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Census 2018 and Implications for Māori

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Abstract

The population census is a universal tool of governance but has come under increasing pressure as governments look to reduce costs, gain efficiencies and counter declining response rates. In Aotearoa New Zealand, the census transformation strategy has a short-term focus on modernising the census and a long-term vision of a fully administrative census. The digital-first 2018 Census was an ambitious step towards modernisation but there are growing concerns that it may fail to deliver high-quality data, particularly for Māori and iwi. This research note considers the implications of lower response rates and reflects on the steps that might be taken to retain the trust and confidence of Māori in the census, including possibilities for Māori data governance across the official statistics system.

The population census is a universal tool of governance but has come under increasing pressure as governments look to reduce costs, gain efficiencies and counter declining response rates (Kukutai, Thompson, & McMillan, 2015; Poulain & Herm, 2013; Royce, 2011). Some believe that the census is an idea whose time has gone, with prominent demographer David Coleman (2013) suggesting that the census as we know it may be entering its "twilight". In Aotearoa New Zealand, as in many other countries, net coverage rates and response rates have also been on a downward trajectory (Statistics New Zealand, 2016a) and there is increasing pressure to deliver better value from the investment in official statistics. The census transformation strategy has a short-term focus on modernising the census and a long-term vision to move to a fully administrative census (Bycroft, 2015; Stats NZ, 2017a). The digital-first 2018 Census was an ambitious step towards modernisation (Stats NZ,

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2017a), with an online target of 70 per cent, more than double the online completion rate in the 2013 Census. While initial statements from Stats NZ noted that the target for online completion was exceeded (Stats NZ, 2018a, 2018b) and that the quality of online data was "very high" (Stats NZ, 2018b), a number of commentators and organisations were quick to identify possible problems with the 2018 Census in terms of the census approach, potential coverage and proposed methodologies for output (Manhire, 2018; Matthews, 2018; Williams, 2018).[1] Concerns were also raised about the potential impacts of lower response rates for Māori, including possible constitutional implications (Hopkinson, 2018; Te Mana Raraunga, 2018).

Stats NZ is now under considerable pressure to deliver first results from Census 2018 but it will be some months yet before it will be able to release any data, or specific details relating to the census coverage, response rate and data quality. The agency announced in July 2018 that the first release of Census 2018 data, scheduled for October 2018, would be postponed to March 2019. However, in November it reported that it could not meet the revised deadline and would not be announcing a new release date until April 2019 (Stats NZ, 2018c). It also noted that it would be working with iwi and Māori-focused organisations "as the impact of the lower response rate on Māori descent and iwi data becomes clearer".

A census external data quality panel has been appointed and will be publishing its own independent data quality report (Stats NZ, 2018d).[2] Independent reviewers are also undertaking a comprehensive review of the design, implementation, and operation of Census 2018, with a focus on census participation and coverage. Similar moves to involve independent experts were taken in relation to the 2011 Canada Census and 2016 Australia Census when attempts to modernise their census model also struck problems (Harding et al., 2017; Royce, 2011).

This research paper focuses specifically on the implications for Māori of a census with potentially unprecedented (in modern times) low response rates. The census is important to Māori for a number of reasons. Census data are crucial for the distribution of resources and for monitoring the impact of Crown policies and (in-)actions in relation to its obligations under Te Tiriti o Waitangi and international conventions. The census also provides information on Māori descent and iwi (tribal) affiliation which is necessary to fulfil legislative requirements (e.g. with regards to Māori

electorates) and is used by Māori collectives to realise their own self-determining aspirations (Bishop, 2016; Kukutai & Rarere, 2017; Walling, Small-Rodriguez, & Kukutai, 2009). More broadly, there are implications for Māori rights and interests in data, as articulated in the nascent but rapidly growing Indigenous data sovereignty and Māori data sovereignty literature (Carroll Rainie, Schultz, Briggs, & Palmanteer-Holder, 2017; Kukutai & Taylor, 2016; Te Mana Raraunga, n.d.; Walker et al., 2017). We consider the potential impacts of poorer response rates on these uses but first briefly consider the changing census context.

The changing census context

The population census is the flagship of official statistics in many countries and is essential for many of the functions that underpin democracy. In the past decade, however, the census has faced increasing scrutiny due to increasing cost, declining response rates, concerns about privacy and confidentiality, and the need for more timely and frequent data. While these concerns, and official responses to them, have raised the question of whether the traditional footwork census is entering its "twilight" (Coleman, 2013), the empirical evidence is mixed. A recent study of global census practices for the period 1995 to 2014 found that the number of countries undertaking a census had increased over time to be nearly universal, but that the use of alternative census models (using administrative data, population registers, and/or sample surveys) had also increased substantially. Alternative models are mostly confined to Europe which has a long history of maintaining population registries and broader public acceptance of using personal data for statistical purposes (Kukutai, Thompson, & McMillan, 2015). Most of the countries adopting an alternative census model lack a political commitment to collecting ethnic-racial data and, in some cases, explicitly opposed it. This broader context is important because it highlights the complexities of census transformation in Aotearoa New Zealand where the structural advantages enjoyed by European countries with population registers is absent, and where there is the additional challenge of having to collect granular, high-quality ethnicity, Māori descent and iwi data (Cormack & Kukutai, 2016).

Aotearoa New Zealand has a long history of census enumeration and of ethnic data collection. The first census was held in 1851 and a census has been taken every five years since 1881 with just three

exceptions: during the Great Depression, World War 2 and after the 2011 Christchurch earthquake. The first Māori census was taken in 1857/58 and Māori continued to be separately enumerated until 1956 using a variety of state-imposed classifications including tribe (until 1901), lifestyle (until 1926) and racial blood quantum (until 1981). (For a detailed history of how Māori have been counted and classified in the census, see Kukutai, 2012; Pool, 1991). Despite a fraught history of state-controlled data collection, Māori and iwi now generally support and see value in the census, and there is a shared interest in ensuring that it is high quality (Te Mana Raraunga, 2018; Walling, Small-Rodriguez & Kukutai, 2009). Under the Statistics Act 1975, a census is required to be undertaken every five years and the collection of name, address, sex, age and ethnic origin details are mandatory.[3]

There are many uses to which census data are put but the primary purpose is to count everyone in the country on census night so as to provide accurate population and dwelling counts nationally, subnationally and for smaller geographic areas such as meshblocks. This is extremely important given the high rates of mobility in Aotearoa New Zealand and of migration-driven ethnic diversity, with about one-quarter of the usually resident population being overseas-born (Statistics New Zealand, 2014a). The census also provides the benchmark for national, subnational and ethnic group population estimates that,[4] in turn, are used as the denominators for rates; for example, fertility and mortality rates. Measured over time, these rates provide important insights into the ways in which Aotearoa New Zealand is changing and whether life is getting better or worse for particular groups, especially those with the greatest needs. The census is also the only extensive information source on the social and economic characteristics and conditions of local communities. By international standards, the New Zealand population census is considered to be excellent and delivers value far in excess of its cost (Bakker, 2014).

These favourable traits, however, have not insulated Stats NZ from political pressure to do more with less. As Bycroft (2015) noted, "Pressures on the sustainability of the current census model centre on the high costs" (p. 402). In 2012, the Government agreed to a two-pronged census transformation plan. In the short to medium term, the focus is on modernising the current census model and making it more efficient. A

detailed business case for the 2018 Census was approved by Cabinet in 2014 with objectives that included:

- undertaking a census that met statutory requirements
- at least maintaining the quality of census information compared with the 2013 Census
- improving the timeliness of census products compared with the 2013 Census, and
- reducing the average cost of the census. (Statistics New Zealand, 2016a, p. 6)

Long-term transformation involves investigating alternative ways of producing small-area population and social and economic statistics, notably the possibility of a fully administrative census (Bycroft, 2015; Gleisner et al., 2015). Stats NZ has undertaken a range of work including producing population estimates from linked administrative data (Stats NZ, 2017c) and comparing the quality of ethnicity data in administrative data sets with the census (Statistics New Zealand, 2016b).[5] Much like Canada (Royce, 2011), Aotearoa New Zealand currently lacks several key preconditions for moving to a register-based census including a central population register, national property register and unique personal identifier (Bycroft, 2015). As such, the focus thus far has been on applying statistical approaches to existing administrative data in the Integrated Data Infrastructure (IDI).[6]

Census 2018

Census 2018 involved major changes in methodology (Stats NZ, 2017a, 2018a). This included a crucial shift in collection approach away from a primarily paper-based census to a digital census, with paper forms as a supplementary mode. Changes were also made to the way in which census field staff were recruited (Stats NZ, 2017a). Technical changes included changes to official classifications and variables, requiring mandatory completion of some variables on the online forms (including Māori descent and ethnicity), changes to the ways in which forms are processed, and an increased reliance on government administrative data and statistical methods of imputation (Stats NZ, 2017a, 2018a, 2018e, 2018f). Imputation is the process of replacing missing data with substituted values.

Interim figures for Census 2018 released by Stats NZ in July indicate that full or partial information has only been received for about 90

per cent of individuals, compared with 94.5 per cent for the 2013 Census (Stats NZ, 2018a).[7] It is important to highlight here that partial in this context means a partial-response dwelling rather than partial completion of an individual census form. More specifically, a partial-response dwelling is one where there is no individual form but the dwelling form or household summary page has a list of people at the dwelling on census night that includes their name, age, sex, location and relationship to the householder.

Table 1 shows how the various components of census non-response have changed over the last three censuses, drawing on the results from the relevant Post Enumeration Surveys (PES). The purpose of the PES is to provide an independent check of the accuracy of the census count and to provide information on the completeness of the census coverage. The proportion of partial-response households and fully non-responding occupied households (all-substitute households in Table 1) has increased since 2001.[8] Stats NZ has already confirmed that Census 2018 has more households where no one has responded than in previous censuses (Stats NZ, 2018a). This means that the 90 per cent "'full or partial" preliminary figure provided by Stats NZ will include a larger share of partial-response dwellings than in previous censuses. The 2018 PES has still to be processed with results expected to be released sometime in 2019.

Table 1. Non-response in the Census of Population and Dwellings, 2001–2013 PES

	Percentage of estimated total			
	2001	**2006**	**2013**	**2018**
Forms received by the census (census response rate)	95.0	94.8	92.9	{ 90?
Substitute individual records				
— in partly counted households	*0.7*	*0.9*	*1.6*	
— in all-substitute households	*2.1*	*2.3*	*3.1*	
Total substitutes	2.8	3.2	4.7	
Census usually resident population	97.8	98.0	97.6	
Estimated net undercount	−2.2	−2.0	−2.4	
PES estimated population	100.0	100.0	100.0	

Source: Statistics New Zealand, 2014b, Table 5.

Given that a key goal of the census is to count all usual residents in the country on census night,[9] commentators are rightly concerned that the non-response rate is likely to be much higher than in recent censuses. For Māori, the extent of the problem will inevitably be worse. Like other Indigenous peoples in colonial settler states, Māori are much more likely to be missing from the census than other population groups. In 2013, the Māori net undercount was 6.1 per cent compared with just 1.9 per cent for Europeans (Statistics New Zealand, 2014b),[10] and the 2013 PES report suggests that the Māori net undercount was probably underestimated.[11] Among Māori, the probability of being missed in the census is higher for young adults, males and those living in particular areas. Thus, in 2013, the net undercount for Māori males aged under 30 years was just over 8 per cent (Statistics New Zealand, 2014b, Figure 8).[12] Given ethnic inequities in internet access, the digital-first approach of Census 2018 has almost certainly deepened the undercount problem for Māori and increased the number and proportion of partial-response and fully non-responding households. In the 2013 Census, Māori internet access at home was 67 per cent, compared with 85 per cent for 'European/Others' (Ministry of Social Development, 2016). For now, we can reasonably deduce that the Māori census response rate will be well below 90 per cent and perhaps as low as 80 or even 70 per cent in areas that have historically had lower coverage, such as Northland and the East Coast.

Implications for Māori

Though Census 2018 and PES results are not yet publicly available, it is important to consider in advance the implications of reduced Māori response rates. One of the most important implications is constitutional. Under the Electoral Act 1993, census counts are used as part of the statutory formula to determine the boundaries and number of General and Māori electorates.[13] The calculation of the 2013 Māori Electoral Population (MEP) by Stats NZ is shown below:[14]

Table 2. Calculation of 2013 Māori electoral population

Population	Source	Number
Census usually resident population count *(u)*	2013 Census	4,242,049
Electoral Māori descent census usually resident population count *(d)*	2013 Census	755,598
Māori on the Māori electoral roll *(m)*	Māori electoral roll	256,212
Māori on the general electoral roll *(g)*	General electoral roll	203,640
% of Māori choosing Māori electoral roll (Māori ratio, *r*)	$r = m/(m+ g)$	55.7
Māori electoral population	$MEP = r \times d$	420,990

Source: Statistics New Zealand, 2013, Table 2.1

Because the calculation draws on both census and electoral data, the number of Māori electorates is thus influenced by population factors (population change since the last census, number of people included in the census, and how people answer the census Māori descent question) and by electoral factors (the level of enrolment by people who indicated Māori descent on the General or Māori roll, and the proportion of electors of Māori descent who are on the Māori roll).

A key point to note here is that the 2013 electoral Māori descent Usually Resident Population (URP) count of 755,598 was considerably higher than the actual number of individuals who reported being of Māori descent in 2013 ($n = 668,724$). This is because the figure also includes a proportion of those who did not provide a clear "yes" or "no" answer to the descent question (Statistics New Zealand, 2007).[15] In 2013, just over half a million New Zealand residents either answered "don't know" ($n = 87,237$) or did not provide a valid response to the Māori descent question ($n = 420,603$). Of significance, in Census 2018 the Māori descent question was made compulsory in the online form, which was a change to the method used in previous censuses. Stats NZ anticipated that this would result in an "increase in the proportion of the population answering 'no' to the Māori descent question" (Stats NZ, 2018e, p. 17). The potential impact on electorate calculations will thus come from both an increase in "no" responses due to the forced completion of this question in the online format, and the higher number of Māori descendants not being counted at

all due to issues with the census roll-out and follow-up. This could reduce the size of the Māori electoral population and potentially the number of Māori electorates. A reduction in the South Island electoral Māori descent URP could have implications for both Māori and general electorates.[16] Under the Electoral Act 1993, the number of South Island general electorates is fixed at 16 and the South Island quota (the South Island General Electoral Population (SI GEP) divided by 16) determines the mean size for the general electorates in the North Island and the Māori electorates. Hypothetically, a reduction in the South Island MEP, due to the forced responses in the e-census and/or lower Māori response rates, would increase the size of the SI GEP and the mean electorate population, with the potential to reduce the number of Māori and general electorates. Stats NZ is under time pressure as it works through these complex issues, with the Electoral Commission that oversees the electoral boundary review requiring the electoral population figures by September 2019 at the latest (Manch, 2018). The potential for a legal challenge of the electoral figures ahead of the 2020 general election has been suggested by some commentators (Cooke, 2018; Easton, 2018; Manch, 2018), but it is not yet clear what this would mean for Māori.

Beyond the more immediate concerns of electoral boundaries, there are a number of reasons why high-quality census data are crucial for Māori. One is to inform decisions about the resourcing of national, regional and community services and infrastructure – schools, housing, hospitals, GP services, superannuation and roads are just a few examples. Census data form the basis of national, subnational and ethnic population estimates and projections, all of which are essential for planning and policy, as is the ability to monitor changes in ethnic inequities over long time periods (e.g. mortality rates, income distribution, home ownership). The impacts of poor-quality data are more pronounced for Māori and Pacific peoples because of their smaller population share.[17] Issues with the quality of ethnicity data in vital registrations (births and deaths) and in health data sets is well documented, as are the impacts of poor ethnicity data quality on the ability to monitor health outcomes for Māori, and ethnic health inequities and trends over time (e.g. Cormack & Harris, 2009; Cormack & McLeod, 2010). For example, misclassification of Māori in births and deaths registrations historically led to significant underestimates of Māori rates of birth and death for many years (Ministry

of Health, 2001). If ethnicity data in the census are impacted by the lower response rates and the increased use of imputation, this has the potential to introduce numerator/denominator bias into the calculation of Māori rates and estimates of inequities, due to differential quality between numerators and denominators, as well as different methods of data collection. Where this creates the need for additional resources for Māori to compensate for data quality issues, it creates a further inequity in access to reliable timely data. The census is also the only source of data for some areas of interest. For example, the census question on number of children ever born alive is the only source of data on women who remain childless (an increasing trend for all New Zealand women, including Māori women (Didham & Boddington, 2011) and the proportion of women who have one, two, three or more children (Statistics New Zealand, 2009). The Government also has a number of policy priorities including improving housing, child well-being and poverty reduction, all of which disproportionately affect Māori and Pacific peoples, and which require access to accurate data.

In addition to ethnicity and descent data, the census is an important source of data about te reo Māori. While there does not appear to be an explicit legal obligation to collect census data on te reo, such data are needed by Te Taura Whiri i te Reo Māori (Māori Language Commission) to carry out its functions as set out in the Māori Language Act 1987. As such, Stats NZ has duties in relation to providing information on te reo Māori in its role as a Crown agency. The census is also the sampling frame for a number of important nationally representative surveys, including the survey of Māori well-being, Te Kupenga. It is not yet clear whether and how the quality of the census as a sampling frame may be compromised by lower than expected response rates, and whether this will also impact the accuracy of survey estimates.

Implications for iwi data

Higher rates of non-response might also seriously compromise the quality and usability of iwi data. Stats NZ recognises that iwi are Treaty partners and that it has a responsibility to collect and disseminate high-quality iwi data (Gleisner, Downey, & McNally, 2015). For many iwi, the census is the only comprehensive source of data about their people. Iwi affiliation is collected in some administrative data sets but the quality of such data is

generally lacking. While most iwi maintain their own electronic registers of members, they do not have the resources or capacity to collect the extensive demographic, social and economic data captured by the census (Kukutai & Rarere, 2013, 2017). Stats NZ census iwi counts are also used in negotiations with the Crown and in other forms of decision-making affecting resource allocation.[18] Higher rates of census non-response for Māori not only have the potential to significantly decrease iwi census counts, but may also affect their composition such as age-sex structure and educational profile (Kukutai & Rarere, 2017). Iwi whose customary rohe encompass areas with higher undercounts will be even more severely affected by high non-response rates in Census 2018.

The problem is compounded by recent changes to the Iwi Standard and Classification.[19] The Standard provides guidelines for how to gather, organise and report iwi and iwi-related groups' information and statistics. The classification includes a list of 100+ iwi and iwi-related groups that are recognised for official statistical purposes. A review of the classification in 2016–2017 saw the inclusion of more than 20 additional iwi and iwi-related groups (Stats NZ, 2017b). These changes are important because Stats NZ's proposed solution for addressing missing information is to use individuals' data from 'alternative sources', specifically the 2013 Census and government administrative sources, along with imputation methods (see more below). For those iwi and iwi-related groupings that were recognised for the first time in Census 2018, no prior census data will exist. For those iwi that were in the classification at the time of the 2013 Census, there will still be problems with using earlier census data to fill missing information. This is because inconsistencies in how individuals report their iwi across censuses (Kukutai & Rarere, 2013, 2017) suggests that their iwi response in the 2013 Census may be a poor predictor of their likely response in 2018. In short, imputation methodologies and the use of alternative sources are unlikely to be a robust solution for addressing missing iwi information in Census 2018.

The increasing use of alternative sources and statistical imputation

In addition to a higher level of non-response (for which final results are still to be announced), Census 2018 differs dramatically from previous censuses in the much wider use of imputation methods and the use of administrative data. This makes for a much higher degree of complexity, amplified by the inconsistent use of terminology by Stats NZ. In its initial census methodology papers Stats NZ used the term imputation broadly to include cases where information about the respondent in other datasets (eg health or education datasets) would be used to replace their missing data in the 2018 Census (Stats NZ, 2018a, 2018e). In a paper released in December 2018, Stats NZ redefined the term in a more limited sense to only refer to instances involving statistical imputation (Stats NZ, 2018f). Stats has already indicated that it will have to rely much more heavily on imputation for Census 2018 than in previous censuses: "If we do not impute, there will be large amounts of missing data that will affect the overall quality of the dataset" (Stats NZ, 2018b, p. 2). Each imputation method inevitably brings some bias and analytical limitations. Although the undertaking of the census is set out in some detail in legislation, there is no explicit guidance on what level of imputation is acceptable.

Prior to Census 2018, Stats NZ used a combination of unit imputation and item imputation to address missing data in the census. In previous censuses, *unit imputation* (formerly known as substitute records, Statistics New Zealand, 2014c) was used to add to the census count where there was sufficient evidence that a person existed, or a dwelling was occupied, but no individual form was received. Unit imputation was used for one member of the household or for the entire household. For Census 2018, Stats NZ has redefined unit imputation to exclude partially responding households. Instead, people who are listed on a household form will be 'treated as responses, even when no individual form has been received' (Stats NZ, 2018f, p. 5). In Table 1 such people would appear in the first row 'forms received by the census'. This change of designation is a major departure from prior census practice. In another key change, Stats will also make use of data from alternative sources to add people to the census count, calling this 'admin enumeration' (Stats NZ, 2018h, Figure 1). Taken together, these changes have the potential to make it very difficult

for data users to make sense of the data, particularly as it relates to Māori and other groups with higher census non-response.

For Census 2018 *item imputation* describes the process of imputation used where an individual form exists but not all questions were answered (Stats NZ, 2018b, p. 7), and it is not possible to use individuals' data from the 2013 Census or administrative sources. For past censuses, responses were only imputed for age, sex, place of usual residence meshblock and labour force status (Statistics New Zealand, 2014c). Māori descent was also imputed, but only for electoral counts. The previous item imputation method used information provided by census respondents and known variable distribution patterns (Stats NZ, 2018f). For Census 2018, Stats NZ will impute responses for a far wider range of variables. It will also use a different methodology for item imputation that 'fills in the missing variables by 'borrowing' information from similar people or similar households that have responded' (Stats NZ, 2018f, p. 5). Stats NZ has acknowledged that this approach is problematic when used in neighbourhoods with a relatively high share of non-responding households because they are unlikely to be missing at random (Stats NZ, 2018a). Māori are likely to be over-represented in such areas.

It is useful here to return to the use of Māori descent data for electoral purposes. Māori descent data are only reliably collected in the census (since 1991) and on birth registrations (since about 1995). Where possible, Stats NZ plans to use an individual's descent response from the 2013 Census or descent information from births registrations to fill missing data in the 2018 Census.[20] The assumption is that how individuals were identified in these sources is a robust indicator of how they would identify (or be identified) in 2018. This assumption is untested as, to our knowledge, there are no nationally representative studies exploring individual patterns of Māori descent identification over time. Studies of Māori ethnic and iwi affiliation in the census and in other surveys have shown that patterns of identification can be dynamic at the individual level (Didham, 2016; Kukutai & Rarere, 2013, 2017; Walling, Small-Rodriguez, & Kukutai, 2009). While descent may be a more stable indicator of identity than ethnicity, there is still a lack of information with which to make informed judgements. Where alternative data are not available, Stats NZ will use imputation methods to provide a Māori descent response. The statutory importance of Māori descent data calls for

a high duty of care and transparency over how descent data are derived, along with the limitations.

The wider use of data from the 2013 Census and administrative data to address missing data in Census 2018 also raises the need for a wider public conversation about how individuals' data are being used in the various administrative datasets that are part of the IDI.[21] Many individuals who participate in the census may be unaware that their names and addresses are retained (Stats NZ, 2018g), and that these details are used to link their census records to their previous census records, and to other Government administrative data about them held in the IDI.[22] While identifying information is always removed before it is made available for research and analysis as part of the "five safes" framework used by Stats NZ,[23] it important that New Zealanders are well informed about how their data are being used and are comfortable with it. This issue is particularly sensitive for Māori who have a long history of being surveilled by the State.

In addition to technical issues, imputation raises a bigger question about the right of Stats NZ, as a Crown agency, to make a determination about who is Māori or not, albeit statistically. This potentially undermines rights of Māori to self-identify, which includes the right to refuse, or choose not to, identify to the Crown. Stats NZ had already anticipated using more imputation well ahead of the Census, including imputation for both Māori descent and Māori ethnicity variables (Stats NZ, 2018a). This suggests that there were opportunities for Stats NZ to engage meaningfully with Māori about these proposed changes to methodology prior to Census 2018.

Looking ahead

In a global context, Aotearoa New Zealand is unusual in being one of a very small number of countries that has multiple comprehensive sources of Indigenous statistical data, and Stats NZ is often looked to as best practice for the collection and dissemination of Indigenous data and statistics (Bishop, 2016). There are significant opportunities for census transformation in Aotearoa New Zealand to deliver real benefits for Māori through, for example, more frequent data, reduced respondent burden, and the ability to better track Māori migration. Official data are a strategic resource for both national and Māori development; there is a common

interest in ensuring that the census and other official data remain robust, relevant and trustworthy. However, missteps are likely to be made if Māori are not able to fully participate in decisions about the future direction of the census. To date, significant decision-making has occurred in the absence of any substantial Māori input.

The rise of Indigenous data sovereignty, as an Indigenous-led movement and as a field of research, has underscored the clear rights and interests that indigenous peoples, including Māori, have in relation to Indigenous data (Caroll Rainie et al., 2017; Kukutai & Taylor, 2016). These rights are supported by the United Nations Declaration on the Rights of Indigenous Peoples and have also been endorsed by the Special Rapporteur on the right to privacy (Cannataci, 2018). Rapid changes in data ecosystems, analytics and computing are opening up new ways of collecting, storing and analysing data. Internationally, there are a growing number of Indigenous-led data collections undertaken independently and in partnership with government.[24] Stats NZ recognises that it has responsibilities to meet the statistical and information needs of Māori and iwi as tangata whenua with distinctive rights and interests. A recent report noted that "The census must uphold Stats NZ's commitment to the Treaty of Waitangi by providing information needed by both Treaty partners – to work positively together, for mutual benefit, towards nation-building" (Gleisner, Downey, & McNally, 2015). Te Mana Raraunga, the Māori Data Sovereignty Network, has called for Māori data governance across the official data system, in part to provide clear lines of accountability back to iwi and Māori (Te Mana Raraunga, 2018). In late 2018, Stats NZ publicly announced that it would be committing to co-designing a Treaty-based Māori approach to data governance across the official data system (Stats NZ, 2018h). The co-design process will be jointly led by Stats NZ and the Data Iwi Leaders Group – the data expert group for the Iwi Chairs Forum, which provides a national platform for inter-tribal collaboration to advance shared aspirations. The coming years will be a real test of whether and how these commitments can be delivered on.

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views in our capacity as scholars, not as panel members. It draws heavily from the TMR statement on Census 2018, written primarily by the authors, and published online in July 2018. It does not contain references to any material circulated to the panel. We thank the reviewer for the helpful comments provided to us. Any errors or omissions are ours alone.

Notes

1 Statistics New Zealand rebranded in 2016/17 to Stats NZ. For ease of reading, the organisation is referred to by its new name throughout the paper, although both names will be seen in the in-text citations and references depending on when each report was published.

2 The authors are both members of this panel. This paper does not represent our views as panel members, nor does it contain information circulated to the panel.

3 Statistics Act 1975, sections 23 & 24.

4 Population estimates for the national estimated resident population are produced quarterly and annually for Māori and subnational areas. Estimates adjust for census net undercount, the estimated number of usual residents temporarily overseas on census night, net migration and natural increase.

5 Stats NZ has developed experimental ethnic population estimates from linked administrative data in the IDI but has found important limitations (Stats NZ, 2018i). One is that administrative data, with the exception of birth registrations, tend to under-report people with multiple ethnicities. The method used to generate ethnic estimates also does not allow for changing ethnic self-identification over time.

6 For more on the IDI, see http://archive.stats.govt.nz/browse_for_stats/snapshots-of-nz/integrated-data-infrastructure.aspx

7 Most releases by Stats NZ have used around or *about* 90 per cent; however, at least one other paper refers to *at least* 90 per cent. See https://www.stats.govt.nz/news/2018-census-update-2

8 A substitute household is one in which there is sufficient evidence that a person exists, or a dwelling was occupied, but no individual form was received. Substitute records (now known as unit imputation) are raised for one member of the household or for the entire household. Partly counted households and substitute households have forms raised in the census and are thus counted in the usually resident population (URP) but not in the response rate.

9 The census also counts visitors in Aotearoa New Zealand on census night but not usual residents overseas.

10 The sampling error was +1.3 and +0.5 percentage points for Māori and European, respectively.

11 The report notes that many of the PES records matched to substitute records (which in 2013 did not contain ethnicity information) were from people who gave Māori as one of their ethnicities. Thus "the PES tends to

overstate coverage and underestimate undercount for some ethnic groupings" (Statistics New Zealand, 2014b, p. 48).

12 Stats NZ does not publish detailed net undercount rates for subnational sub-populations (e.g. Māori males in Northland) because of the large sampling errors.

13 The Representation Commission is convened every five years following receipt of a report from the Government Statistician on the New Zealand electoral population. The next boundary review will take place in 2019, with the new boundaries applying to the 2020 and 2023 General Elections.

14 The Act defines the Māori electoral population as "a figure representing both the persons registered as electors of the Maori electoral districts and a proportion of the persons of New Zealand Maori descent who are not registered as electors of any electoral district and a proportion of the persons of New Zealand Maori descent under the age of 18 years". Retrieved from http://www.legislation.govt.nz

15 This proportion takes account of respondents who answered "don't know", who provided a multiple response, or who did not provide any response to the Māori descent question (Statistics New Zealand, 2007, p. 11).

16 We thank the reviewer who identified this possible outcome.

17 New Zealand European/Pākehā are buffered somewhat by these changes because of their larger population share.

18 A key example is the allocation of fisheries quota in the Māori Fisheries Act 2004. The document *He Kawai Amokura* contained the methodology used by the Treaty of Waitangi Fisheries Commission to determine the notional population of the 57 recognised iwi, as set out in Schedule 3 of the Act. The notional iwi population figures provided the basis for the allocation of fisheries assets and were derived from iwi data from the 2001 New Zealand Census of Population and Dwellings.

19 Accessed from http://archive.stats.govt.nz/methods/classifications-and-standards/
classification-related-stats-standards/iwi.aspx

20 Stats NZ has indicated that imputation of Māori descent data will use, in order, the response to the 2013 Census, birth records, if the respondent answered the iwi question, and lastly if the respondent indicated Māori ethnicity in the 2018 Census (Stats NZ, 2018e, p. 17).

21 For more on the IDI, see
http://archive.stats.govt.nz/browse_for_stats/snapshots-of-nz/integrated-data-infrastructure.aspx

22 In cases where Māori descent and iwi variables are imputed (i.e. attached to an individual's data), this imputed data is included in the IDI with a flag to indicate its imputed status. This could mean that an imputed variable in the census could be linked to an individual's data over a long period of time.

23 For more on the "five safes", see
http://archive.stats.govt.nz/browse_for_stats/
snapshots-of-nz/integrated-data-infrastructure/keep-data-safe.aspx

24 See, for example, the work of the First Nations Information Governance Centre: http://fnigc.ca/first-nations-regional-health-survey.html and the Yawuru "Knowing our community" survey: http://www.yawuru.com/our-culture/knowing-our-community/

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