

The implications of changing Indigenous status for data linking and population projections

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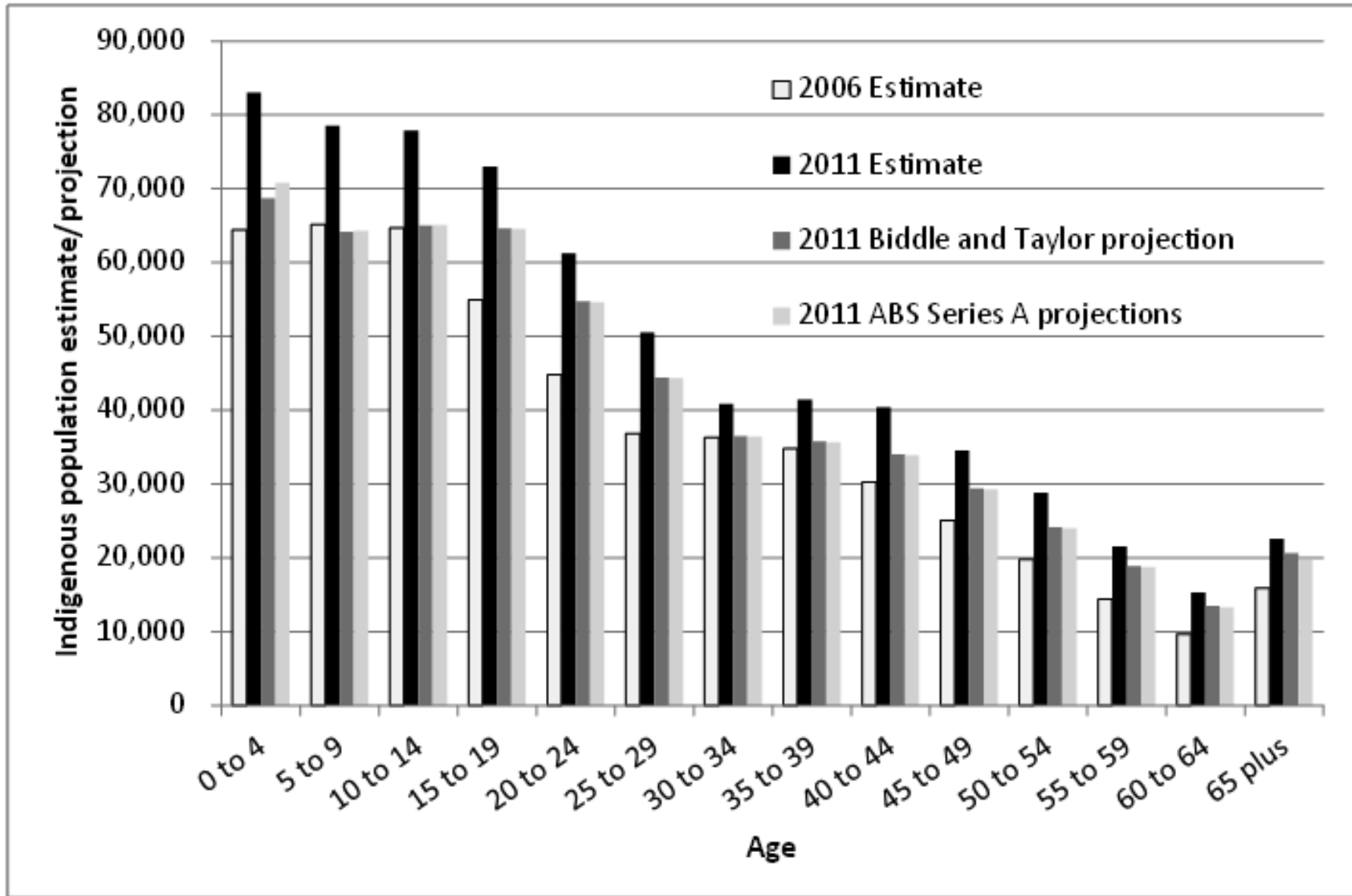
Research School of Social Sciences, Australian National
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<http://thenumbercruncher.org/>

- A person is Indigenous if:
 - They are of Aboriginal or Torres Strait Islander descent;
 - They identify as an Aboriginal or Torres Strait Islander; and
 - They are accepted as an Aboriginal or a Torres Strait Islander by the community in which he or she lives.
- While Indigenous status question constant, people's response may differ
- There were 548,370 Indigenous Australians counted in the 2011 Census
- 20.5 per cent higher than the population count in 2006

Comparing estimates and projections





- **Identity change**
 - Individuals identifying as being Indigenous in 2011 who did not identify as being Indigenous in 2006
- **Identification change**
 - Individuals identify in the same way to themselves, but change the way in which they are identified to data collectors
 - Reduction in 'not stated' on census form
- **Improved enumeration**
 - More Indigenous Australians respond to the census

Introducing the ACLD

- A sample of 5% (approximately 1 million records) is taken from the 2006 Census
 - Linked probabilistically based on the most likely match with 2011
 - Blocking variables – Those where potential records had to match on a given pass (Age, sex, mesh block)
 - Linking variables – Agreement leads to an increased probability of linking
- Linking conducted without name and address
- Linked 800,758 records (82% of the sample)

- The linking method introduces two types of error: false links and missed links
 - False links: Records belonging to different individuals are linked (5-10%)
 - Missed links: Records belonging to the same individual are not linked (10%)
- Errors in linking are caused by errors or incomplete information in the input data
- False links pose a problem for transition analysis
 - ACLD released with consistency flags
- Missed links typically introduce bias
 - ACLD looks quite representative

Using the ACLD to understand Indigenous population change



- **Indigenous in 2006**

- 14,802 were linked with a 2011 Census record
- 1,367 individuals (9.2 per cent) were identified as being non-Indigenous in 2011
- 163 individuals (1.1 per cent) were identified as not having stated their Indigenous status in 2011

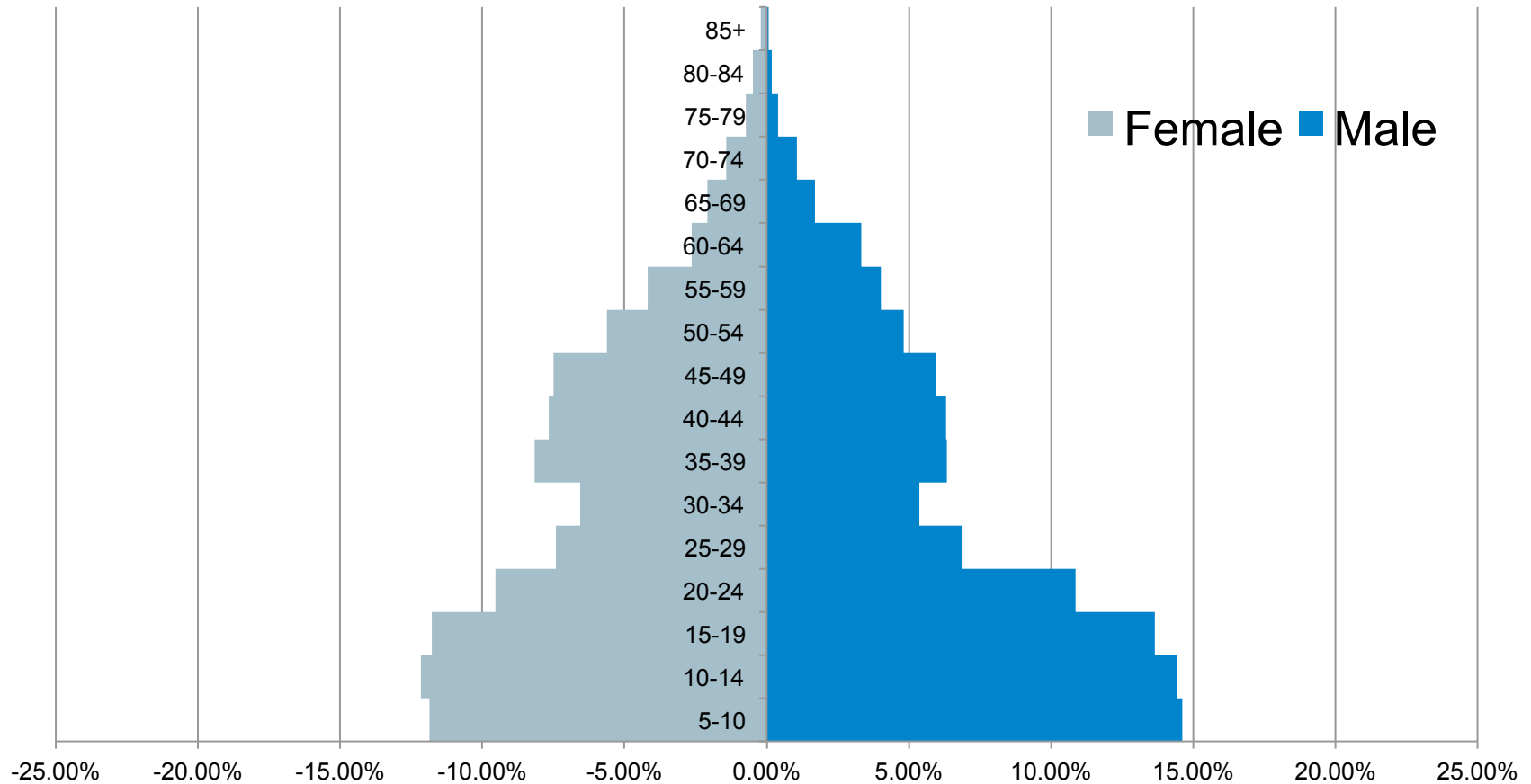
- **Non-Indigenous in 2006**

- 1,697 individuals were identified as Indigenous in 2011
- A further 226 pairs in the sample who changed from being not-stated to Indigenous

- A net increase in the Indigenous population due to changing status
- Reflects change in how people were identified, not how they identify

Population Pyramid (I)

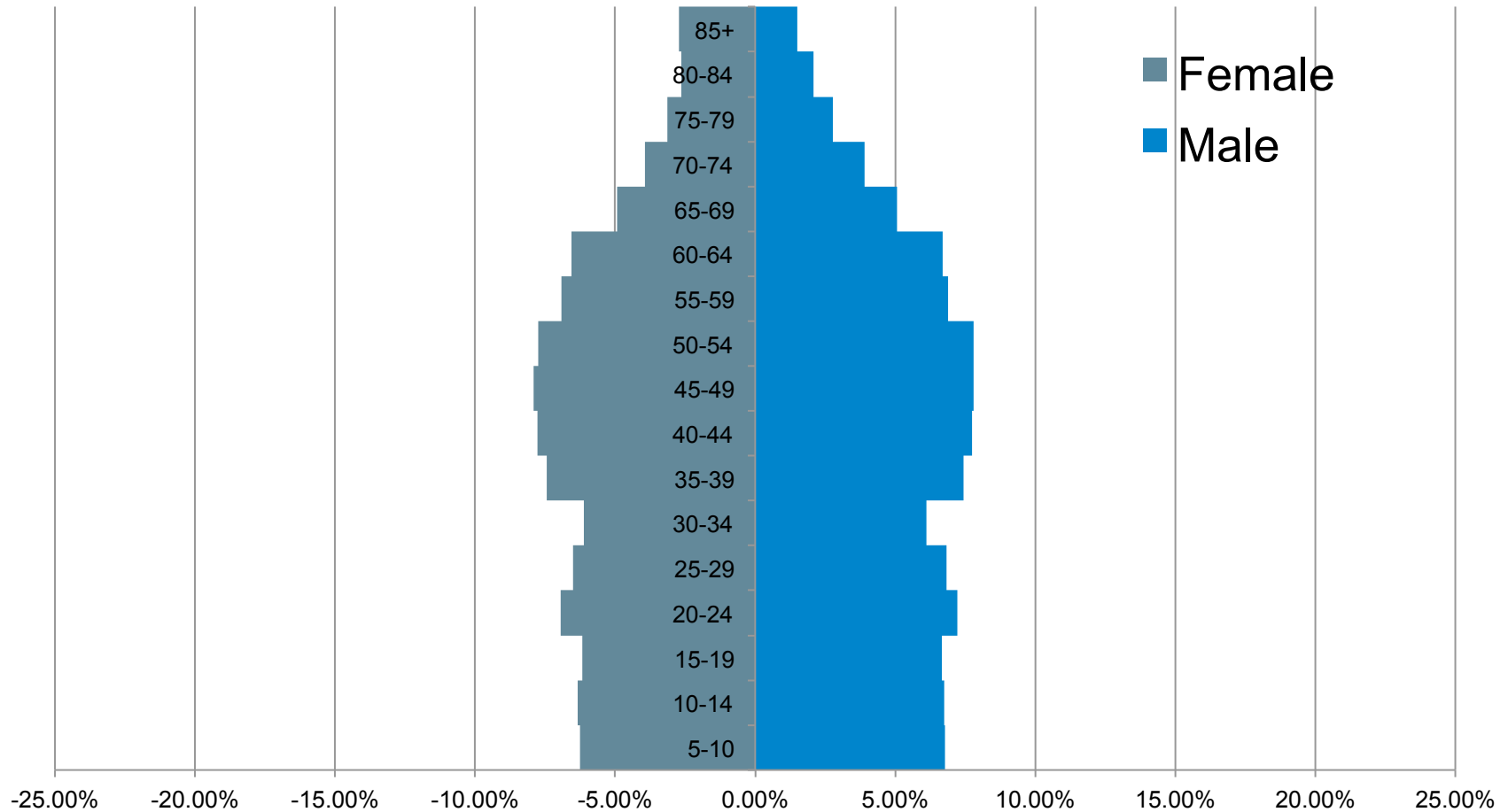
Always Indigenous





Population Pyramid (II)

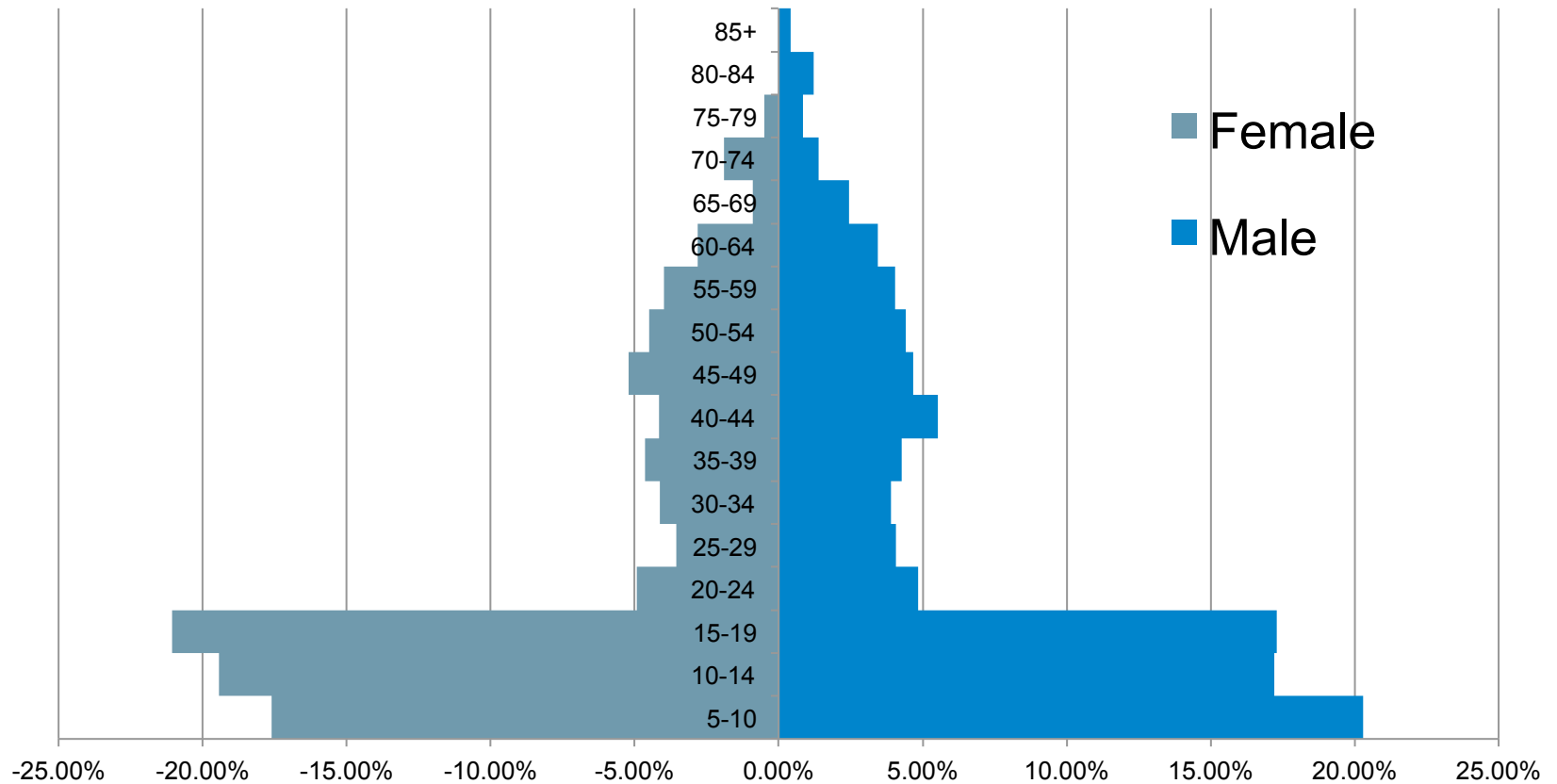
Never Indigenous





Population Pyramid (III)

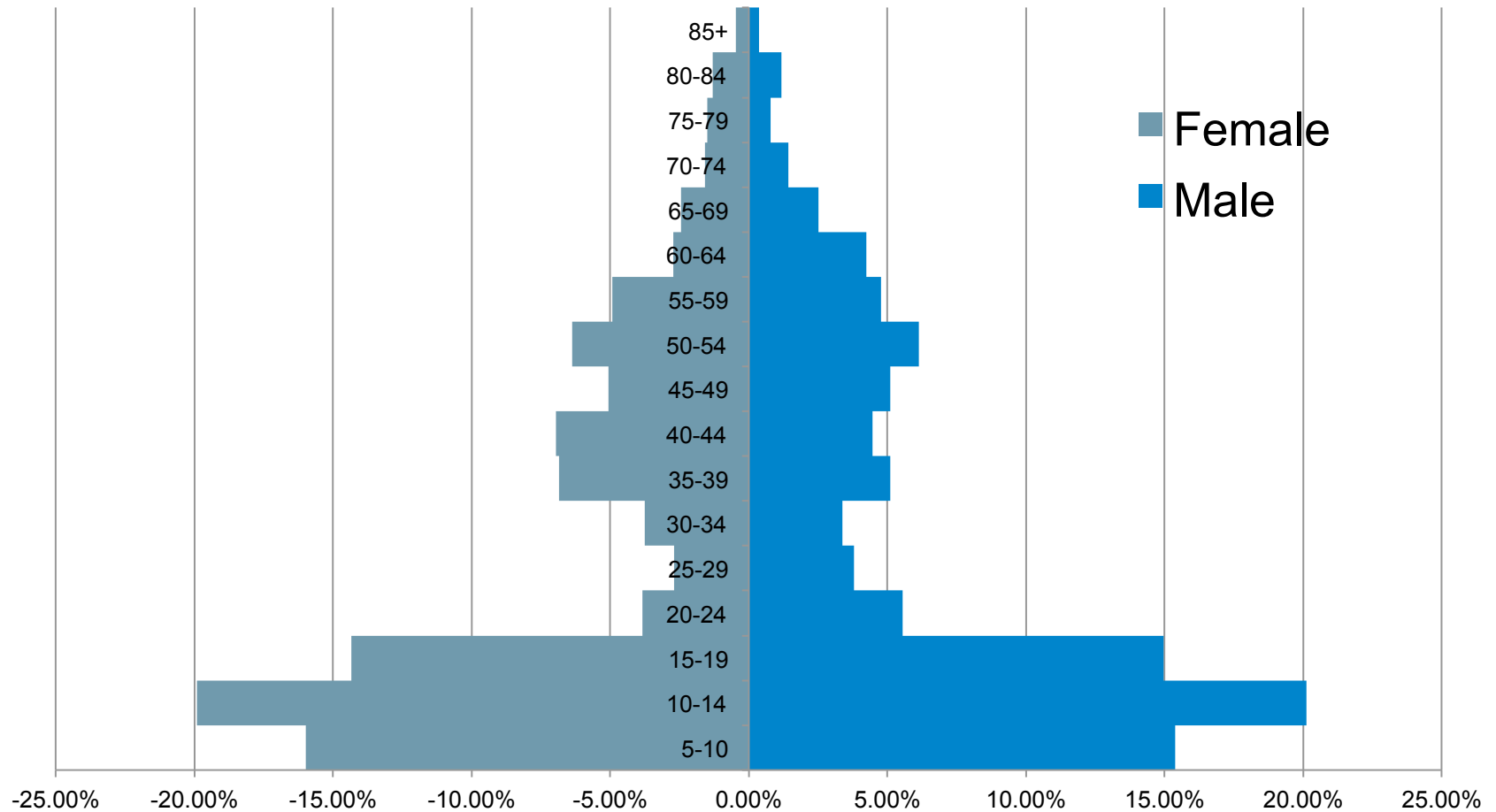
Formerly Indigenous





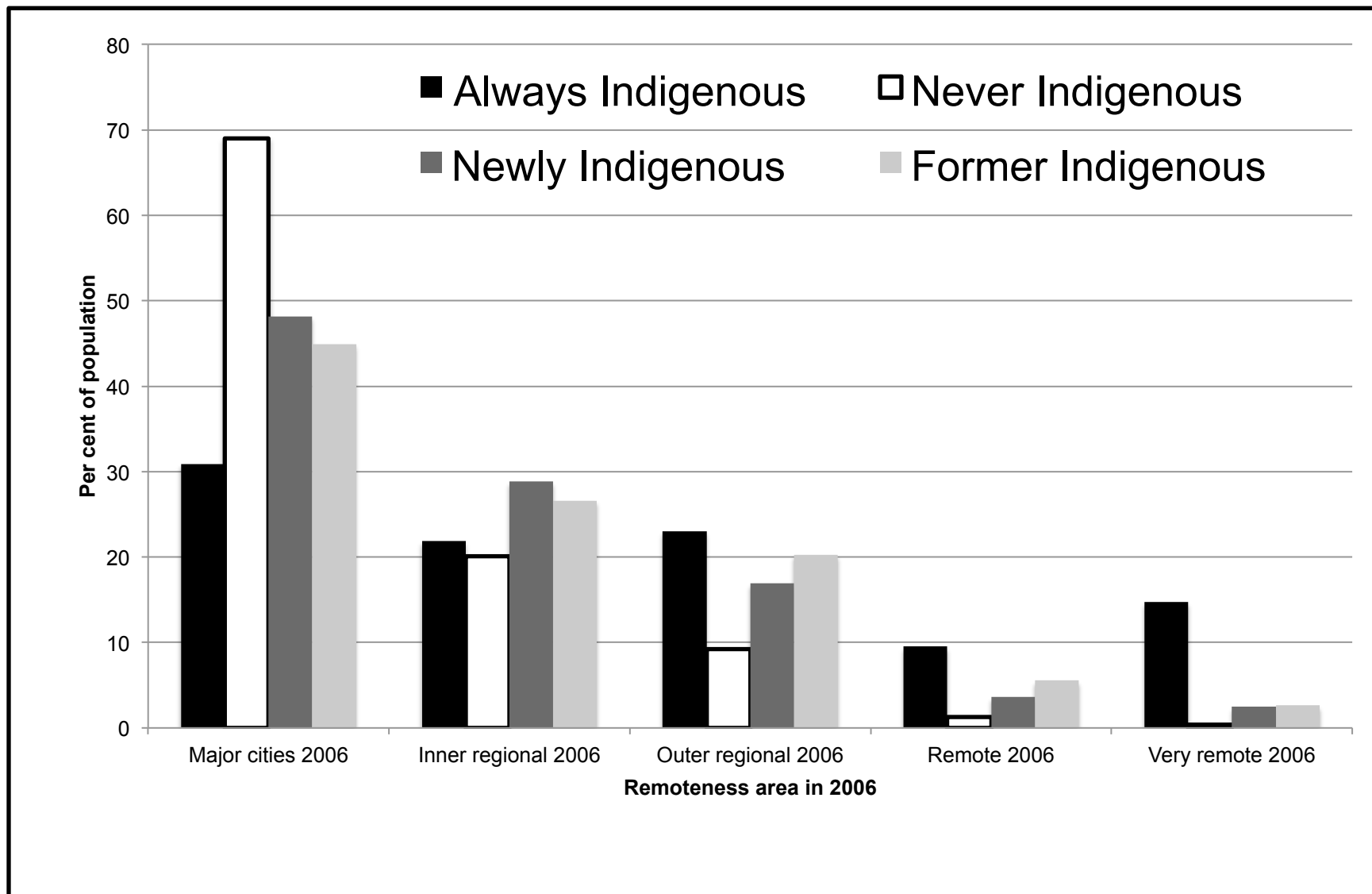
Population Pyramid (IV)

Newly Indigenous





Geographic location in 2006 by Indigenous identification



Using the ACLD to project Indigenous population change



$$I_{t+5,a+5,s} = I_{t,a,s} - m_{a_a+5,s,I} I_{t,a,s} + n_{a_a+5,I} I_{t,a,s}$$

$$N_{t+5,a+5,s} = N_{t,a,s} - m_{a_a+5,s,N} N_{t,a,s} + n_{a_a+5,N} N_{t,a,s}$$

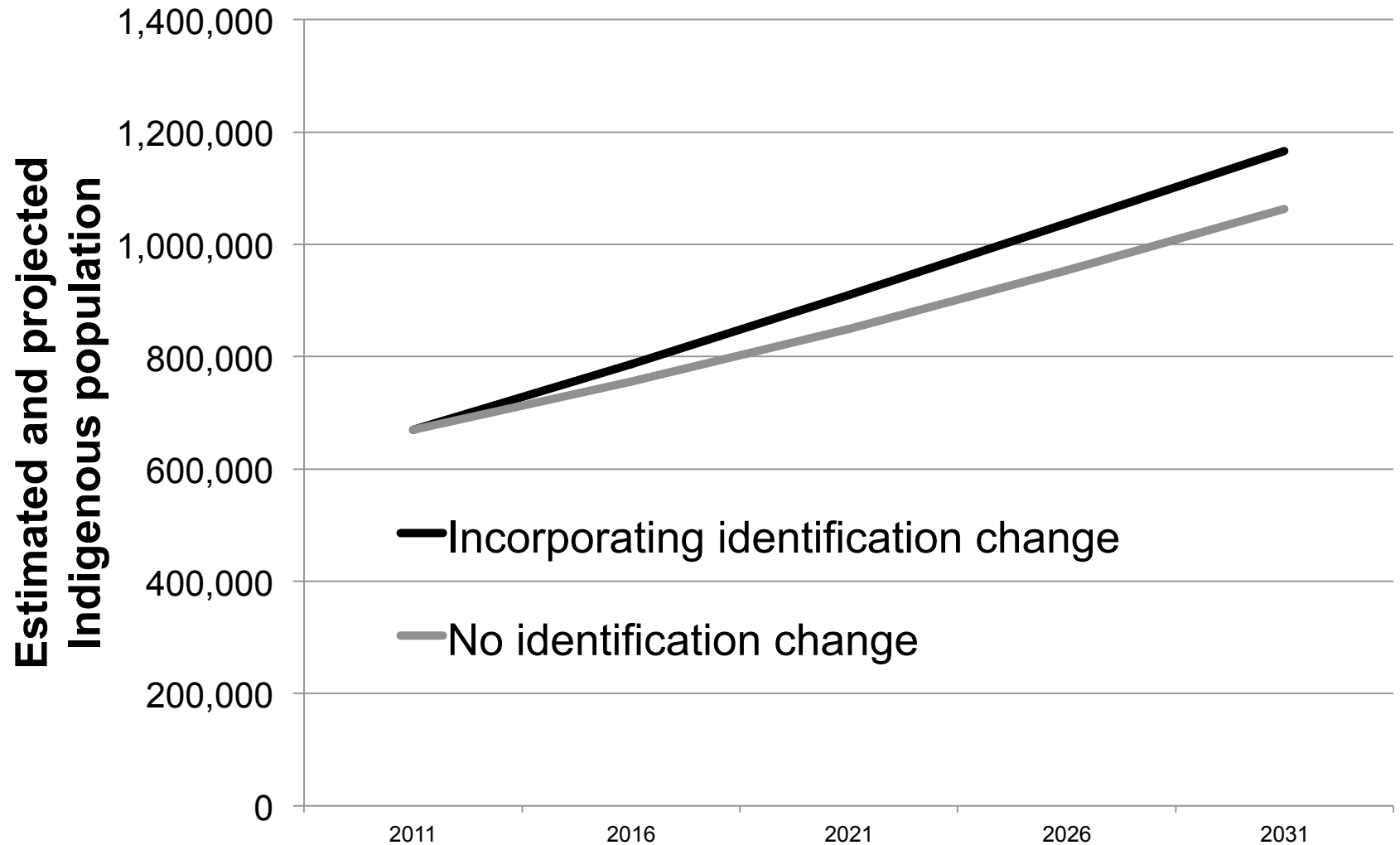


$$I_{t+5,a+5,s} = I_{t,a,s} - m_{a_a+5,s,I} I_{t,a,s} + n_{a_a+5,I} I_{t,a,s} + p_{a_a+5,s} N_{t,a,s} + (1 - q_{a_a+5,s}) I_{t,a,s}$$

$$N_{t+5,a+5,s} = N_{t,a,s} - m_{a_a+5,s,N} N_{t,a,s} + n_{a_a+5,N} N_{t,a,s} + (1 - p_{a_a+5,s}) N_{t,a,s} + (q_{a_a+5,s}) I_{t,a,s}$$

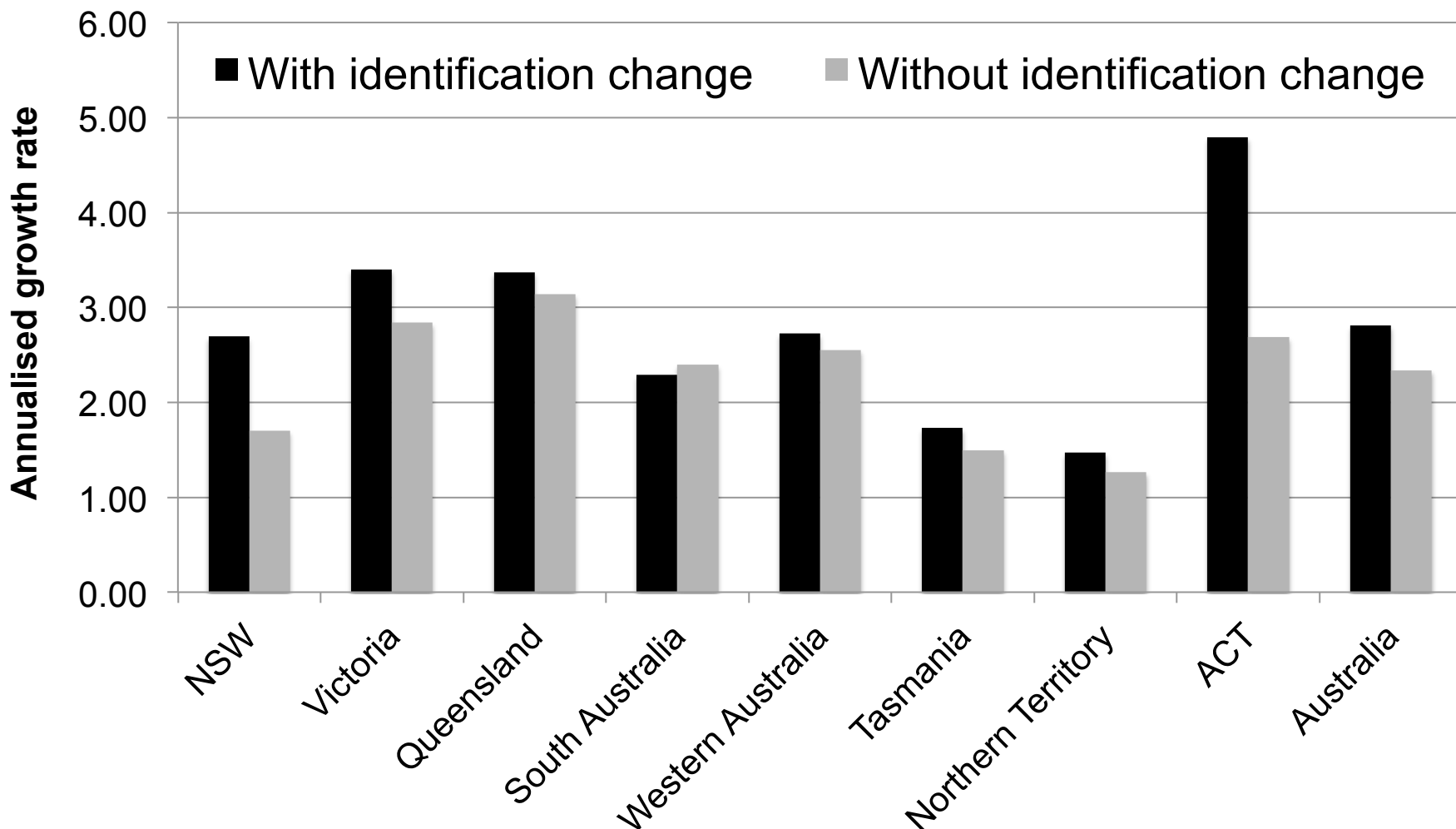


Projections with and without identification change





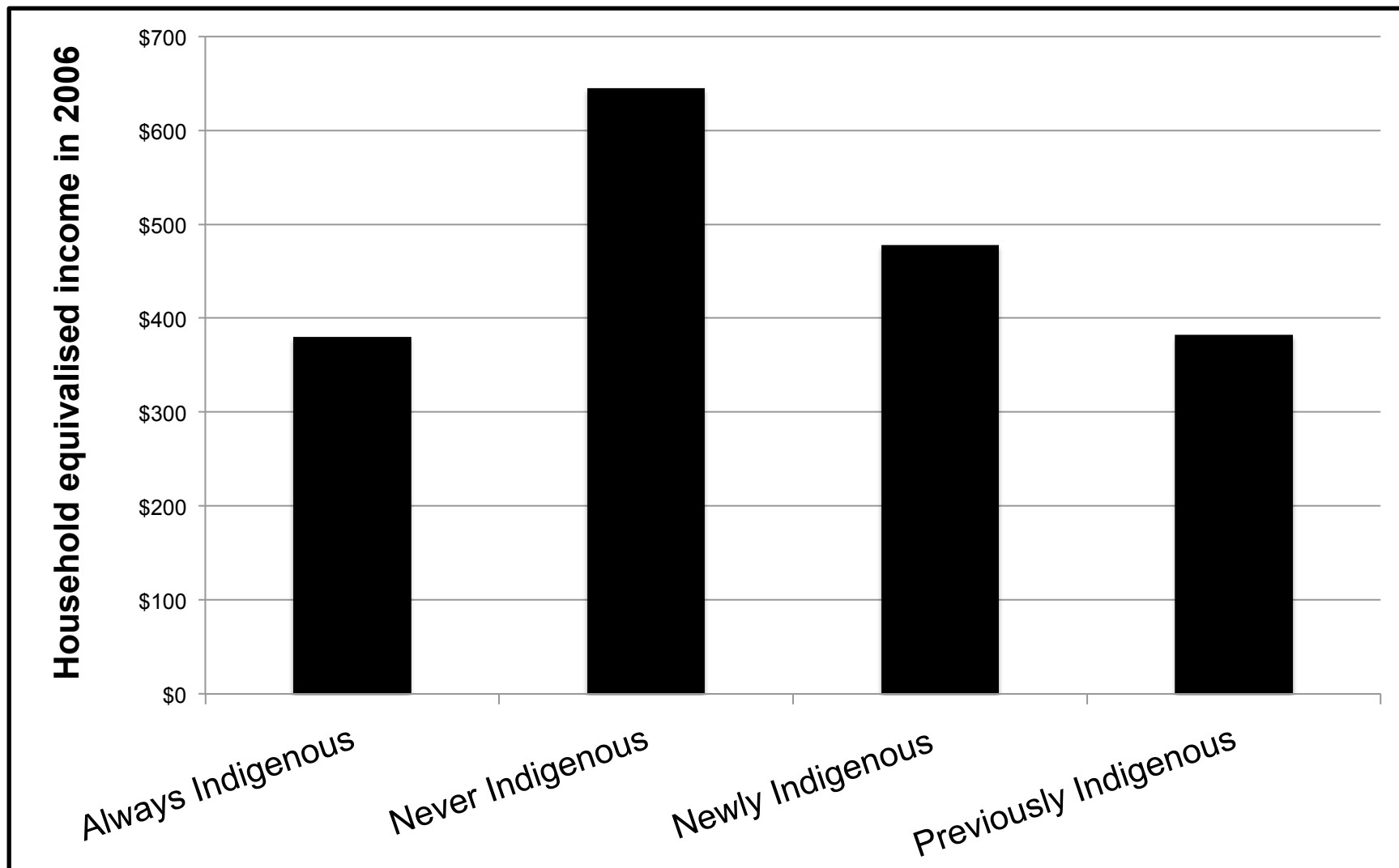
Projections with and without identification change – Annualised growth rates by state



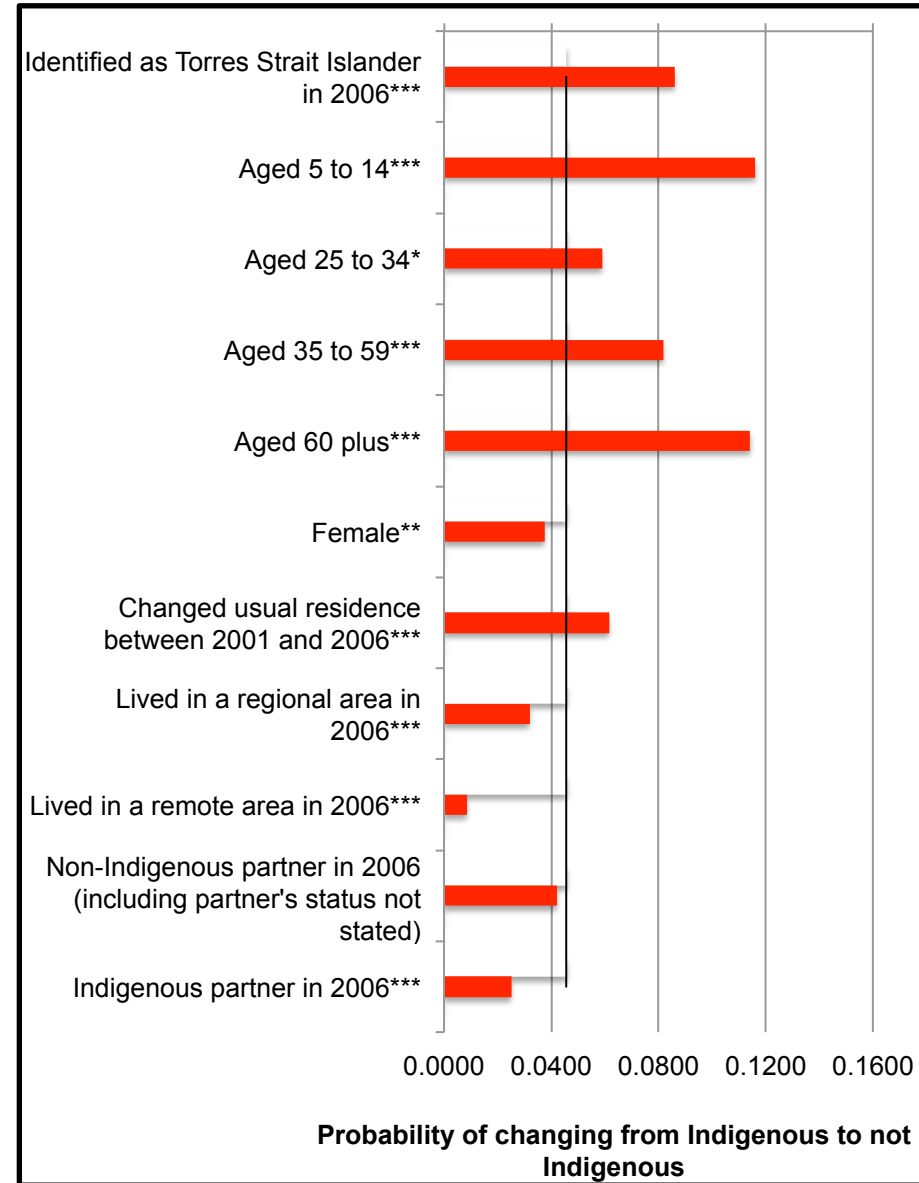
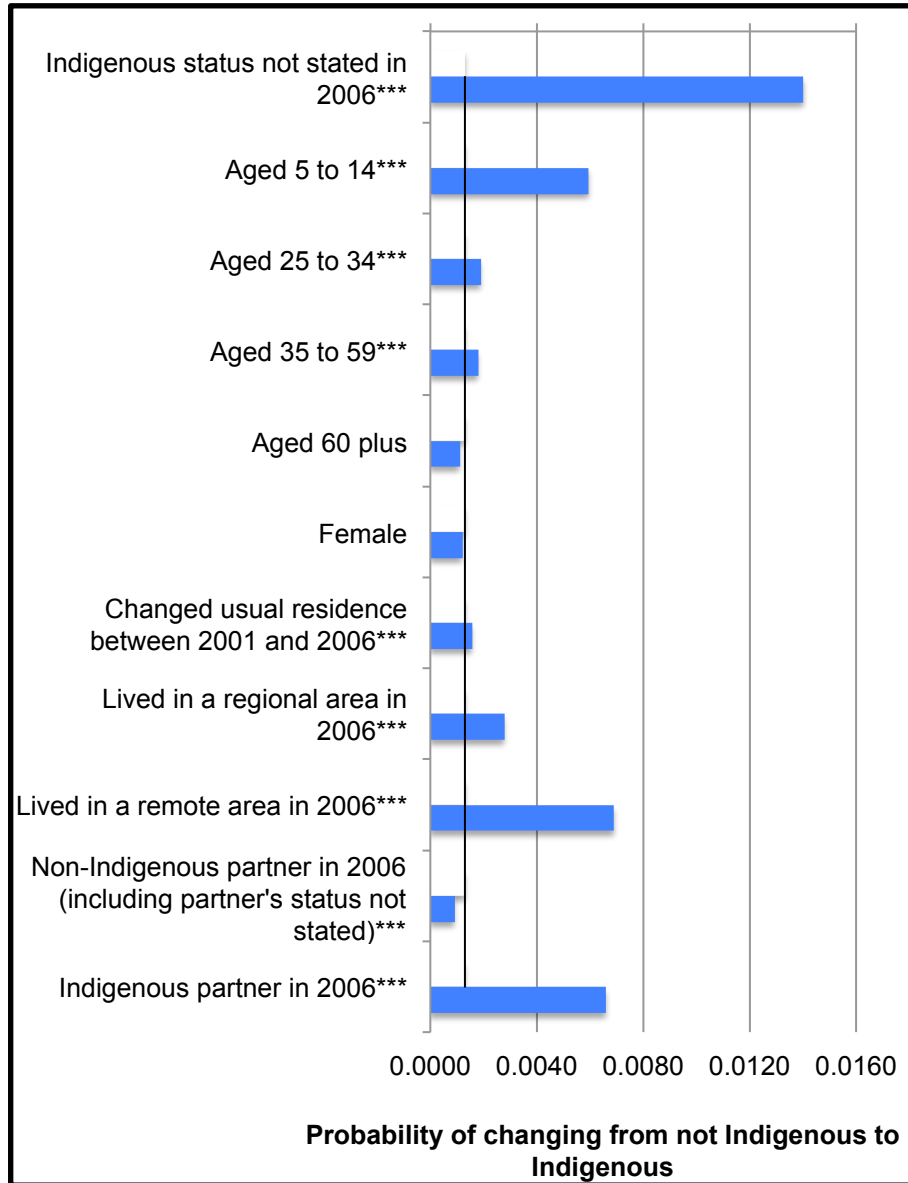
Complications and concluding comments



Socioeconomic status in 2006 by Indigenous identification



Individual census analysis – Initial results



- We cannot assume that Indigenous identification is fixed. ACLD shows:
 - a large number of people who are newly identified as Indigenous **and** a large number of people who were formerly identified
- Identification change not random
 - Proportionally more children have changed status
 - Indigenous share of area/family associated with identification change
 - Socioeconomic status associated with identification change
- Implications for:
 - Data collection – Build these assumptions into census processing experimentally
 - Data linking – Use of Indigenous status as a blocking/linking variable assumes changes is due to error
 - Population projections – Identification change increases Indigenous population, but can we assume patterns constant
 - Policy analysis – Changes in identification, not programs may be driver of measured change in outcomes

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Additional slides



The Aboriginal and Torres Strait Islander population – 1971 to 2011

Census year	Census count	Change from previous census		
		Number	Per cent	Annualised per cent
1971	115,953			
1976	160,915	44,962	38.8	6.8
1981	159,897	-1,018	-0.6	-0.1
1986	227,645	67,748	42.4	7.3
1991	265,459	37,814	16.6	3.1
1996	352,970	87,511	33.0	5.9
2001	410,003	57,033	16.2	3.0
2006	455,031	45,028	11.0	2.1
2011	548,370	93,339	20.5	3.8
1971-2011	-	462,417	372.9	4.0



2006	2011	All records	Variables Consistent		
			Age	Age, Birthplace	Age, Birthplace, Sex
Indigenous	Indigenous	522,167	95.5%	95.3%	95.3%
	Non-Indigenous	34,805	95.4%	94.0%	94.0%
Non-Indigenous	Indigenous	55,712	97.8%	97.7%	97.5%
	Non-Indigenous	17,591,570	95.3%	93.4%	93.3%

Transition probabilities

Jurisdiction	Aged 0 to 14		Aged 15 to 24		Aged 25 to 54		Aged 55 plus	
	p	q	p	q	p	q	p	q
NSW and ACT	0.0119	0.1098	0.0034	0.0340	0.0033	0.0637	0.0022	0.0839
Victoria	0.0039	0.1581	0.0007	0.0373	0.0012	0.0850	0.0008	0.1710
Queensland	0.0108	0.0951	0.0022	0.0415	0.0029	0.0432	0.0020	0.0659
South Australia	0.0060	0.1239	0.0012	0.0632	0.0021	0.0626	0.0010	0.1348
Western Australia	0.0081	0.0802	0.0005	0.0277	0.0019	0.0423	0.0013	0.0677
Tasmania	0.0154	0.1069	0.0018	0.0750	0.0052	0.0815	0.0028	0.0903
Northern Territory	0.0358	0.0380	0.0136	0.0039	0.0093	0.0102	0.0000	0.0190
Australia	0.0091	0.0977	0.0020	0.0360	0.0025	0.0503	0.0016	0.0808