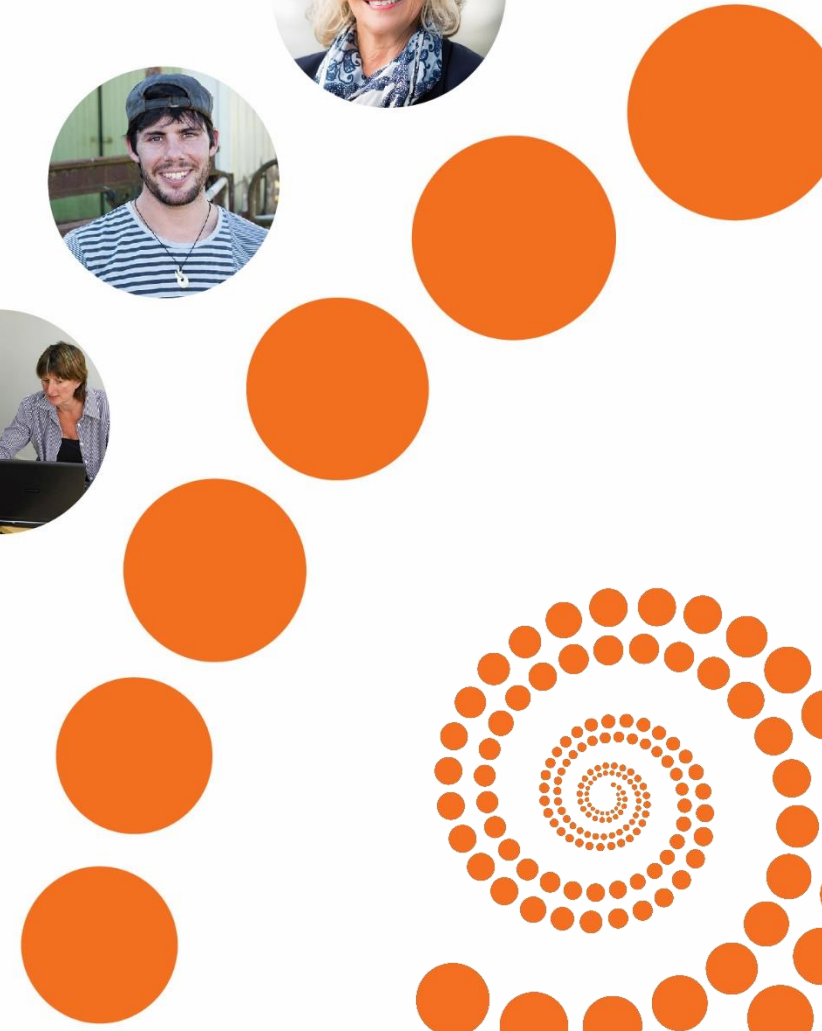


Challenges in measuring subnational mobility

Peter Dolan

Senior Manager –
Population Statistics



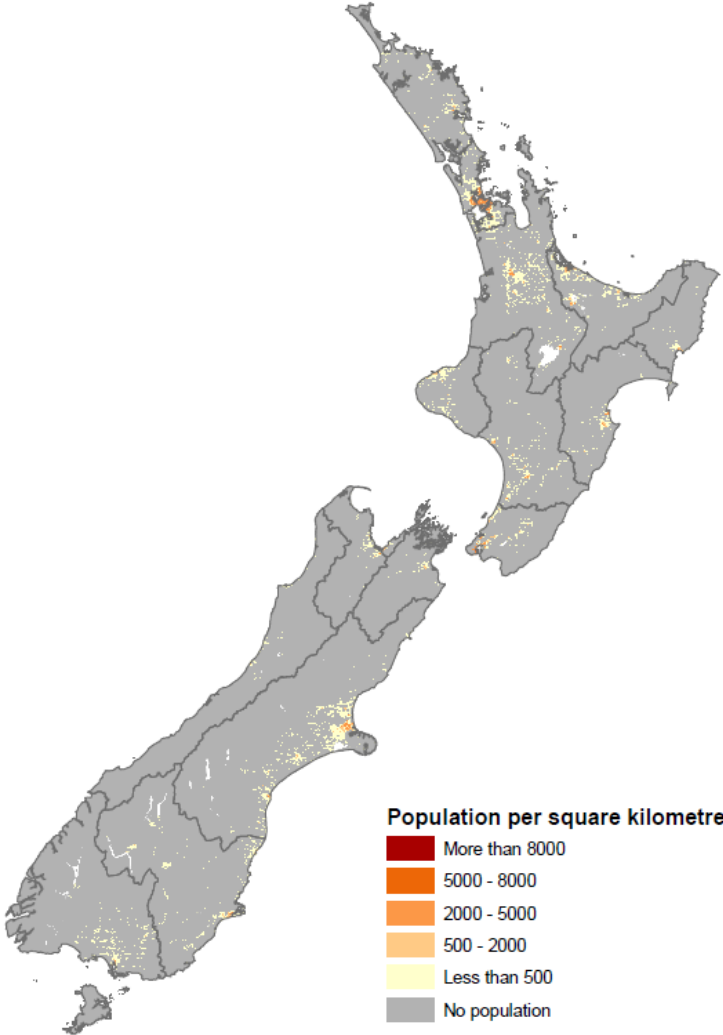
Disclaimer

- The opinions, findings, recommendations, and conclusions expressed are those of the author, not Stats NZ.

So, where are we?



Population Density 1km Grid June 2013



There's a lot of space,
but not many people

Some definitions

Mobility

- People move – either short term or for longer periods (including permanently)
- Longer term moves may be referred to as migration
- Populations of interest include people moving across boundaries and within boundaries, as well as people who are not moving at all

Some definitions

Migration

- International migration usually defined as a move of 12 months or more duration – across a border
- Internal migration defined generally as a move from one self-identified usual address to another

Some definitions

Subnational

- Between defined areas within a country – may be at any scale
- But can be extended to any polity with open borders

So, this includes

Mobility, migration and a subnational dimension

- International exchange of people
- Intra-national exchange of people
- The relationship between these flows and with the non-mobile population

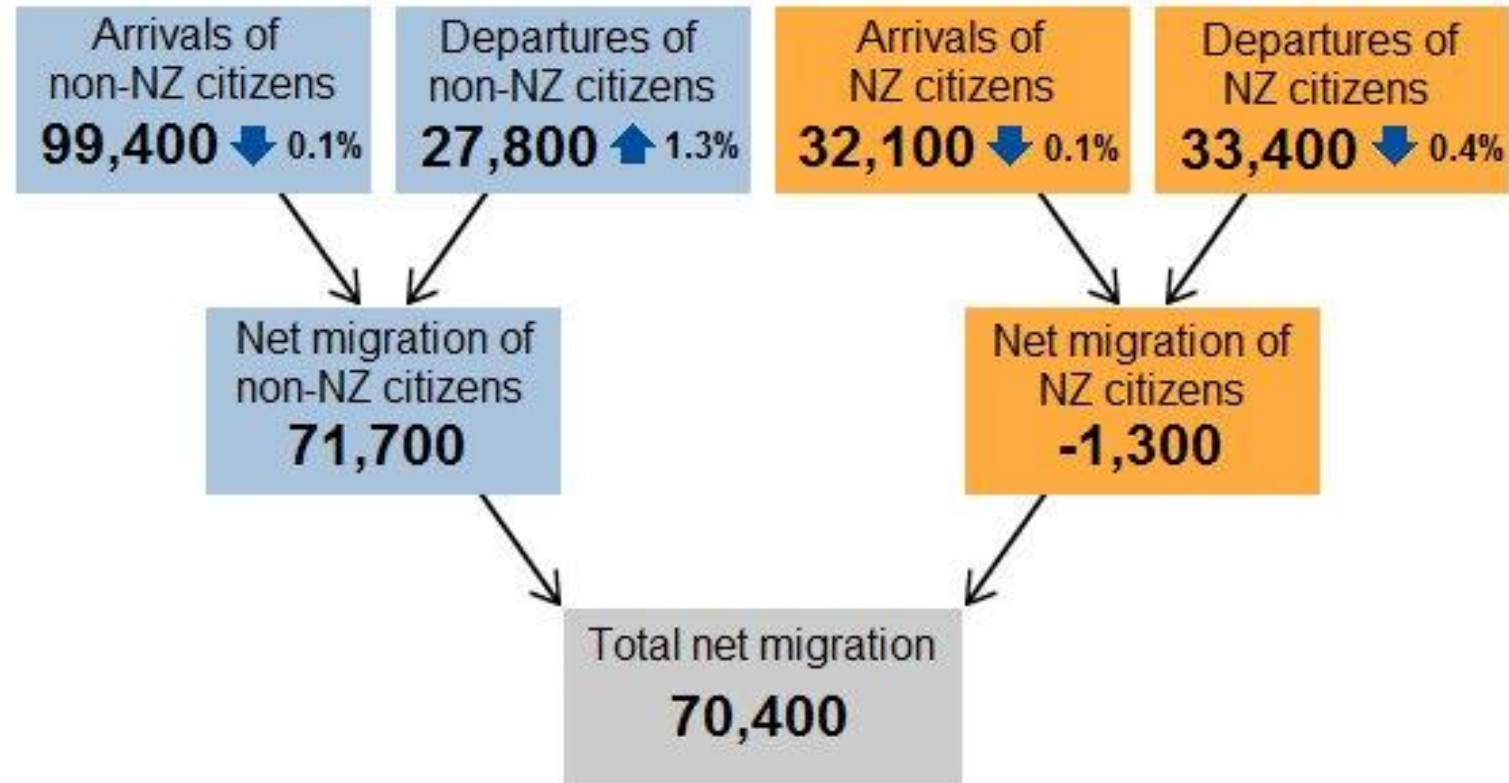
Migration is volatile in New Zealand

The measurement problem

- Over 13 million border movements
 - 6,631,129 arrivals
 - 6,570,631 departures
- And, at the moment
 - less than 2 percent of arrivals are PLT
 - less than 1 percent of departures are PLT



Permanent and long-term migration
Year ended November 2017

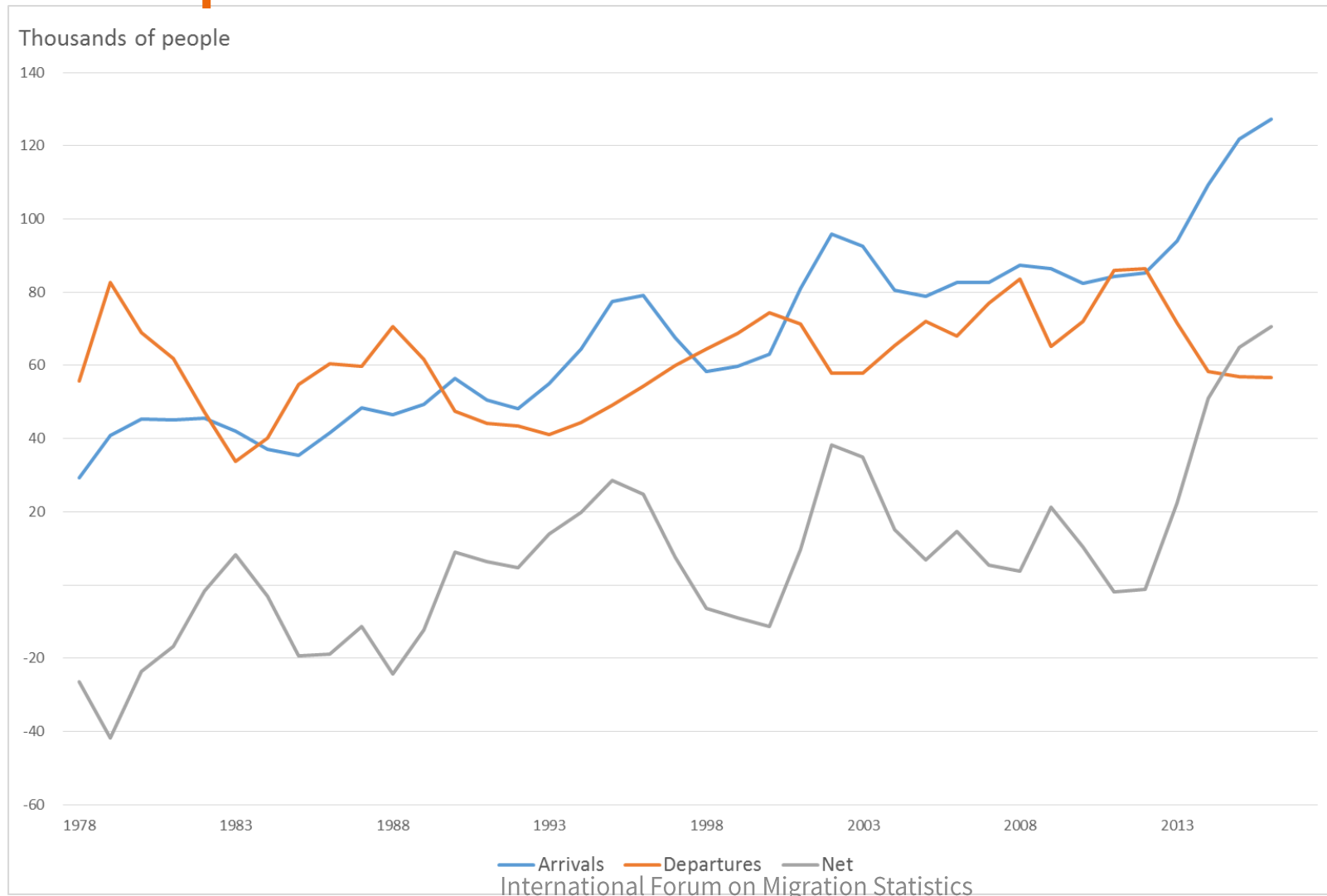


Note: Totals may not sum due to rounding
Percentage changes are indicative of the November 2017 year compared with the October 2017 year.

Source: Stats NZ



Permanent & Long-Term Arrivals and Departures: 1978-2016



Internal flows (2013 Census)

Almost half the population changed address

- Of those with specified address 5 years ago in 2013 Census
 - 46 percent were at the same address
 - 31 percent moved within the same regional council area
 - 8 percent changed their regional council
 - 7 percent were overseas and 8 percent had not been born

Internal flows (2013 Census)

But there are some limitations...

- 9 percent of population did not give an address able to be coded at region level
- people who had moved may have moved several times
- excludes people who were not counted by the census or had left NZ

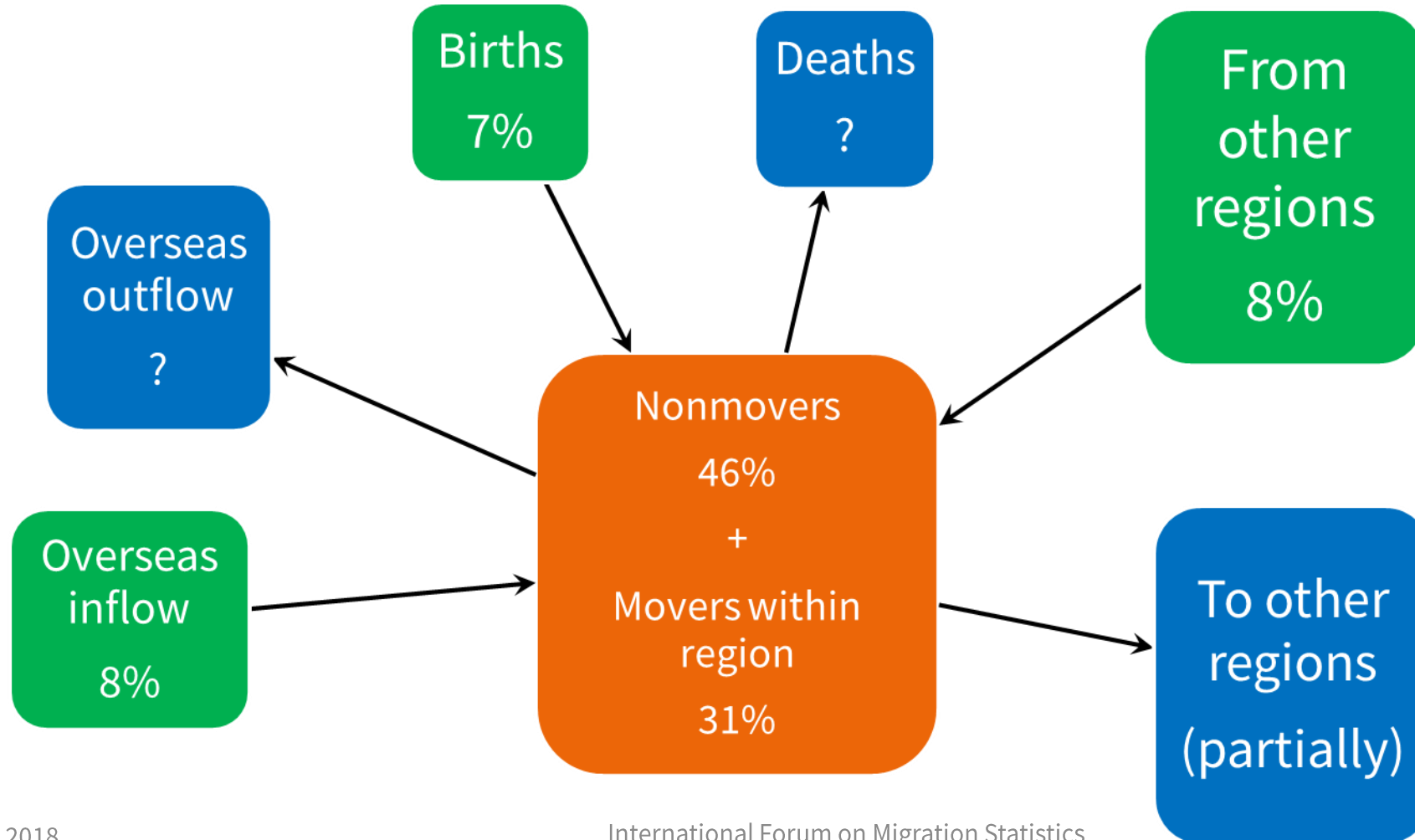
Internal flows (2013 Census)

For those counted in the Census, we know

- how many are counted as usually living in the region
- the gains and losses for the region
- the gains as at census date due to inflows from overseas and births
- we do not have a direct measure of mobility for those gone overseas or died

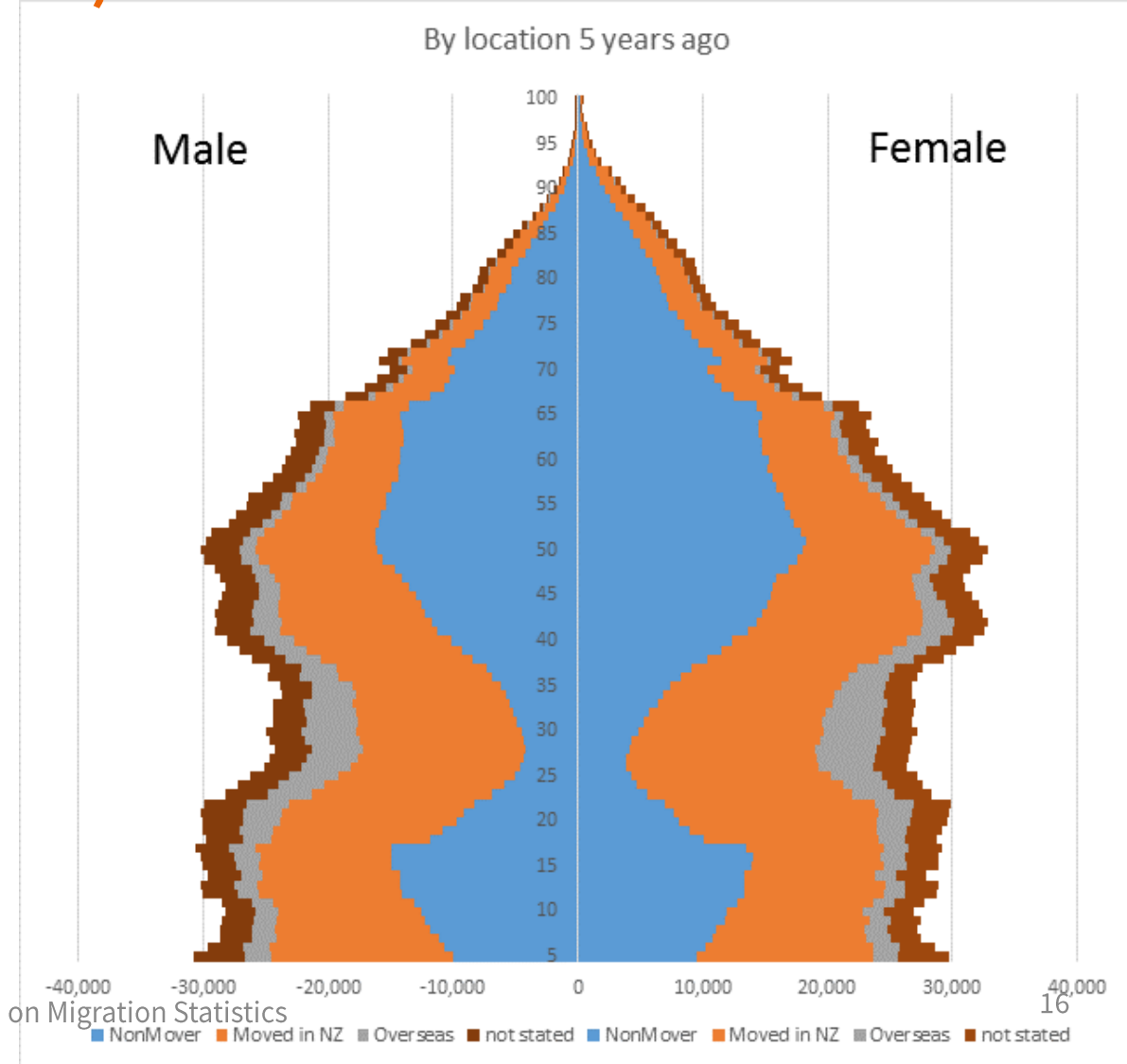
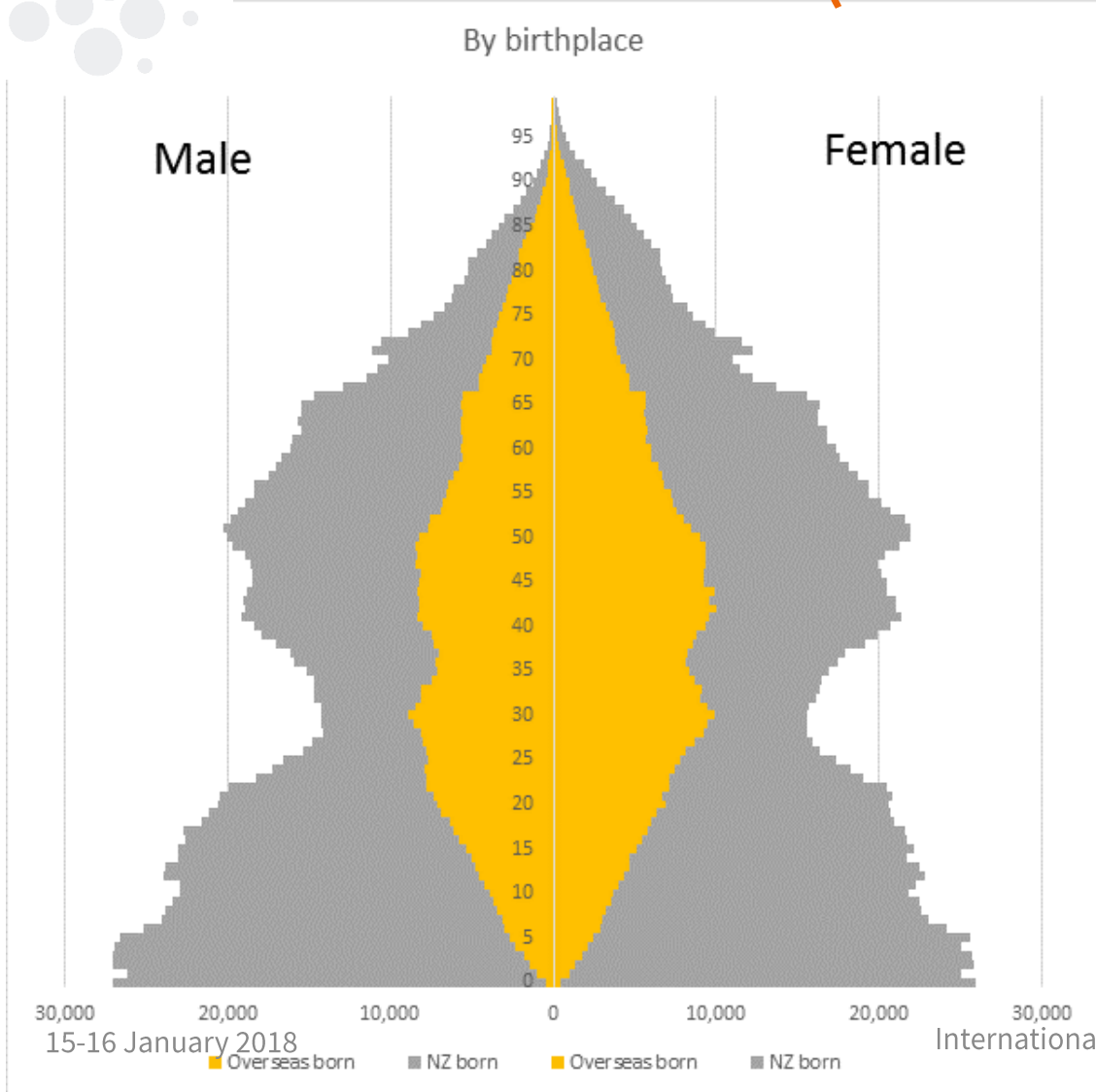


Flows of people relative to 5 years ago





National level Population outcomes (2013 Census)



More measurement challenges

Internal mobility

- Census valuable source for location at points in time
- Linked Census good for flow histories at census time nodes
- Misses intermediate moves and limited granularity
- Administrative source can add some information

More measurement challenges

International mobility

- Very good information on
 - total arrivals at the national level (but limited information on address in New Zealand)
 - total departures at the national level (but only intended destinations)
 - But only as long as there are departure cards

Internal flows (2013 Census)

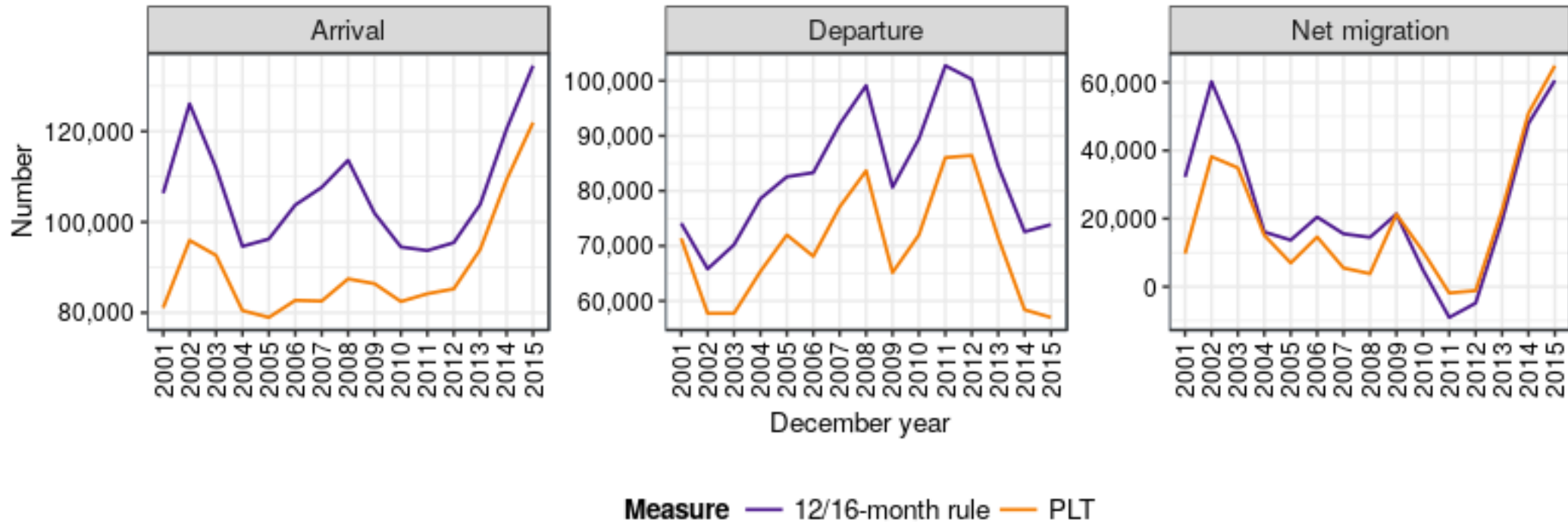
Intentions data for international travelers

- Subject to change of intentions and on-shore transitions of status
- In future, alternative data sources will be needed (more on this below)



Comparing traveller intentions and outcomes

Migrant arrivals and departures
By 12/16-month rule and PLT measures
2001–15



Source: Stats NZ

Measurement of international mobility

- Traveller intentions collected historically by cards
- Intentions and outcomes often differ
- In the future, a longitudinal approach to derive outcomes
 - statistical resident status defined as living in NZ for 12 months or more in a 16 month period
 - independent of passenger card information
- Harmonised with Australia

Measurement of internal migration

Current approach for residential migration in estimation

- computation of stocks and transitions using admin sources, such as tax, primary health enrolments, electoral enrolments
- preferential use of source by age
- coverage estimated in base year only adjustments of student, prison and military populations
- requires manual intervention and reliant expert judgement

Measurement of internal migration

Improvements identified

- transparent and consistent use of administrative sources
- provide estimates of internal migration flows
- evaluation of principles of measurement required
- recognition that estimation is only one use of internal migration data

Future potential

An internal 12/16 approach

- Subnationally, mobility is a change of geography
 - Not logical to define internal and international flows on a different basis
 - A 12/16 month approach to all people enables definition of temporary mobility

Measurement of internal migration

An internal 12/16 approach – some other benefits

- People may have multiple usual addresses, regularly commute, move frequently
- Service populations are often required but currently poorly measured
- Provides longitudinal mobility at the individual level
- Enables estimation at a range of geographic and temporal scales
- Enables real-time estimation and improved projection bases

Links between internal and international mobility

- Immigrants relocate after settlement
 - where to and from and outcomes matter
- Partnering between migrants and locally born
- Changing social and economic characteristics
- Returning migrants may return to a different area than they left
 - mobility of NZ born and overseas born differs in reasons and consequences

What do we need to know, and how can we measure it?

Some content requirements

- Individual demographic variables
 - date of birth, sex, country of birth, addresses time stamped, ethnicities time stamped, Maori descent, date of death,
- Family
 - partnering/childbearing, linked relationships between people and children/parents
- Households

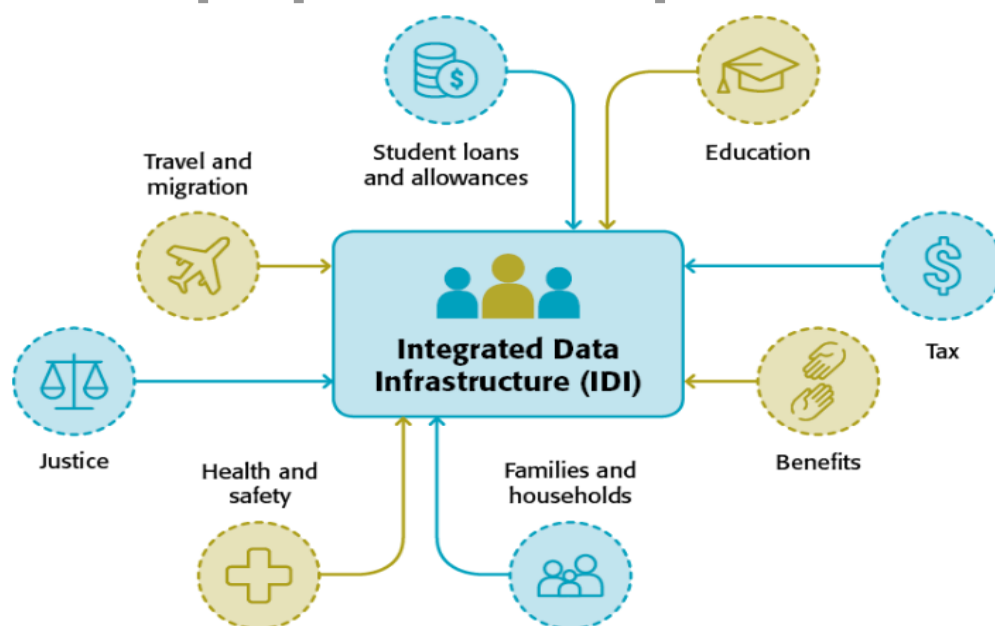
And that might mean a different kind of census

Census Transformation?

- New Zealand has had a 5-yearly survey-based census since 1851 and the next census March 2018
- Census transformation and Next Census programs
- Range of options under consideration
- Work so far implies significant gains in efficiency and robustness in population estimation, gaps still require solutions

Statistical person register (SPR)

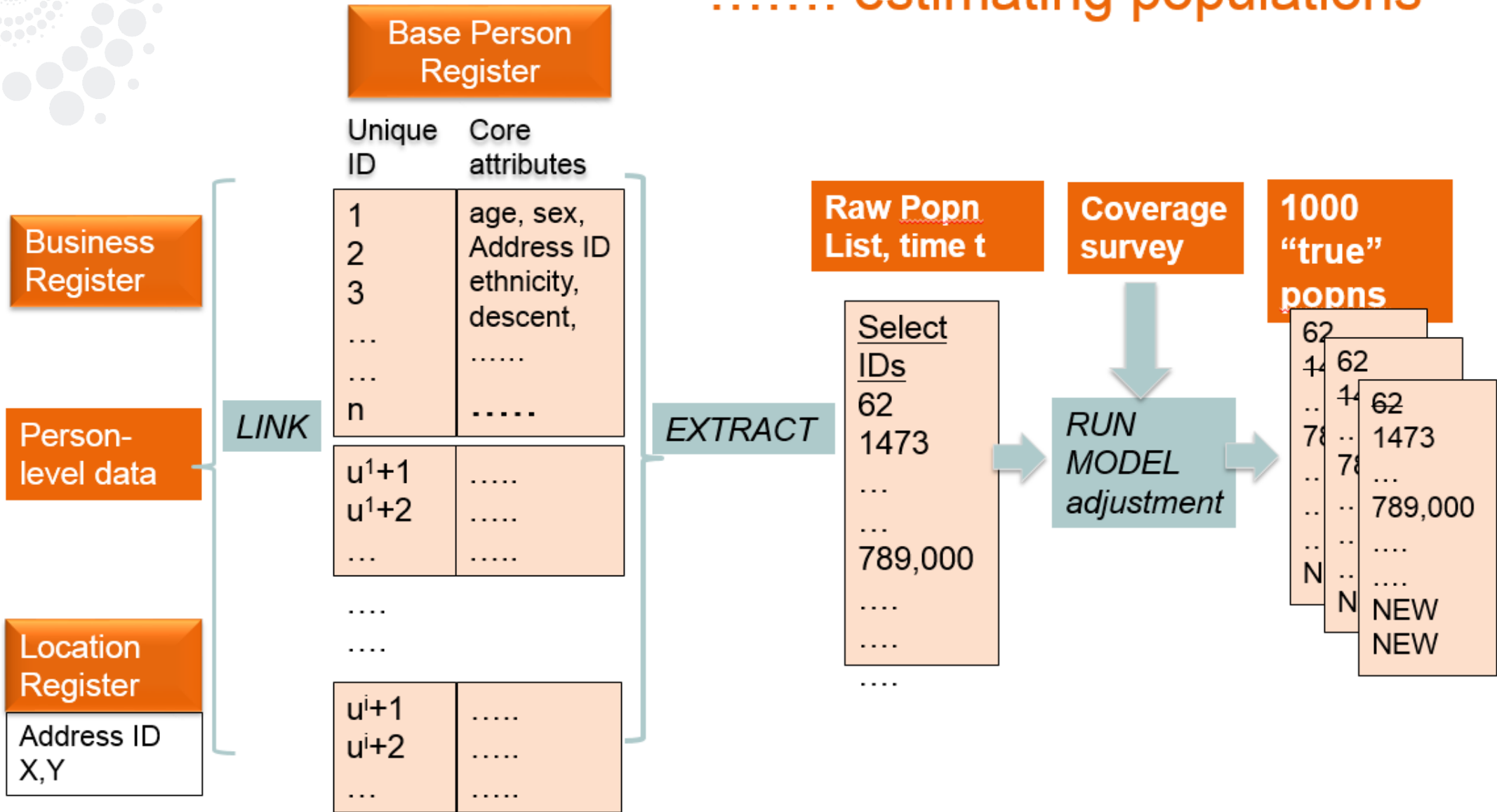
A “population spine”



- Official Statistics
 - in production systems
- Research purposes
 - Stats NZ access to microdata
 - External access to microdata



..... estimating populations



And different population measures

Demographic accounts

- Where the SPR has individual record data, demographic accounts will aggregate cell-count data
- Bayesian statistical framework
- Limited range of key demographic measures
- But, a powerful tool for longer time series, with build-in uncertainty measures, and able to exploit many sources

Where are we now?

- Reasonably well placed for international migration data
- Less well placed with internal migration
- Data environment changing – potentially dramatically

And we would like to be...

- Able to observe population mobility – in detail, at defined parameters, at local levels, at any time
- Future solutions are being investigated – perhaps combining:
 - Statistical person register,
 - Periodic survey-based census
 - Demographic accounts for aggregation and small area population estimation

Next Steps?

- Wider discussion on requirements, theory and methods
- Integrate across the Official Statistical System for timeliness and accuracy
- Develop a prototype person register and demographic accounts system
- Productionise – including automation for routine production, but retaining flexibility and scope for research