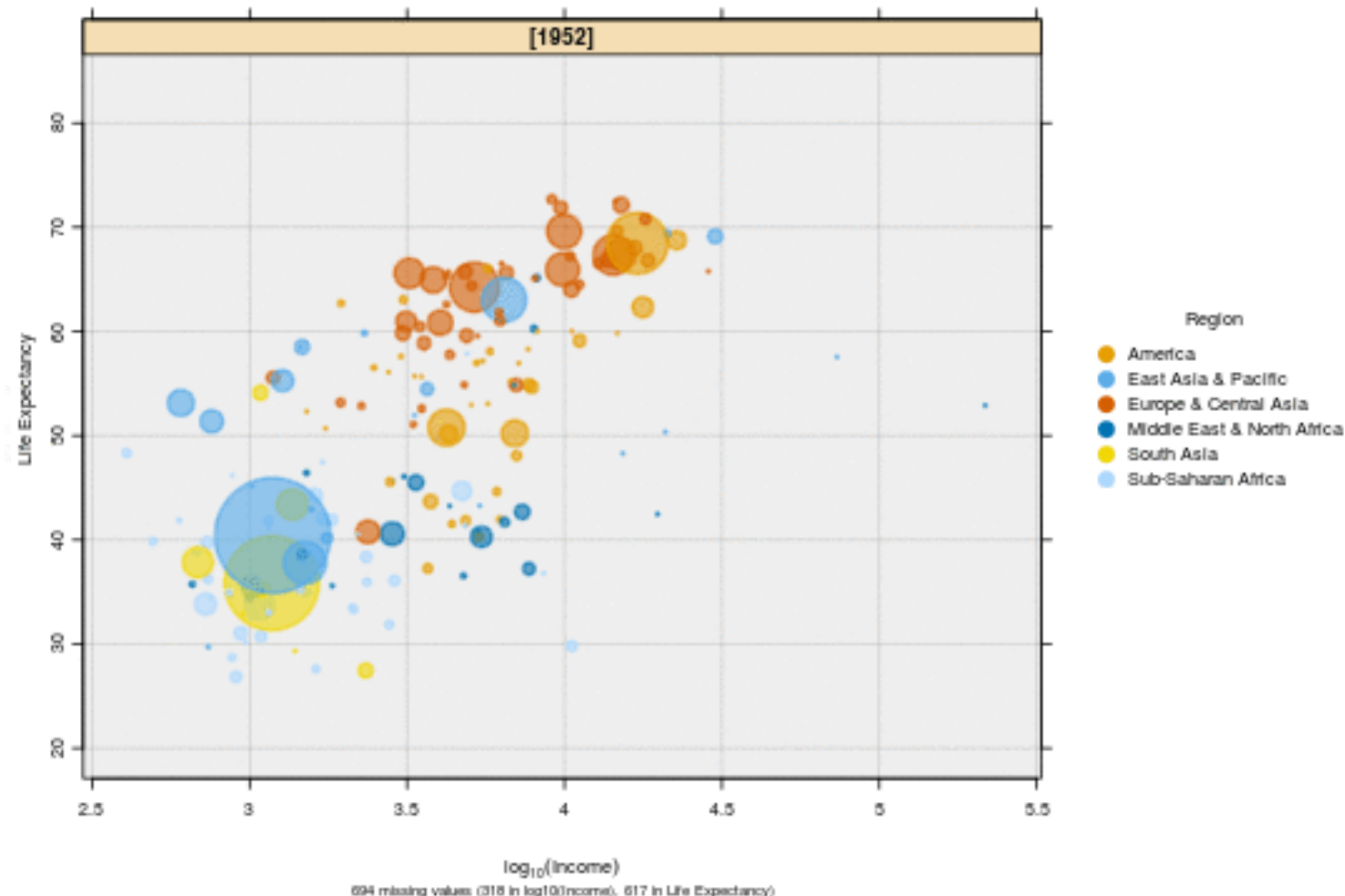
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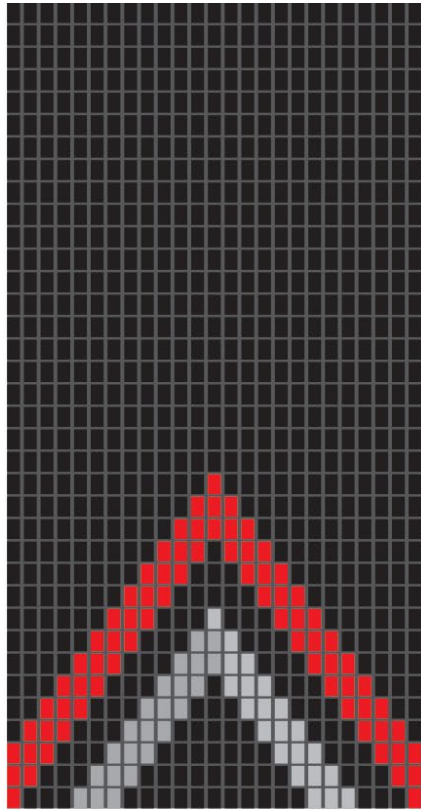
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