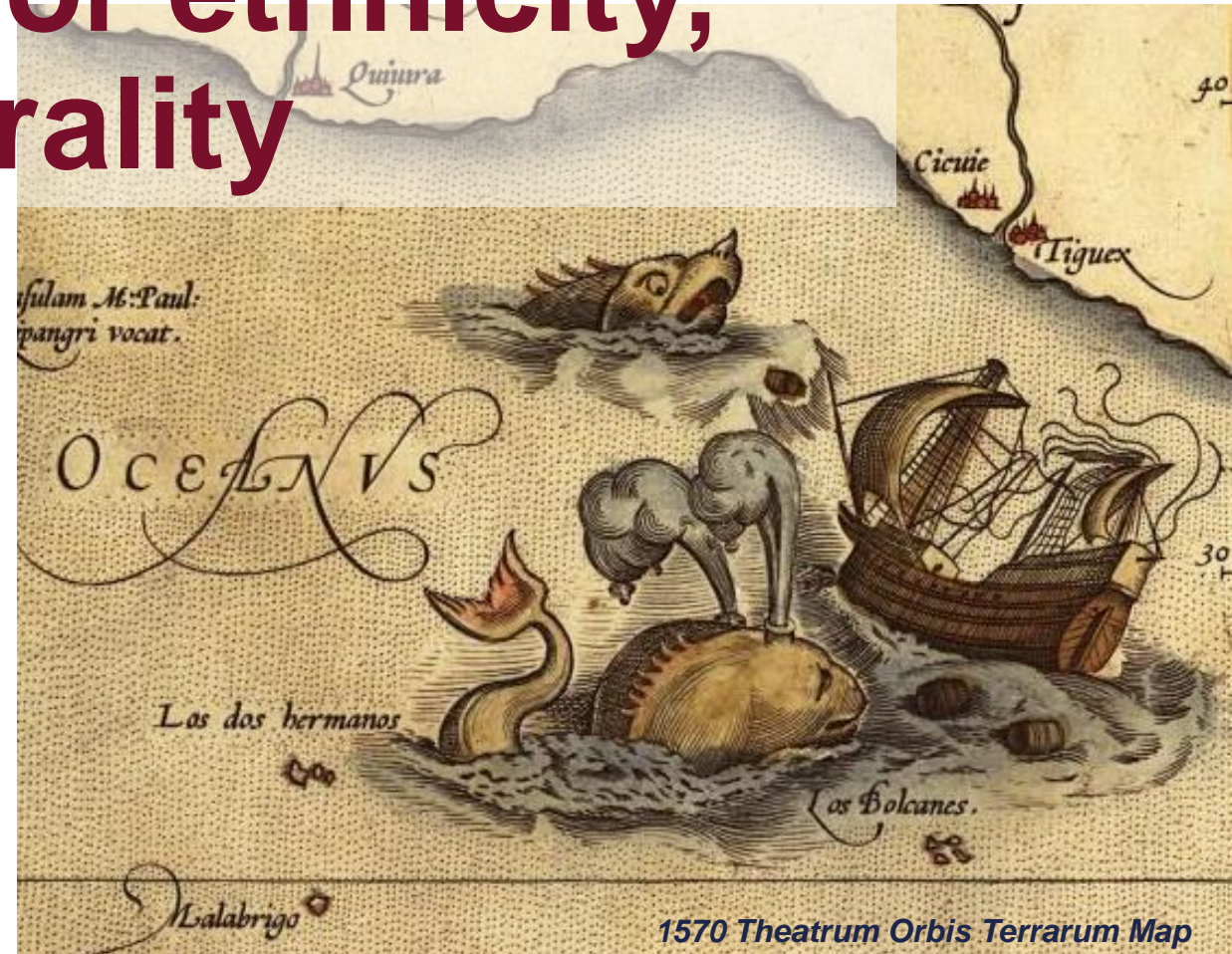# "There be Dragons"
Definitions matter for ethnicity, deprivation, and rurality

**PHONZ Conference
Friday 21 July 2023
Heather McLeod, June Atkinson**

1570 Theatrum Orbis Terrarum Map

Te Whatu Ora
Health New Zealand

Deaths in Aotearoa MORT Study 2000-2018

March 2023 Part I

April 2023 Part II

Jo Hathaway

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Ōtautahi Christchurch

Equity by Ethnicity

Issues with two definitions of ethnicity in MORT data

The Mortality Collection (MORT)

Asked for:

- Ethnicity 1
- Ethnicity 2
- Ethnicity 3
- Prioritised Ethnicity

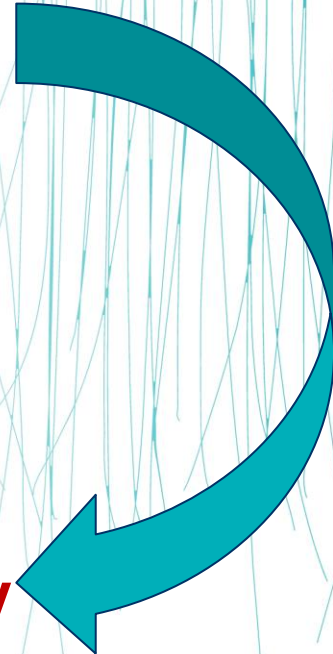**ALWAYS check Ethnicity 1, 2, 3 gives correct Prioritised Ethnicity for Māori.**

Any mention of Māori must be equal to Prioritised Ethnicity for Māori.

Received rounds 1 and 2:

- MORT Ethnicity 1
- MORT Ethnicity 2
- MORT Ethnicity 3
- **NHI Prioritised Ethnicity**
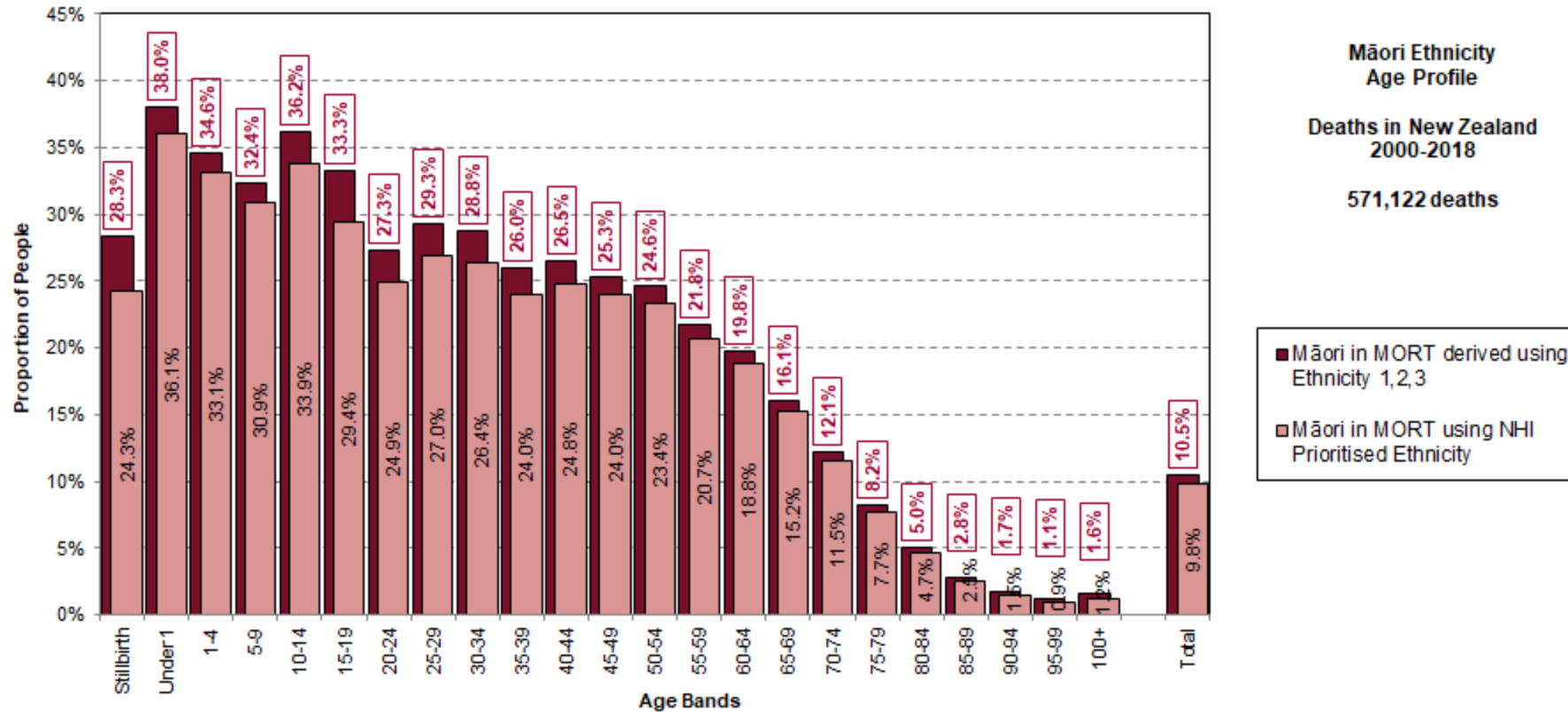
Received round 3:

- MORT Ethnicity 1
- MORT Ethnicity 2
- MORT Ethnicity 3
- **MORT Prioritised Ethnicity**

Prioritisation: see order in right hand column of "Level 2 ethnic codes":
https://www.tewhatuora.govt.nz/our-health-system/data-and-statistics/nz-health-statistics/data-references/code-tables/common-code-tables#ethnicity-code-tables

Percentage Ethnicity Māori in MORT Data

Māori Ethnicity Age Profile

Deaths in New Zealand 2000-2018

571,122 deaths

Legend:
- Māori in MORT derived using Ethnicity 1,2,3
- Māori in MORT using NHI Prioritised Ethnicity

Dark bars use Ethnicity_1, Ethnicity_2 and Ethnicity_3 in MORT and look for any mention of the code for Māori. This total ethnicity should have been identical to prioritised ethnicity for Māori.

This is how we first discovered a problem and shows the very large difference between MORT-derived Māori ethnicity and NHI Māori ethnicity incorrectly supplied.

Prioritised Ethnicity NHI
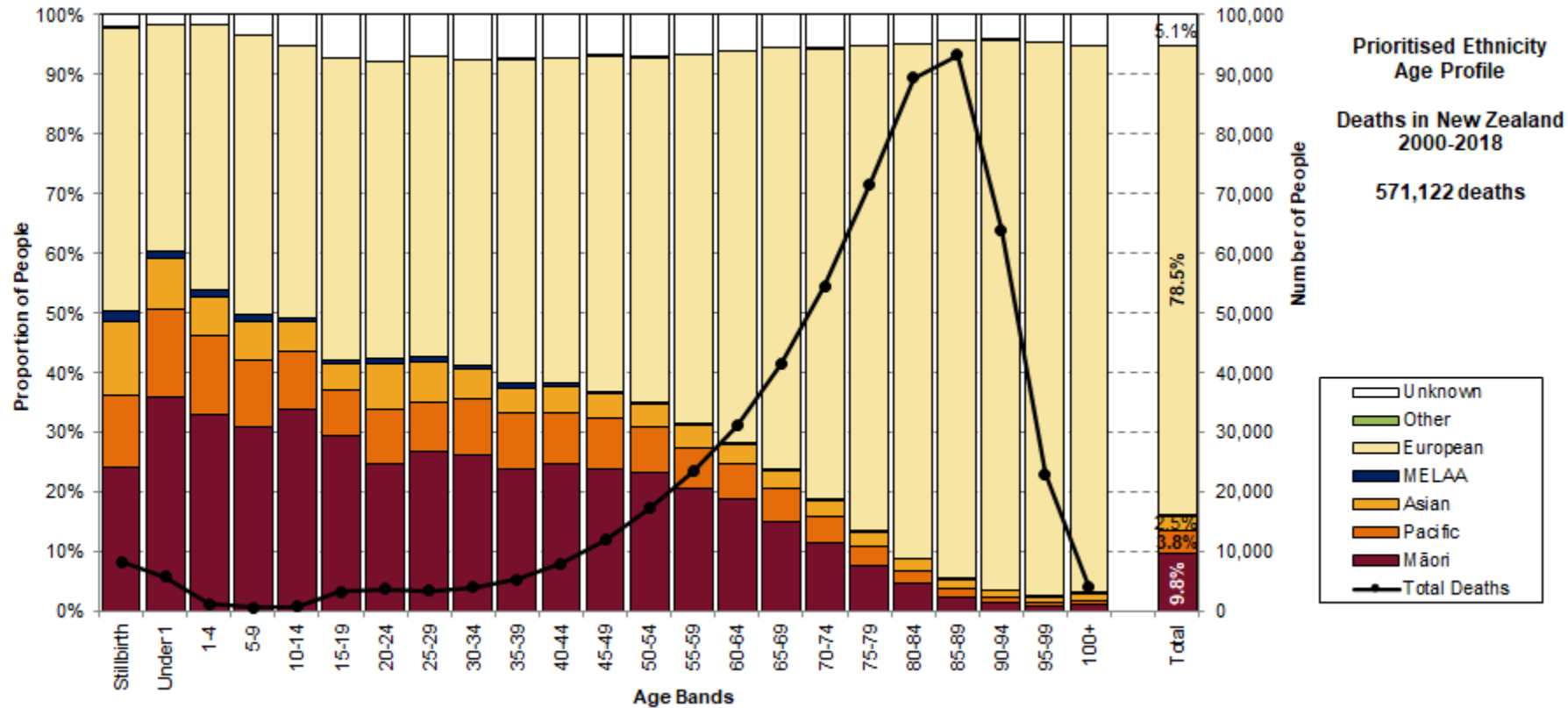
This is the priority ethnicity as first received. After queries, it was found to be NHI prioritised ethnicity and not the prioritised ethnicity in the MORT data.

Prioritised Ethnicity MORT
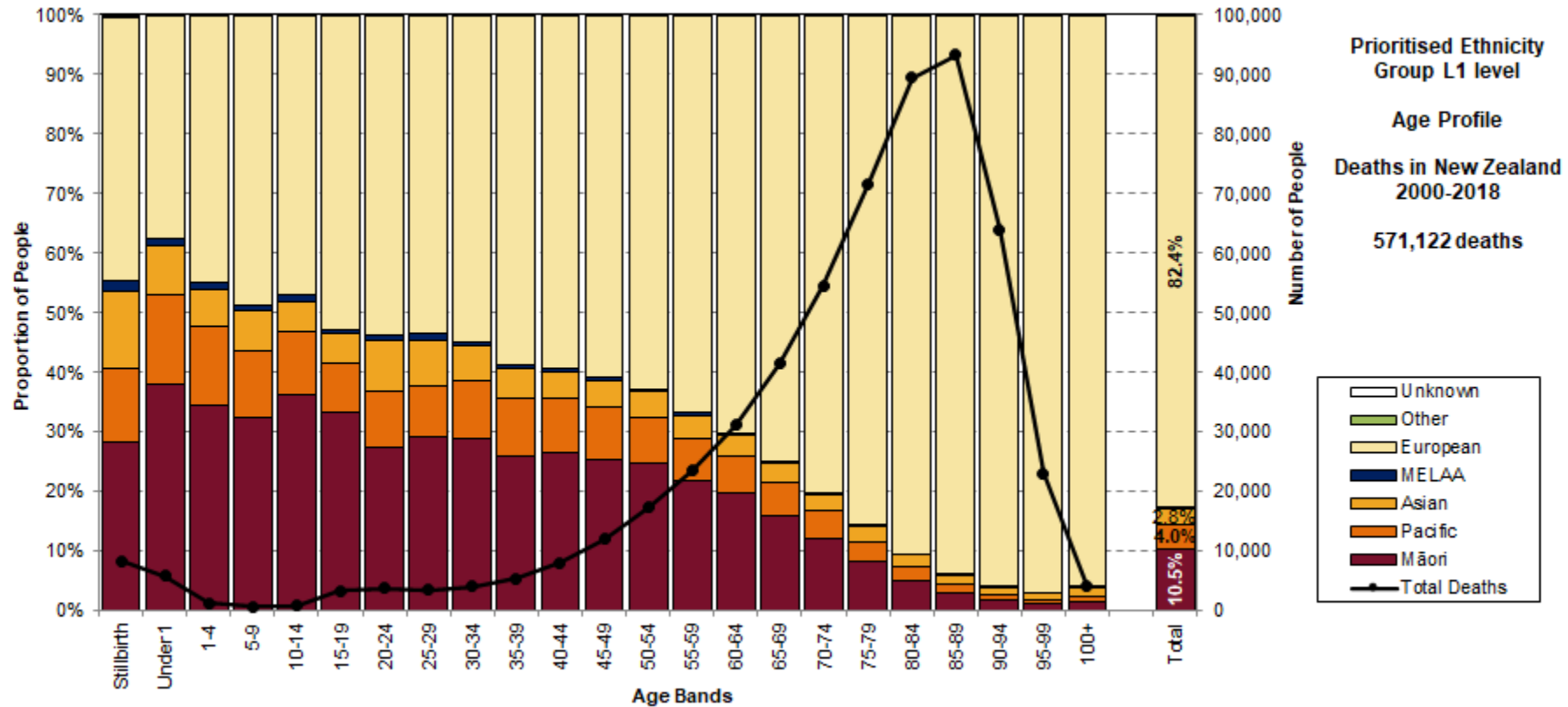
This is Level 1 prioritised ethnicity using the three ethnicity fields supplied with the MORT data, and the algorithm used in the National Collections for prioritisation.

Under-counting Māori in Health Data

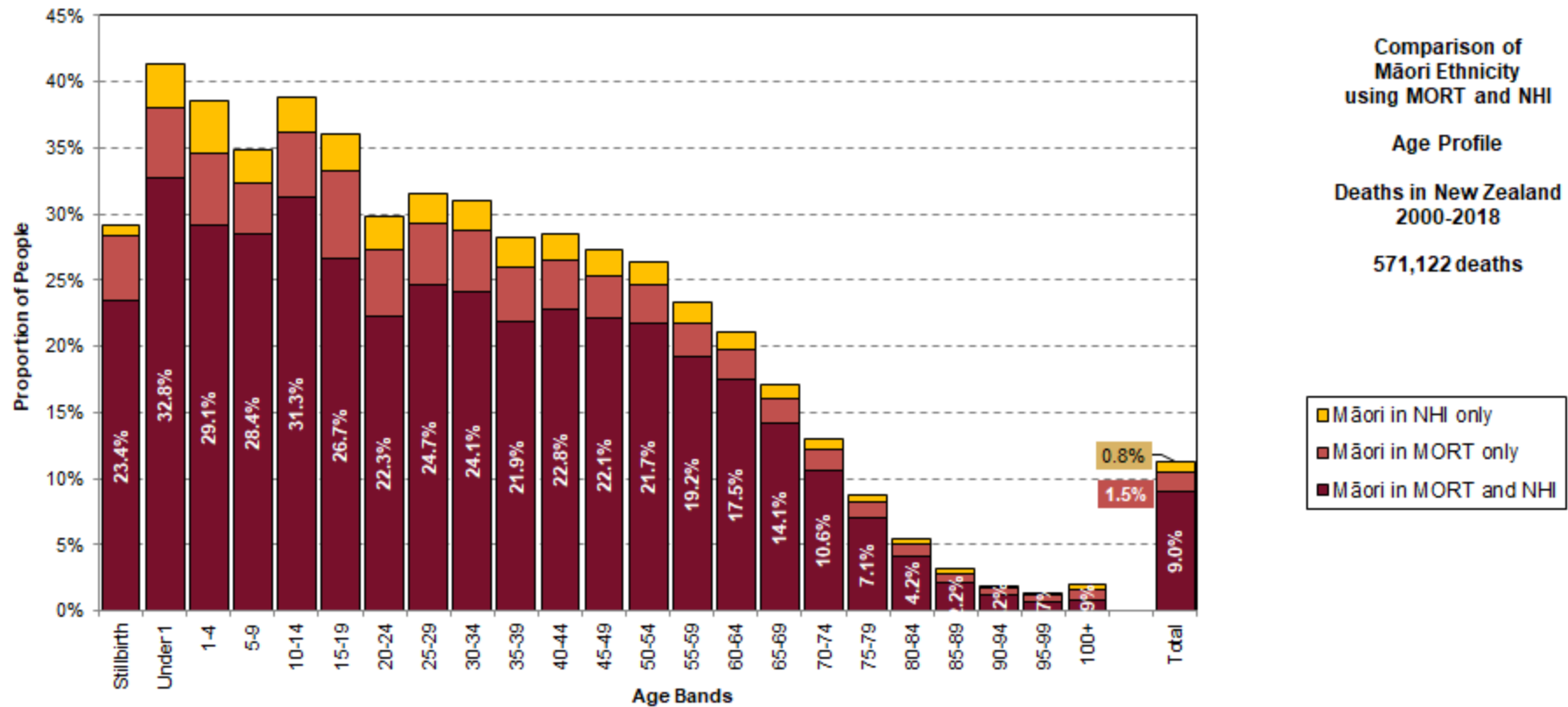- Researchers examined ethnicity data quality; in particular, the representation and potential under-counting of Māori in health and disability sector data, as well as implications for inequities.

- Māori and non-Māori ethnicity data analysed at a population aggregate level across multiple 2018 datasets (Estimated Resident Population, Census Usually Resident Population, Health Service User (HSU) population and Primary Health Organisation (PHO) enrolments).

- Also analysed at an individual level for those linked in PHO and 2018 Census datasets. Ethnicity is from the National Health Index (NHI) in health datasets.

- **Results**

- Aggregate analyses show that Māori are considerably under-represented in HSU and PHO data. In linked analysis Māori were under-counted on the NHI by 16%. Under-representation is pronounced for Māori men with variations by age.

Ethnicity Māori in NHI and MORT

Comparison of Māori Ethnicity using MORT and NHI

Age Profile

Deaths in New Zealand 2000-2018

571,122 deaths

Legend:
- Māori in NHI only
- Māori in MORT only
- Māori in MORT and NHI

It is not just an undercount of Māori when the NHI ethnicity is used. We find **9.0%** of deaths (**51,218** people) are Māori in both. A further **1.5%** (**8,597** people) are Māori only from the MORT ethnicity and **0.8%** (**4,599** people) are Māori only in NHI prioritised ethnicity.

Using NHI ethnicity fails to identify **8,597** people as being Māori yet finds a different **4,599** people.

Ethnicity Māori in NHI and MORT

- NHI has **55,817** Māori. MORT has **59,815** Māori.
  - However, only **51,218** people are Māori in both.
- A further **8,597** are Māori using MORT prioritised ethnicity, for a total of **59,815.**

- Using NHI prioritised ethnicity fails to identify those **8,597 people** but finds a different **4,599 people** being Māori for a total of **55,817**.

- Examples:
  - NHI identifies 254 people as Māori, but they are Cook Islands Māori (Pacific) in MORT.
  - NHI identifies 96 people as Māori, but they are Samoan (Pacific) in MORT.
  - NHI identifies 3,926 people as Māori, but they are NZ European (European) in MORT.

Ethnicity Māori in NHI and MORT

Number of People / Ethnicity Description	Ethnicity Priority Code MORT	10	11	12	21	30	31	32	33	34	35	36	37	40	41	42	43	44	51	52	53	54	61	94	95	97	99	(blank)	Total
European nfd	10	335	608	541	4							2			1		2	1	2	1	5			3		49	97		1,651
NZ European	11	4,975	343,504	8,487	3,926	16	121	63	35	29	11	57	38	16	41	123	67	75	42	18	42	22	81	165	22	9,300	10,341	8	381,625
Other European	12	5,959	36,352	39,195	173	3	23	9	7	3	3	18	35	5	11	12	55	39	33	24	223	2	89	59	8	2,374	2,719	1	87,434
Māori	21	111	5,843	185	51,218	9	70	158	24	20	6	8	15	2	7	11	10	9	3	1	1	1	7	40	7	889	1,146	14	59,815
Pacific Peoples nfd	30		4	2		9	3	3		3	1	1	4		1											1	3		35
Samoan	31	6	197	23	96	49	8,481	15	27	30	27	14	84	1		3	3	2		1				3	9	167	205	4	9,447
Cook Islands Māori	32	4	164	15	254	45	31	3,799	24	10	3	2	141			3		1	1					1	2	88	94	1	4,683
Tongan	33	2	54	14	28	33	61	36	3,825	14	9	6	46		1		2	2						1		40	84	1	4,259
Niuean	34	2	43	5	32	15	55	21	17	1,371	3	2	32	1			1	2						1		39	28		1,670
Tokelauan	35		2	1	4	12	26	2	2	2	424		19		1									1		4	9		509
Fijian	36	7	132	31	10	5	16	2	12	2		706	16	1		5	297	5						1	1	25	39		1,313
Other Pacific Peoples	37	4	35	27	9	66	20	13	4	3	10	20	392			5		1						3	3	23	20		658
Asian nfd	40	4	14	14	1	2								24	11	10	2	20		1			2			1	2		108
Southeast Asian	41	9	92	63	6	1	1				1	2	10	197	775	239	28	573	2	3	2			9	3	64	65		2,145
Chinese	42	6	107	24	14	1	4					3	2	132	78	5,219	5	255	8					2	5	81	184	2	6,132
Indian	43	12	118	70	13	6	1		6	1	2	592	14	9	6	4	4,377	34	5	4	18			6	2	66	96	1	5,463
Other Asian	44	9	55	26	3							1		137	84	30	130	1,225	45	1	1	1		9	4	51	63		1,875
Middle Eastern	51	28	250	140	2							3	2		1	1	7	7	544	1	9			3	2	44	41		1,085
Latin American	52	11	41	42	1										1				1	147				1		10	11		266
African	53	8	48	76	1							1	2				9	3	3	3	240			1		20	13		428
Other Ethnicity	54	10	189	21	4								1		4	1	3	2			1		1		17	13		267
Other Ethnicity	61	5	29	14	4		1		1	1					4	3		4			4		4				2		76
Unknown	99		21	4	14				2					1	1									7		58	70		178
Total		11,507	387,902	49,020	55,817	272	8,914	4,121	3,985	1,489	501	1,435	856	527	1,016	5,675	4,999	2,258	694	207	547	25	224	305	38	13,411	15,345	32	571,122

Overall	Identical	465,949	81.6%
	Different	105,173	18.4%

Reading across shows MORT prioritised ethnicity; reading down shows NHI prioritised ethnicity. Numbers in green are where the two are identical, which is for only 81.6% of people in the study. In other words, **105,173 people (18.4%) have a different prioritised ethnicity**.

For Māori, only **51,218** people are Māori in both. A further **8,597** are Māori in MORT (code 21), giving a total of **59,815 Māori** using MORT prioritised ethnicity. Using NHI prioritised ethnicity fails to identify those **8,597** people but finds a different **4,599** people as being Māori for a total of **55,817.**

Data Source: MORT Study 2000-2018

Ethnicity Māori in NHI and MORT

At Level 1 Ethnicity Groups										As proportion of group	
Ethnicity MORT	**Ethnicity NHI**										
	Māori	**Pacific**	**Asian**	**MELAA**	**European**	**Other**	**Unknown**	**Total**		**Identical**	**Different**
Māori	51,218	310	39	5	6,139	8	2,096	59,815		85.6%	14.4%
Pacific	433	20,126	338	2	774	10	891	22,574		89.2%	10.8%
Asian	37	650	13,604	92	623	26	691	15,723		86.5%	13.5%
MELAA	4	6	31	948	644	4	142	1,779		53.3%	46.7%
European	4,103	473	448	390	439,956	197	25,143	470,710		93.5%	6.5%
Other	8	4	15	11	268	4	33	343		1.2%	98.8%
Unknown	14	4			25		135	178		75.8%	24.2%
Total	55,817	21,573	14,475	1,448	448,429	249	29,131	571,122			

For Māori, only **51,218** people are Māori in both. A further **8,597** are Māori in MORT at Level 1, giving a total of **59,815 Māori** using MORT prioritised ethnicity. Using NHI prioritised ethnicity fails to identify those **8,597** people but finds a different **4,599** people as being Māori for a total of **55,817.**

Note the impact on MELAA, with 46.7% being identified as another ethnicity.

Ethnicity Māori Cause of Death
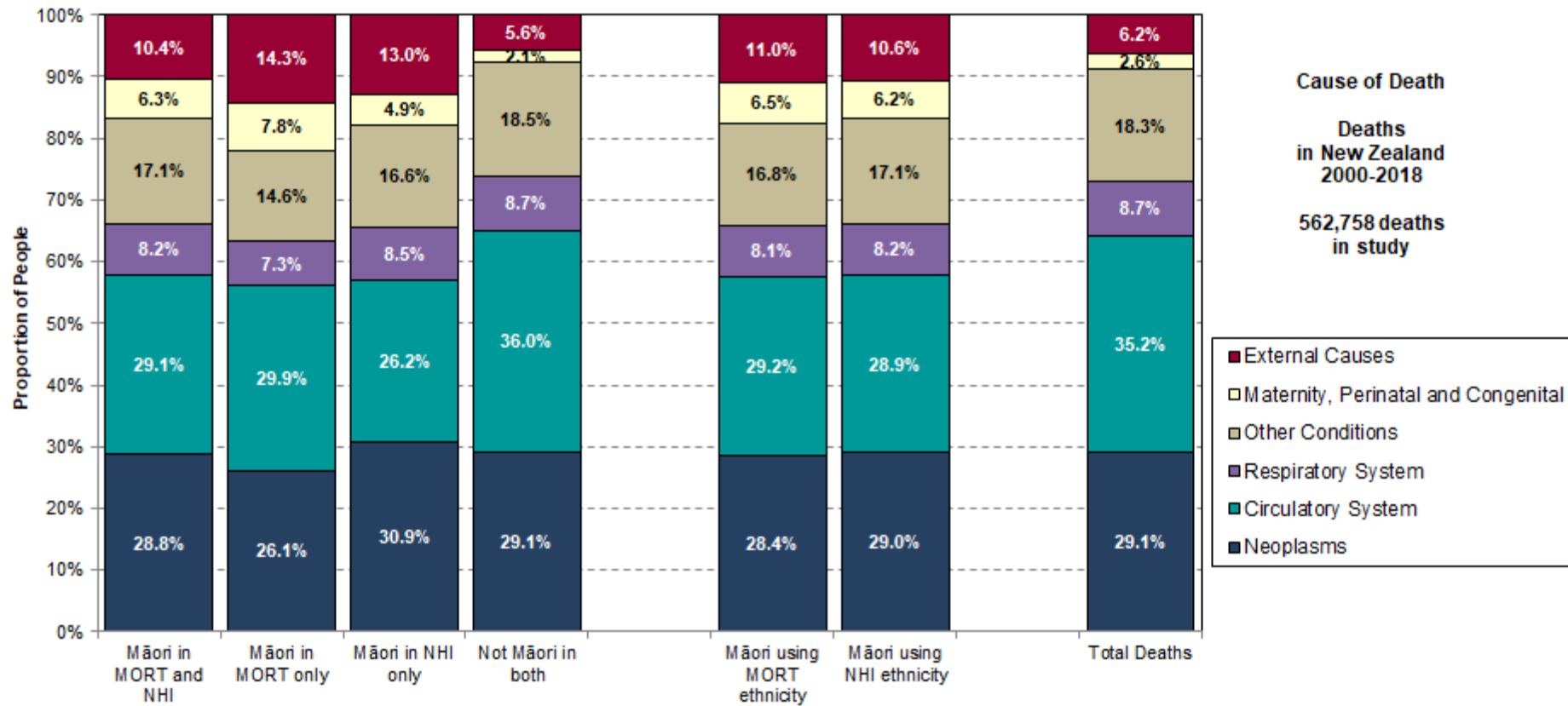
Impact of different sources of ethnicity on cause of death for Māori.

There are large differences between MORT prioritised ethnicity and NHI prioritised ethnicity. This problem with NHI ethnicity is deeply concerning.

The numerator is a long-standing problem ….

- Quoting from a document dated 9 Dec 2010:
- In **December 2010** three papers were published as part of a series of discussion papers considering key issues in ethnicity data, and implications for Māori health.
- Papers commissioned by the Ministry of Health:
  - Classification and output of multiple ethnicities: considerations for monitoring Māori health (by Donna Cormack & Carey Robson)
  - **Improving and maintaining quality in ethnicity data collections in the health and disability sector** (by Donna Cormack & Melissa McLeod)
  - Ethnicity, national identity and "New Zealanders": considerations for monitoring Māori health and ethnic inequalities (by Donna Cormack & Carey Robson)

IMPROVING AND MAINTAINING
QUALITY IN ETHNICITY DATA
COLLECTIONS IN THE HEALTH
AND DISABILITY SECTOR

Stats NZ Revision of Māori Population

- In <u>April 2022</u>, Stats NZ released a report on the under-estimate of the Māori ethnic group population in 2013 official population estimates.

- This under-estimate was first identified and documented in the <u>September 2020</u> release of the 2018-base estimated resident population.

- Māori ethnic group population living in New Zealand had been under-estimated by 40,000–50,000 (6-7 percent) in the 2013-base.

- Pacific ethnic group population was also likely to be under-estimated by 10,000–20,000 (about 5 percent) in the 2013-base.

- The issue was caused by the approaches used in both the 2013 Census and 2013-base Estimated Resident Population (ERP) to 'fill in' missing information.

- Census increasingly uses administrative information, and this is how the issue was uncovered after the 2018 census.

Comparison of Projections Māori Deaths
Update 2015, 2018, 2020 and 2022
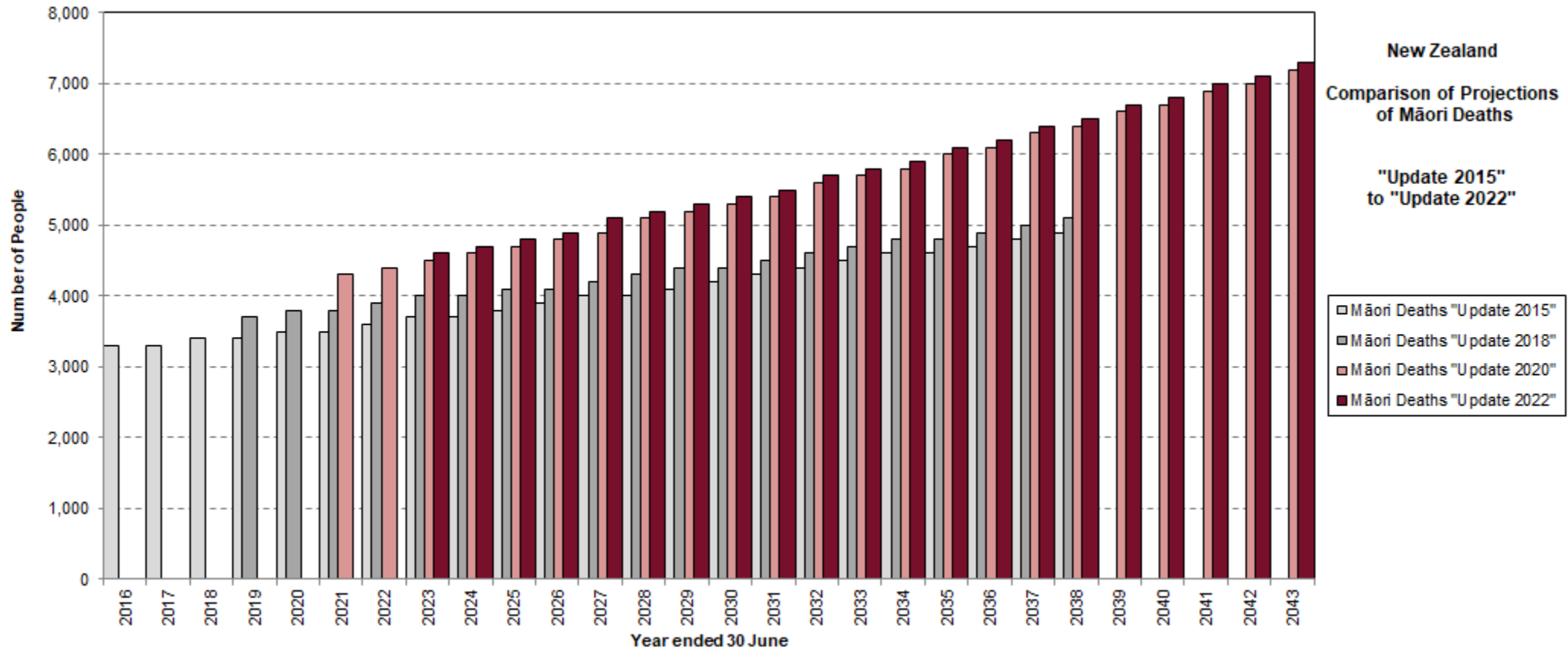
"Update 2015" and "Update 2018" used Base 2013. There was a very significant increase in Māori deaths when projections began to use Base 2018 after Census 2018 and Stats NZ revised the 2013 estimates of Māori population. Total deaths in "Update 2022" are higher than "Update 2020".

"There be Dragons"
Advice on Ethnicity

- Be very careful about what the source of the ethnicity data is.
  - Will mostly be working with NHI ethnicity for the numerator.
- Where there is more than one definition, give the results from both (or all).
- Ensure that historical denominators are updated to use the revision of the Stats NZ estimated resident population, documented in September 2020.
- Projected denominators need to be versions after that date.
  - Use "Update 2020" or preferably "Update 2022" projections.
  - New versions annually, released usually in December.

- NB. Read the Stats NZ material on this revision.
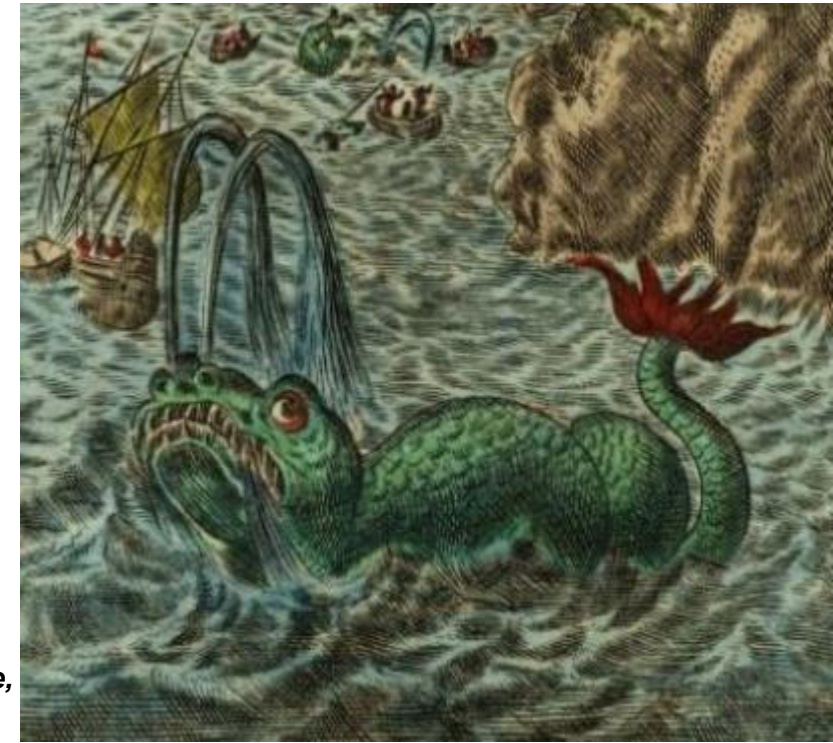
1719, Description de L'Universe,
Alain Manesson Mallet

Urban-Rural Equity

Geographical Classification for Health (GCH)

Place of Death and Urban-Rural GCH
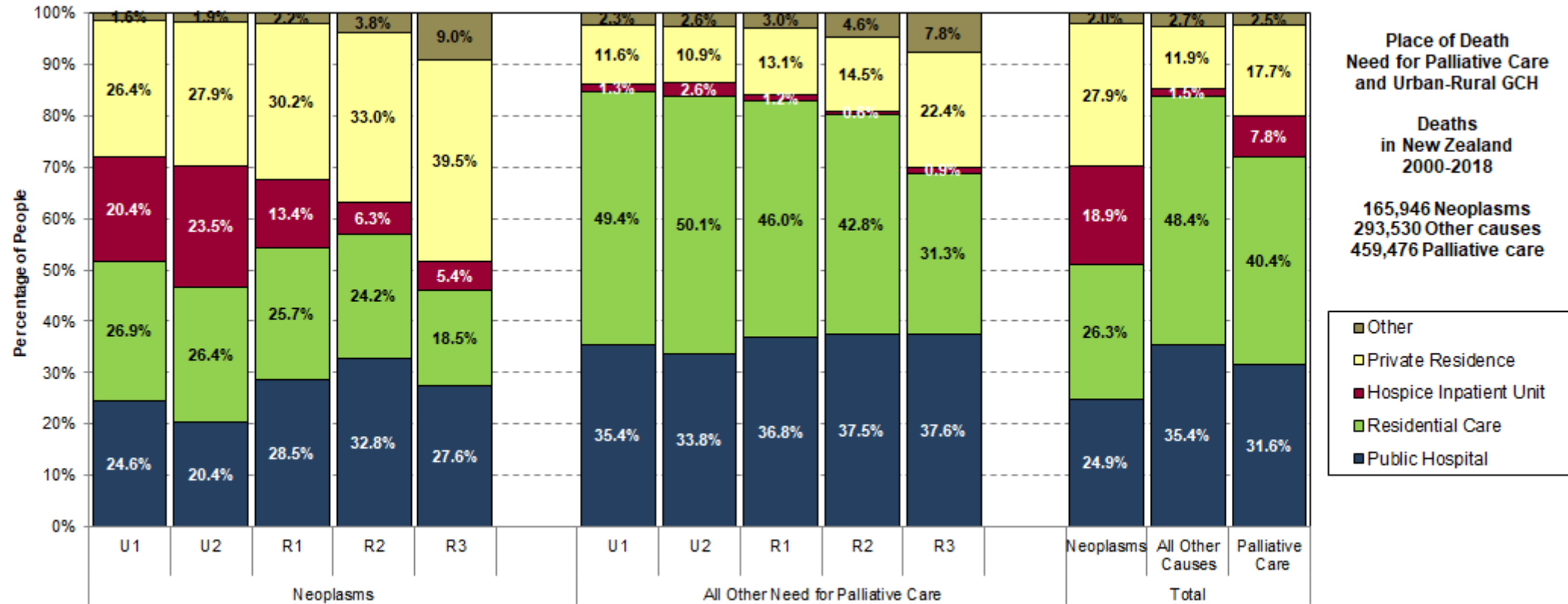
The more rural, the lower the use of hospice IPU for Neoplasms and of residential care for All Other Need. Public hospital use for neoplasms is highest for R2. The more rural, the higher use of private residence and other settings.
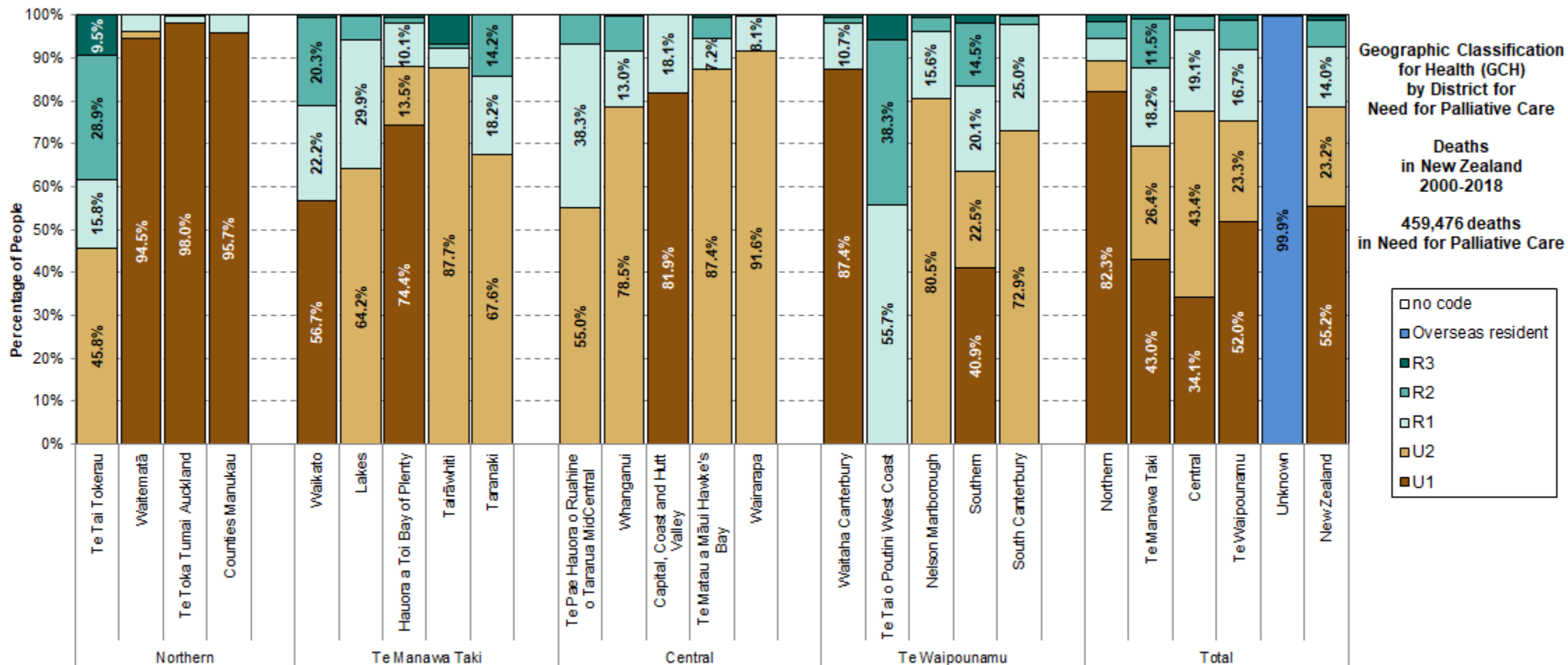
Geographical Classification for Health (GCH)

Geographic Classification for Health

	Urban 1 U1	Urban 2 U2	Rural 1 R1	Rural 2 R2	Rural 3 R3
Major Urban ≥100,000	≤25 min		>25 to ≤60 min	>60 to ≤90 min	>90 min
Large Urban 30,000-99,999		≤20min	>20 to ≤50 min	>50 to ≤80 min	>80 min
Medium Urban 10,000-29,999			≤25 min	>25 to ≤60 min	>60 min
Small Urban 1,000-9,999				≤25 min	>25 min

URBAN (left axis) — RURAL (bottom axis)

Uses two categories for urban (U1 and U2), and three categories for rural (R1, R2, and R3).

Produced for meshblock, SA1 and SA2 areas in 2018.

Used file of the link between GCH and **domicile** (which is in MORT data received).

Source: Whitehead, J., Davie, G., de Graaf, B., Crengle, S., Fearnley, D., Smith, M., . . . Nixon, G. (2022). Defining rural in Aotearoa New Zealand: a novel geographic classification for health purposes. N Z Med J, 135(1559), 24-40. https://www.ncbi.nlm.nih.gov/pubmed/35999779

Urban-Rural Deaths by District using GCH

Proportion of all deaths in the study, by region and by districts within regions. Assigned using domicile.

Data Source: MORT Study 2000-2018
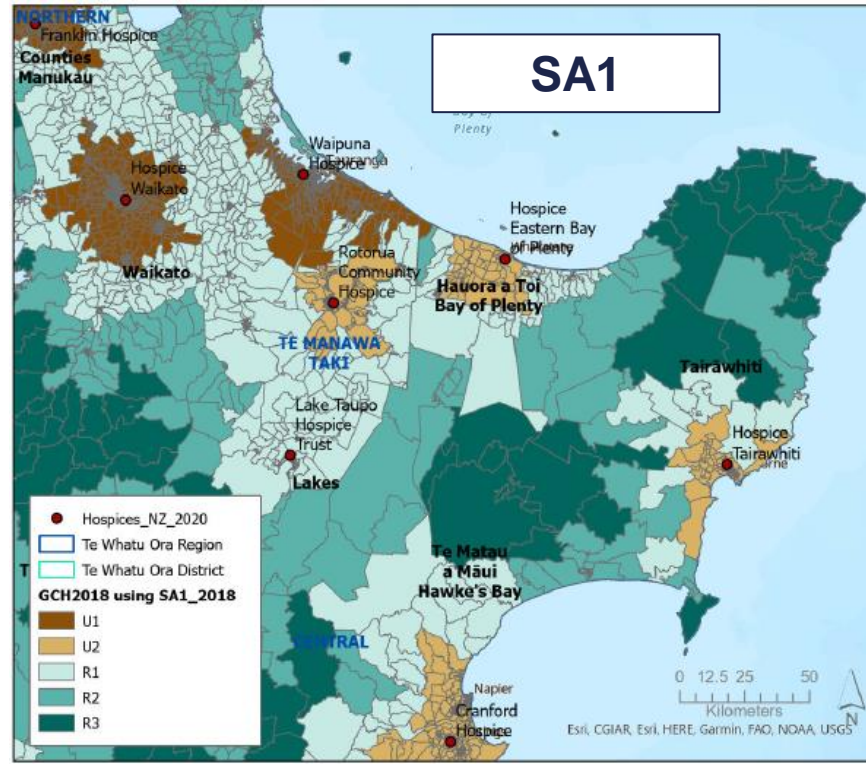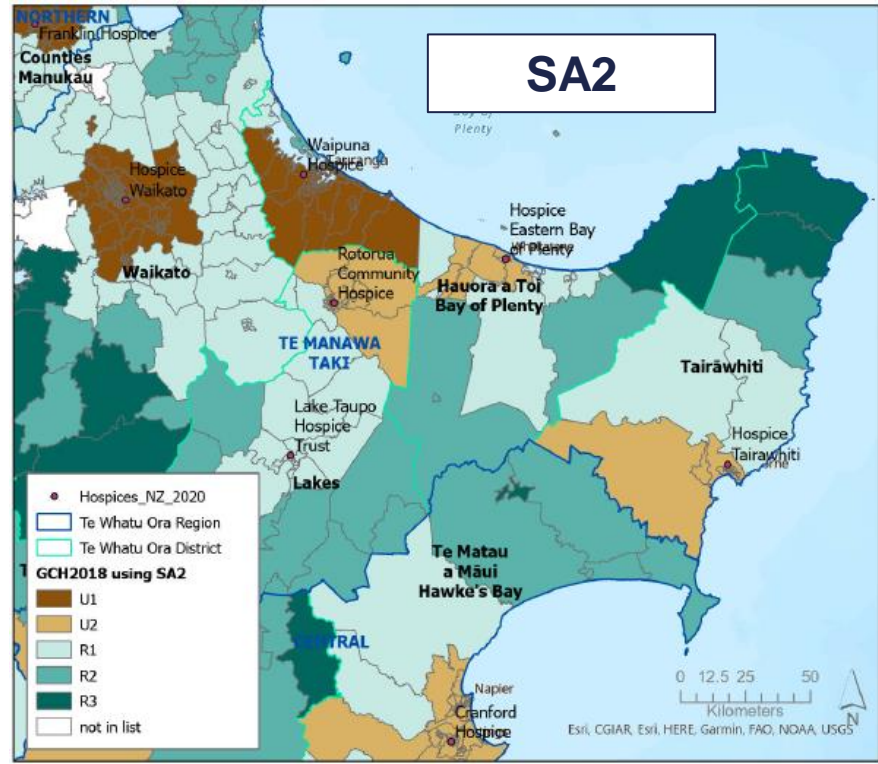
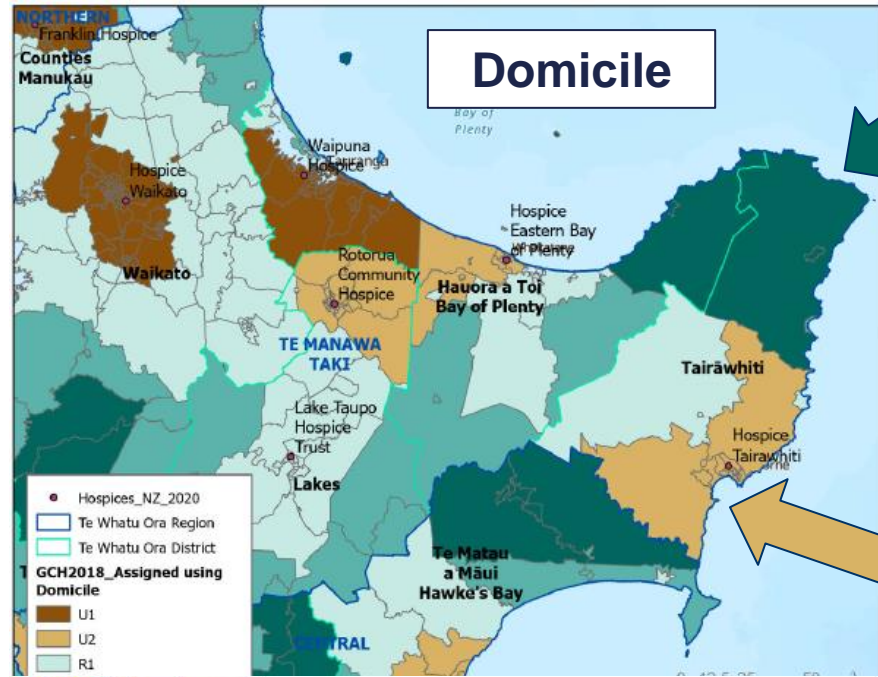# Te Manawa Taki GCH using Domicile
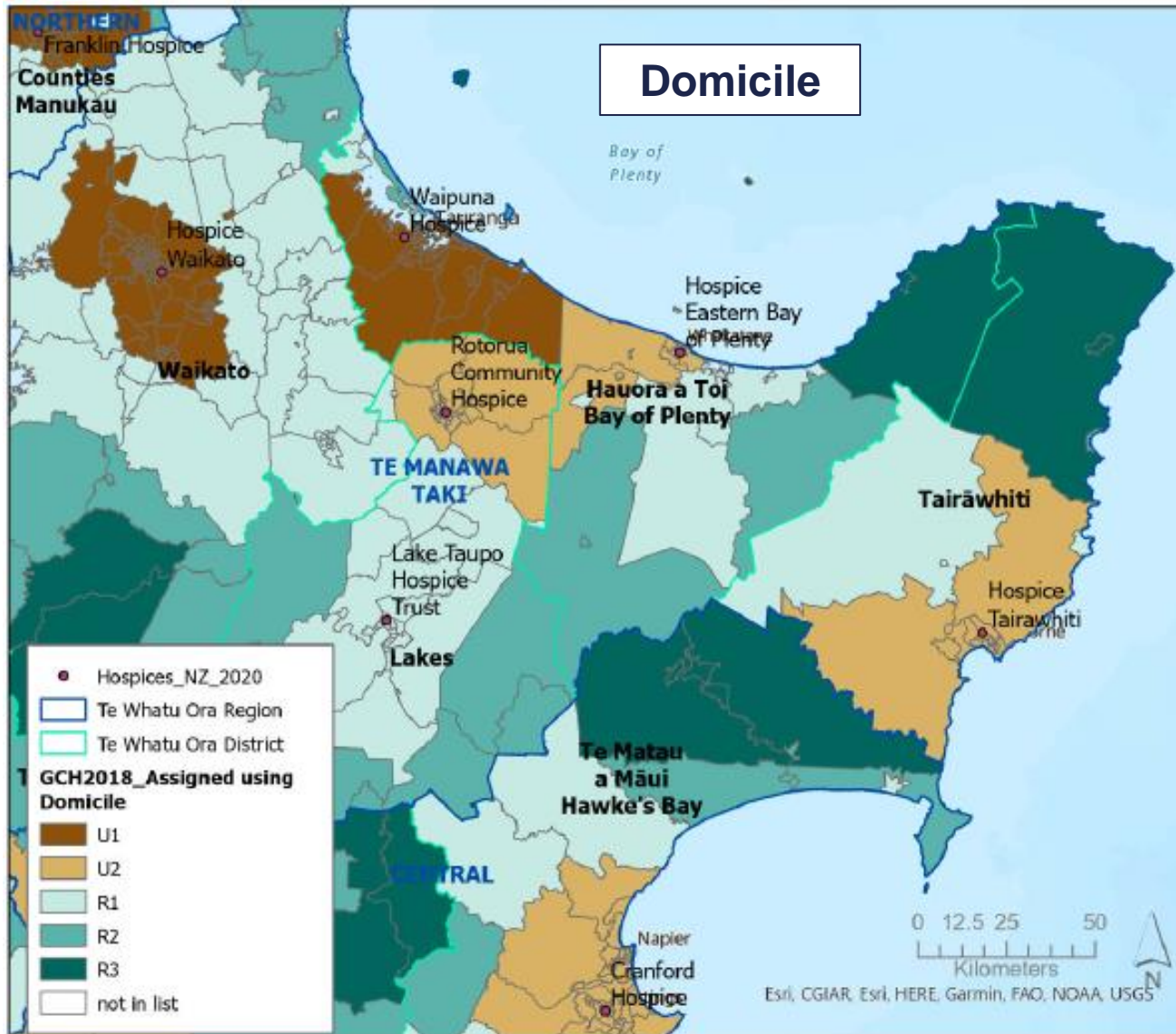
Domiciles are based on an old 2013 Area Unit geography. That geography was used in 2015 to define DHB boundaries.

Domiciles are not the same shape as amalgamations of Stats NZ SA2 areas. This produces some notable differences across the country.

Assigning GCH using domicile is not perfect. But is better than using older urban-rural measures.

Te Manawa Taki GCH using three Geographies

Domiciles are based on an old 2013 Area Unit geography. That geography was used in 2015 to define DHB boundaries.
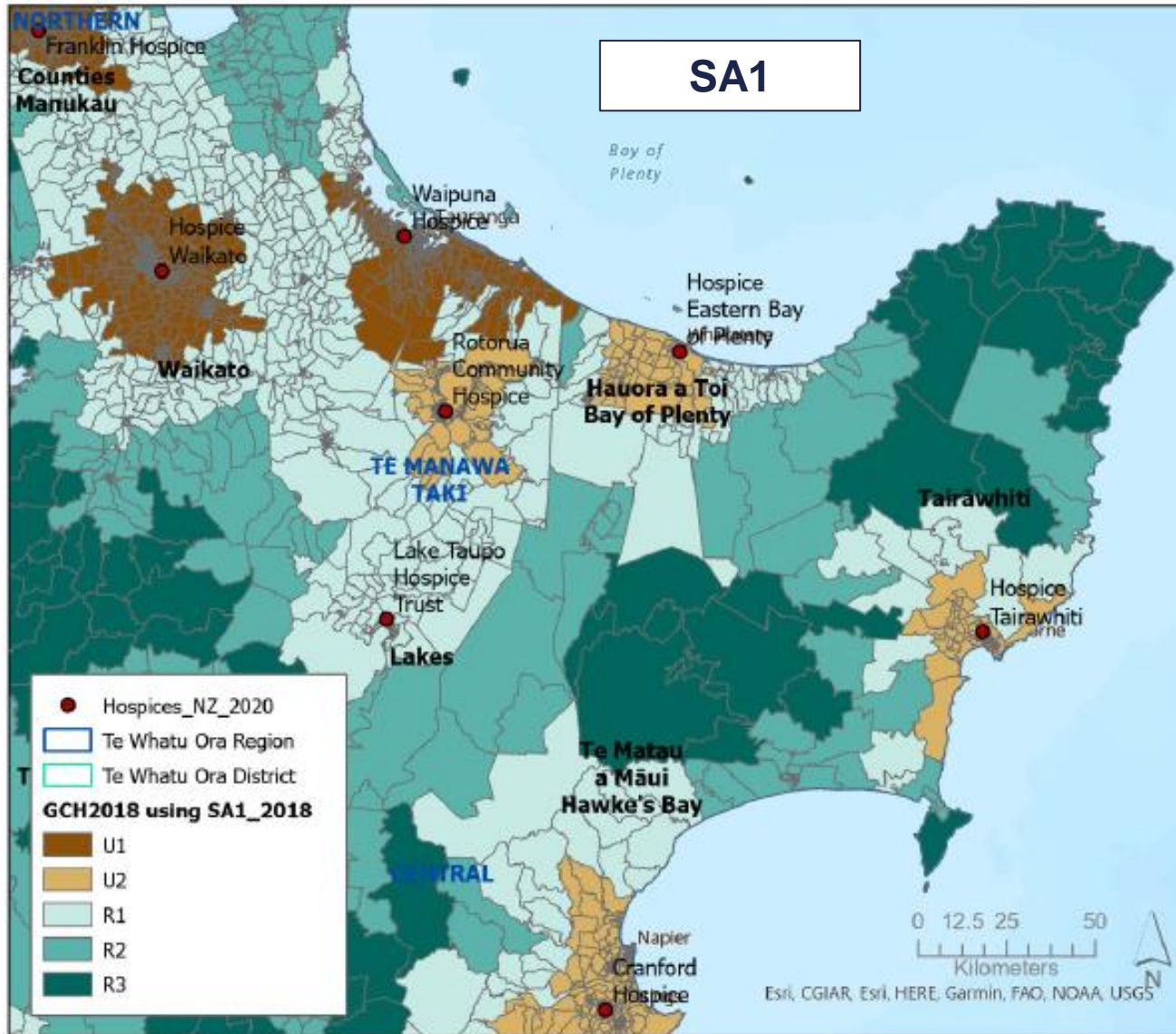
SA2 and SA1 areas from Stats NZ, using 2018 definitions for Census 2018.

New geographies for Census 2023 now also have SA3.

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Te Manawa Taki GCH using SA1

GCH using SA1 is the "Gold Standard".

Try to get meshblock in your data, then amalgamate meshblocks to SA1 and use the SA1 GCH table.

Meshblocks can be amalgamated to the old DHB definitions, still used for districts and regions by Te Whatu Ora.
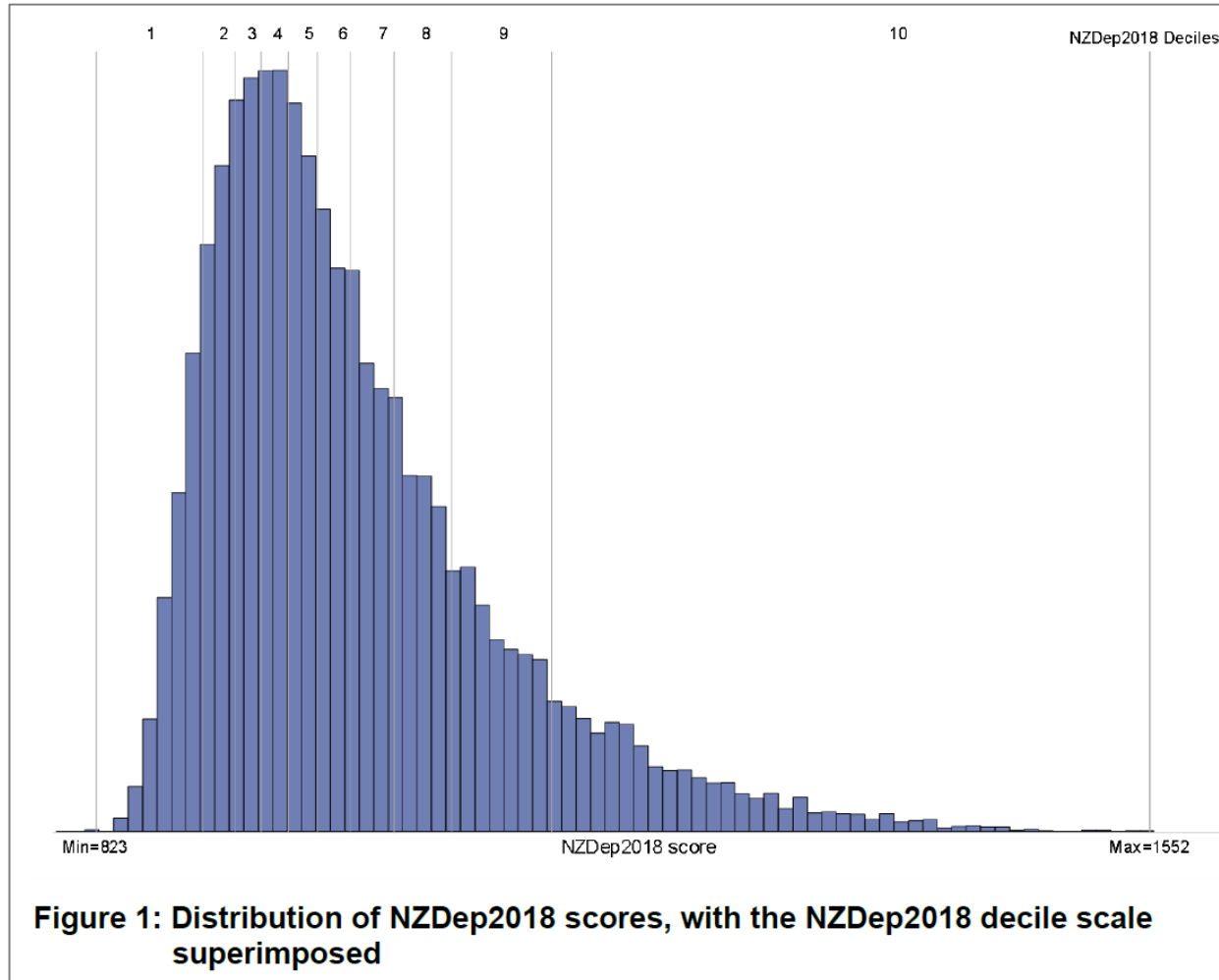
Testing Deprivation and Rurality

	Total UR Popn 2018						
	GCH Domicile version						Total
	.	U1	U2	R1	R2	R3	
GCH MB or SA1 version							
.	441	0	3	6	21	0	471
U1	0	2,951,760	369	9,057	.	0	2,961,186
U2	0	1,431	831,399	12,489	.	.	845,319
R1	.	12,711	17,415	529,713	9,672	564	570,075
R2	0	0	1,557	22,044	236,013	7,476	267,090
R3	3	.	372	3,945	11,412	40,005	55,737
Total	444	2,965,902	851,115	577,254	257,118	48,045	4,699,878

	Total UR Popn 2018						
	NZDep Quintile - Domicile version						Total
	.	1	2	3	4	5	
NZDep Quintile - MB or SA1 version							
.	330	138	42	18	39	411	978
1	0	546,663	225,360	87,750	37,818	4,737	902,328
2	0	250,563	354,534	206,973	87,828	16,050	915,948
3	0	72,135	260,076	328,380	219,324	51,567	931,482
4	0	15,723	90,123	253,002	403,059	194,544	956,451
5	0	2,661	13,554	58,617	244,875	672,984	992,691
Total	330	887,883	943,689	934,740	992,943	940,293	4,699,878

- Tested NZDep and GCH assigned using meshblock and SA1 compared to what is assigned using domicile.

- **4,699,878 people in Census 2018:**
  - 97.6% had same GCH group
  - 49.1% had same NZDep quintile

- For larger areas than SA1, recommend showing distributions of NZDep deciles or quintiles, not a single number.
- Avoid using SA2, as NZDep and GCH based on SA1.
- Contact June Atkinson for advice.

NZDep2018 Scores and Decile Scale

Figure 1: Distribution of NZDep2018 scores, with the NZDep2018 decile scale superimposed

Not a single number.

Best practice to retain the distribution by scale as small areas amalgamated to higher geographies.

"There be Dragons"
Advice on Deprivation and Rurality

- Sometimes domicile is all that is available. It is fair for GCH, but problematic for NZDep.
- The "gold standard" is to geocode to SA1 level.
  - If you can get meshblock, geocode to meshblock, then amalgamate to SA1.
- Avoid using the SA2 tables, particularly for NZDep.

1592 A. Ortelius "Islandia"
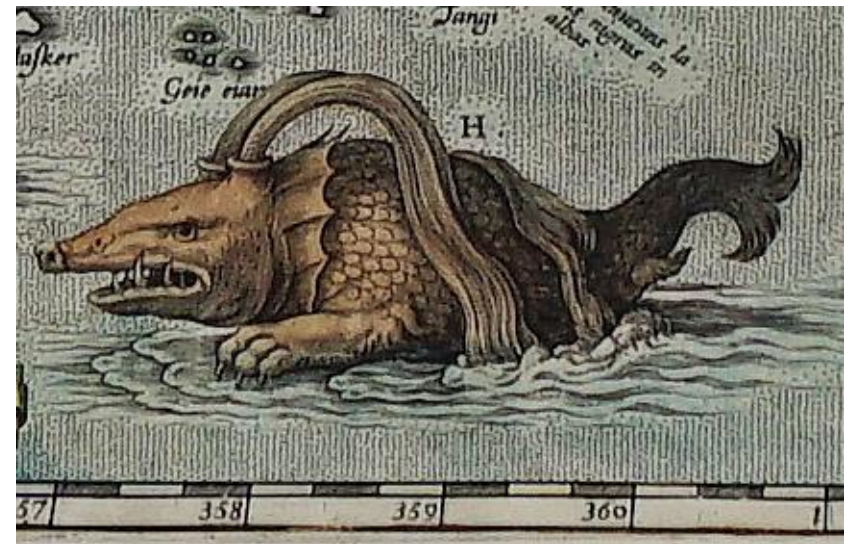
There is rightly a strong focus on equity by ethnicity, deprivation, and rurality.

Yet the data underpinning our analysis is not as solid as we might think.

Be very careful …

Owen Mapp, Dragons and Taniwha
https://pataka.org.nz/whats/exhibitions/owen-mapp-dragons-and-taniwha/

Body, Mind, Soul
Earth

Heather McLeod

Heather McLeod & Associates Ltd

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Extraordinary Professor, Department of Statistics and Actuarial Science, University of Stellenbosch

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