12. NATSISS crowding data: What does it assume and how can we challenge the orthodoxy?

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In this paper we consider the sociospatial problem of crowding in Indigenous Australia. Quantitative data are regularly collected in Census and other social surveys by the Australian Bureau of Statistics (ABS) to create quantitative indices of the extent of household utilisation and then 'overcrowding' in Australian society in general, and amongst the Australian Indigenous population in particular. However, in our view, the identification of states of Indigenous crowding requires an understanding of distinct cultural constructs to achieve greater validity of measurement. Our analysis also refers to the interconnected nature of Indigenous crowding and homelessness, a relatedness that has been seldom addressed in the literature,[1] despite its importance to policy development in the Indigenous sector including effects on housing, family violence, education and health.

We draw our central quantitative analysis from statistics derived from the 2002 and 2008 National Aboriginal and Torres Strait Islander Social Surveys (NATSISS), and the 1996, 2001 and 2006 Australian Census of Population and Housing. NATSISS and the census both examine Indigenous housing utilisation and crowding based on calculated occupancy of houses and bedrooms.[2] In the case of NATSISS the percentage of people experiencing 'overcrowding' as a potential 'stressor' in the past twelve months by participants is identified. We use the term crowding in preference to the frequently used 'overcrowding' which is inherently tautological.

There are a number of methodological assumptions in NATSISS and the census examined in detail here. The first is the assumed cultural norms in the way houses are occupied. These norms are embedded in calculable measures of crowding, which are then applied to define what is, or is not, a crowded housing situation. The second assumption is the method of counting the levels of occupancy in houses that does not fully account for the dynamic nature of many Indigenous

1 An exception is Birdsall-Jones (2007, 2008, 2010).

2 See Appendix 12A for detail on the methodology used in NATSISS.

households whose central values involve sharing and mobility. This results in what we argue is an undercount of Indigenous people occupying a house at any one time, but also an undercount of who is homeless. A third assumption is that crowding should be defined by number of bedrooms alone, rather than the spatial adequacy of a house and its yard. We argue that crowding is a complex construct whose definition may be affected by a number of other, sometimes culturally specific, factors such as the number of families within one home, climatic and geographic factors such as remoteness, seasonable habitability of outside areas, access to kin, neighbours and other alternative places for entertainment and socialisation.

Our analysis draws on research protocols that were derived in Canada and encompass practices in Australia and New Zealand. We frame these within the cultural, racial and social factors that affect the definitions and policy responses to crowding and homelessness in Australia to critique the applicability of this supposedly culturally 'neutral' model.

This paper is divided into five main parts:

- data from the 2008 NATSISS relating to Indigenous house utilisation and household crowding
- methodological issues in the NATSISS design and execution
- an international social science model on cross-cultural crowding as an alternative
- case studies from Aboriginal Australia illustrating how Aboriginal understandings of crowding are culturally distinct, and
- recommendations.

The NATSISS data

Our entry point to this analysis was originally via two published statistics from the 2002 NATSISS (ABS 2004: 12). In an analysis of 'selected reported stressors in the previous twelve months' which included 'overcrowding at home', the ABS (2004: 5) reported that 42 per cent of Indigenous people in remote areas had experienced 'overcrowding' and that this was the second most frequently cited stressful event, after death of a family member or friend. In contrast approximately 10 per cent of non-remote people experienced 'overcrowding at home' as a stressor in the past 12 months (ABS 2004: Fig. 1). The corresponding figures from the 2008 NATSISS have not been published, but the weighted percentage, Australia-wide, of those reporting 'overcrowding as a stressor' for themselves or their family in the past 12 months was 7.63 per cent (ABS 2008b).

This figure seems low to us, and we discuss possible causes for under-reporting of crowding and the use of 'crowding' as a socially and culturally specific term in our later analysis.

The second set of results that had a bearing on crowding pertained to the nature of dwelling problems and dwelling adequacy as indicated by the need for additional bedrooms. According to NATSISS 2002, 40 per cent of Indigenous people were living in dwellings with structural problems (32% in non-remote areas and 58% in remote areas) and over 60 per cent were living in dwellings which had been repaired or maintained in the last year. In remote areas, 52 per cent of people lived in dwellings that required at least one more bedroom while in non-remote areas 16 per cent of people were in 'crowded' dwellings using this definition (ABS 2004: 12).

We now update these published figures with our own analysis of the 2008 NATSISS data. The 2008 NATSISS uses definitions and follows an enumeration method that is relevant to our analysis in several ways. The term 'usual resident' denotes anyone who usually lives in a given dwelling and who regards that as their primary place of residence (ABS 2009b). This is also the census definition. NATSISS also differentiates between remote and urban or metropolitan Indigenous communities using the 'community sample' and 'non-community sample' terms, each also having a distinct enumeration and analysis method associated with it. We will analyse the impact of these terms and methods as we discuss the underlying assumptions of NATSISS.

Crowding in Indigenous households: The 2008 NATSISS data

To investigate crowding in Indigenous households using 2008 NATSISS we first examine the descriptive relationships between housing utilisation and other characteristics and then carry out a logistic regression analysis to model the likelihood of crowding.

The measure of crowding, used in this part of our analysis is derived from the 2008 NATSISS variable that reports 'household utilisation'. This variable indicates the number of bedrooms a given household requires or has spare, and is derived using the criteria of the Canadian National Occupancy Standard (CNOS); of course a household could also be classed as not requiring any additional bedrooms, nor having any spare. The utilisation variable was best re-coded into a simple dichotomous indicator of crowding, in which those households requiring additional bedrooms were coded as 'crowded' and both those with bedrooms spare and those with none required nor spare, being coded as 'not crowded'.

Significant correlates of crowding were identified by first carrying out statistical chi-squared tests of association between potential explanatory variables and the crowding measure. Of these explanatory variables, the following exhibited significant associations with the crowding variable:

- Household Composition: whether a given household is comprised wholly or partly of Indigenous residents.[3]
- Household Type: whether a household usually accommodated one family, more than one family (includes single family households that had non-family members living with them), a group of unrelated individuals (group household) or a lone resident.
- Remoteness of area: whether a household was located in a remote or non-remote area, as classified by the ABS Accessibility/Remoteness Index of Australia (ARIA).[4]

These variables were subsequently included in a logistic regression model for the dichotomous crowding variable. The analysis estimated the odds of crowding for different levels of the explanatory variables. Each explanatory variable was dichotomised with zero representing the baseline category. In the logistic regression, the coefficients for explanatory variables are reported as odds ratios, which are the relative odds of crowding for the second category of an explanatory variable compared to the baseline category.

Results of 2008 NATSISS analysis: Descriptive analysis

Table 12.1 shows the distribution of different categories of Indigenous housing utilisation by households across remote and non-remote areas. Indigenous households in remote areas are almost three times as likely as those in non-remote areas to require additional bedrooms (i.e. to be crowded), whereas households in non-remote areas are about 1.4 times as likely to have spare bedrooms. About 30 per cent of remote and non-remote households have an appropriate number of bedrooms. This association is highly statistically significant.

3 These variables are derived from standard definitions according to ABS, see Appendix 12B.

4 'ARIA measures the remoteness of a point based on the physical road distances to the nearest Urban Centre' (ABS 2009).

Table 12.1 Indigenous housing utilisation by ASGC Remoteness Area, Australia, 2008

Whether has bedrooms needed/ spare		ASCG remote area code		Total
		Non-remote	Remote	
Bedrooms needed	No.	594	325	919
	%	10.52	28.31	13.53
No bedrooms required/ spare	No.	1 664	334	1 998
	%	29.48	29.09	29.41
Bedrooms spare	No.	3 387	489	3 876
	%	60.00	42.60	57.06
Total	No.	5 645	1 148	6 793
	%	100.00	100.00	100.00

Source: Authors' analysis of CURFs from ABS 2008 dataset (via RADL); Pearson chi-squared (2) = 273.81 Pr < 0.001

Table 12.2 presents Indigenous housing utilisation by household composition by Indigenous residents. Similar to the breakdown by remoteness, Indigenous households are twice as likely to require additional bedrooms but less likely to have bedrooms spare than households where not all persons are Indigenous.

Table 12.2 Indigenous housing utilisation by household composition, Australia, 2008

Whether has bedrooms needed/ spare		Household composition		Total
		All Indigenous Persons	Not all Persons Indigenous	
Bedrooms needed	No.	602	316	918
	%	18.02	9.15	13.51
No bedrooms required	No.	1 042	957	1 999
	%	31.19	27.72	29.43
Has bedrooms spare	No.	1 697	2 179	3 876
	%	50.79	63.12	57.06
Total	No.	3 341	3 452	6 793
	%	100.00	100.00	100.00

Source: Authors' analysis of CURFs from ABS 2008 dataset (via RADL); Pearson chi-squared (2) = 150.88 Pr < 0.001

Table 12.3 displays Indigenous household utilisation by household type. Here 'greater than one family' represents both multiple family households as well as households that have at least one family plus non-family members. As can be seen from this analysis, these households exhibit much higher rates of requiring additional bedrooms – around 5.75 more likely than one family households, and

4.7 times more likely than group households. Naturally, lone person households exhibited required no additional bedrooms. Again the chi-squared test indicates that the association between the two variables is statistically significant.

Table 12.3 Indigenous household utilisation by household type, Australia, 2008

Whether has bedrooms needed		Household type				Total
		One family	Greater than one family	Lone person household	Group household	
Bedrooms needed	No.	521	374	0	23	918
	%	10.3	59.27	0	12.57	13.51
No bedrooms required/spare	No.	1 591	150	185	73	1 999
	%	31.45	23.77	20.09	39.89	29.42
Has bedrooms spare	No.	2 947	107	736	87	3 877
	%	58.25	16.96	79.91	47.54	57.06
Total	No.	5 059	631	921	183	6 793
	%	100.00	100.00	100.00	100.00	100.00

Source: Authors' analysis of CURFs from ABS, 2008 dataset (via RADL); Pearson chi-squared (6) = 1,500 Pr < 0.001

As we show later in the paper, although Tables 12.1, 12.2 and 12.3 suggest that 13.5 per cent of Indigenous households nationwide experience crowding, there are good reasons to think this underestimates the prevalence of crowding in both remote and urban or metropolitan settings.

2008 NATSISS analysis results: Logistic regression analysis of crowding

Table 12.4 presents results of a logistic regression model for the odds of crowding, based on whether a household is in a remote area or not, the composition of the household (all Indigenous vs. not all Indigenous) and the household type. The model indicates that, when holding all other factors constant, the odds of crowding in remote households are approximately 2.7 times the odds of crowding in non-remote households. Similarly, in households in which all persons are Indigenous, the odds of crowding are over three times those of household with some non-Indigenous residents. Finally a household with greater than one family has odds of being crowded approximately 11.8 times that of a single-family household (the reference category).[5]

5 For this analysis only, single person households were excluded from the model as they predict non-crowding perfectly (that is, by definition, single person households cannot be overcrowded) and group households do not have a statistically significant influence on the odds of crowding over and above the reference category of single family households.

Table 12.4 Logistic regression model of Indigenous crowding (with remoteness, household composition, single family and multiple families)

Variable	Odds ratio	Standard error	P-Value
ARIAC: ASGC Remoteness of Area Code *Reference category: non-remote*	2.69	0.22	<0.001
COMPHOLD_1: Household Composition—all persons Indigenous *Reference category: not all persons Indigenous*	3.04	0.28	<0.001
HHTYPE_1: Household type—greater than one family* *Reference category: one family household*	11.78	1.09	<0.001
HHTYPE_3: Household type—group household *Reference category: one family household*	1.05	0.36	0.895

* This includes both households with two or more families and those with one family plus non-family members.

Model fit: n = 5932 chi-squared (4) = 1760 p-value < 0.001 Pseudo $R^2 = 0.27$

Source: Authors' analysis of CURFs from ABS, 2008 dataset (via RADL)

Discussion and critique on the NATSISS analysis: Methodological issues

While the NATSISS data provide some useful information about the prevalence and correlates of crowding in Indigenous households, we argue next, that the failure to appropriately contextualise the data collection and survey instrument for aspects of Indigenous culture and circumstances, partially undermines the validity of the NATSISS data. As shown, the analysis of the 2002 NATSISS data, repeated here for the 2008 data, involves a house utilisation measure through the identification of the numbers of bedrooms that a sampled household requires or has spare, by applying the CNOS and then moving to a definition of 'overcrowding'.

The Canadian National Occupancy Standard model

In Australia, the density model of determining crowding using the CNOS, which employs bedroom density to determine the residential capacity of a house, has been used by the ABS for Census and NATSISS calculations and continues to be employed. The basis of the CNOS is that gender and age determine who can share a bedroom (see Table 12.5). Each person occupying a bedroom beyond these rules is deemed to require an extra bedroom, and the house is 'crowded'

(or 'overcrowded') (Canadian Mortgage and Housing Corporation 1991). These rules certainly do not have a basis in Indigenous cultures, but appear to be derived from Anglo norms of privacy and individuality.

Table 12.5 Summary of bedroom sharing criteria from the CNOS, 1991

Canadian National Occupancy Standard criteria	Bedroom requirements
General	No more than two people per bedroom
Gender and age	Children aged under five, of the same or different genders can share a bedroom
	Children aged over five and under 18, of the same gender, can share a bedroom
	Children aged over five, of different genders should not share a bedroom
Relationship status and age	Couples and their children should not share a bedroom
	A household of one unattached individual may occupy a bed-sit
	Single household members, aged over 18, should have their own bedroom

Source: Canadian Mortgage and Housing Corporation 1991

The CNOS rules summarised in the above table dictate that children over the age of 5, of different genders, should not share a bedroom. Many authors cite the CNOS as widely used, but it is rarely questioned in terms of validity (although one exception is Jones 1991). However these presumed standards are not reflective of community norms in many cultures including that of the contemporary Anglo-Australia. (Memmott et al. 2011). Rather than the CNOS being an unusual use of density as a measure, crowding has been measured through repeated, blunt density calculations over many decades in Australia as Jones (1991: 7) has pointed out (see Table 12.6):

> The [Canadian National] occupancy standard is…defined by the functional capacity of a bedroom rather than any cultural standard, whether those of Aboriginal and Torres Strait Islander people or those suggested for the wider Australian society.

Yet the CNOS remains as a powerful orthodoxy in Indigenous crowding measurements today. The NATSISS also utilises the CNOS despite known Indigenous issues which compromise its validity: high residential mobility, cultural obligations to accommodate kin and other visitors, avoidance behaviours that determine suitability of particular sleeping and other living arrangements based on complex kin and shame relationships, and preference for outdoor living amongst some groups.

Table 12.6 Models of 'crowding' utilised by various governments

Country of use	Institution and source	Crowding definition
Australia	Australian Bureau of Statistics Family survey 1975 (ABS 1980) Family Survey (ABS 1980) Anderton and Lloyd (1991)	Density derived
Australia	Neutze (1977)	Density derived
Australia	Housing and Locational Choice Survey (National Housing Strategy 1992)	Density derived
Canadian origin; used in Australia by ABS for census and NATSISS	Canadian Mortgage and Housing Corporation (1991)	CNOS; density derived
USA; used as one of several indicators in New Zealand	United States Census Bureau (Statistics New Zealand 2011)	American Crowding Index; density derived
Australia	Australian Institute of Health and Welfare (AIHW 2005)	Proxy Occupancy Standard; density derived
One of several indicators in New Zealand	Statistics New Zealand (2003)	Equivalised Crowding Index; density derived

Source: Adapted from Jones 1991: 7

Policy significance

The effect of this household utilisation standard is to determine in government policy what is required for a house of a decent standard, in terms of bedrooms per person. For example the National Affordable Housing Agreement (NAHA) between the Commonwealth and the States (see Tables 12.7 and 12.8) uses measures of crowding defined by the ABS application of the CNOS to determine baseline levels of crowding against which future performance measures for the provision of housing will be evaluated for Indigenous and non-Indigenous households alike (Steering Committee for the Review of Government Service Provision (SCRGSP) 2009; Council of Australian Governments (COAG) 2009).

Additionally CNOS has been used to determine levels of crowding in Indigenous houses and whether children in particular are being adequately cared for, and whether additional bedrooms, or housing, are required. It appears that these rules on crowding are being used to determine standards of decency in terms of housing use with FaHCSIA staff arguing in the media as recently as March 2011 that crowding causes children to be at greater risk of abuse (ABC 2011).

Table 12.7 Proportion of Indigenous households living in 'overcrowded' conditions, by number of bedrooms, State and Territory, Australia, 2008[a]

	Unit	NSW	VIC	QLD	WA	SA	TAS	ACT	NT	AUST
Number of bedrooms	Numerator – number of overcrowded Indigenous households									
0–2 bedrooms	No.	1 759	244	1 570	593	88	165	34	960	5 412
3 bedrooms	No.	3 624	708	4 663	1 790	889	366	46	3 371	15 458
4 or more bedrooms	No.	1 167	213	1 653	942	235	47	13	799	5 070
Total	No.	6 550	1 166	7 886	3 324	1 212	577	93	5 131	25 940
Number of bedrooms	Denominator – total number of Indigenous households									
0–2 bedrooms	No.	14 348	3 383	12 184	3 513	2 148	2 178	328	3 509	41 590
3 bedrooms	No.	33 111	8 500	25 898	10 968	7 677	4 973	1 010	9 101	101 236
4 or more bedrooms	No.	16 515	3 702	14 676	7281	1 786	2 168	623	2 346	49 096
Total[b]	No.	64 341	15 819	53 179	21 956	11 710	9 323	1 985	15 108	193 421
Number of bedrooms	Proportion of Indigenous households living in overcrowded conditions									
0–2 bedrooms	%	12.3	7.8	12.9	16.9	4.1	7.6	10.4	27.4	13.0
3 bedrooms	%	10.9	8.3	18.0	16.3	11.6	7.4	4.6	37.0	15.3
4 or more bedrooms	%	7.1	5.8	11.3	12.9	13.2	2.2	2.1	34.1	10.3
Total[b]	%	10.2	7.4	14.8	15.1	10.4	6.2	4.7	34.0	13.4

a. Overcrowded conditions are defined using the CNOS for 'needing 1, 2, 3, 4 and >4 bedrooms'.

b. Includes where overcrowded conditions are 'Not Known', which account for approximately 0.8% of all Indigenous private dwellings.

n/a = not available.

Source: Adapted from SCRGSP 2009: 209

Table 12.8 Proportion of Indigenous households living in 'overcrowded' conditions by type of location, State and Territory, Australia, 2008[a]

	Unit	NSW	VIC	QLD	WA	SA	TAS	ACT	NT	AUST
Location	Numerator – number of overcrowded Indigenous households									
Capital city	No.	1 801	626	1 691	862	554	234	93	656	6 517
Balance of State	No.	4 749	539	6 195	2 462	659	344	n/a	4 475	19 423
Total	No.	6 550	1 166	7 886	3 324	1 212	577	93	5 131	25 940
Location	Denominator – total number of Indigenous households									
Capital city[b]	No.	21 339	8 043	16 080	8 539	6 008	3 355	1 985	4 900	70 251
Balance of State[b]	No.	43 002	7 776	37 099	13 416	5701	5 968	n/a	10 208	123 170
Total[b]	No.	64 341	15 819	53 179	21 956	11 710	9 323	1 985	15 108	193 421
Location	Proportion of Indigenous households living in overcrowded conditions									
Capital city[b]	%	8.4	7.8	10.5	10.1	9.2	7.0	4.7	13.4	9.3
Balance of State[b]	%	11.0	6.9	16.7	18.4	11.6	5.8	n/a	43.8	15.8
Total[b]	%	10.2	7.4	14.8	15.1	10.4	6.2	4.7	34.0	13.4

a. Overcrowded conditions are defined using the CNOS for 'needing 1, 2, 3, 4 and >4 bedrooms'.

b. Includes where overcrowded conditions are 'Not Known', which account for approximately 0.8% of all Indigenous private dwellings.

n/a = not available.

Source: Adapted from SCRGSP 2009: 211

Definition of 'community' vs 'non-community' terms in NATSISS

NATSISS categorises settlement units as 'communities' and alternatively 'non-communities'. In our view, the terms 'discrete settlement' and 'dispersed housing settlement' (for a rural town or city) are preferable terms for analysis of Indigenous settlement types (Memmott and Moran 2001). 'Communities' (as bounded systems of social networks) may occur in both types of settlements, but as social units they are not necessarily congruent with settlement units. The term a 'non-community sample' is thus misleading. Most Aboriginal people including those in urban and metropolitan settlements belong to some sort of Aboriginal community, and perhaps several, but some may not (e.g. the 'Stolen Generation'). This suggests there may be an analytic problem in making one set of suggestions about sampling in discrete settlements versus another set in dispersed settlements.

Definition of the 'family' in NATSISS

When asking question(s) that differentiate whether one is part of a resident family or not, how does the interviewer interpret between Aboriginal and non-Aboriginal kinship concepts in responses? The enumeration of 'family' in NATSISS does not include classificatory kin categories, but an Aboriginal interviewee may assume such kin are included as family. In Aboriginal kinship, classificatory relations may be included as family, but such kin may not be close relatives by blood descent or by direct marriage. This suggests there is a potential ambiguity in the responses of Aboriginal interviewees that involve the term 'family' which introduces measurement error into this indicator.

Non-enumeration of visitors and non-'usual residents' in NATSISS

The NATSISS sample of 2008 includes only those who are 'usually resident' in a private dwelling within Australia. 'Usually resident' is defined as anyone who usually lives in a given dwelling or regards it as their primary residence. Note that 'usually resident' excludes visitors. 'Usual place of residence' in NATSISS 'refers to the place where a person lives or intends to live for six months or more' (ABS 2009b).

As visitors are not included among the definition of residents, it is misleading to interpret 'spare' bedrooms as being unoccupied bedrooms. One of the Aboriginal researchers in our team commented in response to the findings in Table 12.1: 'I can't think of any relative of mine who has a spare bedroom' (co-

author Corunna, a Nyungar/Palyku woman). The so-called spare bedrooms may well be occupied by visitors. 'Bedrooms needed' is therefore an underestimate in our view. This non-enumeration masks both crowding of those residences, and 'secondary' homeless people (according to the ABS categories of homelessness) who are 'visiting' and not enumerated (see Table 12.9, category 2.2).

Table 12.9 Categories of homelessness employed by ABS

Conceptual category	Operational definition
1. Primary homelessness	Improvised home, tent, sleepers out ('rough sleepers')
2. Secondary homelessness	In temporary shelter:
	Hostels for the homeless, night shelter, refuge
	Visitors to private dwellings with 'no usual address'
3. Tertiary homelessness	Boarding house/private hotel (unserviced room)

Source: Adapted from Chamberlain and Mackenzie 2008: 3, 10

Mobility can be a form of homelessness according to Memmott, Long and Thomson (2006) and moving from house to house can arise from inadequate security of tenure, social problems and violence, inadequate or unsuitable housing and other problems. These movements may contribute to both homelessness, for those fleeing particular social or environmental circumstances, and crowding for those who receive them into their homes.

> If visitors were taken into account in the measure of overcrowding [sic] for Census night 2006, the proportion of people living in overcrowded conditions would increase from 27% to 31% for Indigenous people… It is not possible five years on from the 2006 Census to readily establish the culturally motivated visitors from those people that may have been seeking accommodation because they were experiencing homelessness according to a western context (ABS 2011: 55).

If usual address is defined as being the place at which people will stay or intend to stay for six months, then how is 'no usual address' defined? It should be noted that reporting of 'no usual address' is uncommon in the Aboriginal population (Horspool and Mowle 2011: 6.1; Morphy 2007: 42).

In reality (and based upon both our personal and research experiences), visitors may have several homes in which they are welcome and between which they alternate for accommodation, none of which are their usual address. This situation could be masking one of homelessness, in which a person desires but cannot obtain a permanent home of their own, alternatively visitors may have their own home to which they may, or may not, eventually return.

'Indigenous household' definition in NATSISS

The definition of an 'Indigenous household' used by NATSISS includes any household that has one Indigenous resident (ABS2009b). While this is no doubt intended to capture the variety of living arrangements which Indigenous people use, it does tend to blur the figures relating to crowding, because Indigenous households on this weak criterion are not homogeneous. As demonstrated by the analysis of crowding for all Indigenous households with all Indigenous residents and those that include both Indigenous and non-Indigenous people, exclusively Indigenous houses have three times the odds of being crowded (see Table 12.4). The apparent homogeneity within the term 'Indigenous household' also masks the diversity of families and circumstances within the Indigenous community, and reduces the visibility of crowding in wholly Indigenous households. Given prevalent differences between different types of Indigenous households, relying on this weak definition will understate the extent of crowding.

The challenge of Indigenous enumeration in a remote discrete settlement

If there is a level of inaccuracy in the NATSISS reporting of the number of spare bedrooms, and it is indeed an overestimate, what could account for this? First let us consider that the calculated spare bedrooms are in fact occupied. One reason would be that they were occupied by short-term visitors (staying less than 6 months) as noted above. A second reason would be that interviewees have given false information by under-reporting on the number of actual occupants for fear of eviction by their rental agency due to hosting a greater number of people than allowed by their tenancy agreement.

Now let us assume that a proportion of bedrooms are spare but that this is notwithstanding the potential for crowding to still occur. What hypothetical reasons could there be for this? Firstly, it is possible that people may refuse to utilise a room due to the belief that it contains the spirit or presence of a recently deceased householder who occupied the room, or out of respect for that person even if the spirit is believed to have departed.[6] A second possible reason is that a household (e.g. a nuclear family) may choose to all sleep in one bedroom for preferred closeness and intimacy (see later), thereby leaving one or two other bedrooms empty. A third possible reason is the partial use or non-use of houses with dysfunctional health hardware (showers, toilets, cooking

6 Both of the Aboriginal co-authors (Go-Sam and Corunna) of this chapter suggested this as a possible explanation. Interestingly, although we are confident that this belief is widespread there are negligible references in the Aboriginal housing literature to suggest this. We are of the view that the lack of reporting is because it has not been formally studied as a phenomenon. There are nevertheless references to Aboriginal responses to death in houses (e.g. Fantin 2003; Memmott 2003).

facilities, room heaters). The householder of such a dysfunctional house may sleep there but use a neighbour's house for ablutions and cooking, or indeed move in temporarily with their neighbour.

As evidence of this last reason, consider the following statement on household sizes in a remote discrete community taken from the *National Indigenous Housing Guide* and based on six years of data collection from a sample of more than 25 000 Indigenous people:[7]

> In a community with 300 people and 50 houses, it could be assumed that an average of six people live in each house. However only 25 of the 50 houses have functioning bathrooms and toilets, so residents of the non-working houses use the houses in which bathrooms and toilets work, which means the average house population would be 12… If a sports carnival is held in the community, or death occurs or during the annual wet season, the population could double or treble and the demand on working houses could increase to 24–36 people per house (FaHCSIA 2007: 137).

Batten (1999) argues that an orthodoxy of suitable housing has developed in Australia around economic models of efficient use of housing which lead to the perception of under-utilisation of housing amongst some groups. Similarly one could argue, regarding crowding, that an orthodoxy has developed where crowding was defined in a situation removed from Australia decades ago, yet now remains unchallenged as the standard of suitability and continues to be unquestioned. The CNOS, developed in Canada in 1991 by their Government's National Housing Agency, Canada Mortgage and Housing Corporation, state the acceptable levels of occupancy of a house by determining the appropriate use of bedrooms per person, depending on age, gender, relationship status and other factors which are widely agreed to be culturally specific. Yet these standards are applied in Australia, and in Australian Indigenous communities which are very different to the circumstances in Canada. That they have become an orthodoxy is evidenced by their unquestioned use by Australian organisations including the ABS in its NATSISS, the Census and other analysis of data (Horspool and Mowle 2011; NATSISS Glossary in ABS 2009b; SCRGSP 2009). Many academics too have assumed this is a fair and accurate measure of crowding.

7 Based on 'Housing for Health' and 'Fixing Houses for Better Health' projects undertaken and drawn from a survey of 3615 houses over a period of 6 years. Houses surveyed include urban, urban fringe, regional, remote and very remote regions, across four states: Western Australia, Queensland South Australia, New South Wales, and the Northern Territory (FaHCSIA 2007: 5, 17).

Current social science models of crowding

Elsewhere, we have recently reviewed the social science literature on crowding (Memmott et al. 2011). We drew liberally on a comprehensive literature review of crowding carried out by environmental psychologist Robert Gifford (2007), which is 40 pages long and cites some 288 references (most written in the post 1990 period, but some as early as 1903), as well as drawing on selected references upon which he bases his analysis. We also utilise an earlier review of the Australian Indigenous crowding literature by Memmott (1991) and a recent audit of the Aboriginal housing literature by Long, Memmott and Seelig (2007).

The social sciences have employed a stress model of 'crowding' for at least 40 years. This model holds that states of crowding involve high-density settings that generate certain stimuli, which induce stress in setting participants according to their values of the environmental acceptability and non-acceptability of these stimuli. However, not all high-density settings are experienced as being crowded for particular groups. Gifford (2007: 191, 192, 194) provides a model of crowding which is experiential, based on stress rather than density:

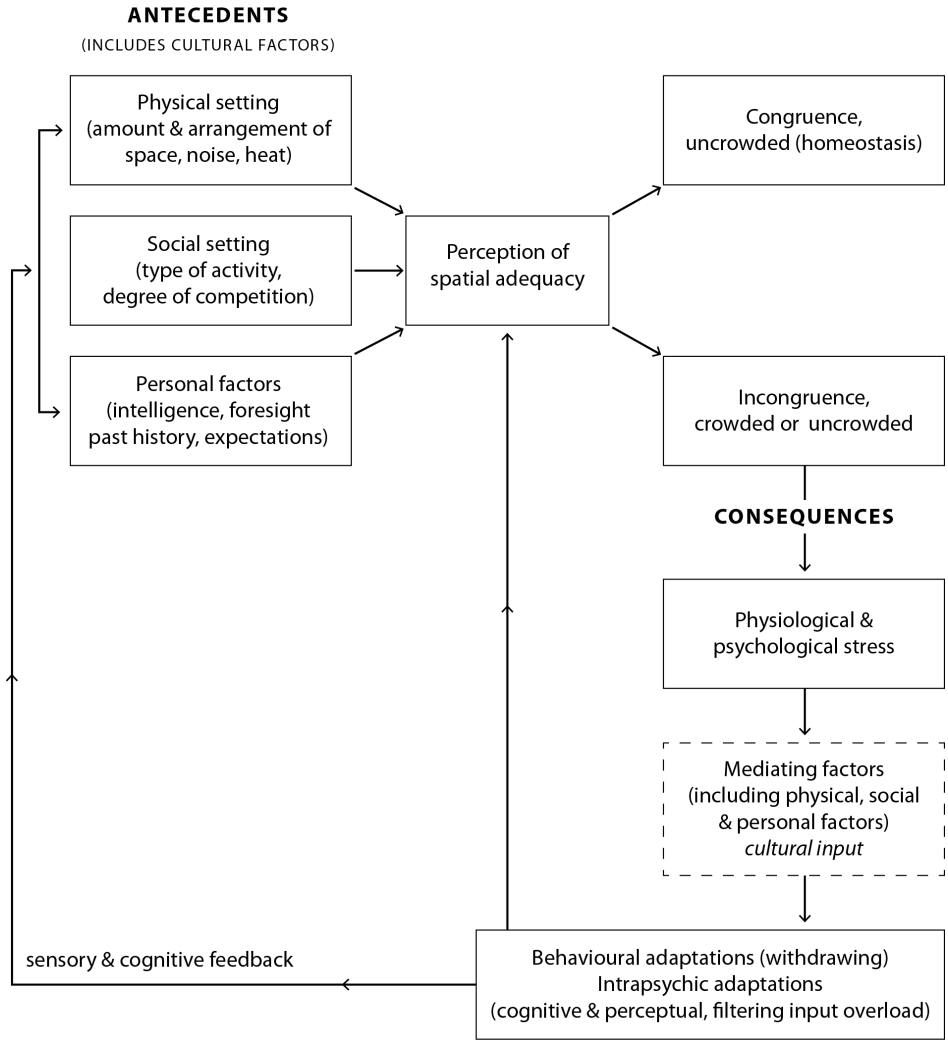
> Density is a measure of the number of individuals per unit area… Crowding…refers to the person's experience of the number of other people around. Rather than a physical ratio, crowding is a personally defined, subjective feeling that too many others are around…Crowding is a function of many personal, situational, and cultural factors…Crowding and density are not always strongly correlated with one another.

In the case of Aboriginal groups, the stimulus that induces stress is often the presence of inappropriate categories of kin in too close a proximity (Fantin 2003). A second stimulus is often the inappropriate behaviour of such persons as a result of substance abuse (Memmott et al. 2011: 37).

In his comprehensive review of crowding theories, Gifford (2007: 217) attempts to synthesise the various dominant paradigms of crowding into a single integrative theory of crowding which he summarises as follows:

> Certain personal, social, and physical antecedents lead to the experience of crowding. Among these are a variety of individual differences, resource shortages (behavior-setting theory), the number of other people nearby (density-intensity and social physics theories), who those others are, and what they are doing. Sensory overload and a lack of personal control are psychological processes central to the experience of crowding. The consequences of crowding include physiological, behavioural, and cognitive effects, including health problems, learned helplessness, and reactance.

Fig. 12.1 An integrative model of crowding



Source: Adapted from Gifford 2007: 195, 214, Fig. 7.12

We have adapted Gifford's diagrammatic theoretical model to crowding (Fig. 12.1), to include the salient cultural factors in his discussion. We note that Gifford incorporates culture into his crowding model in two places: (i) cultural factors are implicit as part of the antecedent factors (e.g. physical and social settings character, past personal and group history); and (ii) cultural factors are also implicit as part of the mediating factors shaping response to stress (Memmott et al. 2011: 17).

With respect to antecedent factors, it is argued that in different cultures, childhood conditioning and socialisation processes equip individuals to

adapt to, and to deal with perceived high-density situations in different ways, according to different norms. Thus Rapoport (1976: 18) and others have argued that being with like people will decrease stress frequency in potentially crowded circumstances. Kinship groups (e.g. extended families, multiple family units) and other culturally homogenous groups are most likely to be socially well-structured. Similarly those individuals within the same culture will have common methods to mediate situations that are perceived to be stressful and crowded, and to maintain group sanctions over what is appropriate stress-avoidance behaviour. Of the propensity for cultural factors to act as mediating or moderating influences, Gifford (2007: 21) writes:

> The consequences of crowding and high density depend in part on cultural background. Culture acts as a moderating influence on high density, sometimes providing its members with a shield against the negative effects of high density and sometimes failing to equip them with effective means of coping with high density.

Our literature analysis of crowding (Memmott et al. 2011) thus argues that states of crowding are characterised by the perception of high-density, displaying various stimuli, some of which induce stress in occupants. The determinations of whether these stimuli are stressful, or not, varies according to one's values of the environmental acceptability or non-acceptability of these stimuli. The experience of crowding is also

> …accentuated by personal factors (personality, expectations, attitudes, gender), social factors (the number, type, and actions of others, the degree of attitude similarity), and physical factors (architectural features and spatial arrangements) (Gifford 2007: 220).

The result may be perceived loss of personal control and/or social and informational overload (comprising a perceptual/cognitive component of the crowding model). Alternatively in response to such a situation, a coping mechanism may be utilised if one is available (a reactive behavioural component to the model). The values that are employed to evaluate the setting state (its stimuli), and to select an appropriate coping or mediating mechanism, and the nature of such mechanisms may vary cross-culturally (Memmott et al. 2011: 20–21).

Three ongoing questions for research arise from the above social science model of crowding with respect to understanding crowding in the context of Indigenous Australia.

- What are relevant Australian Indigenous norms and situational factors of household life?

- How do these norms or situational factors become compromised by density changes, resulting in stress and a perceived state of crowding according to the above model?
- What are Australian Indigenous coping mechanisms for crowding?

Aboriginal case studies of high mobility and household transformation

A cultural driver of Aboriginal crowding is the high rate of circular mobility within regions across the continent that can impact on household transformation. Three short examples have been chosen to illustrate aspects of the nature of Aboriginal mobility as a situational and culturally specific factor that can underlie crowding.

A study of a Warlpiri single women's household in Yuendumu

Yasmine Musharbash's (2003) doctoral study centers upon the occupants of a single women's house (or *jilimi)* in the central Australian desert community of Yuendumu in the Northern Territory over a period of 221 nights, and is a significant contribution to understanding the socially complex nature and composition of this Indigenous household type. Musharbash construed the Warlpiri, or *Yapa*, day-to-day worldview as being founded on three principal behavioural values of mobility, immediacy and intimacy. Musharbash (2008: 4, 7, 62) uses these values to explore and accurately describe everyday life and the finer nuances of inter-relatedness. More specifically, these values become clearly understood as drivers of everyday social practice by Warlpiri people in general and by the residents of the *jilimi* in particular (2008: 8). Her findings on mobility and intimacy have a direct relevance to constructs of crowding.

Mobility is regarded as a valued process rather than an incidental phenomenon that occasionally affects 'household' or 'residential group' composition.[8] Not only do Warlpiri people frequently change and hold multiple residences, but Musharbash found the analysis of this dynamic through cyclical activities such as sleeping arrangements, damper making, meal consumption or demand sharing, renders the static concept of 'household', relatively useless as an analytical tool (Musharbash 2008: 60, 73–76, 115–23, 174–75).

8 This approach is specifically employed by Musharbash as a critique of the inadequacy and yet prevalent use of the term 'household', utilised in housing research and in ABS Census data.

Table 12.10 Average numbers of adults and children sleeping in the *jilimi* per night as sampled over 221 nights, 1998–2001

Occupants	Average	Highest[a]	Lowest
Adults	12	19	6
Children	5	11	1
Total[a]	17	30	9[b]

a. This table does not include individuals from *sorry mobs*, in which case these numbers would be substantially higher.

b. This is the lowest number of actual residents present at any one time, not the sum of lowest number of adults and children together.

Source: Adapted from Musharbash 2008: 62, Table 1

The *jilimi* residents thus fell naturally into four categories by such social closeness or distance, (i) core residents, (ii) regular residents, (iii) on-and-off residents and (iv) sporadic residents (see Table 12.11).

Table 12.11 Types of residents in *jilimi* over the 221 nights, 1998–2001

Resident type	Number of individuals	Number of nights
Core residents	11	100+
Regular residents	12	44–76
On-and-off residents	36	8–36
Sporadic residents	48	1–6

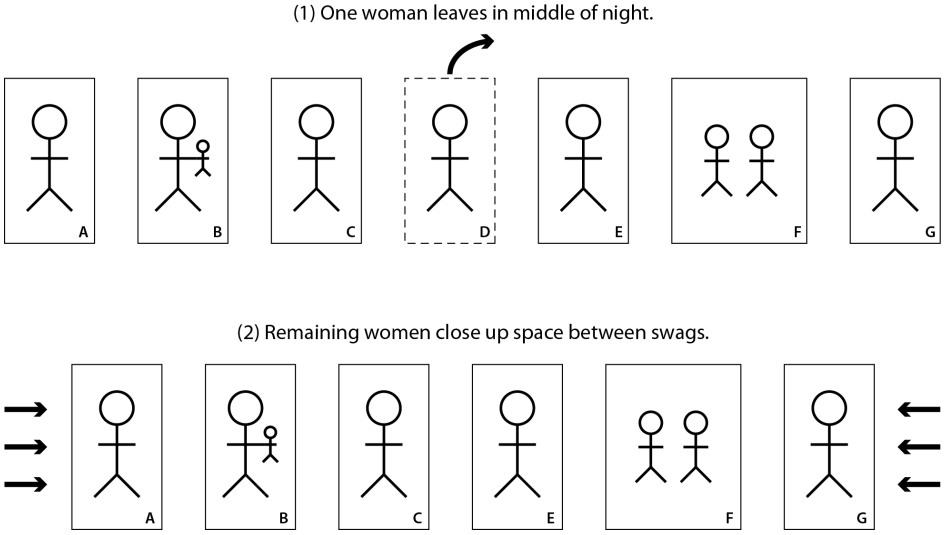
Source: Adapted from Musharbash 2008: 64 Table 2

Musharbash defined these categories partially through their relative frequency of sleeping in the *jilimi*. Core residents were individuals who slept at the *jilimi* between 133 and 221 nights during the study period. The second category, 'regular' residents, stayed at the *jimili* for between 44 and 76 nights. The greater number of individuals belonged to the categories of 'on-and-off' residents totaling 36 individuals staying eight to 36 nights and 48 'sporadic' residents staying one to six nights. The latter two categories of kin were drawn from both actual and classificatory kin. For the recording period of 221 non-consecutive nights, the minimum occupancy was nine people, the maximum 30, and an overall average of 17 individuals. Emphasising the sheer volume of people sleeping in the *jilimi*, it was noted that more than 160 individuals were recorded. However, Musharbash concludes that this was a conservative estimate due to a failure to count nocturnal and early morning residential shifts and 'sorry mobs'[9] (2008: 62–65, 71). It can be argued from Musharbash's model of mobility as valued that much residential mobility is sanctioned, at least within Central Australian Aboriginal communities, and seen as an acceptable and positive phenomenon.

9 Group of mourners who travel from other settlements to engage in ritualised mortuary behaviour (Musharbash 2008: 165).

Another of the tripartite values identified by Musharbash (2008: 95–97) is intimacy, knowing closely the bodies of others, generated largely from the fluidity of sleeping arrangements, albeit constrained within the sociospatial categories of married people's camps, single men's camps, and single women's camps. Intimacy was the norm and high density was not usually perceived as a problem. At night, if a woman left the sleeping group for some unexpected reason, the remaining people would close-up the space to be close together. 'Yapa [Aboriginal people] strive for 'gap-free' yunta [sleeping configurations]'… and '[s]leeping alone is an impossibility' (Musharbash 2008: 44).

Fig. 12.2 Example from Musharbash's description of the Aboriginal value of intimacy in Warlpiri single women's households



Source: Adapted from description in Musharbash 2008: 43–44

On the direct subject of crowding, little is elaborated upon by Musharbash, other than passing references about frequent tensions arising from 'gambling schools' involving the core residents complaining about the camp becoming 'dirty', or about people who 'just leave their rubbish' and 'use the toilet all the time' as a response to the high volumes of people being hosted. Significantly, the 'gambling schools' that operated day and night on a regular fortnightly basis, became problematic to residents when it interfered with the sleep of core residents. The strategy employed to disperse gambling participants was indirect action by turning off the electricity and declaring the power meter was empty (Musharbash 2008: 127).

Clearly these values and preferences recorded by Musharbash reveal that rather than crowding being a concern, for some people the driver of appropriate levels of intimacy, proper company for individuals so they need not feel alone, is key to many sleeping and household behaviours which determine numbers. Similarly mobility is conceived of as a positive value which allows for the proper behaviours demonstrating kin and place connections. While these preferences for intimacy and mobility can be seen as causes of crowding, the stress caused by inadequate facilities such as bathrooms, cooking facilities and large enough rooms to accommodate desired numbers may be a better way to conceptualise the issue, rather than simple numbers per bedroom. (Memmott et al. 2011: 26–28.)

The following example at Pipalyatjara in South Australia reveals nuances of mobility that in turn affect responses to crowding at both the house and neighbourhood scale.

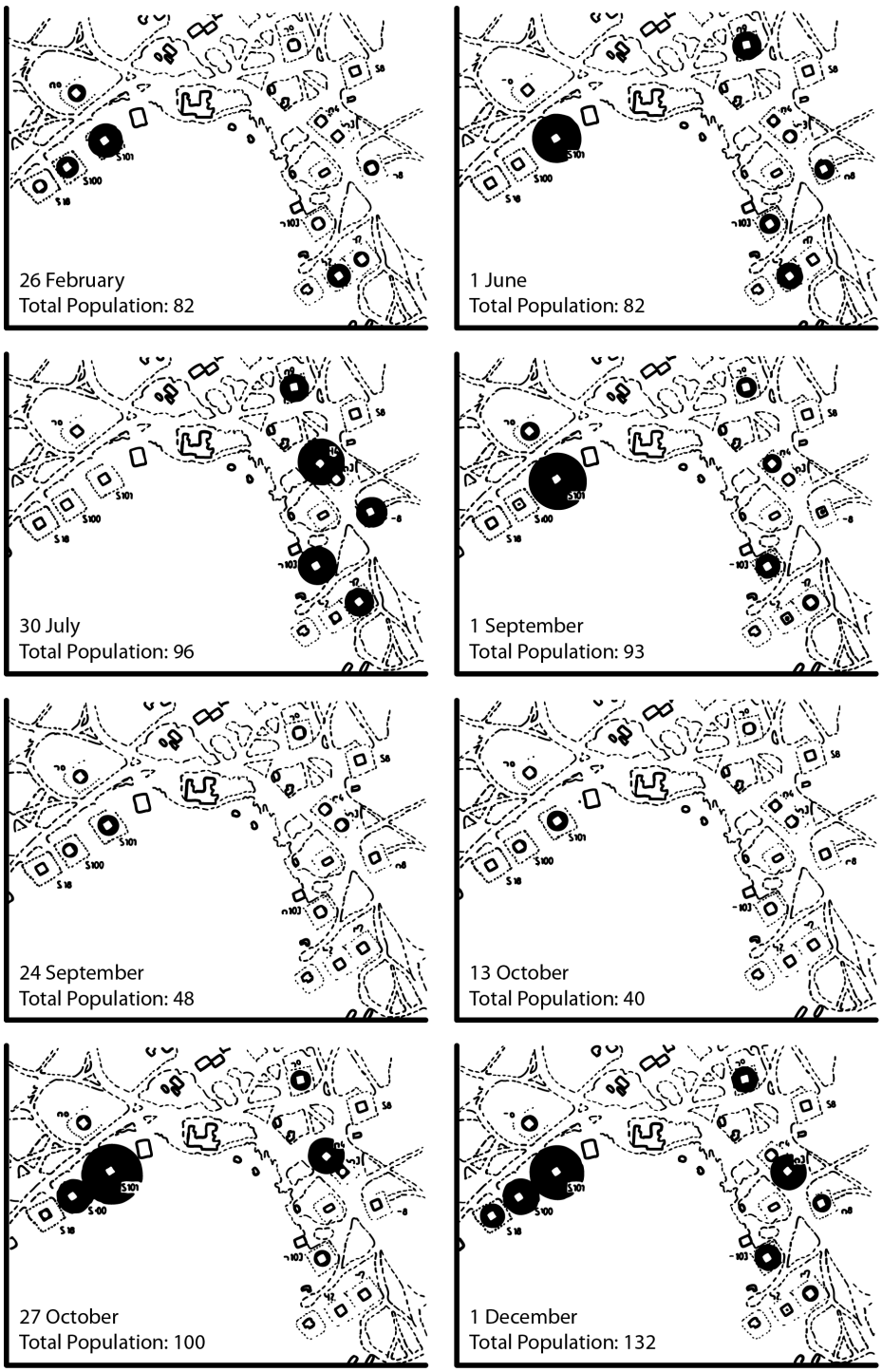
The Pipalyatjara example

There are few case studies that provide accurate data on residential household dynamics through time. Pholeros, Rainow and Torzillo (1993) use an example from Pipalyatjara that demonstrates mobility within a very remote discrete settlement and can be used to illustrate the variation in household numbers (Fig. 12.3). The relative size of the blackened circles indicates the relative size of households, with the settlement total ranging from 40 to 132 persons.

Mobility can be both a cause of crowding (through new residents arriving) and a coping mechanism in response to crowding (by departing for a perceived non-crowded residence) (Fig. 12.4). While crowding and mobility can be seen as linked, the complexity of the neighbourhood situation is shown through these examples. The desire to be close to particular people at relevant times of celebration, mourning or the result of other factors, means that household sizes swell and shrink according to cultural and social factors which require careful analysis over time.

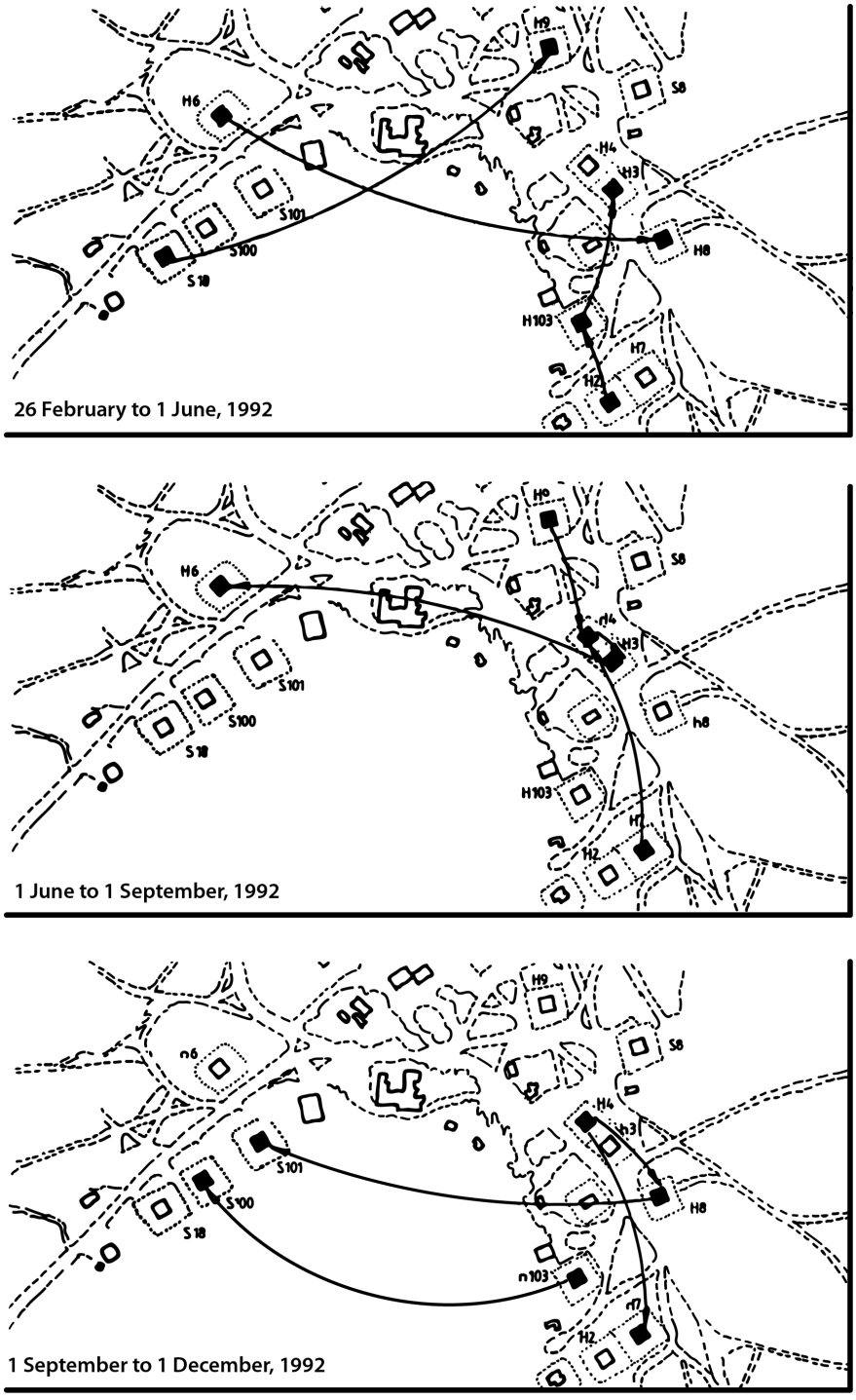
The following example at Ti Tree (Northern Territory) gives further evidence of these complexities, including the issue of self-constructed housing.

Fig. 12.3 Population distribution within Pipalyatjara on eight survey occasions, 1992



Source: Pholeros, Rainow and Torzillo 1993: 26–27

Fig. 12.4 Family group mobility at Pipalyatjara based on three census times, 1992

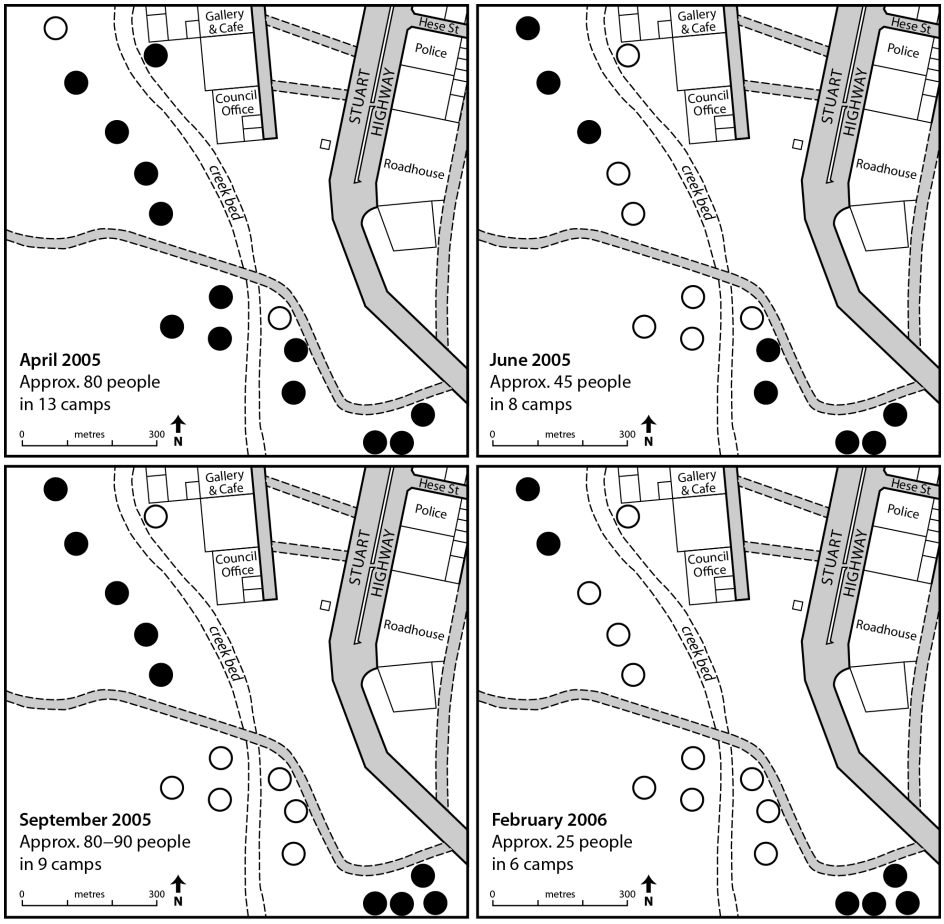


Source: Pholeros, Rainow and Torzillo 1993: 28

The Ti Tree Town Camp example

The changing living patterns of people in a town camp located beside the township of Ti Tree in the Northern Territory over a period of nine months during 2005–06 (see Fig. 12.5 described in Sanders and Holcombe 2006). This area accommodated people in a series of self-constructed camps, which were used by both long-term residents and visitors. The recorded mobility included both intra-settlement movement from camps into nearby houses and back again, and people travelling further afield into the wider region under a variety of motivations. Some camps were abandoned as social groups dispersed in response to the change of seasons or social conditions in the camp and elsewhere, but a number of camps were occupied by people for long periods of time spanning years (Sanders and Holcombe 2006: 3).

Fig. 12.5 Settlement plan of south-west side of Ti Tree Township, Aboriginal campsites occupied and unoccupied, 2005–06[a]



a. Aboriginal campsites occupied indicated by black circles and unoccupied indicated by white circles.

Source: Sanders and Holcombe 2006: 12–15

This study highlights the nature of mobility for some Indigenous people, which can be seasonal, social, employment or health based, and clearly affects the occupation pressures on dwellings (of whatever type), which cannot be captured in a single night snapshot, such as the NATSISS. If one imagines the receiving dwellings at the other end of the outward mobility from Ti Tree, one can infer the occupation of those dwellings swell and shrink also, as visitors arrive or become longer-term residents.

Understanding the Aboriginal rules of allocation of people to household sub-groups

To minimise the stresses arising from high density living in Aboriginal households, a common coping mechanism is the purposefully arranged setting structured by the householders, achieved through rules governing the combinations of people allocated to living and sleeping spaces that establish what are perceived to be ordered and safe behavioural patterns. If for example, a sub-group of unmarried women are allocated a room in a large household, their numbers are unlikely to be a concern and they will sleep within touching distance of one another. The arrangement of people in sleeping spaces thus occurs according to combinations based on age, gender, conjugal status and kin relationships. Despite being a large household it may not be regarded as crowded. If the core members of such a rule-governed household are stable, such households may endure for years.

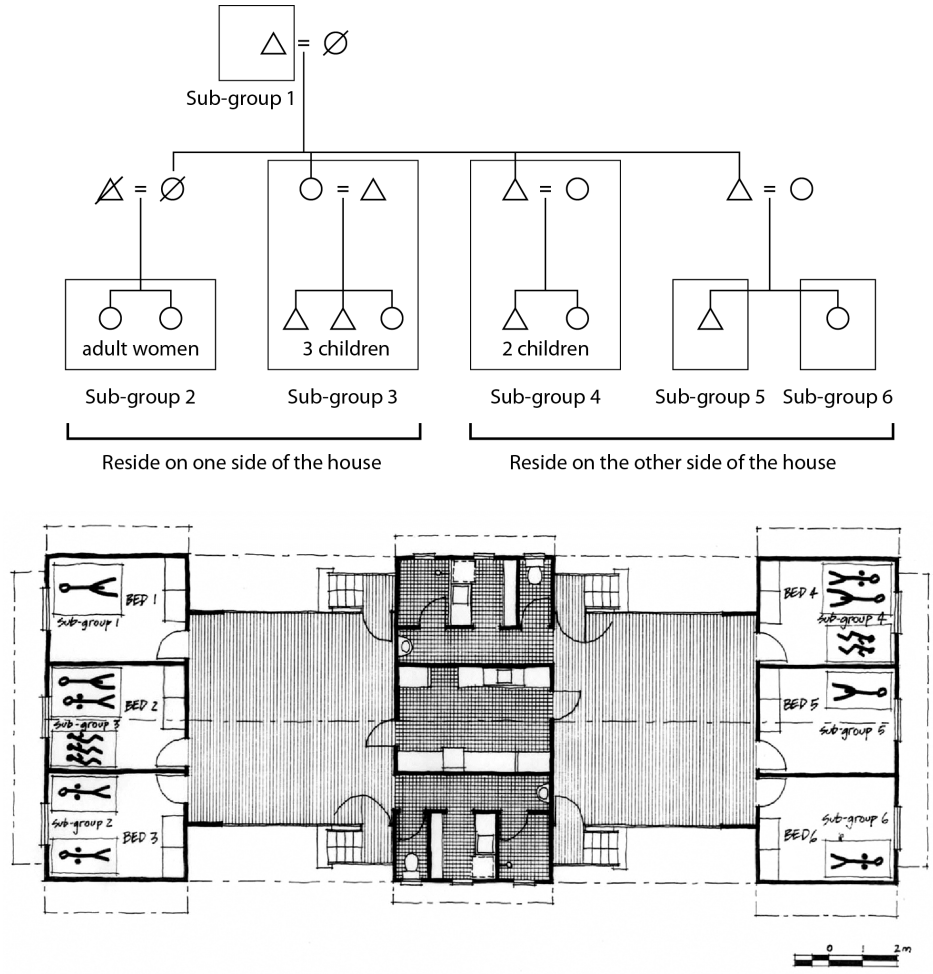
One sub-group of householders (often including the senior householder) may sleep and live in the 'living room' of the house, irrespective of whether bedrooms are too small or too few. The room is furnished with mattresses on which people will sit or lie engaging in social discourse or sleep as they wish. This differs from the typical Australian living room, which often features a couch and a television, but which is seldom used as a permanent nocturnal sleeping room.

A threshold of stress may arise, even for the rule-governed household, when the density increases to the point whereby there is no means of allocating sleeping space to persons without placing them in situations which compromise the need for respect among kin. Such a situation will induce stress, and emotional responses may include shame, jealousy, anger and violence. The household in this situation is generally crowded. It can be severely exacerbated through substance abuse by particular householders or by their visitors. It will lose stability and may not endure.

The next example demonstrates an architectural response to a particular housing requirement, which accommodates multiple families in a dense, but we argue, not crowded arrangement.

This house was built at Ngukurr (Roper River, Northern Territory) during 1998–99 and designed by the architectural firm Northern Building Consultants, to accommodate a complex Indigenous household. The household genealogy and floor plan show the sleeping locations of the six household sub-units or groups (see Fig. 12.6). The total population of the household was 14 (Memmott et al. 2000).

Fig. 12.6 A house built at Ngukurr, Northern Territory, 1998–99



Source: Authors' own research

The design achieved a degree of sociospatial separation from a senior male householder and his adult daughters (in sub-group 3) from his adult son (in sub-group 4), thus conforming to an obligatory avoidance rule between adult siblings of opposite gender. The occupation of a single bedroom by a nuclear family with infants was regarded as acceptable but once the children reached adolescence they occupied separate rooms (sub-groups 3, 5, and 6).

This case study provides an example of the use of sociospatial division and allocation of sleeping spaces combined with avoidance behaviour principles as complementary coping mechanisms to minimise or prevent crowding, in keeping with Gifford's key concept of stress, rather than arguments that all dense situations are stressful, even at a subconscious level. In the case of some Aboriginal groups, as witnessed by Musharbash, such density may be an expression of proper intimacy with kin and others, which in fact reduces stress. This example clearly does not conform to the Canadian National Occupancy Standard. What would cause perceived crowding would be the incorrect juxtaposition of people according to the cultural rules.

Given the high density of many Aboriginal households, the techniques to minimise and avoid crowding include a combination of sociospatial divisions, observance of avoidance and respect rules, the punishment of any rule violation with shaming, adjusting spaces where possible with flexible architectural elements and ultimately, especially under high stress, the deployment of residential mobility within kin networks (Memmott et al. 2011: 56).

Conclusion

Use of the CNOS as a measure of 'crowding' is problematic. It has embedded culturally specific assumptions such as preferable sleeping arrangements of particular genders, relationships etc. which are not necessarily applicable to Indigenous Australians, but few alternatives have been proposed despite critiques of CNOS.

A key problem then, as we have argued here, is that NATSISS, at best, is a snapshot of household sizes and profiles, and probably a blurred one due to the under-reporting of visitors. NATSISS does not readily capture flows in and out of households and other social pressures on Indigenous households. These deficiencies diminish the possibility of an accurate modelling of crowding, even though government departments and other agencies persist in extrapolating findings on crowding from the NATSISS data. The complexity we have demonstrated in the perception, mobility, coping mechanisms and culturally specific drivers of house crowding makes a survey-based density measure as a stand-alone model of crowding unhelpful. Furthermore, scaling

up or extrapolating NATSISS survey results may mask local contextual factors. Caution is therefore counselled concerning the use of NATSISS findings to direct government program expenditure in order to redress housing shortages. It may be that more rich or fine-tuned measures are required, despite the potential cost or complexity of gaining such information. In our view NATSISS findings are better used as a first step to decision-making only, to be followed with more in-depth community surveys or consultation prior to expenditure decisions. Just as health diagnoses cannot be made via a simple survey questionnaire separate from medical practitioners, similarly the complexity of house crowding requires a more in-depth and nuanced 'diagnosis'. We do not doubt that crowding exists and that in many cases it is severe, but the cultural and group specific nature of the causes of crowding and possible solutions require more investigations than the NATSISS survey data can currently provide.

The need for terminology and concepts that are meaningful in Aboriginal household contexts

One of our aims in this paper has been to demonstrate that terms whose meanings are briefly defined and taken for granted in the Census and NATSISS surveys do not necessarily make sense when applied in all Aboriginal contexts, which are by no means homogeneous. There is a need to carefully explore and deconstruct the culturally specific semantic meanings of terms such as family, resident, household, community, visitor as well as crowding itself. The use of inappropriate, ambiguous or inaccurate terms in the collection or definition of NATSISS data causes difficulties in being able to make useful interpretations of the data.

Table 12.12 Analysis of current policy terms, household enumeration, Australia

Words currently used by policy formulators	Aspects of semantic deconstruction necessary for Indigenous contexts
community	Community/settlement
family	Agnatic, cognatic and classificatory types of kin as family; all visitors as family
resident (= six months present or 'usual place of residence' or not counted by ABS for census or NATSISS)	Visitors (not enumerated) Sanctioned v. non-sanctioned mobility
household ('common provision' definition)	The residential group present for particular activities (eating, sleeping, nocturnal/diurnal, recreational) but transforming
usual resident	Core resident/long-term/short-term/night visitor/day visitor.
visitor	Classificatory kin/strangers/multiple home bases
crowding	Density/crowding
overcrowding	Crowding/non-crowding/types of crowding

Source: Authors' analysis

Suggestions for improving NATSISS with respect to crowding

Firstly, we suggest that included in NATSISS, should be a count of 'place of enumeration' on the night (or place of residence on the night) as well as 'place of usual residence'. (This was possibly not done because the NATSISS survey may have been carried out over more than one night.)

Secondly we suggest that a statistical algorithm technique be developed to incorporate a 'visitor factor' and/or a 'household mobility factor' into the NATSISS weighting process.

Additional desirable complementary research to NATSISS

In addition to improving the NATSISS survey, we make four suggestions on additional research that should be encouraged to obtain complementary findings for those of the NATSISS survey.

- In general we suggest that there combined quantitative and qualitative methods be developed, to better contextualise and model crowding and spatial needs in Aboriginal households
- More longitudinal case studies should be undertaken so as to understand household dynamics; these ought to be separate studies to NATSISS, but to complement the NATSISS findings
- An effective technique needs to be developed to capture flows of people in and out of households, and
- More research is needed on the nature of the relationships between core and temporary householders. (For example, is 'visitor' an appropriate term? What does it mean to Aboriginal people who are serial or repeated dwellers in a home; do they identify with such a term?)

The need for a new metric of Indigenous crowding

Finally, there is a need for a new metric to assess Indigenous households and whether they are crowded. A key design issue for such a metric would be the level of complexity and the cost (time involved) of using it.

Appendix 12A: Methodological notes

The NATSISS sampled the discrete Indigenous communities, dubbed 'community sample,' of remote Queensland, Western Australia, South Australia and the Northern Territory separately, using a different sampling design from the rest of Australia, the latter urban and metropolitan areas being termed the 'non-community sample' (ABS 2010). For the former, communities were selected at random from the 'Indigenous Community Frame', derived by ABS from the 2006 Census of Population and Housing. From these, a random selection of dwelling and then of Indigenous usual residents within dwellings was derived.

The non-community sample used a multi-stage area sample, which randomly selected a sample of Census Collection Districts (CDs) from each State. From here all 'Mesh Blocks' that contained at least one Indigenous household, according to the 2006 Census, were screened, as well as a random sample of those not recording any Indigenous households. From identified Indigenous households up to two Indigenous adults (aged 15+) and two Indigenous children (aged 0–14) were randomly selected to respond to the survey.

The final sample was of approximately 13 300 Indigenous persons from 6 858 households.

Summary of the NATSISS Sample

Community sample:

Discrete Indigenous communities (remote Queensland, Western Australia, South Australia and the Northern Territory); random selection of:

- communities
- dwellings
- Indigenous usual residents

Non-community sample:

Multi-stage area sample; random selection of:

- CDs
- mesh block
- Indigenous household
- Indigenous usual residents

Weighting of data

The 2008 NATSISS contains weights at both the person and household levels of measurement (ABS 2010). The initial weights 'scale up' the sample data to the in-scope population by multiplying each unit by the inverse of its probability of being selected.[10] These initial weights are then adjusted to population benchmarks in order to compensate for undercoverage, which may have occurred due to sampling bias, non-response, non-identification, etc. Population benchmarks are independent estimates of the population of interest with regards to specific (independent) parameters (usually demographics). The aim of calibrating sampling weights to such benchmarks is to ensure that the distribution of observations is aligned to that of the population, rather than the idiosyncratic distribution of the sample.

Summary of NATSISS Sampling Weights

Probability weights

Scale-up observations by the inverse probability of each person/household being selected.

Adjustment to population benchmarks

Indigenous Household Definition in NATSISS

Calibrated to:

- State
- part of State
- age
- sex
- community/non-community

10 For example, if a household was 1 of 4 selected from a particular collection district which comprised 48 households, it would have a probability of 1/12 (4/48) of being selected, and would therefore be assigned an initial weight of 12 (i.e. a weight that multiplied its responses by 12).

Appendix 12B: Selected definitions taken from ABS (2009b)

Private dwelling

The premises occupied by a household. Includes houses, flats, home units, garages, tents and improvised dwellings. Excludes hostels, hospitals and prisons.

Estimated resident population (ERP)

The official ABS estimate of the Australian population, based on the Census count (on a usual residence basis). The estimated resident population is compiled at 30 June each census year, and is updated quarterly between censuses. These intercensal estimates of the resident population are revised each time a population census is taken. For more information, see Australian Demographic Statistics (ABS 2011a). See also 'estimated resident Indigenous population' (ABS 2009b).

Estimated resident Indigenous population

The Indigenous ERP is based on the census count and adjusted for instances in which Indigenous status is unknown and for net undercount. These adjustments are necessary because of the volatility of counts of the Indigenous population between censuses. For more information, see ABS 2009a.

Household

Consists of a person living alone, or two or more related or unrelated persons who live and eat together in private residential accommodation. In this survey, each household contained at least one identified Indigenous resident.

Housing utilisation

This information is based on the CNOS for Housing Appropriateness, a widely used measure that is sensitive to both household size and composition. The following criteria are used to assess bedroom requirements and households requiring at least one additional bedroom are considered to be overcrowded:

- there should be no more than 2 persons per bedroom
- a household of 1 unattached individual may reasonably occupy a bed-sit (ie. have no bedroom)

- couples and parents should have a separate bedroom
- children aged less than 5 years, of different sexes, may reasonably share a room
- children aged 5 years or over, of different sexes, should not share a bedroom
- children aged less than 18 years and of the same sex may reasonably share a bedroom, and
- single household members aged 18 years or over should have a separate bedroom.

Indigenous household

An Indigenous household is a household where one or more of the Usual Residents is Indigenous. See also Indigenous.

Non-remote

Geographical areas within the 'Major cities of Australia', 'Inner regional Australia' and 'Outer regional Australia' categories of the Australian Standard Geographical Classification (ASGC) Remoteness Structure (ABS 2008a). See also 'remoteness area' (ABS 2009b).

Remote

Geographical areas within the 'Remote Australia' and 'Very remote Australia' categories of the ASGC Remoteness Structure (ABS 2008a). This term has been abbreviated to 'Remote' in this publication. See also 'remoteness area' (ABS 2009b).

Respondent

An Indigenous person who was selected to participate in the 2008 NATSISS and who completed an interview. In non-community areas, up to 2 Indigenous adults and 2 Indigenous children per household were randomly selected after all usual residents of the household were listed. In community areas up to 1 Indigenous adult and 1 Indigenous child were randomly selected as respondents. A proxy provided answers on behalf of children aged 0–14 years of age. The collection of information from people aged 15–17 years required parent/guardian permission, if this was not given then an interview was not conducted. See also Proxy.

Usual place of residence

Refers to the place where a person has lived or intends to live for a total of 6 months or more (Compare this definition with the information given about the scope of the survey from the users' guide shown below).

Scope and coverage: Taken from ABS (2010)

The scope of the survey is all Indigenous people who were usual residents of private dwellings in Australia. Private dwellings are:

- houses
- flats
- home units, or
- any other structures used as private places of residence at the time of the survey.

Usual residents are people who usually live in a particular dwelling and regard it as their own or main home. People usually resident in non-private dwellings, such as hotels, motels, hostels, hospitals, nursing homes, or short-stay caravan parks were not in scope.

Acknowledgements

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Quantitative analysis conducted by the authors used data from the 2008 National Aboriginal and Torres Strait Islander Social Survey, which was kindly provided by the ABS in the form of Confidentialised Unit Record Files (CURFs). We were granted access to both the 'NATSISS State by Remoteness 2008 Expanded Reissue 1' CURF and the 'NATSISS State/Territory 2008 Expanded Reissue 1' CURF, which were analysed remotely using the ABS Remote Access Data Laboratory (RADL).

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