

Invited Commentary: Enriching Public Policy with a Population Perspective

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Abstract

Statistics often provide answers, but equally, so they point to questions that need to be asked. What we now know about some past condition will change with the knowledge we continue to gain. Population statistics and demographic analyses are amongst our most reliable windows on our society and economy. They are less shaped by political and institutional forces that determine the nature of the public evidence base. Changing demographic influences have made it essential to remain aware of the effect of population change on specific policies and investments. The institutional leadership that is needed for this is discussed in this paper.

Population change – past, current and prospective – is a major driver of policy initiatives and of commercial investment. While much of New Zealand’s post-WWII population change through to the 1970s could be roughly characterised as New Zealand-wide fertility-driven growth alongside rural depopulation and a drift to the north, other drivers of population change have since come to prominence. We now have unprecedented levels of diversity in age structures, gender, ethnicity, mobility and subnational differences in growth (Jackson & Brabyn, 2018), along with high levels of economic and social fragility that are the focus of political attention.

At the same time, concepts of personal responsibility, social investment (Boston & Gill, 2018) and predictive risk modelling (Keddell, 2014) have become more prevalent in public policy, especially the justice and social sectors (e.g. child protection). These approaches generate analyses that can be overly reliant on behavioural theories that focus on the individual characteristics of those in situations of need or vulnerability.

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By contrast, population studies show the evolution of the base population as defined by age, ethnicity or place, enabling age, cohort and period effects relevant to the policy area. In short, while population approaches inform and challenge systemic responses to situations, behavioural models tend to focus on the need for individual rather than system change.

Currently, studies of the impact of population change on sub-populations are rare, and major issues including welfare benefits, housing and prisons now only earn attention analytically when they become a political embarrassment. However, population analysis is of sufficient importance that it should be an obligation that is recognised either in the cabinet manual or the Public Finance Act. This paper identifies and describes some of the potential risks of severe misallocation of public resources in New Zealand arising from policy inertia and failings in assessing population change. This misallocation has made public policy in justice, welfare, housing and retirement provision less responsive, and even ignorant, of known population dynamics and trends. Missed opportunities arise from the generally weak application of the tools of population analysis and weakness in the analytical breadth of public policy analysis.

The nature of population change

A wide range of influences have resulted in New Zealand's population dynamics and structure now being less dominated by its extraordinary post-war baby boom. Migration has continued to exacerbate the concentration of the population in Auckland, far more so than in the other main urban centres. The determinants of population change in each of the four main ethnic groupings (European or Other, Māori, Pacific peoples, Asian) are quite different (Stats NZ, 2017). Sometime after 2050, deaths, which are currently half the number of births, will exceed the number of births. While the national age structures change steadily, at a local level age structures have changed quite dramatically, with parts of the country already having the age structures projected for New Zealand in some thirty years' time.

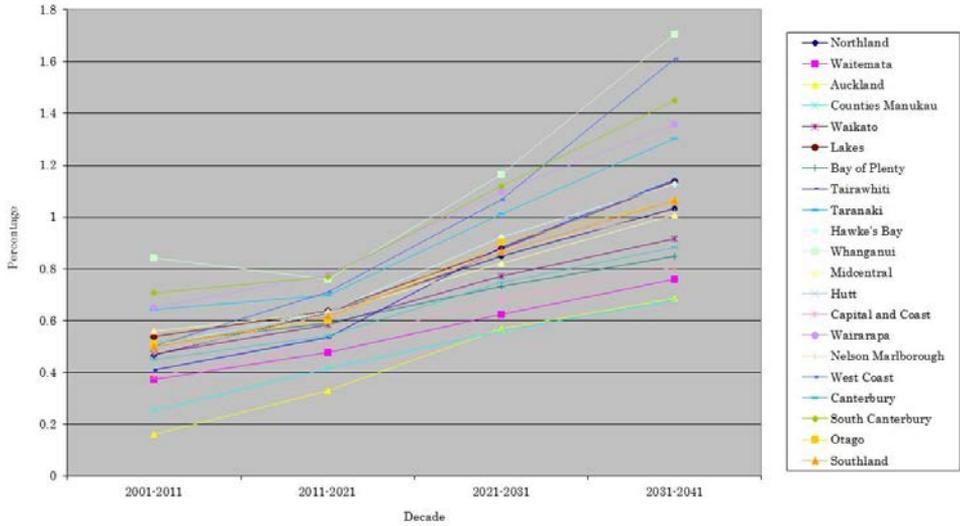
Population change in New Zealand has included an accelerating diversity in subnational and ethnic age structures and growth patterns. The work of Natalie Jackson and others has highlighted how the

continuing, albeit slowing, population growth at a national level is an aggregation of a great deal of local and ethnic diversity.¹ For some sub-populations there is absolute population decline, while for others growth continues most across age groups. The share of the population that is Pākehā will continue to decline.

How people gather in families and communities generally amplifies the effect of population change on the demand placed locally for services. In recent decades, social change, higher longevity, changing fertility and changed patterns of household formation and dissolution have led to an accelerated growth in the number of families and households compared with the increases seen in the population overall. The growth in multi-family households is one of the exceptions to the general trend of household sizes getting smaller and more work is needed to distinguish economic and cultural influences on the significant ethnic differences in the growth of multi-family households. Household form and formation rates influence the gap between the demand and supply of houses. This affects the workload and volatility of activity levels in the building and construction industries. One example pointing to the scale of difference in regional demands for housing and other services (in this example, health expenditure attributed to the projected population 75 and over) is highlighted in Figure 1.

At the other end of the life cycle, for each decade since the 1980s, the care of each new generation has fallen on fewer families because of declining fertility and because an increasing share of men and women are choosing not to have become parents before reaching middle age (Didham, 2016). We have yet to find ways of ensuring that those who are themselves not bringing up children can contribute fairly to the bringing up of the later generations which sustain our society, in part because the importance of population renewal is poorly understood by all generations.

Figure 1: Percentage of increase in health expenditure attributed to over 75 population



At any time, unusual period effects of economic and social forces can result in significant downstream effects on those most affected. An illustrative example of this was the effect of the 1930s Great Depression on the health, education and life course of those who lived through it, and their distinctive later attitudes to risk (Cogley & Sargent, 2005). The post war Baby Boomers who followed them had the opposite experiences that left them healthier and more affluent than any earlier generation, and less risk averse and more open to opportunity.

In most areas of public policy, measures of cohort differences matter because they take account of generational differences in how people live, relate and use their time, and the composition of the population at any time. We can analyse cohorts by a range of differentiating factors so that cultural, gender and generational differences in age-specific experience can be separated. These factors are at risk of being ignored when simply looking at age-specific rates. This is especially important in New Zealand where generation experiences at ages and times have been very different or where individual ethnic communities, especially Māori, have had markedly different experiences than Pākehā with multiple government agencies and agents that span more than a century. Age-period-cohort analyses enables us to untangle the complex and confounding effects of age, period and cohort and can capture the unique

experiences and exposures of age groups as they move across time (Lin et al., 2018). When cohort, period and age influences are measured in the available evidence base, they can be confronted and challenged by available but less tangible evidence from individual experiences.

We have a rich but underused understanding of much about the nature of the New Zealand population and the certainty with which it will change over the next three decades, along with a considerable array of knowledge about the interdependence among government programmes. The breadth of policy whose relevance will be consequently challenged will require a stronger focus in our national research agenda. The sources of uncertainty we need to reduce include the compression of morbidity, the effect on later life chances of childhood poverty, historical influences that continue to affect outcomes for Māori and Pacific populations, managing the impact of chronic health conditions on population health, responding to the rapid shift in the age distribution within smaller cities and places, and what makes up good housing.

The Relationship between the Population Base and Public Investment and Service Provision

Shifting population structures affect those who require some form of local or regional infrastructure or use public goods and services, as well as those in or serviced by highly trained occupations where demand has to be anticipated well ahead, such as doctors, nurses and teachers. There are many sectors of policy where life course and intergenerational influences exist because interactions with services at one point in the life course can influence the likelihood or form of later service interactions. Historical experience has a long reach in sectors such as justice, health and housing. The early involvement with child protection services is now known to have been a significant forerunner to later connection as an adult with the justice system (Stanley, 2016).

Policy risks are amplified where costs and benefits involve different time periods and accumulate over much longer periods than is usual for government budgeting. Immunisation and child health are examples, as is the screening for conditions such as diabetes where there is a high likelihood that early detection and treatment will curtail the much later potential demand for dialysis. Early knowledge of conditions often signals

an opportunity to fund preventive or remedial action with an initial cost that is outweighed by any later payback. This type of analysis does not sit well with the three-year budget cycle of governments, nor of the electoral term. The ultimate cost to government of alternative shorter-term responses is to generate fiscal pressures downstream that are likely to lead to services being curtailed or rationed, if they continue to exist, unless they are predicted.

The range of alternative responses will usually be at its greatest when preventative measures or options for risk mitigation can have an effect. For example, changes in age-specific fertility rates will have later implications for pupil numbers and consequently the number of teachers that need to be trained or recruited. As we are currently experiencing with the teacher shortage in New Zealand, we observe first-hand the consequence of delayed action is to search internationally at the eleventh hour for people to bring from overseas. New Zealand has long been dependent on a capacity to compete internationally for the highly qualified individuals needed to offset the extraordinarily high loss overseas of doctors, nurses and other graduates, but we now see many trades and some partly skilled jobs such as drivers facing the same issues. The construction sector has long been affected by boom and bust, the net effect of this over several decades is a smaller and ageing permanent workforce with little capacity to train an upcoming generation. The longer-term effects of a reliance on short-term levers from immigration has led to structural imbalances in the age and experience mix of key occupations that could take decades to resolve even if training intakes were to reach levels more appropriate for self-sustainability (Medical Training Board, 2008).

There is immense variation in the size of the communities that form the service base for optimal use of public resources such as hospitals and specialist health workforces, schools, universities, ports and public housing as well as nationally managed regional resources such as dams, prisons, roading, railways and airports. This is especially important for New Zealand, both because of our small population and the way that the population is spread. These two characteristics limit the opportunity to have sufficient population mass to ensure the viability of providing services where people have concentrated. The scale of service justified economically by the population mass will determine its current and future

viability as a service operation with the capability to function in a sustainable way. Information and communications technologies and enhanced transportation services continue to bring radical change to service value chains. Even so, for many services there is a high likelihood that population levels and public services and public investment and disinvestment will be poorly connected.

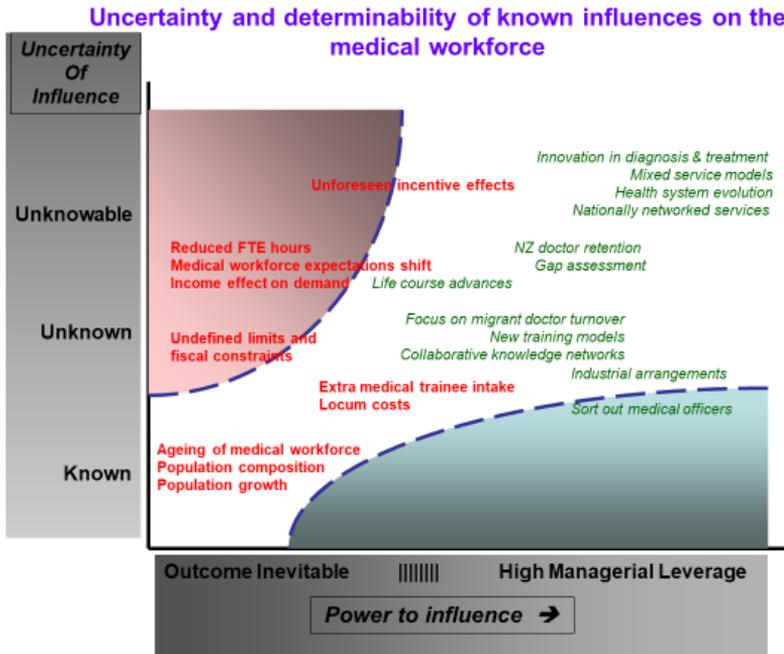
Example from planning significant workforces

Examples of the dependence between cohorts are seen in teaching and health workforces, such as the matching of teacher numbers to pupils or in providing care workers for the infirm elderly, as well as where there are apprenticeship models, particularly in industries such as building and construction which are subject to both economic and demographic fluctuations. Despite quite clear-cut connections between demand and supply, generation differences can exist in participation in occupations where attitudes and opportunity have shifted. For example, eight per cent of the annual birth cohort of all young women born around 1956 had trained in nursing by 1976. In comparison, thirty years later, of the annual cohorts of young women born each year around 1986, just 0.4 percent were trained in nursing.

By analysing cohorts, population projections can take account of a diverse range of influences on future population levels and apply a wider range of variables when selecting assumptions. For example, in work done some time ago (2008) to advise on the number of additional medical school places, the modelling sought to identify the most significant factors influencing the demand for doctors. Figure 2 below presents the range of variables. The work was done to challenge the use, up to then, of simple models relating doctor numbers to growth in the total population.

The chart demonstrates the many factors alongside population change that influence the scale of future demand for medical graduates, and what are the uncertainties that limit the reliability of models of any sort in workforce forecasts.

Figure 2: The range of variables influencing the demand for doctors



Source: Medical Training Board reports, Ministry of Health 2008.

Example from prisoner forecasting

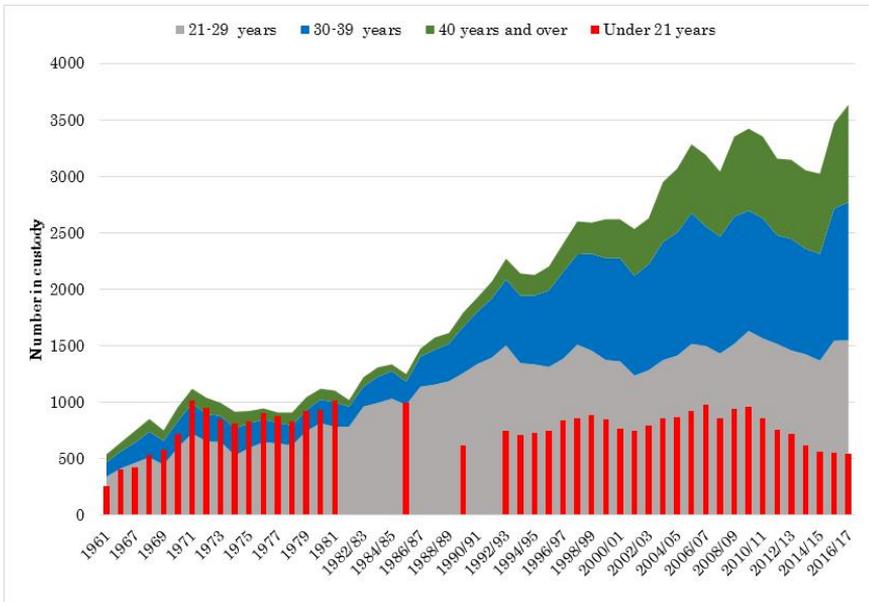
Despite the availability of the relevant demographic information, most reporting of the prison system has the narrow purpose of overseeing the management of a corrections system where flows in and out operate independently and huge volatility is just part of the picture. The analytical efforts that have prominence are those that seek to explain the characteristics of those captured by the system, who are disproportionately Māori, rather than the interaction of the population at large with the whole justice system. It should therefore be no surprise that justice policy in New Zealand is characterised by Parliamentary responses to a series of one-off incidents involving penalising offenders by more imprisonment, and these generally have had culture and cohort-wide consequences that are rarely considered. Many New Zealanders who have experienced imprisonment when older were as children involved with past processes of child justice and institutionalisation that we simply would not countenance now. The continuing influence of those past experiences needs to be recognised.

For New Zealand, the justice system has long had different approaches for Māori, and while these differences in treatment appear to have diminished, the harm done in earlier times has had a continuing impact on the life course of those Māori as they get older. Of significance has been the lifelong impact on Māori males who were taken into state custody as teenagers during the 1970s, at a time when some 52 per cent of the Māori population was aged 15 years and under. One in fourteen Māori boys were placed in some form of state custody (Donnell & Lovell, 1982) compared with one in a hundred Pākehā boys. There was a clear racial bias in the threshold for being placed in custody.

The differences have been echoed in later imprisonment rates of this same cohort of Māori males as they aged, in the 1980s for mainly property offences, then later in 1990s with a growing share of violence offences.

Figure 3 shows the disproportionate contribution of Māori children aged 16 and under, to the number of Māori males of all ages who were in state custody during the 1970s and 1980s. Before the late 1980s, the number of Māori over 30 who had been incarcerated had changed little but this number grew rapidly from around 1990 as the birth cohorts who had been placed in custodial situations at very high rates as children then became adults. (Note: The statistical series before 1982 uses different age ranges, and the information on those aged 16 and under is available only for some years.)

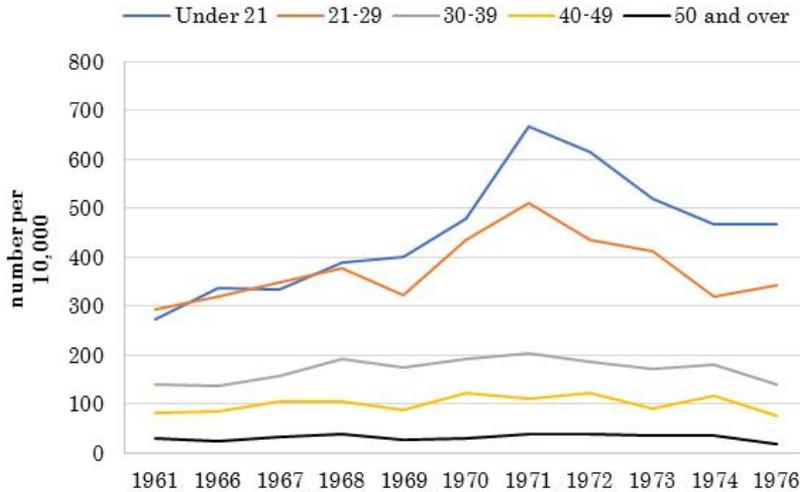
Figure 3: Number of Māori males in prison, 1961–2014/15



Source: Compiled by author from official statistics publications.

Figure 4 shows that the rate of imprisonment of adult Māori males aged 30 years and over was unchanged over the two decades from 1961 until the late 1980s when much of the growth in the increase in the rate of child custody took place. In particular, the rate of imprisonment of Māori males aged 21–29 rose in the middle of the same 20-year period but had returned to near the 1961 level by 1976.

Figure 4: Imprisonment rates of Māori males for key age groups, 1961–1971 (calendar years)



Source: Department of Statistics Population Miscellaneous Bulletin No 7 November 1978.

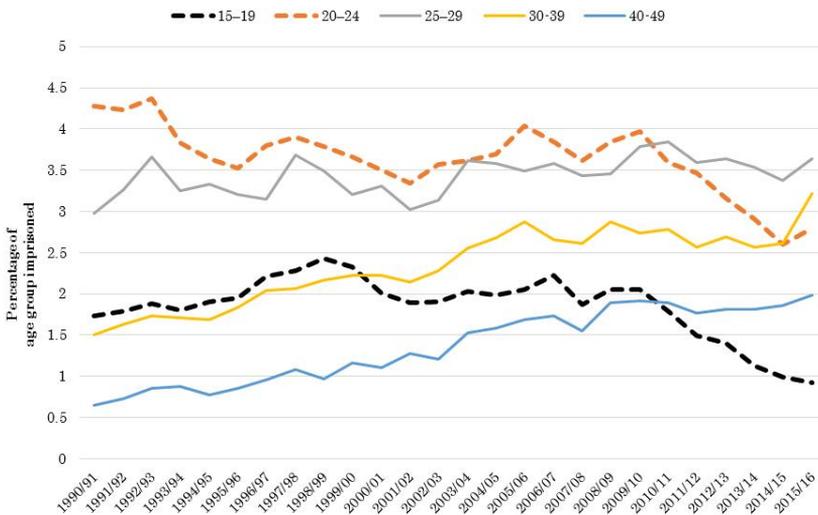
Finally, Figure 5 presents the age-specific rates of incarceration from 1990 to 2015 when a consistent series of measures is available. While the rates changed little over the three decades up to 1990, the fastest rising age groups of incarcerated Māori males since then are those aged 30–39 years and 40–49 years. The decline in the rate of those aged 15–19 years and 20–24 years seen in the last 8–10 years is the first significant decline in Māori male incarceration since the rate of putting Māori children into custody fell after the late 1980s. This suggests that the dynamics of incarceration of Māori males continues to be age-specific, but who are most deeply affected has changed significantly. Cohort analysis is needed to disentangle the period and age effects.

The Necessity for Population Analyses that Inform and Challenge Fiscal Analyses

Policy analysis of necessity can involve projecting fiscal, personal and community impacts over the course of the term of the Executive Government of the day. The fiscal and performance measurement practices under which the public sector operates has resulted in the fiscal performance at an agency level dominating the analysis and direction of

social services and affecting the execution of policy in most domains. While it is essential to know of the cohort relationships and connections that are relevant in any sector in order that the long-term impact may be foreseen with any reliability, the pressures of political life and the nature of public policy making generate contrary forces which often limit the nature of long-term analyses, unless it is expedient at any time to produce and publish them. The processes for holding government to account are often inadequate for the task.

Figure 5: Trends in imprisonment of Māori males by age group, 1990/91–2014/15



Source: Compiled by author from Department of Corrections and Statistics New Zealand

Because policy choices tend to place more emphasis on perceptions of political palatability rather than analytical rigour, operational practices have little foundation for evaluation and continuous improvement. This undervalues multi-sector investments and long payback periods. Both nationally and regionally there is a lack of visibility of the accumulated obsolescence of public investments in hospitals, schools, prisons and public housing. The recent Counties Manukau failure to account for depreciation is probable a signal of problems all DHBs face, as with schools, prisons and the public housing stock. This short-changes future generations as they will have to fund a disproportionate share of new capital required to sustain well-established services over their lifetime. The future population base that will need to be serviced is neither consistently recognised nor is

the likely pathway likely to be sufficiently understood. Programme interdependencies, social and demographic change, cohort effects and unexpected impacts necessitate remedial responses, while the political context will usually be dominated by local or national public sentiment rather than the quality of the scientific analysis available. Over the lifespan of all forms of assets, we must now expect that future consumers of those assets will vary in ways unique to the region through population change.

Worldwide there is debate on the age of eligibility for state paid retirement pensions and their funding creates a highly visible crucial test of the capacity of legislators to act in the face of public sentiment. Population sciences highlight the increases in longevity we continue to experience, and the impact of their concentration now on improving years of life after age 55, but this needs to be responded to in the face of the inequalities in outcomes we now measure. Without recognising the significance of the structural shifts and dynamism in sub-populations, then interventions to support high-risk, high-cost populations will not be of known effectiveness and efficacy. These evaluations are sensitive to assessments of the target populations, who themselves can be vulnerable groups, some of whom may be in the custody of the state.

While we might regard demography to be comparatively well placed to inform fiscal analysis, in many areas of public policy there are notable examples where that evidence has not informed policy. Without analysis, agencies have diverted attention from their impact on population groups including Māori. We need to ensure that institutional arrangements exist that allow independent evidence to be regularly published separate from policy conclusions. The extent to which freedom of information legislation obliges Ministers to make public the evidence available when making decisions is also important. Where institutional arrangements are unsatisfactory, it can lead to reduced information in the public domain, and limitations on the capacity of professional public officials to talk in the public domain about their research.

The place of cohort analyses in evaluating model selection in public policy

The policies of the state that influence the combined effectiveness of markets and government in the welfare of the people in households are those of redistribution, public goods, public safety and regulation. Social progress is usually measured at a national level by long-term trends in improved health, life expectancy and education, and when this progress does not include all groups in society, it can create the ironic situation that the policies that lead to improvements in overall well-being result in a more divisive society. Such divisiveness appears in vast differences in outcomes generationally, between ethnic groups and across the workforce, just as the administrative processes of service delivery of the state, including income support, reinforce divisions. Unless measures of well-being capture such diversity and division, they will present a false picture of the well-being of those in the nation and encourage redistributive policies whose effectiveness is ephemeral.

Cohort, age and period analyses can bring to light effects of shifts over time of policies at any point, and the lingering effect of policies or events long past. By connecting with theoretical developments in social sciences, epidemiology and criminology, for example, we can have more certainty when forecasting the long-term implications of current policy settings. Where access to public goods has been limited by screening criteria (time, money, transport, communication capability), those screened out will be less likely to benefit from ongoing general improvements in the disability-free life expectancy experienced generally by the population. We need to know where people can be missed from the information base, particularly the census of population, as they are more likely to come from the tails of the income distribution.

Changing norms determine the selection of models and practices used in government, and generally narrow the focus of policy and practice to middle-class expectations and norms, deceiving policymakers about their relevance for informing political choices that involve redistribution. The same is the case with many aggregate measures of well-being. Indicators tend to be highly summarised and contain little that put to test the fundamentals of policy settings. Consequently, well-being measures do not substitute for the need to have processes for the vindication of the

implementation policy. The justice example above exemplifies this. Figure 6 provides examples of where publicly relevant concepts have become narrowed in the measures used in the policy domain.

Figure 6: Examples of publicly relevant concepts being narrowed by the policy measure or model

Publicly relevant concept	Policy measure or model
Cost of living	Consumer price inflation
Housing	Home ownership
Retirement income	Personal savings (KiwiSaver)
Common free education	Decile-ranked school
Income substitution	Means-tested benefits Sanctions of process
Free medicine	Part charges for doctor and prescriptions No dentist
Prison as punishment	Prison for punishment

Behavioural models bring a tendency for analysis to be overly reliant on data sources that focus on the individual characteristics of those in some selected situation of need or vulnerability. Given this, they then seek to identify the similarity of their characteristics and experiences is with others in the same situation, in order to make predictions about the propensity of others in that situation to have that need or vulnerability. The potential in behavioural models for continuing ethnic and other biases is well documented, particularly the work of Emily Keddell on predictive risk modelling. There is bias from proxy measures, errors in variables, and avoidance of developments in social and economic theory, and they all bring serious consequences, as does the ecological fallacy of imputing the characteristics of a group, however accurate, to all the individuals in that group. All of these are serious issues, perhaps enabling the removal of a baby from its mother or determining the likelihood of incarceration of remand or convicted offenders. Where models have been screened from public view through obligations to protect commercial confidentiality, it releases public servants and Ministers from proper accountability. The Government Statistician recently released a report on the use of

algorithms across government agencies, which included the use of predictive risk modelling,² which was comprehensive in its description of the practices but highlighted the limited thinking so far on the ethical, statistical and accountability issues.

The nature of the challenge for population experts

In analysing population change and the consequences of policy, it is not easy to disentangle and isolate the influences of population, policy, politics and public sentiment, especially where both investment and disinvestment will be critical to the long-term viability and fiscal sustainability of public programmes. Much regional population change will be considerable yet foreseeable, but the impact will be complicated by large shifts in inequality, climate, globalisation and technological change. The demographer's role as a public communicator will be vital in underpinning the trust that communities will need to have in understanding, managing and coping with such change. Population studies underpin many public programmes and inform policy about them.

We know that legislators are more inclined to introduce policy measures that respond quickly and agreeable towards public sentiment and less inclined to reverse policy measures that conflict with public sentiment. This is more obvious in policies that transfer resources to communities, or which deliver benefits long after costs need to be paid. Similarly, where policies incur costs or face higher risks in order to deliver a benefit to others later, such costs may not be incurred. Obvious examples include the willingness to be vaccinated (e.g. MMR), the location of health and education services, and the age of eligibility for retirement pensions.

Without strong pressure, it is unlikely that politicians will reform practices, and the inconsistent commitment of public services to investing in relevant evidence as critical infrastructure has shown no signs of change. The Chief Science Advisor model has been a good step, but the disestablishment of the Crown's Social Policy Research and Evaluation Unit (Superu) without associated promised shifts in resources for analysis and evaluation within the public service points to some hiatus in commitment. Increasing public literacy and numeracy may reduce the barriers to change, on the rare occasions when evidence has been communicated well to the public. The Treaty of Waitangi Act uplifted the quality, standing and imperative to act on historical studies in New

Zealand, and it may take something similar, perhaps appropriate amendments to the Cabinet Manual or the Public Finance Act, to do the same for population studies. Scientists, including population experts, and their professional bodies and institutions, all have a need to increase their effectiveness at presenting in the public domain the nature of population change and the consequences of inadequate policy responses, and promoting solutions of this sort.

Conclusion

The linkages between evidence and policy are often fraught, because of the often-immeasurable influence that sentiment, values, political compromise and occasionally accident or error play in making policy decisions.

It must be up to scientists and their professional bodies, including population experts, to increase the understanding of their methods and highlight their effectiveness at explaining in the public domain the nature of population changes and the consequences of inadequate policy responses. Currently the depth of policy analysis and the necessary wider analytical competence in demography and other social sciences in government has yet to match the increased computational opportunities. As we move into an era where big data is seen as a changemaker, it is critical that giving greater recognition to demographic structure is not side-lined by the new interest in summarising the content of the administrative records. The richness of demographic thinking can provide a powerful spotlight on potential policy distortion and system limitations of social policies much more than is possible from single-source analysis, predictive modelling and the perceived potential of algorithmic methods.

Given the significance for communities, places and generations now of projected demographic change, it may be timely for all policy initiatives, including the periodic review of continuing programmes, to be supported by an independent demographic assessment of the basis and quality of long-term projections supporting the introduction or retention of the policy. This should be a requirement that is reinforced by appropriate directives contained in amendments to the Cabinet Manual or the Public Finance Act, that recognise the essential place of population analysis in policy selection.

Notes

- 1 See the 2017 special issue of *Policy Quarterly*, "The ebbing of the human tide: What will it mean?" <https://ojs.victoria.ac.nz/pq/issue/view/547>.
- 2 <https://www.data.govt.nz/assets/Uploads/Algorithm-Assessment-Report-Oct-2018.pdf>.

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