

# Using the parent-child link in the birth registrations to derive 'number of children born' information

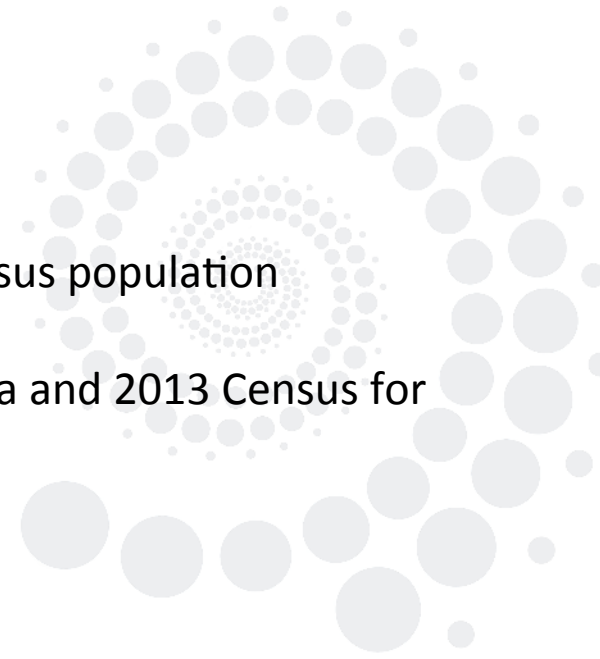
**Sini Miller**, Christine Bycroft and Robert  
Didham

Census Transformation, Stats NZ



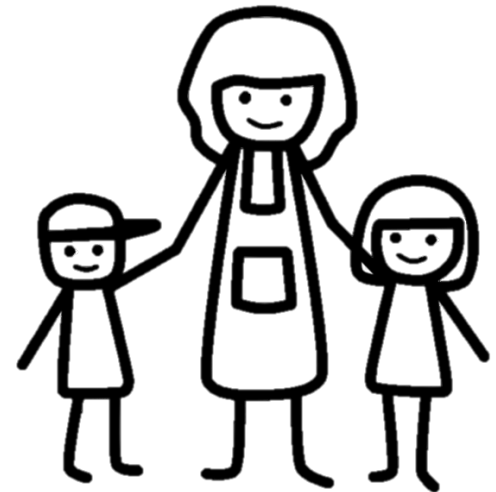
# Census Transformation programme

- Stats NZ's Census Transformation programme is investigating the potential for admin sources to provide census-type information.
- Assess admin quality against Census information requirements, as stated in statistical standards
- Census attributes from admin data
  - **Social and economic characteristics, for people, households and families, housing**
  - ~10 broad topics; over 40 census variables
  - **'Number of children born alive'**
- Quality frameworks, accuracy:
  - We compare admin resident population against the census population (coverage/ **representivity**)
  - We compare consistency responses between admin data and 2013 Census for the same person (**measurement error**)



# Introduction

- **Fertility** is one of the main ways through which the size and composition of a population may change
- Widely known fertility measures (eg total fertility rate) are derived from **birth registrations** and resident population estimates
- A more complete understanding of a country's fertility also needs to account for the pattern of births for woman
- In New Zealand, information from the **census question 'number of children born alive'**



# 2013 Census question

- Number of children **ever born** alive to each female aged 15 years and over, who usually resides in New Zealand
  - Includes all the children whether they were born in New Zealand or overseas
  - Excludes: foetal deaths and stillborn; Step-, adopted and foster children; wards of the State
- Response categories
  - 0 (used for childlessness)
  - 1, ..., 9, 10+
  - Object to answering
  - Response unidentifiable / outside scope / Not stated

**25** If you are male → go to **26**  
If you are female, answer this question.  
How many babies have you given birth to?

number born alive  
 none  
 object to answering this question

→ go to **26**

# Admin sources to provide census-type information?

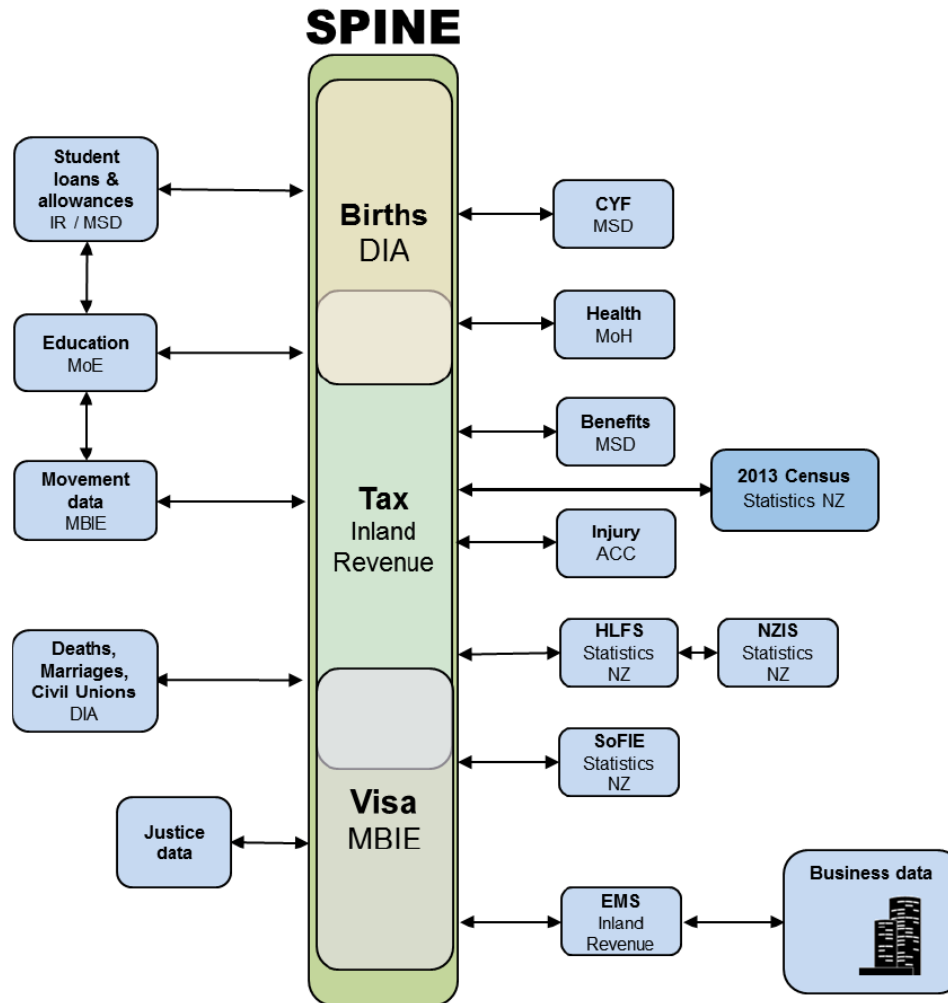
- Information of 'number of children born' is not directly available in admin data
- New Zealand birth registrations record both parents and child, and are available in the IDI
- Can we derive number of children born information from admin data using the mother-child relationships?
- Could linked admin data satisfy information need in place of the census question?
- What opportunities are there for admin data to add value?

# Birth registrations data New Zealand

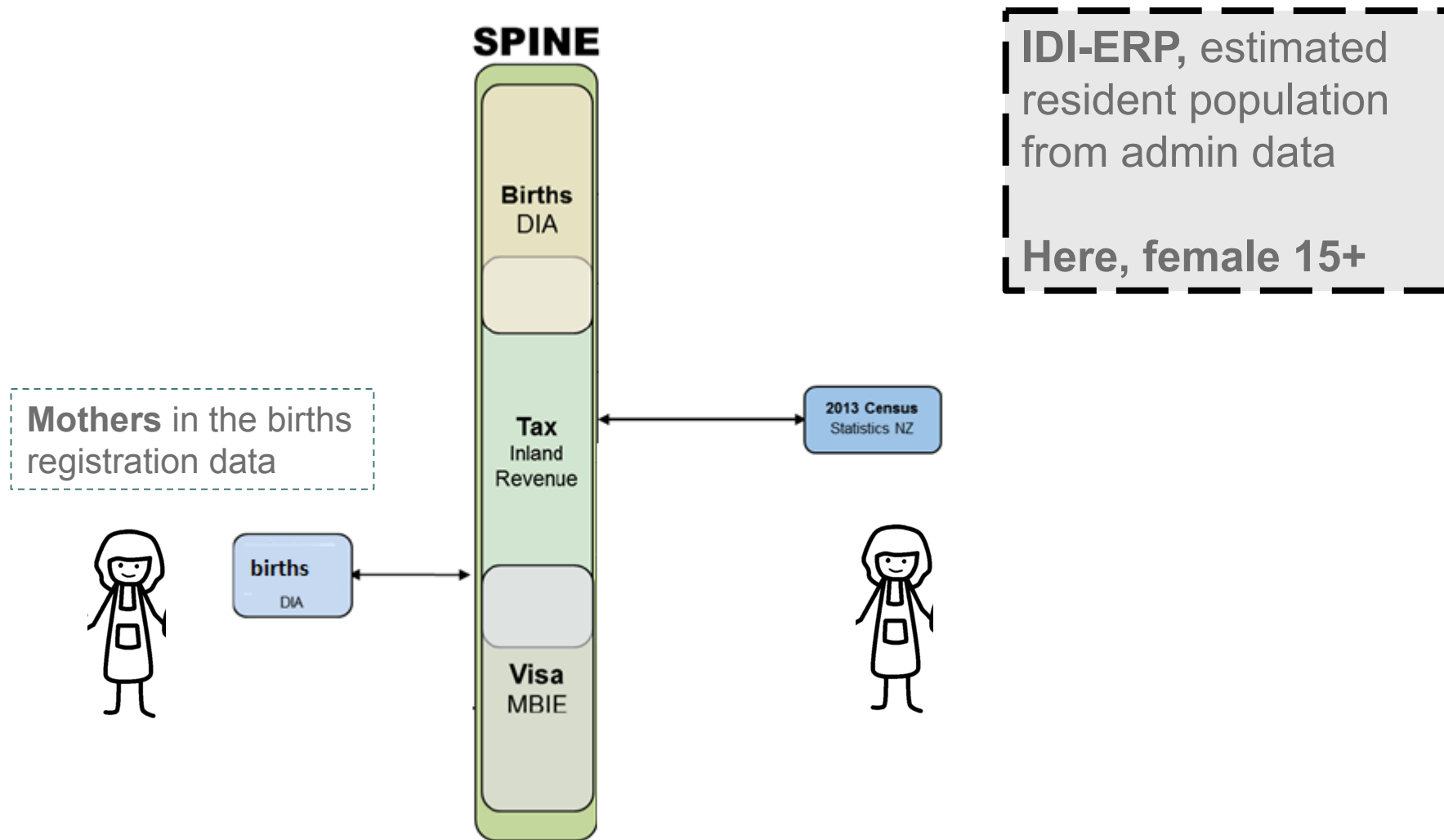
*“Every baby born in New Zealand must be registered, normally within 2 months of being born”*

- Department of Internal Affairs’ (DIA) birth registrations data
  - Children born **in New Zealand**
  - Registration system is event-based rather than person-centric
  - Administrative unit is an individual birth event
- Each birth record includes information about the child and their parents
- Comparison with census
  - Only positive identification (“born”)
  - No events occurring overseas

# Structure of the Integrated Data Infrastructure (IDI)

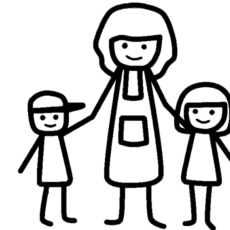


# Number of children born comparisons: Admin sources used in IDI



# Mother-child link

**Census unit:** number of children for each woman

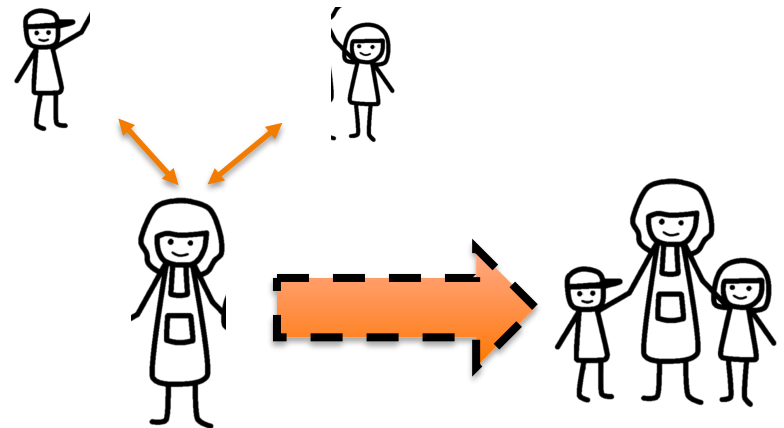


**Admin unit:** birth of a child

- Each record: information about the child and parents.

IDI link between the mother and child is key to

- Link mother to IDI spine, where possible
- Derive the total number of children born for each mother
  - Births up until 2013 Census night
- Allow comparisons



## IDI Disclaimer

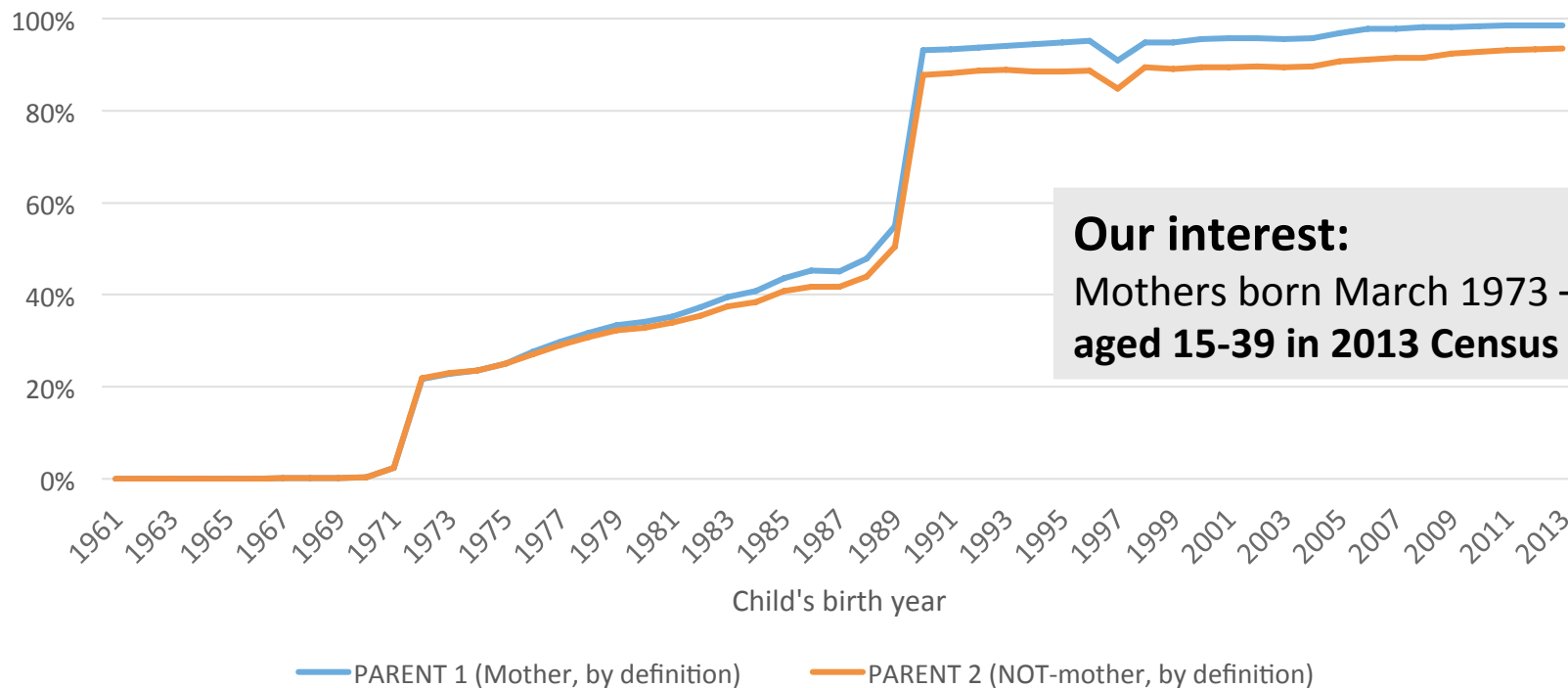
The results in this presentation are not official statistics. They were created for research purposes from the Integrated Data Infrastructure (IDI) managed by Statistics NZ.

Access to the anonymised data used in this study was provided by Statistics NZ in accordance with security and confidentiality provisions of the Statistics Act 1975. Only people authorised by the Statistics Act 1975 are allowed to see data about a particular person, household, business, or organisation. The results in this presentation have been confidentialised to protect these groups from being identified.

Careful consideration has been given to the privacy, security, and confidentiality issues associated with using administrative and survey data in the IDI.

# Coverage: percentage of parents (in birth record) linked to IDI spine

**Births 1961-2013**



**Our interest:**

Mothers born March 1973 – 1998,  
aged 15-39 in 2013 Census

<b>1840</b> first records (IDI)	<b>1920</b> births included in the IDI spine	<b>1972</b> recording parents' birthdates	<b>~1989</b> more information digitised (parents)	<b>1998</b> all information is digitised <i>Record Back Capture Project</i>
---------------------------------	--	---	---	--

# Comparison of number of children born: admin vs census

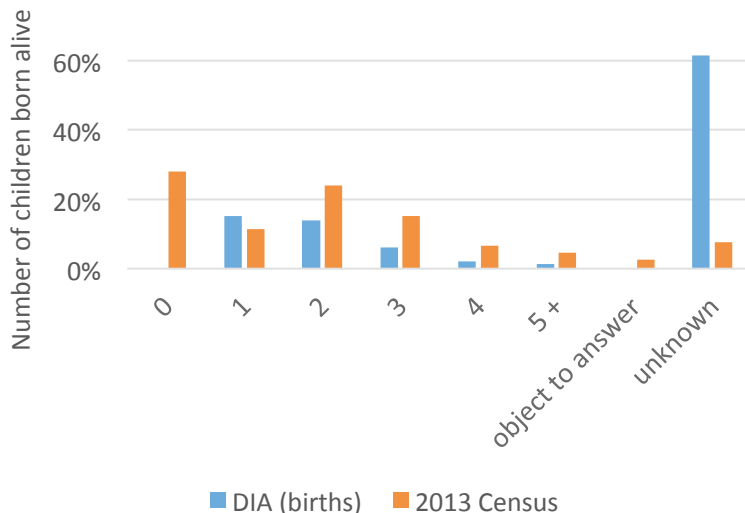
## Aggregate level comparisons

- For the younger women (born 1973-1998), high consistency with census results
- Different categories for different collection contexts
  - **Zero** responses in census
  - **Missing information** in admin data

**Assumption: admin missing = zero children**

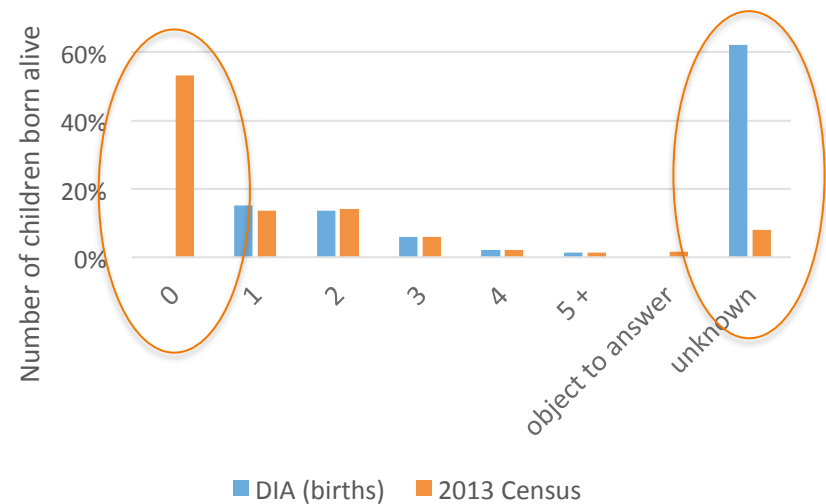
### Women aged 15+

Distribution for number of children born



### Women aged 15-39

Distribution for number of children born



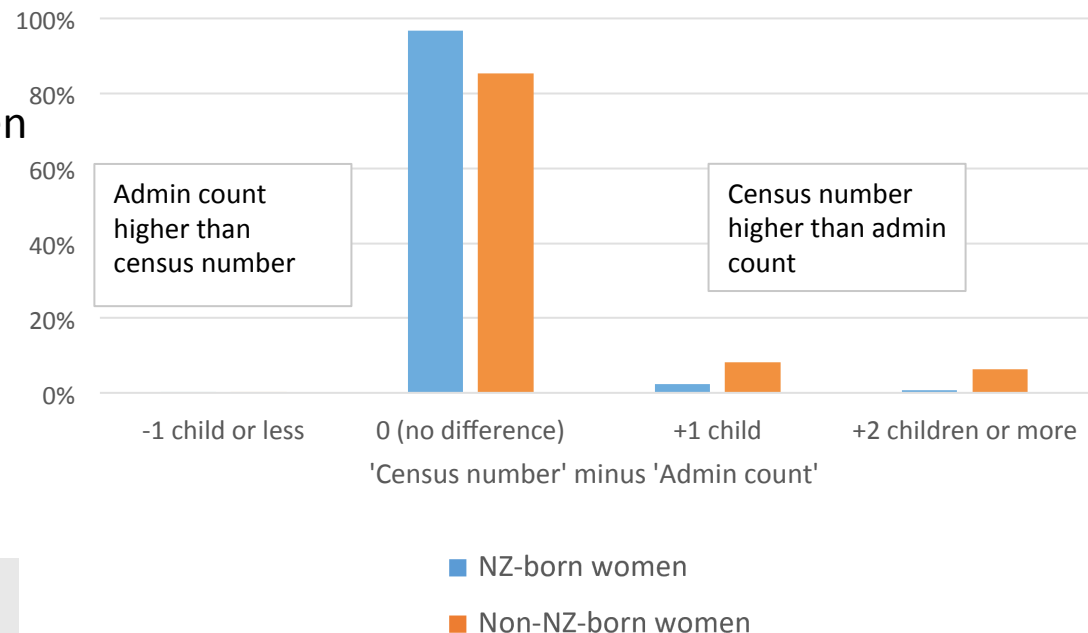
# Comparison of number of children born: admin vs census

## Individual level comparisons

- High consistency between the sources
- Better consistency for those born in NZ
  - 97% of NZ-born women, no difference in counts
  - 85% of non-NZ-born women
- When there are differences, the census number of children is higher

## Women aged 15-39

Differences in number of children born, by mother's birthplace  
Linked Census-IDI-ERP data



**Assumption: admin missing = zero children**

# Admin vs census

- Why there might be differences?
  - Different collection contexts
  - Census non-response and other survey errors
  - Missing links in births data, in IDI; and linkage errors
  - Limited digitised records; less relevant when time goes on
- Admin missing information  $\sim$  zero children
  - What can we say about this assumption?

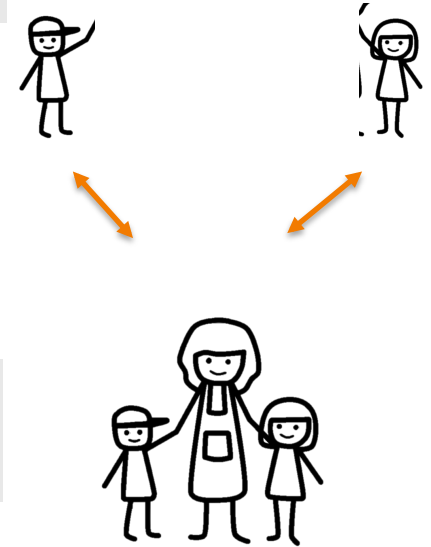
# Wider importance: parent-child link in the IDI

The parent-child link is fundamental in other contexts as well, for example

- to construct families from admin data
  - Used in census transformation work ([Gath and Bycroft 2018](#))
- to provide information about a child's parents in cohort analysis

# Summary

- Can we derive number of children born information from admin data using the mother-child relationships?
  - Good **coverage** for women born since 1974 – but poor before that
  - Good **consistency** between sources
    - 97% for NZ born women
    - 85% for non-NZ born women
- Could linked admin data satisfy information need and potential to add value?
  - For women born since 1974, potential for ongoing, more frequent, series from admin data
    - Admin data is missing some births, eg overseas born
  - A small bias on overestimating childlessness, and underestimating number of children per woman
    - Need of a survey based data



Thank you!

