CENTRE FOR ABORIGINAL ECONOMIC POLICY RESEARCH

THE AUSTRALIAN NATIONAL UNIVERSITY

INDIGENOUS LABOUR SUPPLY CONSTRAINTS IN THE WEST KIMBERLEY

J. Taylor

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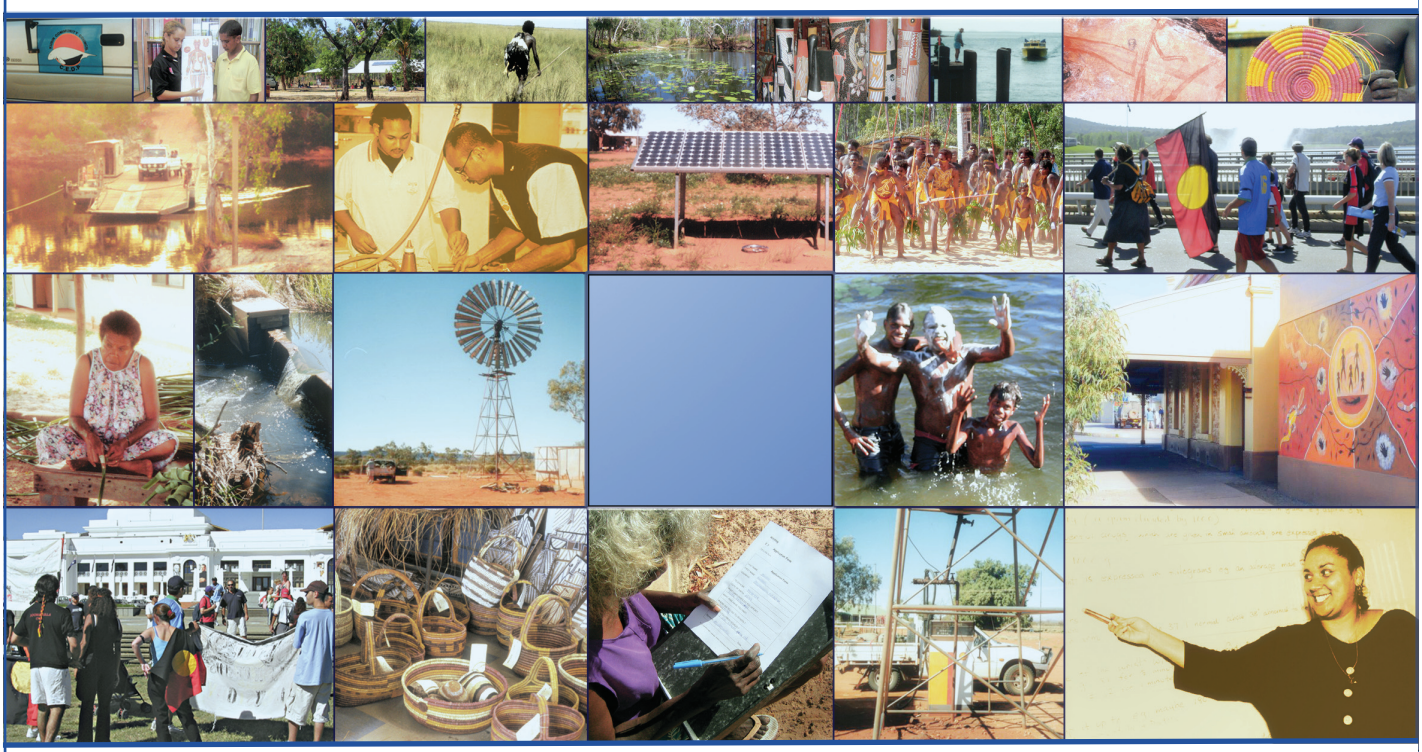

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Enquiries may be directed to:

The Centre for Aboriginal Economic Policy Research
Hanna Neumann Building #21
The Australian National University
Canberra ACT 0200

Telephone 02–6125 8211
Facsimile 02–6125 9730

Professor Jon Altman
Director, CAEPR
The Australian National University
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J. TAYLOR

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John Taylor is Deputy Director and Senior Fellow at the Centre for Aboriginal Economic Policy Research, College of Arts and Social Sciences, The Australian National University, Canberra.

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ABBREVIATIONS AND ACRONYMS

ABS	Australian Bureau of Statistics
AIGC	Australian Indigenous Geographical Classification
AIHW	Australian Institute of Health and Welfare
ANU	The Australian National University
ASR	Age-standardised mortality rate
ATSIC	Aboriginal and Torres Strait Islander Commission
CAEPR	Centre for Aboriginal Economic Policy Research
CBO	Community Based Order
CDEP	Community Development Employment Projects (scheme)
CHINS	Community Housing and Infrastructure Needs Survey
CRC	Crime Research Centre
DALY	Disability-Adjusted Life Year
DHW	Department of Housing and Works (Western Australia)
EHNS	Environmental Health Needs Survey
ERP	Estimated resident population
ESRD	End-stage-renal disease
GEHA	Government Employees Housing Authority
GROH	Government Regional Officers Housing
GST	Goods and Services Tax
IA	Indigenous Area
ICC	Indigenous Coordination Centre
ISO	Intensive Supervision Order
LGA	Local government area
MCEETYA	Ministerial Council on Education, Employment, Training and Youth Affairs
NATSIS	National Indigenous and Torres Strait Islander Survey (1994)
NATSISS	National Aboriginal and Torres Strait Islander Social Survey (2002)
OECD	Organisation for Economic Co-operation and Development
P49	Police Offence Information System (Western Australia)
PDM	Population density measure
PES	Post-Enumeration Survey
REIWA	Real Estate Institute of Western Australia
SAAP	Support Accomodation Assistance Program
SLA	Statistical local area
SMR	Standardised mortality ratio
SOMIH	State Owned and Managed Indigenous Housing
SSD	Statistical sub-division
TOMS	Total Offender Management System
WDO	Work and Development Order

ABSTRACT

The West Kimberley is the latest region in Western Australia poised to reap huge benefits from a super-cycle of resource exploitation. Labour demand is at an all-time high and challenges in securing an adequate labour supply are already emerging. Juxtaposed is an Indigenous population that has sizeable cohorts moving into working-age groups but is poorly situated to share in the benefits of economic growth for want of adequate capacities to participate. As a companion to *CAEPR Working Paper 35*, this paper examines a set of supply-side issues that undermine successful Indigenous participation. These are more wide-ranging than just the skill-set brought to the labour market, and include many of the factors that underpin the very acquisition of such skills in the first place. Importantly, they include key points of intersection between Indigenous peoples and government policy. Three of these are examined here: housing, health and interaction with the criminal justice system. Essential background to the analysis is provided by examining recent change to that most fundamental element of labour supply, namely the size and composition of the regional working-age population.

ACKNOWLEDGMENTS

This study had its genesis in approaches made to CAEPR by Woodside Energy and agencies of the Western Australia government in 2005 to develop a social and economic profile of the population resident in the West Kimberley. The profile was to proceed in two Phases—Phase 1 was reported in *CAEPR Working Paper No. 35* and the present study represents Phase 2. Thanks for their support in financing the study are due to Bev East of Woodside, to Howard Pederson of the Western Australia Department of Local Government and Regional Development, and to Jeff Gooding of the Kimberley Development Commission. I am also grateful to Paul Lane and Patrick Dodson of the Lingiari Foundation in Broome for their assistance in managing and facilitating the project. Numerous officials from both the Australian and Western Australian governments were generous of their time in providing data access and special mention should be made of the pivotal role played here by officials in the Western Australian Department of Premier and Cabinet. In Canberra, I am indebted to Hilary Bek and John Hughes for editorial assistance, and to Mandy Yap for careful proofing.

BACKGROUND

There is a growing appreciation in government and corporate circles of the lingering (and to some degree) widening gap in labour force participation and related socioeconomic outcomes between Indigenous people and others in the boom economy of Western Australia. A recent manifestation of this is the *Indigenous Jobs Forum* announced by the Premier of Western Australia in November 2007, aimed at bringing leading figures in business and industry together with Indigenous stakeholders, training providers and Government to discuss and develop new initiatives to promote Indigenous employment participation in the State. Some of the challenges that lie ahead for this group in terms of the relative economic situation of Indigenous populations across Western Australia have been outlined in series of papers with some focus on remoter regions such as the Pilbara and Kimberley (Biddle & Taylor 2007; Taylor 2004, 2006; Taylor & Scambary 2005).

In each of these studies, it is clear that Indigenous economic outcomes do not remain sub-optimal because of a lack of labour demand per se. Even in remoter regions away from the metropolitan south-west (where half of the Indigenous population of the State continues to live), the resources boom has generated an unprecedented demand for labour, not just in mining but in ancillary activities and service provision (Taylor 2005). More specifically, corporate interests, and notably mining companies, are increasingly competing with each other to fill Indigenous workforce quotas in pursuit of social responsibility agendas. The issue of low Indigenous labour force participation and poor employment status is therefore not a measure of demand, rather it reflects the fact that many Indigenous people are poorly equipped to respond to the nature of current and likely future demand, even if they wanted to.

Admittedly, much of this demand is located away from the actual communities in which many Indigenous people reside, and workforce engagement would therefore require a modicum of intra-regional migration or mobility. No doubt the supply of Indigenous workers to mainstream labour markets is affected to some degree by varying aspirations for such mainstream work and a preference for alternate forms of economic participation in situ. Models for this exist (Altman 2005), but the extent to which it can be demonstrated across the Western Kimberley remains largely unquantified (Taylor 2006: 61-5; 102-3). What is measurable, though, is the estimation that even if Indigenous labour was fully available for more formal market engagement, the cumulative depth of human capital disadvantage is such that government and industry goals of closing gaps in socioeconomic status would still face a major challenge. Already there are signs in some regions that the collective targets set by mining companies for engaging Indigenous workers are likely to exhaust entire local supplies of employable labour (Taylor 2004, 2006; Taylor & Scambary 2005). For this reason, companies are increasingly investing in remedial programs to enhance work readiness and address structural barriers in meeting 'fitness for work' requirements (Tiplady & Barclay 2007). When other competing industry sectors are added to this equation, the supply-side constraints become further emphasised.

This paper provides a companion to an earlier analysis of Indigenous participation in the West Kimberley labour market (Taylor 2006). It responds to an observation made there that the growing attempts within the corporate sector to establish targets in Indigenous employment as part of company relations with Indigenous stakeholders raise reciprocal issues regarding supply-side capacities. Some aspects of this were covered in the earlier analysis, specifically in regard to educational achievement and formal skills training among Indigenous adults. However, the set of supply-side issues that may mitigate against successful Indigenous participation are more wide-ranging than just the skill-set brought to the labour market. Indeed, they include many of the factors that underpin the very acquisition of such skills in the first place and, importantly, include key points of intersection between Indigenous peoples and government policy. Three of these are examined here: housing, health and interaction with the criminal justice system. However, before considering these, there is a need to examine changes in that most fundamental element of labour supply, namely the size and composition of the working-age population.

POPULATION CHANGE IN THE WEST KIMBERLEY 2001-2006

Taken at face value, results from the 2006 Census count suggest that one of the emerging constraints on Indigenous labour supply in the West Kimberley is a diminishing potential labour force based on reduced numbers of working-age population. In 2001, a total of 5,264 Indigenous adults (aged over 15 years) were counted as resident in the West Kimberley. In 2006, this number was less by 329, a reduction in working-age population of 6.2 per cent. The greatest reduction in the count was in the Broome Shire, where the working-age number fell from 2,619 to 2,347, a fall of 10.4 per cent. In Derby-West Kimberley, numbers remained more or less the same, with a decline of just 2 per cent. Contrary to expectation, then, given previous projections of sustained growth in the Indigenous working-age population, if these census counts were accurate government would face fewer, not greater, challenges ahead in finding jobs for Indigenous workers. Quite simply, it suggests that previous estimates of required jobs growth to achieve an improvement in Indigenous regional labour force status (Taylor 2006) are over-inflated and that achievement of such goals should be more manageable than previously projected. Much depends, of course, on census accuracy—an issue that has raised some interest in the Kimberley, and in Western Australia as a whole following the 2006 Census.

At the 2006 Census, a total of 7,589 individuals who were counted as usual residents of the West Kimberley indicated an Indigenous identity on their census form. In addition, as many as 2,318 residents of the West Kimberley did not indicate an Indigenous status on a census form, either because they did not answer the relevant question on an otherwise completed form, or because a form was not collected from a dwelling known to be occupied. In these latter instances the number of occupants in relevant dwellings was imputed from other census records for the area and added to the count, but Indigenous status remained unrecorded.

According to these usual resident counts, the census-identified Indigenous population of the West Kimberley declined over the five years between 2001 and 2006. This is a significant result, as it represents the first

Table 1. Indigenous Usual Residence Counts: West Kimberley SLA[1]s: 2001 and 2006

Local Government Area	2001	2006	Net change	Per cent change
Broome	4,164	3,559	-605	-14.5
Derby-West Kimberley	4,210	4,030	-180	-4.3
Total West Kimberley	8,367	7,589	-778	-9.3

1. SLA = Statistical Local Area.
Source: ABS 2006 Census of Population and Housing Cat no. 2068.0.

time that the census count of Indigenous population in the West Kimberley has declined since the period of modern-census taking began in 1971. While this is observed across the region, both the absolute and proportional size of this decline was greatest in the Broome Shire (Table 1: see Taylor 2006 for a discussion of the pertinent demographic background). Of related interest is the fact that the total population count in Broome Shire increased by 3 per cent over the same period (from 12,670 to 13,059), while in Derby-West Kimberley it decreased by 16 per cent (from 7,793 to 6,506). In the latter region, then, the 2006 Census points to an almost 20 per cent decline in overall population. These census outputs present major challenges for interpretation, not just because they break a long-standing trend of population growth, but also because they are contrary to both the scale and direction of population projections for both Shires (Taylor 2006; Western Australian Planning Commission 2005), especially in regard to the expected increase in Indigenous numbers.

However, it should be remembered that from a demographic perspective raw census counts do not constitute the final outputs, since the ABS acknowledges that it never succeeds in counting all people and dwellings. Indeed, the ABS has conceded that the census count in parts of the West Kimberley was negatively affected by collection issues (ABS 2007a: 82) and this is supported by empirical qualitative evidence gathered in the region at the time of the census (Thorburn 2007). Accordingly, a follow-up survey of around one per cent of all households (the Post-Enumeration Survey, or PES) is conducted a month after each census to estimate numbers missed, including Indigenous people. This is added to an estimate of those not reporting an Indigenous status to produce a 'net undercount'. With this to hand, the original counts are then adjusted (inevitably upward) to produce final population estimates. These become the official figures and they are used for important public policy purposes such as electoral redistributions, fiscal allocations of Goods and Services Tax (GST) revenue, calculation of service needs, and so on.

It is important to note is that up until the last census this PES had never been conducted in remote Indigenous communities. As a consequence, the rate at which people in such places were missed by the census had simply been assumed to be the same as in non-remote areas (in 2001) or as in the whole of Australia (in 1996) after adjusting for estimates of non-response to the Indigenous question. In 2006, however, the ABS

Table 2. Preliminary Estimated Resident Total Populations: Kimberley LGAs: 2001 and 2006

Local Government Area	2001	2006	Net change	Per cent change
Broome	13,196	14,436	1,240	9.4
Derby-West Kimberley	8,287	7,511	-776	-9.4
Total West Kimberley	21,483	21,947	464	2.1

Source: ABS 2007b.

invested extra resources and extended the PES to remote communities for the first time, enabling a full regional measure of Indigenous undercount. This contributed to a greatly increased net undercount rate in Western Australia, with one in every four Indigenous people estimated to have been overlooked by the census (ABS 2007a: 78). However, this figure has a fairly high standard error of 5.5 per cent, so the true value of those overlooked could be anywhere between 19 and 29 per cent.

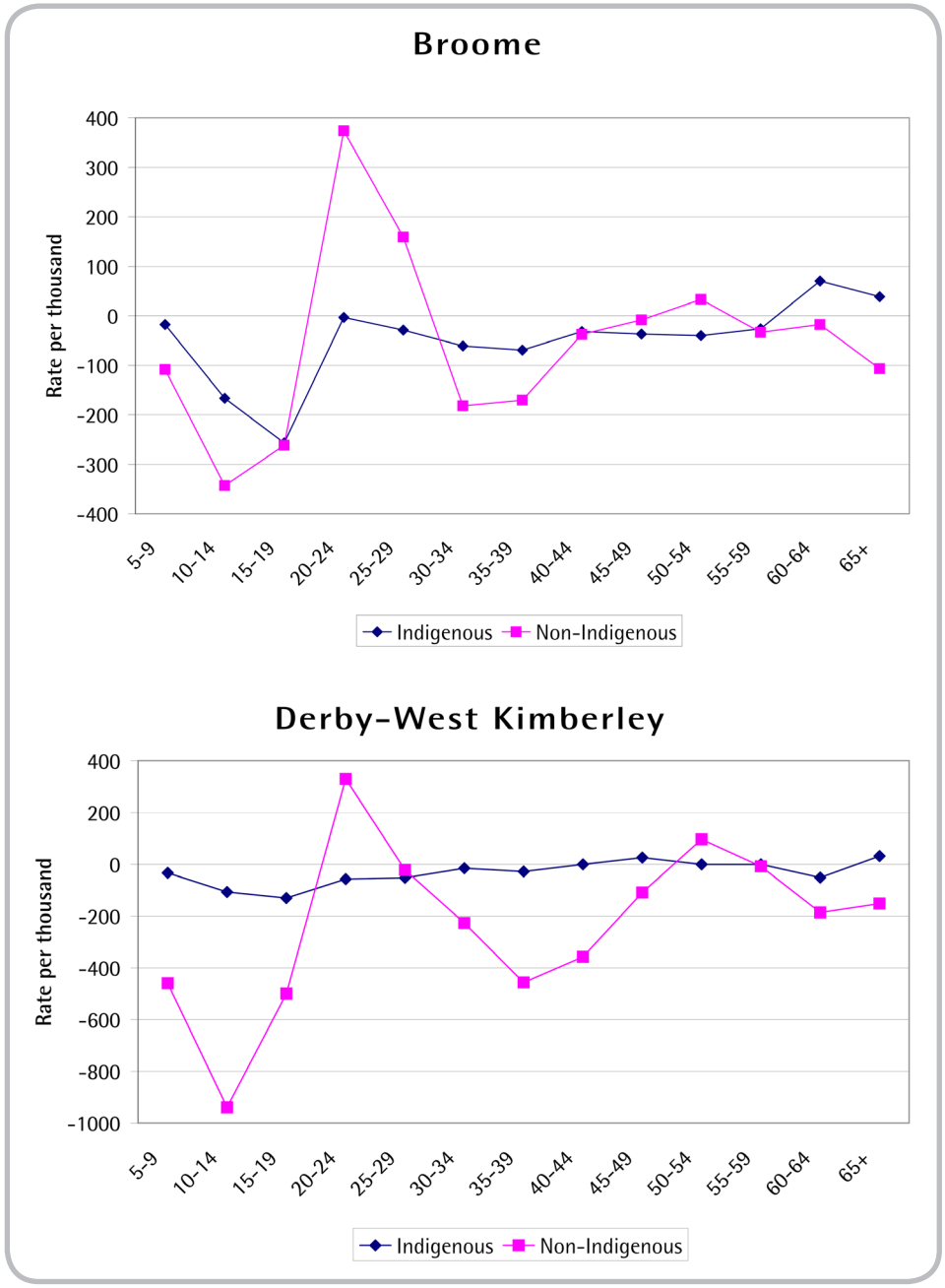
Due to the small size of the local PES sample, the net undercount for the West Kimberley does not exist as a separate rate. Rather, in developing post-censal population estimates at the SLA-level, net undercount rates for broad regional geographies are applied to local area age/sex/and Indigenous composition. Based on such calculations, total population estimates are currently available for the two West Kimberley Shires (Table 2), but a breakdown of these into separate Indigenous/non-Indigenous estimates is not due for release until mid-2008.

These Indigenous estimates will include a pro rata allocation of those who failed to respond to the 2006 Census question on Indigenous status (2,322 persons in the Western Kimberley) as well as a weighting in line with the Indigenous undercount rate. In the meantime, it is interesting to consider the preliminary estimates of total population in light of the Indigenous counts shown in Table 1. In Broome Shire, for example, an increase in the total estimated population of almost 10 per cent was registered. Much of this is likely to reflect upward adjustment to the non-Indigenous population given the substantial drop in the Indigenous usual residence count plus the greater non-Indigenous share of total population in that Shire. In Derby-West Kimberley Shire, the total population is estimated to decline even after adjusting for undercount. This also indicates that Indigenous estimates are likely to be down.

MIGRATION

Some clue as to the underlying demographic factors contributing to these census counts and estimates is provided by an analysis of net migration. Overall net migration loss of Indigenous population from each Shire was similar at -200 persons in Broome and -150 in Derby-West Kimberley, producing a net (loss) rate of

Fig. 1. Indigenous and non-Indigenous net migration rates by age 2001–2006, Broome and Derby–West Kimberley SLAs



Source: ABS 2006 Census of Population and Housing usual residence counts customised tables.

-71 per thousand in Broome and -44 per thousand in Derby-West Kimberley. The non-Indigenous population in each Shire also recorded a net migration loss, although in Broome this was lower than the Indigenous rate at -46 per thousand (301 persons), whilst in Derby-West Kimberley it was much higher at -181 per thousand (308 persons). Significant though they are, these net migration losses are far from sufficient to account for the decline in census counts shown in Table 1, especially when we consider the likely contribution to growth from natural increase, especially among the Indigenous population. This discrepancy is especially evident in the Broome Shire and presents strong evidence of census undercount.

The distribution of net migration rates by age for the two Shires is shown in Figure 1. In both cases, there is a clear net loss of Indigenous population in the school years and school-to-work transition years, and while losses continue in Broome through to age 55 they are much lower at most other ages. In Derby-West Kimberley a net balance is restored beyond age 30. Non-Indigenous rates display much greater variation, with clear out-migration among children, teenagers and in middle ages, and high net gains among those in their twenties.

The common feature in the age pattern of net migration loss from both Shires for both Indigenous and non-Indigenous populations is the focus on school age out-migration, with corresponding net loss in parental age groups for non-Indigenous parents, but far less so among Indigenous parents. This pattern suggests that a large part of the overall net loss due to migration is related to movement out for schooling. This may be significant in explaining the overall decline in Indigenous census counts, but in the Broome Shire there remains a persistent net migration loss of population across the working-ages, albeit very small (It involves a population of just 132, most of whom are aged 15-19 years and therefore arguably part of the school-related net migration). To the extent that school-linked migration is responsible for overall net loss, then this may be a significant issue for the proper interpretation of regional population change since children absent at school are required on the census form to indicate usual residence in favour of areas where they are boarding at census time. Overall, the indication from these migration data is that the reduction in the Estimated Resident Population (ERP) shown in Table 2 for Derby-West Kimberley is difficult to account for in light of natural increase of the resident Indigenous population. The figures for Broome look far more plausible.

Given the relative lack of net migration impact on Indigenous population change, added to the possibility that net losses reflect usual residents absent at school, and in light of the fact that new 2006-based ABS estimates will not be available until mid-2008, it seems wise to adjust Indigenous population levels for 2006 where feasible using projected figures for 2006 derived from Taylor (2006). This is an acknowledgement of the sizeable census undercount reported for Western Australia and an attempt to benchmark the present analysis on as realistic a demographic base as possible. In this way, the census is used here as a very large sample survey with the key output being population rates rather than population levels.

INDIGENOUS HOUSING STATUS

Access to sufficient housing and related environmental health infrastructure commensurate with demand has been a constant struggle for Indigenous families in the West Kimberley for at least several decades. Problems of overcrowding and sub-standard dwellings continue to contribute to negative outcomes in other population characteristics that more directly impinge on labour supply, notably health status and educational performance. There are several reasons for this persistence of poor housing outcomes for Indigenous people.

First, rapid population growth and little evidence of sustained out-migration has maintained a high rate of new family formation within the region. According to census data, the number of Indigenous families in households in the West Kimberley doubled over the 20 years from 1986 from 898 to 1,757. Second, the migration of Indigenous people off pastoral properties across the West Kimberley and into the towns of Fitzroy Crossing, Derby and Broome from the 1960s onwards placed considerable strain on available urban housing stock and added to the pressures for new dwelling construction and provision of social housing. Third, the influx of large numbers of relatively wealthy non-Indigenous residents into West Kimberley towns (especially into Broome) has left poorer Indigenous residents at a disadvantage in what has become a high cost rental market. Fourth, the program-dependent supply of low cost community-managed and public rental accommodation has failed to keep up with demand. Finally, increased dispersion of the Indigenous population to outstations has strained the capacity of governments to deliver infrastructure within budget. As a simple measure of limited progress in providing an adequate housing supply to the regional Indigenous population, the overall occupancy rate for Indigenous dwellings has only fallen from 7.5 to 6.3 over the past 20 years. As a benchmark, this 2006 rate can be compared with an estimated average of 3.9 persons per Indigenous dwelling recorded for Western Australia as a whole (based on 2006 dwelling counts and population projections from the 2001 Census).

As noted, part of the difficulty in overcoming the backlog in housing need has been rapid growth of the Indigenous population, as well as increased population dispersion. Across the West Kimberley there are 117 discrete Indigenous communities with a collective estimated service population of 5,570. While most of these communities are small rural settlements, a number are town camps and others are larger service centres and townships. Overall, in 2001, there were eight communities of between 200 and 700 persons including (in rank order) Bidyadanga, Looma, Bardi, Junjuwa, Beagle Bay, Mowanjum, Noonkanbah and Djarindjin. Below this there were 15 communities of between 50 and 199 persons, while at the bottom of the hierarchy there are almost 100 very small communities of less than 50 persons (Taylor 2006).

By 1991, the first nation-wide normative measure of Indigenous housing need found that the Broome ATSIC Region ranked 9th out of 36 ATSIC regions nationwide in terms of absolute need measured as total bedroom requirements to meet minimum crowding standards (with rank 1 being the lowest need and 36 the highest). In contrast, the Derby ATSIC Region ranked 21st (Jones 1994: 61-4). However, in terms of relative need measured as the percent of housing need that remained unmet, Broome's ranking was much

Table 3. Number of occupied dwellings and estimated occupancy rates for Indigenous and non-Indigenous households: Broome and Derby-West Kimberley SLAs, 2006

	Indigenous dwellings			Non-Indigenous dwellings		
	Dwellings[1]	Population[2]	Occupancy rate	Dwellings	Population	Occupancy rate
Broome	939	5,658	6.0	2,897	9,936	3.4
Derby-West Kimberley	862	5,615	6.5	771	4,082	5.3

1. Includes 'structure of dwelling not stated'.
2. ERP-based (see Taylor 2006: 27)
Source: ABS 2006 Census of Population and Housing Cat no. 2068.0.

higher at 22nd (with 31% of bedroom requirements unmet), while Derby also ranked very high at 27th (with 42% of bedroom requirements unmet) (Jones 1994: 61–4). In each case, these outcomes reflected relatively high levels of family 'homelessness' and overall housing need (defined for statistical purposes as families in improvised homes, or sharing overcrowded dwellings) in relation to the 36 ATSIC regions nationwide.

Ten years later, in 2001, a similar ranking of ATSIC Regions based on bedroom requirements to meet national occupancy standards was established (National Centre for Social Applications of GIS 2003). This revealed a substantial worsening of the relative position of Broome ATSIC Region in terms of its overcrowding (from 9th ranked to 25th) while Derby remained more or less unchanged (from 27th to 28th). Out of 899 Indigenous households in Broome ATSIC Region, as many as 22 per cent were estimated to be overcrowded. The equivalent figures in Derby ATSIC Region were 876 and 33 per cent (National Centre for Social Applications of GIS 2003: 66).

Equivalent estimates based on 2006 Census data are not provided here due to changes in the Australian Indigenous Geographic Classification that has replaced the 36 ATSIC Regions with 30 Indigenous Coordination Centre (ICC) Regions. In any event, as noted, there are potential issues with the quality of Indigenous census data for the West Kimberley in 2006 that may also compromise any inter-regional and temporal comparison. Nonetheless, it is clear that housing needs in the region remain acute.

DWELLINGS AND OCCUPANCY

The five-yearly census is an enumeration of population and housing. It provides a range of details regarding the number and structure of dwellings and it is possible to classify these according to Indigenous or non-Indigenous occupancy and other housing-related variables. Table 3 shows the number of Indigenous and non-Indigenous dwellings and corresponding occupancy rates in the West Kimberley, with the former

classified as such if one or more adults in a dwelling are Indigenous. Because occupancy rates are so directly affected by numbers in each dwelling, uncertainties surrounding the quality of the 2006 census count of Indigenous people present a serious issue. As we have seen, the census indicated a 14 per cent decline in the usual resident Indigenous population in the Broome Shire from 4,157 in 2001 to 3,559 in 2006, and a 4 per cent decline in Derby-West Kimberley from 4,210 to 4,030. As noted earlier, although Indigenous ERPs for the region will not be available until mid-2008, an attempt can be made to adjust the levels of housing adequacy reported in the 2006 Census using previously established projections to 2006 of the 2001 ERP (Taylor 2006). This is applied to produce the population figures in Table 3, with corresponding effects on occupancy rate.

In 2006, a total of 3,386 dwelling units were recorded by the census in the Broome SLA. Of these, 939 (28%) were Indigenous dwellings, most of which (75%) were separate houses, with 8 per cent recorded as improvised dwellings. The equivalent figures in Derby-West Kimberley SLA were 1,633 dwellings, the vast majority of which (89%) were separate dwellings and more than half of which (862 or 53%) were occupied by Indigenous households. Only 2 per cent of these Indigenous dwellings were improvised (a low proportion when compared to many other parts of remote Australia).

As with population numbers, some doubt surrounds these housing figures for Derby-West Kimberley, as the number of Indigenous dwellings counted in the Shire fell by 26 (3%) from the previous census in 2001. Given Indigenous population growth over this period of around 2.2 per cent per annum (Taylor 2006) this reduction in Indigenous dwellings seems unlikely and suggests that not all Indigenous households were enumerated in 2006, an outcome that is entirely plausible owing to the difficulties encountered by ABS field operations in that Shire (Thorburn 2007). However, unlike population numbers, there is no way of estimating any deficiency in dwelling counts, except by use of administrative data for certain tenure-types, although (as will be revealed), this is not unproblematic.

While most non-Indigenous dwellings in both SLAs were also separate houses, one of the distinctions in the regional housing market is the distribution of non-Indigenous residents across a wider range of dwelling structures including townhouses, units, apartments, and caravans, especially in the town of Broome where only 64 per cent of non-Indigenous households lived in separate dwellings . The other key difference between Indigenous and non-Indigenous dwellings is in occupancy rates, with an average of at least 6 persons per Indigenous dwelling in both Broome and Derby-West Kimberley Shires compared to three and five persons in non-Indigenous dwellings respectively. Overall, it seems that pressure on housing (as measured by combined occupancy rates) is greatest in Derby-West Kimberley, even given the caveat above about likely under-renumeration. However, overall rates at the Shire level tell only part of the story. At sub-regional levels, and at the individual community level, a good deal of variation in housing occupancy rates is evident. Much depends, also, on whether one takes into account the functionality of available dwellings from an environmental health perspective.

Table 4. Indigenous housing occupancy rates by IA: Broome Shire, 2006

Indigenous Area	Indigenous per cent of SLA 2006 UR[1] count	Derived Indigenous ERP	2006 census count of dwellings	Estimated 2006 occupancy rate
Bardi	5.2	294	41	7.2
Beagle Bay	5.1	289	32	9.0
Bidyadanga	11.3	639	70	9.1
Broome	65.6	3,712	686	5.4
Broome pastoral	6.3	356	69	5.2
Djarindin/Lombadina	6.5	368	45	8.2
Broome SLA	100.0	5,658	943	6.0

1. Usual residence.

Source: ABS 2006 Census of Population and Housing Cat no. 2068.0, and Taylor 2007.

Table 5. Indigenous housing occupancy rates by IA: Derby-West Kimberley Indigenous Region[1], 2006

Indigenous Area	Indigenous per cent of Regional 2006 UR count	Derived Indigenous 2006 ERP	2006 census count of dwellings	Estimated 2006 occupancy rate
Bayulu	6.1	343	47	7.3
Derby	27.4	1,539	318	4.8
Derby-WK balance.	7.3	410	64	6.4
Fitzroy Crossing	15.1	848	147	5.8
Fitzroy River	21.7	1,218	170	7.2
Looma	9.4	528	65	8.1
Mowanjum	6.3	354	37	9.6
Yungnora	6.5	365	43	8.5
Derby-WK IR	100.0	5,615[2]	891	6.3

1. Incorporates a small part of Halls Creek Shire hence the higher number of dwellings compared to Table 3.

2. Derby-West Kimberley SLA only.

Source: ABS 2006 Census of Population and Housing Cat no. 2068.0, and Taylor 2006.

Thus, in order to provide a more detailed appreciation of the depth of housing shortage, Tables 4 and 5 present 2006 Census-based occupancy rates at the Indigenous Area level within each Shire. Once again, an attempt is made to overcome any enumeration problems by using 2006 population estimates derived from Taylor (2006). A clear urban/rural divide emerges, with Broome, Derby and Fitzroy Crossing displaying

Table 6. Adjusted EHNS population density measures for dwellings in discrete Indigenous communities in the Kullarri ATSIC Region, 2004

	Population	Crude PDM[1]	Adjusted PDM
		Settlements over 100 population	
Bidyadanga	850	16.0	16.0
Bardi	400	10.3	11.4
Djarindjin	250	8.6	8.6
Beagle Bay	300	7.3	7.5
		Settlements under 100 population	
Nillirirbanjin	78	7.8	39.0
Brubrunajal	35	8.8	35.0
Midlagoon	23	5.8	23.0
Loumard	17	5.7	17.0
Ladjadarr Bay	50	16.7	16.7
Goombarnun	15	15.0	15.0
Mudnunn	14	3.5	14.0
Maddarr	12	2.4	12.0
Tappers Inlet	11	1.8	11.0
Julgnunn	10	10.0	10.0
Wanamulnyndong	40	5.7	10.0
Carnot Springs	10	1.7	10.0
Middle Lagoon	8	4.0	8.0
Loongabid	15	7.5	7.5

1. Population density measure.

Source: Government of Western Australia 2004 EHNS.

occupancy rates below their respective regional averages and all outlying communities (with the exception of those in the Broome pastoral IA) showing higher than average occupancy, in some cases (such as Beagle Bay, Bidyadanga, Mowanjum and Yungnora) these are considerably higher. Thus, the number of persons per Indigenous dwelling at Mowanjum is twice that reported for Derby, and occupancy at Bidyadanga is more than two-thirds higher than that in Broome.

While the continuance of high Indigenous occupancy rates partly reflects larger Indigenous household sizes based on a cultural preference for extended family living arrangements, it is also a measure of the inadequacy of housing stock available to accommodate the regional population. To acquire a better sense of the adequacy of housing, occupancy rates must be set against dwelling size, and one measure of this is

Table 7. Adjusted EHNS population density measures for dwellings in discrete Indigenous communities in the Malarabah ATSIC Region, 2004

	Population	Crude PDM[1]	Adjusted PDM
		Settlements over 100 population	
Junjuwa	500	8.2	9.6
Looma	475	7.2	7.4
Yakanarra	160	7.3	7.3
Mowanjum	290	6.3	6.7
		Settlements under 100 population	
Cone Bay	50	10.0	50.0
Kandiwal	40	6.7	40.0
Windjingayr	30	15.0	30.0
Bungardi	20	6.7	20.0
Galamanda	20	3.3	20.0
Bedunburru	17	4.3	17.0
Budulah	50	12.5	12.5
Gillarong	45	7.5	11.3
Ngumpan	50	5.6	10.0
Burrinunga	80	8.9	8.9
Joy Springs	87	7.3	7.9
Ngurtawarta	55	7.9	7.9
Parukupan	30	5.0	7.5
Koorabye	70	6.4	7.0
Bidijul	14	3.5	7.0
Prap Prap	14	2.8	7.0

1. Population density measure.
Source: Government of Western Australia 2004 EHNS.

provided by the ratio of available bedrooms to the population in dwellings. Overall, in the West Kimberley, the 2006 Census recorded a total of 5,061 bedrooms in Indigenous dwellings with these evenly split between the two Shires. Using the 2006 estimates of population, this produces an average figure of 2.2 persons per bedroom in each Shire. The equivalent figures for non-Indigenous dwellings are 1.3 in Broome Shire and 2.1 in Derby-West Kimberley reflecting the greater proportion of four bedroom dwellings in the former.

Of course, these data reveal nothing of the quality of housing stock and a more refined (and meaningful) measure of occupancy is based on persons per functional dwelling (defined against minimum environmental health criteria). Data for this calculation are available from the 2004 Western Australia Environmental

Table 8. Localities with greater than 50 per cent of dwellings requiring major repair or replacement in Broome and Derby ICC Regions, 2006

Broome		Derby	
Locality	Per cent of dwellings requiring major repair or replacement	Locality	Per cent of dwellings requiring major repair or replacement
Bayulu	100.0	Bobieding	100.0
Karmarlinunga	100.0	Budgargoon	100.0
Karnparrmi	100.0	Frazier Downs	100.0
Marunbabidi	100.0	Jinyaadi	100.0
Ngalingkadji	100.0	Malaburru	100.0
Ngumpan	100.0	Mallingbar	100.0
Nilargoon	100.0	Mudnunn	100.0
Tirralintji	100.0	Mundud	100.0
Wangkatjungka	100.0	Nillirr Irbanjin	100.0
Waringarri	100.0	Radjarli	100.0
Worrimbah	100.0	Beagle Bay	98.1
Yungngora	83.3	Ladjadarr Bay	80.0
Kadjina	78.6	Bardi	70.4
Joy Springs	72.7	Bulgin	66.7
Ngurtuwarta	71.4	Budgarjook	62.5
Junjuwa	67.6	Brubrunganjal	50.0
Bedunburru	66.7	Gumbarnun	50.0
Camballin	66.7	Munget	50.0
Ganinyi	60.0	Nudugun	50.0
Kupungarri	58.3		
Looma	53.5		
Bidijul	50.0		
Dodnun	50.0		

Source: 2006 Community Housing and Infrastructure Needs Survey, FaCSIA.

Health Needs Survey (EHNS) and resulting population density measures (PDMs) are shown for participating communities in the two West Kimberley Shires in Tables 6 and 7. The crude rates are the basic persons per dwelling ratios, while the adjusted rates are based on persons per functional dwelling. These measures, and especially the adjusted ones, produce some excessively high occupancy rates, especially in smaller outstation settlements. For example, in the Kullarri ATSIC Region, there were 39 persons per functional dwelling at

Nillirirbanjin, while at Cone Bay in the Malarabah Region, there were 50 persons per functional dwelling. Overall, in most communities, the adjusted rates were found to be substantially higher than the crude rates, highlighting the importance of factoring environmental health standards into calculations of housing adequacy.

Further measures of the quality of housing stock are provided by the 2006 Community Housing and Infrastructure Needs Survey (CHINS) that included an assessment of the condition of dwellings owned or managed by Indigenous Housing Organisations in discrete Indigenous communities. For high cost areas such dwellings were categorised by the CHINS according to the extent of repairs needed in the following way (ABS 2006: 221):

- Minor repairs – repairs of less than $33,000
- Major repairs – repairs of between $33,000 to $100,000
- Replacement – repairs of $100,000 or more.

A total of 478 dwellings were reported in discrete Indigenous communities in the Broome ICC Region, and 1,200 in the Derby ICC Region. Of those in the Broome Region, 213 (45%) were found to be in need of major repairs or replacement, while in the Derby Region 583 dwellings (or 49% of the housing stock) fell into this category. In effect, according to the 2006 CHINS, almost half of the housing stock in discrete Indigenous communities in the West Kimberley requires either replacement or significant upgrading. Table 8 shows localities in each region where this requirement for new housing is critical as measured by the fact that more than half of the dwelling stock requires major repair or replacement.

As indicated, in some places (including some sizeable locales such as Bayulu and Wangkatjungka), the entire housing stock fell into this category in 2006. Elsewhere, other notable housing need is evident in places such as Yungnora, Junjuwa, Looma, Beagle Bay and Bardi. In addition to these permanent dwellings, other occupied structures recorded by CHINS included caravans, tin sheds, humpies, tents and improvised shelters. In the Broome ICC Region, 100 such structures were recorded, with 68 in the Derby ICC Region. If these are added to the dwellings requiring major repair or replacement, then overall new housing need across discrete communities in the West Kimberley amounts to 53 per cent of the existing dwellings that people occupy.

Of course, these data indicate nothing of the additional stock of housing required to accommodate new household formation and reduce overcrowding. With respect to this latter point, some sense of progress can be gauged by comparing the number of houses constructed over the 12 months prior to the 2006 CHINS to the number of dwellings demolished. In the Broome Region, the numbers were exactly the same with 12 built and 12 demolished, whereas in the Derby Region there were 14 more houses built than demolished (15 to one). Overall, then, the housing stock appeared to be expanding during 2005-06, but at a very slow rate considering the overall scale of need.

Table 9. Indigenous and non-Indigenous dwellings by tenure type: Broome SLA, 2006

	Fully owned	Being purchased	Rented	Other tenure	Total[1]
			Indigenous dwellings		
Number	94	96	665	23	878
Per cent	10.7	10.9	75.8	2.6	100.0
			Non-Indigenous dwellings		
Number	570	833	1,349	17	2,769
Per cent	20.6	30.1	48.7	0.6	100.0

1. Excluding 'tenure not stated'.
Source: ABS 2006 Census of Population and Housing Cat no. 2068.0

Table 10. Indigenous and non-Indigenous dwellings by tenure type: Derby-West Kimberley SLA, 2006

	Fully owned	Being purchased	Rented	Other tenure	Total[1]
			Indigenous dwellings		
Number	25	54	746	0	825
Per cent	3.0	6.5	90.5	0.0	100.0
			Non-Indigenous dwellings		
Number	135	152	419	9	715
Per cent	18.9	21.3	58.6	1.2	100.0

1. Excluding 'tenure not stated'.
Source: ABS 2006 Census of Population and Housing Cat no. 2068.0

HOUSING TENURE

Australia as a whole has one of the highest home ownership rates among OECD countries. In line with this, 71 per cent of all Western Australian households in 2006 lived in a dwelling that was either fully owned or mortgaged, with only 28 per cent renting. The situation for most Indigenous Australians is quite the reverse, no less so than in the West Kimberley. This is outlined for Broome and Derby-West Kimberley Shires in Tables 9 and 10. Less than half (46%) of non-Indigenous dwellings are fully owned or being purchased, and far

fewer Indigenous dwellings (14%). Consequently, the predominant form of tenure in the region is rental. This accounts for half of all non-Indigenous dwellings, and more than 80 per cent of all Indigenous dwellings.

However, the implications of this are likely to be quite different for the two populations. While renting limits access to the property market for Indigenous people as a means of improving financial security, it is also symptomatic of their relatively low economic status as well as some cultural focus on communal forms of occupancy and tenure. For non-Indigenous people it is far more likely to reflect their preference for investing in housing markets elsewhere (notably in Perth) using the proceeds of earnings gained in the West Kimberley.

HOMELESSNESS

One feature of housing tenure that is not captured in these data is the lack of any tenure, or homelessness. Additional efforts were made in the 2006 Census to enumerate homeless people, although 2006 counts of the homeless population are not yet available as census output. Attempts to categorise homeless people have produced three broad groups:

1. The 'absolute homeless' (or primary homeless) including people without conventional accommodation (living on the streets, in deserted buildings, improvised dwellings, in parks, etc.) what might otherwise be termed 'rooflessness'.
2. The 'relative homeless' (or secondary and tertiary homeless) including people staying in boarding houses, using emergency accommodation services, or with no secure accommodation staying temporarily with friends or relatives in private dwellings.
3. The 'marginally housed' (Chamberlain & MacKenzie 2004). (While this latter group is not operationally specified in the census, Chamberlain & MacKenzie (2004) include residents of caravan parks in this category).

At the 2001 Census, the number of people classified as homeless according to these definitions was 873 in the Broome Shire and 237 in the Derby-West Kimberley Shire. These numbers translated into rates per 10,000 persons of 689 and 304 respectively, with the higher rate in the Broome Shire reflecting the seasonal pressure on accommodation around census time (August) (Chamberlain & MacKenzie 2004: 51). The overall rate in Western Australia was 64 per 10,000 persons (Chamberlain & MacKenzie 2004: 38). Unfortunately no breakdown by Indigenous status is provided at the small area scale, although it is worth noting that in Western Australia as a whole the Indigenous homeless rate was almost three times the non-Indigenous rate (170 per 10,000 persons compared to 60) (Chamberlain & MacKenzie 2004: 55).

Other indications of regional homelessness are available from the Australian Institute of Health and Welfare (AIHW) reporting on the Support Accommodation Assistance Program (SAAP). This national program is Australia's primary response to homelessness and aims to assist people who are homeless, or who are at risk of becoming so, by providing transitional supported accommodation and a range of related support services. Data from this program indicated a total of 1,700 homeless people across the Kimberley in 2005-06 (Anthony

Table 11. Indigenous and non-Indigenous rental housing by landlord type; Broome SLA, 2006

	Real estate agent	State housing	Community housing	Other landlord	Total[1]
			Indigenous dwellings		
Number	72	297	226	61	656
Per cent	11.0	45.3	34.4	9.3	100.0
			Non-Indigenous dwellings		
Number	482	295	21	486	1,284
Per cent	37.5	23.0	1.6	37.9	100.0

1. Excluding 'landlord not stated'.
Source: ABS 2006 Census of Population and Housing Cat no. 2068.0

Table 12. Indigenous and non-Indigenous rental housing by landlord type, Derby-West Kimberley SLA, 2006

	Real estate agent	State housing	Community housing	Other landlord	Total[1]
			Indigenous dwellings		
Number	8	228	439	53	728
Per cent	1.1	31.3	60.3	7.3	100.0
			Non-Indigenous dwellings		
Number	25	131	15	220	391
Per cent	6.4	33.5	3.8	56.3	100.0

1. Excluding 'landlord not stated'.
Source: ABS 2006 Census of Population and Housing Cat no. 2068.0

2007: 14). In Western Australia as a whole, Indigenous clients accounted for 41 per cent of the homeless population. If this ratio were to apply to the Kimberley, then an estimate of 700 Indigenous homeless would be derived. However, given the higher population share of Indigenous people in the Kimberley this is likely to be a very conservative estimate.

RENTAL HOUSING

According to 2006 Census data, a total of 3,059 dwellings in the West Kimberley were rented, and 45 per cent of these were occupied by Indigenous households, although mostly under quite different tenancy arrangements from those of non-Indigenous renters. Tables 11 and 12 show the distribution of tenancies by landlord type for Indigenous and non-Indigenous dwellings in the two Shires. Clearly, Indigenous households depend far more on state-provided rental housing than do non-Indigenous households. According to census data, more than half (55%) of Indigenous dwellings in the Pilbara are rented from the Western Australia Department of Housing and Works (DHW). This compares to only 11 per cent of non-Indigenous rental dwellings.

The main reason for this contrast is the much greater access to employer-owned accommodation for non-Indigenous workers, especially non-government employers ('other landlord'). Overall, 42 per cent of non-Indigenous rental dwellings are provided by non-government employers, and this is more than half in Derby-West Kimberley Shire. Also of note is the greater use of private rental among non-Indigenous households, particularly in Broome Shire, where more than one-third rent from a real estate agent compared to just 11 per cent of Indigenous households. Once again, this reflects the temporary nature of many non-Indigenous households, but it also reflects relative lower housing affordability among Indigenous households based on their lower median household incomes (Taylor 2006: 68-71) and the fact that average private rental prices in Broome have continued to escalate in line with strong demand, and now stand at around $450 per week (*ABC News Online*, June 11, 2007). Partly for this same reason, Indigenous households are largely restricted in their housing options to the state rental sector, while in discrete communities Indigenous community housing association dwellings predominate.

Given the more complex rental options evident in urban settings, it is interesting to compare these census data on rental accommodation with tenancy data for 2007 made available by the DHW (Table 13). Basically, DHW funding arrangements provide for three types of urban rental outcomes—mainstream public rental, State Owned and Managed Indigenous Housing (SOMIH), and Government Regional Officers Housing (GROH) made available to State (or Commonwealth) public servants under the Government Employees Housing Authority (GEHA). As indicated, the DHW currently manages 1,559 dwellings across the West Kimberley with the bulk of these in Broome, Derby and Fitzroy Crossing. Other locations with some DHW stock include Kalumburu, Camballin and Djugun. This figure is considerably higher than the 951 State housing dwellings reported by the 2006 Census because it includes elements of other census rental categories, especially government employer housing.

However, not all Aboriginal tenancies are in SOMIH stock—in fact, most are in public housing. In the Broome Shire, for example, as many as 291 Aboriginal tenants are in public housing stock (51% of all public housing in Broome Shire), whilst in Derby-West Kimberley 111 households are in public housing (45% of all public housing). There are also large numbers of households on waiting lists for housing, and these are shown

Table 13. DHW housing stock by housing fund in Broome and Derby-West Kimberley DHW housing zones, 2007

Housing fund	Broome		Derby-West Kimberley	
	Stock	Per cent	Stock	Per cent
Public Housing	589	53.8	245	52.8
SOMIH	168	15.3	86	18.5
Government Regional Officers Housing	338	30.9	133	28.7
Total stock	1,095	100	464	100

Source: Western Australia Department of Housing and Works.

Table 14. Number and ratio of applications to tenancies for public housing and SOMIH in Broome and Derby-West Kimberley DHW housing zones, 2007

Housing fund	Broome			Derby-West Kimberley		
	Tenancies	Applications	Ratio *	Tenancies	Applications	Ratio*
Public Housing	574	205	0.36	234	115	0.49
SOMIH	168	252	1.50	80	106	1.32
Total tenancies	742	457	0.61	314	221	0.70

* Ratio = Applications/Tenancies.
Source: Western Australia Department of Housing and Works.

for the two DHW housing zones in the West Kimberley in Table 14. Overall, the number of Indigenous households on the waiting list for SOMIH housing (at least as defined by those applicants for housing who identified to DHW as Indigenous) is 358. Scale-wise, this is 44 per cent higher than the number of Indigenous households already in such housing. This gap between SOMIH housing applications and current tenancies is greatest in the Broome Shire. By contrast, applications for public housing are fewer than the number of current tenancies, especially in the Broome Shire, although the number of households applying for public housing amounts to almost forty percent of the number of current tenancies.

Clearly, there is some imprecision in all this, not least because of issues surrounding Indigenous identification in housing records. However, some facts seem assured. First, Indigenous families have fewer urban housing options than others because of their relatively low housing affordability due to low incomes, and their relative lack of access to employer housing, either GROH or private sector, due to poor labour force and occupational status (Taylor 2006). Second, their access to urban housing is dependent on continued expansion of the state public housing stock, and a guaranteed major share of access. While SOMIH stock provides for some of this,

there is a relatively high unmet need in SOMIH as judged by the high ratio of applications to tenancies in each of the West Kimberley towns.

HOUSING AFFORDABILITY

One final measure of housing stress is provided by an affordability calculation for low-income rental households. This complex calculation is currently only available for the West Kimberley at the former ATSIC regional level using 2001 Census data (National Centre for Social Applications of GIS 2003).

Estimates were prepared for ATSIC by the National Centre for Social Applications of GIS on the level of affordability stress experienced by Indigenous households in each ATSIC region (National Centre for Social Applications of GIS 2003). The data reveals that in Kullarri ATSIC Region as many as 26 per cent out of 327 Indigenous rental households in the lowest two income quartiles were paying more than 25 per cent of their income as rent (National Centre for Social Applications of GIS 2003: 70). The proportion for 378 equivalent households in the Malarabah ATSIC Region was 17 per cent. The difference is indicative of the higher cost of rentals in the town of Broome. Altogether, this amounted to 150 Indigenous low-income households in the West Kimberley and meant that Kullarri was ranked 25th out of 36 ATSIC Regions, and Malarabah 27th, in terms of an affordability stress rate (National Centre for Social Applications of GIS 2003: 70).

The definition of affordability stress followed the nationally agreed definition in that households were considered to be subject to affordability stress if they were a rental household, with a gross household income in the bottom 40 per cent of all (national) gross household incomes, and were spending greater than 25 per cent of their household income on rent. Since this calculation if based on census data, there are obviously issues that arise due to missing Indigenous households and missing information for households that are identified. It is also the case that the affordability measure derived in this way does not take into account other cost of living issues that vary from place to place.

These issues aside, 705 Indigenous rental households in the West Kimberley were found to be in the bottom 40 per cent of all Australian gross household incomes in 2001 and 149 of these (21%) were paying more than 25 per cent of their gross weekly income in rent. In 2006, a total of 748 Indigenous rental households in the West Kimberley were found to be in the bottom 40 per cent of all Australian gross household incomes and 219 of these (29%) were paying more than 25 per cent of their gross weekly income on rent. In short, it would appear that affordability stress for Indigenous rental households has increased in recent years, although it remains the case that these levels are relatively low compared to affordability difficulties experienced by Indigenous households in many other regions, notably in major cities (National Centre for Social Applications of GIS 2003).

As for Indigenous households with mortgages, the main issue here concerns the dramatic and steady climb in median house prices since 2001 in the two West Kimberley towns of Broome and Derby. According to Anthony (2007), median house prices in Broome rose from just over $200,000 in December 2001 to reach just under $400,000 by December 2005. Latest estimates from the Real Estate Institute of Western

Table 15. Functionality of dwelling facilities in Kullarri ATSIC Region, 2004

	Dwellings with facility absent		Dwellings with facility working		Dwellings with facility not working		Total dwellings surveyed
Functionality of dwelling facilities	No.	Per cent	No.	Per cent	No.	Per cent	No.
External sanitary plumbing	63	25.2	176	70.4	11	4.4	250
On-site sewerage disposal	117	46.4	130	51.6	5	2.0	252
Hot water system	50	20.5	181	74.2	13	5.3	244
Kitchen sink	29	11.5	211	83.7	12	4.8	252
Bath and/or shower	41	16.2	174	68.8	38	15.0	253
Toilet cistern	41	16.2	207	81.8	5	2.0	253
Toilet bowl	41	16.2	205	81.0	7	2.8	253
Laundry trough	58	23.1	186	74.1	7	2.8	251
Laundry floor waste outlet	48	19.0	199	78.7	6	2.4	253
Ceiling insulation	28	11.2	213	85.5	8	3.2	249
Heating	214	85.6	35	14.0	1	0.4	250
Air conditioning	105	46.3	119	52.4	3	1.3	227
Ceiling fan	30	11.9	206	81.7	16	6.3	252

Source: Government of Western Australia 2004 EHNS.

Australia (REIWA) for September 2007 place this at $653,000, with Broome recording the second highest percentage increase in median house prices (49%) during 2007 of all suburbs in Western Australia <**http://www.reiwa.com.au**>. According to the 2006 Census, average monthly housing loan repayments in the West Kimberley as a whole for Indigenous households amounted to $1,482. This was 20 per cent lower than the average of $1,867 recorded for non-Indigenous households in the region. Both of these average payments were above the national average of $1,148 recorded for all Australian households in 2006 (ABS 2006: 16). Despite this, it is clear that Indigenous households in the West Kimberley enter home ownership (mostly in Broome) at a relatively lower end of the market and are therefore likely to be least placed to compete under conditions of rising costs.

ENVIRONMENTAL HEALTH INFRASTRUCTURE

The idea that Indigenous community housing and infrastructure should be designed, constructed and maintained to support healthy living practices is now firmly embedded in policy following the pioneering work of Pholeros, Rainow and Torzillo (1993) in the Pitjantjatjara Lands. A total of nine such practices are identified, in descending order of priority in terms of impact on health outcomes: capacity to wash people,

Table 16. Functionality of dwelling facilities in Malarabah ATSIC Region, 2004

	Dwellings with facility absent		Dwellings with facility working		Dwellings with facility not working		Total dwellings surveyed
Functionality of dwelling facilities	No.	Per cent	No.	Per cent	No.	Per cent	No.
External sanitary plumbing	35	5.5	574	90.8	23	3.6	632
On-site sewerage disposal	179	30.1	402	67.6	14	2.4	595
Hot water system	43	6.7	529	81.9	74	11.5	646
Kitchen sink	29	4.5	571	87.7	51	7.8	651
Bath and/or shower	24	3.7	509	77.7	122	18.6	655
Toilet cistern	23	3.5	575	86.5	67	10.1	665
Toilet bowl	23	3.4	589	88.3	55	8.2	667
Laundry trough	29	4.3	599	89.4	42	6.3	670
Laundry floor waste outlet	83	12.4	551	82.6	33	4.9	667
Ceiling insulation	197	31.2	418	66.2	16	2.5	631
Heating	629	95.6	27	4.1	2	0.3	658
Air Conditioning	265	40.4	380	57.9	11	1.7	656
Ceiling fan	61	9.2	518	77.9	86	12.9	665

Source: Government of Western Australia 2004 EHNS.

wash clothes and bedding, remove waste safely, improve nutrition, reduce crowding, separate people from animals, reduce dust, control temperature, and reduce trauma. Each of these refer to different aspects of the functionality of dwellings and their related infrastructure. For example, if the focus is on improving nutritional standards and practices, then 'healthy home hardware' refers to the provision of adequate facilities to store, prepare, and cook food.

The National Indigenous Housing Guide (Commonwealth of Australia 1999) includes a range of detailed design and functionality guidelines to address each of these nine healthy living practices. The key functional area with most guidelines is that involving the supply, usage and removal of water: six of the nine healthy living practices are dependent on these. However, even seemingly obscure health-related housing functions include a wide range of design, maintenance and infrastructural features that require attention (Commonwealth of Australia 1999: 49–57).

As with the measurement of housing need, the status of environmental health infrastructure requires a detailed assessment of functionality and adequacy set against agreed normative criteria. The 2001 CHINS includes information on such issues as water supply, sewerage, drainage and solid waste disposal, but this is more in the form of simply noting the existence or otherwise of infrastructure rather than assessing its

Table 17. Identified infrastructure needs: discrete Indigenous communities in the Kullarri ATSIC Region, 2004

Identified need	No. of communities	Per cent of communities
Housing (new, repairs, housing for visitors and workers)	53	75.7
Water, Power, Sewerage (improvements or provision)	48	68.6
Health Hardware (ablutions, hot water systems, washing machines)	23	32.9
Access (internal and access roads, vehicles, boats, airstrips, fuel)	18	25.7
Plant	18	25.7
Recreational facilities (sporting grounds, play grounds)	15	21.4
Telecommunications (phones)	10	14.3
Municipal Services (street lighting, rubbish disposal, drainage)	9	12.9
Other	7	10.0
Training (employment and business development)	6	8.6
Meeting Areas (administration facilities, general purpose buildings)	3	4.3
Environmental Programs (greening, dust suppression)	3	4.3
Fencing (houses, tips, sewerage ponds)	3	4.3
Health Services (medical centre, detox centres, AEHWs, first aid kit)	0	0.0

Source: Government of Western Australia 2004 EHNS.

functionality and adequacy. Likewise, CHINS data do not allow for the proper assessment of activities related to such issues as dust control, animal health and quality of waterways. For example, with regard to dust control, all that is available from the CHINS is the fact that a certain number of permanent dwellings in communities are on sealed roads. While this provides some indication of the likely extent of dust mitigation as an issue, it is far from adequate as an indicator of progress.

A key source of data regarding the functionality of Indigenous dwelling facilities in discrete Indigenous communities in the West Kimberley is the Western Australian Government's 2004 EHNS. Unfortunately output on the functionality of dwelling facilities is reported only for all communities collectively within each ATSIC Region. Thus, we have aggregate data on the functionality of particular infrastructure items for all discrete communities in the Kullarri and Malarabah ATSIC Regions. These are shown in Tables 15 and 16 respectively, according to the proportion of dwellings in each region that have each item or not, and whether they are working or not.

As Table 15 shows, as much as one quarter of all dwellings in the Kullarri ATSIC Region had no external sanitary plumbing, and of those that did, 6 per cent had non-functioning systems. Compounding this problem, almost half of all dwellings (46%) had no on-site sewerage disposal. Other notable absent dwelling

Table 18. Identified infrastructure needs: discrete Indigenous communities in the Malarabah ATSIC Region, 2004

Identified need	No. of communities	Per cent of communities
Housing (New, Repairs, Housing For Visitors And Workers)	40	71.4
Access (Internal And Access Roads, Vehicles, Boats, Airstrips, Fuel)	28	50.0
Water, Power, Sewerage (Improvements Or Provision)	19	33.9
Recreational Facilities (Sporting Grounds, Play Grounds)	14	25.0
Plant/Vehicle Workshop (Tools, Machinery, Tractors, Equipment)	12	21.4
Health Services (Medical Centre, Detox Centres, Aehws, First Aid Kit)	9	16.1
Environmental Programs (Greening, Dust Suppression)	6	10.7
Health Hardware (Ablutions, Hot Water Systems, Washing Machines)	6	10.7
Municipal Services (Street Lighting, Rubbish Disposal, Drainage)	6	10.7
Other	6	10.7
Training (Employment And Business Development)	5	8.9
Meeting Areas (Administration Facilities, General Purpose Buildings)	4	7.1
Telecommunications (Phones)	2	3.6
Fencing (Houses, Tips, Sewerage Ponds)	0	0.0

Source: Government of Western Australia 2004 EHNS.

facilities included hot water systems, laundry troughs, laundry waste outlets and air conditioning. Even where dwelling facilities were present, 18 per cent of baths and showers were found to be non-functioning, along with 7 per cent of ceiling fans. Generally, though, infrastructure items were found to be operational.

The situation in the Malarabah region appears more favourable, especially in regard to the much lower proportion of dwellings with no external sanitary plumbing (Table 16). Likewise, even though one-third of dwellings had no on-site sewerage disposal, this was still lower than the proportion recorded for the Kullarri region. In contrast, a far greater proportion of dwellings in the Malarabah region had no ceiling insulation (31%), and the rates at which housing hardware items were malfunctioning were also generally higher, especially for hot water systems, kitchen sinks, baths and showers, toilet cisterns and ceiling fans.

As a summary device, the EHNS provides information on the number of communities in each region reporting particular identified infrastructure needs (Tables 17 and 18). Thus, out of the 17 communities surveyed in this region, 41 per cent identified housing and municipal services as key needs, 35 per cent identified health hardware, water power and sewerage, 29 per cent identified recreational facilities, 23 per cent identified plant and vehicle workshop equipment, and 18 per cent identified environmental programs such as dust control.

Of course, these data refer only to dwellings in select discrete Indigenous communities and mostly to housing stock managed by Indigenous housing organisations. No information is available on the quality of other rental accommodation in larger towns.

HEALTH STATUS

A primary barrier to the enhanced participation of Indigenous people in the West Kimberley labour market is poor health status and associated high morbidity and mortality. Presently, in Western Australia, the best estimates available from the ABS indicate Indigenous life expectancy at birth to be 58.5 years for males and 67.2 years for females (ABS 2007a: 74). These compare with estimates of 79.1 years for all males in Western Australia and 83.8 years for all females. According to the Epidemiology Branch of the Western Australia Department of Health, Indigenous death rates for all leading causes in the Kimberley Aboriginal Health Planning Region were significantly higher than the State rate except for cancer, which was similar. The all-cause death rate among Indigenous adults in the 25-44 age group was five times higher than that of the State population in this age group. The highest death rate of all for all ages was in the Derby-West Kimberley SLA and it was significantly higher than the State Indigenous and total State populations.

By these facts alone, the chances of full and prolonged Indigenous participation in the workforce and regional economy of the West Kimberley are clearly curtailed. For example, using the ABS experimental life table for Western Australia (combined with South Australia), the chances that a newborn Indigenous male will reach workforce age (15 years) is estimated at 97 per cent. For those who do reach workforce age, 28 per cent will not reach 50 years of age. Statistically, more than half (58%) of Indigenous males who reach age 15 have no chance of surviving to retirement age at 65 years. Thus, out of an average cohort of 100 Indigenous males aged 15, only 42 would still be alive by age 65 (ABS 2007c: 74). Similar if not lower survival probabilities no doubt apply in the West Kimberley. Equally telling though, is the morbidity profile that underpins this high mortality. Here we observe the cumulative impact of progressive morbidity that can commence often prior to birth, persist through childhood, and become compounded in adult years. Allied to this are lifestyle factors associated with overcrowded dwellings, risk behaviours, low incomes, and poor nutrition. This is all well documented (ABS & AIHW 2005; Zubrick et al. 2004a) and confirms the importance of social and economic determinants of Indigenous health outcomes.

Information on the health status of Indigenous people is collected as a matter of course in the day-to-day operation of the health care system in Western Australia. Much of that available from the government-run system has been brought together in summary form by the Epidemiology Branch of the Western Australia Department of Health, and this provides a partial basis for establishing the relative health status of the Indigenous population in the two West Kimberley Shires compared to that of Indigenous people in the State as a whole.

Table 19. Number of deaths, standardised mortality ratio and age-standardised rates for Indigenous deaths in Broome and Derby-West Kimberley, 1994-2003

	Deaths	SMR[1]	Confidence interval	ASR[2]	Confidence interval
Broome	181	0.71	0.62-0.83	947.3	779.1-1,115.5
Derby-West Kimberley	417	1.31	1.19-1.45	1,758.4	1,580.7-1,936.1

1. SMR is the ratio of the number of Indigenous deaths to the expected number of Indigenous deaths in the region based on the State Indigenous age and sex specific death rate.

2. ASRs are standardised with the Australian 2001 population and expressed per 100,000 persons.

Source: Western Australia Department of Health 2004.

MORTALITY

Over the 10-year period between 1994 and 2003 a total of 598 deaths were recorded among Indigenous residents of the West Kimberley, with 70 per cent of these recorded among residents of Derby-West Kimberley (Government of Western Australia 2004a). In the Kimberley as a whole over this same period, 58 per cent of these recorded deaths were of males. Not surprisingly, given the much greater number of deaths recorded for Derby-West Kimberley, the death rate in that region was substantially higher than in the Broome Shire, and 31 per cent higher than expected when compared to the Indigenous mortality rate for Western Australia as a whole as measured by the Standardised Mortality Ratio (SMR) shown in Table 19. By the same measure, the death rate in Broome was noticeably lower than the State Indigenous average. The Indigenous age-standardised mortality rate (ASR) for Derby-West Kimberley was two and a half times higher than the ASR recorded for the Western Australian population as a whole (17.6 deaths per 1000 compared to 6.8), while in Broome Shire it was 40 per cent higher (9.5 per thousand compared to 6.8 per thousand) (Government of Western Australia 2004a: 15).

Indigenous infant mortality rates reveal a similar pattern to that observed for mortality overall with the rate in Derby-West Kimberley at around 20 per thousand live births; significantly above the total State rate of 4 per thousand, while in Broome the rate of 13 per thousand is also significantly above the total State rate but statistically within the same range as the rate in Derby-West Kimberley (Government of Western Australia 2004a: 63).

CAUSE OF DEATH

In Western Australia as a whole, the highest rates of Indigenous deaths are seen in cancer, diseases of the circulatory system, respiratory diseases, endocrine disorders (especially diabetes and renal disease) and injury and poisoning. During the 1990s, these disease categories accounted for 75 per cent of all Indigenous deaths in the state (Watson, Ejueyitsi & Codde 2001). These are also the leading causes of Indigenous deaths

Table 20. Indigenous standardised mortality rates for selected major health conditions in Broome SLA, 1994–2003

	N	Standardised Mortality Ratio (SMR)[1]	Confidence interval	Age Standardised Ratio (ASR)[2]	Confidence Interval	ASR Ratio[3]
Circulatory disease	49	0.70	0.52-0.93	321.2	217.5 - 424.9	1.23
Respiratory disease	13	0.60	0.32-1.02	63.1	14.1-112.2	1.16
Diabetes and renal	12	0.58	0.30-1.01	73.6	28.7-118.6	9.10
Injury & poisoning	32	0.78	0.54-1.11	87.3	50.2-124.4	2.00

1. SMR is the ratio of the observed number of Indigenous deaths to the expected number of indigenous deaths in the region based on total Indigenous age and sex specific death rates in Western Australia as a whole.

2. The ASR is standardised with the 2001 Australian population and expressed per 100,000 persons.

3. The ASR ratio is calculated as the local Indigenous ASR divided by the ASR for the total Western Australian population.

Source: Western Australia Department of Health 2004.

Table 21. Indigenous standardised mortality rates for selected major health conditions in Derby-West Kimberley SLA, 1994–2003

	N	Standardised Mortality Ratio (SMR)[1]	Confidence interval	Age Standardised Ratio (ASR)[2]	Confidence Interval	ASR Ratio[3]
Circulatory disease	116	1.23	1.02-1.48	568.4	461.8-674.9	2.18
Respiratory disease	31	1.04	0.71-1.48	136.5	84.6-188.4	2.50
Diabetes and renal	30	1.13	0.76-1.61	148.6	94.9-202.3	18.3
Injury & poisoning	65	1.55	1.21-1.99	160.6	116.6-204.5	3.7

1. SMR is the ratio of the observed number of Indigenous deaths to the expected number of indigenous deaths in the region based on total Indigenous age and sex specific death rates in Western Australia as a whole.

2. The ASR is standardised with the 2001 Australian population and expressed per 100,000 persons.

3. The ASR ratio is calculated as the local Indigenous ASR divided by the total Western Australia ASR.

Source: Western Australia Department of Health 2004.

across the Kimberley, with circulatory diseases substantially in the lead with an ASR at just over twice the rate reported for all Western Australians (Government of Western Australia 2004a: 16). Among Indigenous infants, age-adjusted death rates by leading cause indicate that for the Kimberley as a whole perinatal conditions were most prominent at around 140 per 100,000 persons, which is almost three times the rate for the State as a whole (Government of Western Australia 2004a: 64).

SMRs and ASRs for four of the top five causes of Indigenous deaths in the Kimberley (except cancer) have been calculated by the Western Australia Department of Health for the two West Kimberley Shires, with comparison drawn between Indigenous (SMRs) and the total State population (ASRs). These results are shown in Table 20 and 21, together with the Indigenous to total State ratios for the ASRs.

Thus, in the Broome Shire, between 1994 and 2003 there were 49 Indigenous deaths due to circulatory disease, and this produced an age-standardised rate that was 23 per cent higher than the rate observed overall in the Western Australian population. Indigenous death rates were also higher than the State level for respiratory disease, injury and poisoning, and especially diabetes and renal disease, although the confidence intervals for all of these causal categories are very wide owing to the small quanta of cases. One notable observation is that death rates for each of these leading causes of death are lower in the Broome Shire than among Indigenous people as a whole in Western Australia.

This is not the case in Derby-West Kimberley, which shows SMRs consistently above 1.0, and substantially so for injury and poisoning. Likewise, the higher number of deaths in this Shire results in narrower confidence intervals. The ASR results for diabetes and renal disease are both markedly above the State level.

As for leading causes within these main categories, ischaemic heart disease, cerebrovascular disease, and hypertensive disease are all prominent in the circulatory category; pneumonia is the main condition in the respiratory category (with an ASR across the Kimberley that is almost 5 times the State rate), while acute respiratory conditions, asthma and bronchitis also display high rate ratios. Within the injury and poisoning set of causes, transport-related accidents are most prominent followed by suicide and self-inflicted injury, and homicide and injuries inflicted by another person. For each of these the ASR ratio is more than twice the State average (Government of Western Australia 2004a). This overall profile of mortality confirms the trend towards 'lifestyle' diseases as the primary cause of death in remote Western Australia first noted by Gracey and Spargo (1987) in their review of the state of Indigenous health across the Kimberley.

MORBIDITY

Hospital separations data for the Indigenous and non-Indigenous usual resident populations of the West Kimberley have been compiled by the Epidemiology Branch of the Western Australia Department of Health for the years 1994–2003. These data form the basis for compiling a statistical profile of the health status of the regional population. However, because the focus is inevitably on diagnoses of major morbidity (i.e. conditions serious enough to warrant hospitalisation), they do not provide a full measure of the burden of ill health in the region.

Following Vos et al. (2007) this is now best established for Indigenous populations using Disability-Adjusted Life Year (DALYs) which estimate the lost years of 'healthy' life due to death and disability. At this stage, such estimates are available only at national level, where Vos et al. (2007) find that the Indigenous population has two-and-half times greater total burden of disease and injury than the general population. What is more, the DALY method enables relativities in disease burden to be established by age group, gender, leading case

Table 22. Burden of disease attributable to 11 selected risk factors by cause: Indigenous Australian population, 2003

	Broad cause group					
	Cancer	CVD	Mental	Injury	Diabetes	All causes
Total burden (DALYs)	7,817	16,786	14,860	12,384	8,498	95,976
Attributable burden due to (per cent)[1]						
Tobacco	34.6	33.0		0.7		12.1
High body mass	3.2	31.3			63.2	11.4
Physical inactivity	4.7	29.9			31.2	8.4
High blood cholesterol		31.3				5.5
Alcohol (net)	6.3	-3.2	16.3	22.2		5.4
High blood pressure		26.3				4.6
Low fruit & vegetable intake	4.2	18				3.5
Illicit drugs		<0.1	12.9	3.6		3.4
Partner violence	2.4	2.4	4.5	7.5		2.6
Child sexual abuse	0.2	<0.1	6.7	2.7		1.4
Unsafe sex	4.5					1.2
Combined risk factors[2]	48.5	68.9	37.4	32.6	68.8	37.4

Note: CVD = Cardiovascular disease.

1. Attributable burden within each column is expressed as a percentage of total burden for that column.

2. Figures for combined risk factors are not column totals.

Source: Vos et al. 2007: 53.

and risk factors. While this is the ideal situation, no data to provide for such analysis have been compiled for the West Kimberley. Suffice to say, Vos et al. (2007) find that at every age, Indigenous Australians are sicker and die earlier than their non-Indigenous counterparts, and so the opportunity for amelioration is enormous. Overall, the total burden of disease would be 59 per cent lower if Indigenous people had the same levels of mortality and disability as the total Australian population.

One practical finding from the national DALY study is that 11 risk factors alone account for almost 40 per cent of the total burden of disease experienced by Indigenous Australians. Table 22 presents a key table from the Vos et al. (2007) study detailing the weight of contribution from 11 selected risk factors to five leading

Table 23. Indigenous standardised hospitalisation rates for selected major health conditions in Broome SLA, 1994–2003

	N	Standardised Mortality Ratio (SMR)[1]	Confidence interval	Age Standardised Ratio (ASR)[2]	Confidence Interval	ASR Ratio[3]
Circulatory disease	695	0.92	0.85-0.99	31.0	28.4-33.6	1.51
Respiratory disease	1,945	0.77	0.74-0.81	57.2	53.8-60.5	3.30
Diabetes	218	0.70	0.61-0.80	9.8	8.3-11.2	5.20
Renal failure	105	1.38	1.14-1.68	5.5	4.3-6.7	13.75
Other urinary diseases	281	0.81	0.72-0.91	11.8	10.0-13.5	2.10
Injury & poisoning	2,680	0.96	0.93-1.00	70.2	67.1-73.4	2.02

1. SMR is the ratio of the observed number of Indigenous deaths to the expected number of indigenous deaths in the region based on total Indigenous age and sex specific death rates in Western Australia as a whole.

2. The ASR is standardised with the 2001 Australian population and expressed per 100,000 persons.

3. The ASR ratio is calculated as the local Indigenous ASR divided by the total Western Australia ASR.

Source: Western Australia Department of Health 2004.

Table 24. Indigenous standardised hospitalisation rates for selected major health conditions in Derby-West Kimberley SLA, 1994–2003

	N	Standardised Mortality Ratio (SMR)[1]	Confidence interval	Age Standardised Ratio (ASR)[2]	Confidence Interval	ASR Ratio[3]
Circulatory disease	956	1.10	1.03-1.17	38.6	28.4-33.6	1.88
Respiratory disease	4,128	1.54	1.49-1.59	102.1	98.6-105.5	5.93
Diabetes	376	1.13	0.61-0.80	14.7	13.2-16.3	7.73
Renal failure	149	1.73	1.47-2.04	6.5	5.4-7.6	16.25
Other urinary diseases	693	1.77	1.64-1.91	24.3	22.4-26.3	4.26
Injury & poisoning	4,286	1.51	1.47-1.56	106.3	116.6-204.5	3.06

1. SMR is the ratio of the observed number of Indigenous deaths to the expected number of indigenous deaths in the region based on total Indigenous age and sex specific death rates in Western Australia as a whole.

2. The ASR is standardised with the 2001 Australian population and expressed per 100,000 persons.

3. The ASR ratio is calculated as the local Indigenous ASR divided by the total Western Australia ASR.

Source: Western Australia Department of Health 2004.

cases of Indigenous mortality and morbidity. The risk factors selected include: tobacco, high body mass, physical inactivity, high blood cholesterol, alcohol, high blood pressure, low fruit and vegetable intake, illicit drugs, intimate partner violence, child sex abuse and unsafe sex.

The significance of this data for the present study is twofold. First, many, if not all, of these same risk factors are known to be prevalent in the Kimberley region (Atkinson et al. 1999). Second, they provide leading indicators of the potential impact of public health interventions to tackle particular risk factors underlying disease burden. So, for example, it is clear that interventions to reduce high body mass would have significant impact on diabetes, as would alcohol reduction on injury, or tobacco on cancer and so on. However, this is indicative only and ideally similar DALY-type studies would be replicated for the Kimberley.

HOSPITALISATIONS

Before considering hospitalisation data in detail, it is important to note that the number of admissions far exceeds the number of individuals admitted: many people are admitted more than once. Although unique patient data are not reported by the Epidemiology Branch, previous analysis from the East Kimberley (Taylor 2004) suggests that an average of 1.9 separations per Indigenous patient compared to 1.02 separations per non-Indigenous patient might apply, making the Indigenous hospitalisation ratio twice as high.

Between 1994 and 2003, a total of 48,373 hospital separations were recorded among Indigenous residents of the West Kimberley, and 57 per cent of these (27,795) were from the Derby-West Kimberley Shire (Government of Western Australia 2004a). As with mortality, this converts to a number of hospitalisations for Indigenous residents of Broome Shire that is slightly below the number expected when compared to the Western Australian Indigenous average , and a slightly higher number for residents of Derby-West Kimberley. (In Broome Shire, the ratio of Aboriginal hospitalisation to the expected number based on State-level Aboriginal hospitalisations was 0.92; in Derby-West Kimberley it was 1.19) However, the age-standardised rate of hospitalisation for Indigenous people in Broome Shire was 2.3 times higher than the average for the total State population, while in Derby-West Kimberley it was 2.5 times higher (Government of Western Australia 2004a).

In profiling the nature of morbidity as defined by principal disease diagnoses, data for all hospital separations (including repeat separations) are utilised. This is because individuals can, and often are, admitted to hospital more than once, but for quite different reasons. In the Kimberley as a whole, the highest rates of Indigenous hospitalisation include respiratory diseases, injury and poisoning conditions, endocrine disorders (especially diabetes and renal disease), complications due to pregnancy, circulatory diseases, digestive diseases, and skin disease. (Government of Western Australia 2004a: 16). Among Indigenous infants in the Kimberley as a whole, respiratory and infectious diseases were the main causes of hospitalisation with rates well over three times the State total (Government of Western Australia 2004a: 64).

Age-standardised hospitalisation rates for the same four leading causes used in the mortality analysis above have been calculated by the Western Australia Department of Health for the two West Kimberley Shires, with comparison drawn between Indigenous (SMRs) and the total State population (ASRs). These results are shown in Tables 23 and 24, together with the Indigenous to total State ratios for the ASRs. Thus, in the Broome Shire, between 1994 and 2003 there were 695 Indigenous hospitalisations due to circulatory disease, almost

three times as many (1,945) for respiratory disease, and many more again (2,680) for injury and poisoning conditions. However, the SMRs for circulatory diseases and injury and poisoning conditions indicate only slightly lower than expected hospitalisations based on the Indigenous Western Australian average, whilst those for respiratory diseases and diabetes are notably lower. Hospitalisations for renal failure, on the other hand, were higher than expected based on age-specific rates for indigenous patients overall in the State.

The ASRs for Broome Shire tell a somewhat different story, with extremely high ratios reported for both diabetes and renal failure indicating much higher Indigenous rates compared to the total Western Australian population, and substantial differences in rates also for all other diagnoses. This is not the case in Derby-West Kimberley, which shows SMRs consistently above 1.0, and substantially so for injury and poisoning. Likewise, the higher number of deaths in this Shire results in narrower confidence intervals, and the ASR result for diabetes and renal disease is markedly above the State level.

As for leading causes within these main categories, ischaemic heart disease, cerebrovascular disease, and hypertensive disease are all prominent in the circulatory category; pneumonia is the main condition in the respiratory category (with an ASR across the Kimberley that is almost 5 times the State rate), while acute respiratory conditions, asthma and bronchitis also display high rate ratios. Within the injury and poisoning set of causes, transport-related accidents are most prominent followed by suicide and self-inflicted injury, and homicide and injuries inflicted by another person. For each of these the ASR ratio is more than twice the State average (Western Australia Department of Health 2004).

These data highlight emphatically that chronic diseases (cardiovascular, cancer, chronic pulmonary, and diabetes) have become the dominant causes of morbidity and mortality in the West Kimberley, as indeed they have for Indigenous people across Australia (ABS & AIHW 2005). Of these, the disease that presents the highest (and growing) gap in rates between Indigenous and non-Indigenous populations is diabetes and related renal disease (especially in Derby-West Kimberley).

This is a significant observation given that diabetes is a debilitating condition with several co-morbidities including obesity, high blood pressure, high cholesterol, peripheral neuropathy, blindness, and renal disease. From the individual's perspective, and that of the health care system, it involves a high management regime and is costly in terms of management time and resources. For example, research cited in Rowbottom et al. (2003: 3) estimates the cost to the Australian health system per year of one diabetic person with complications at over $9,000. In addition, related government subsidies on pensions and sickness benefits amount to more than $6,000 per year. As far as individuals are concerned, they are often out of pocket for 'indirect costs' of non-PBS medication and equipment, as well as the costs of transport and time away from home or work (Rowbottom et al. 2003: 3; Willis 1995).

The impact of diabetes prevalence is reflected in the growth of End-stage-renal disease (ESRD) patients in the Kimberley. According to Kneipp et al. (2004) in 2002 the vast majority of ESRD patients in the Kimberley (98%) were Indigenous residents, and they comprised fully one-third of all such Indigenous patients in the State. Furthermore, they found that dialysis prevalence in the Kimberley had nearly doubled in the four years

from 1998 to 2002 compared to an average increase across the State of just 10 per cent (Kneipp et al. 2004: S122). On this basis they projected that the number of Aboriginal patients in the Kimberley requiring dialysis was likely to more than double from 56 in 2002 to 134 by 2013 (Kneipp et al. 2004: S124). Slightly more than half of these patients (55%) were from the West Kimberley.

Notwithstanding the potential of diabetes to incapacitate populations, accurate information on the number of diabetics in the West Kimberley is difficult to acquire. One attempt to estimate this for the Pilbara region has been made by pooling the evidence from a host of previous studies to apply a 30 per cent rate to the Indigenous population aged 25 years and over (Rowbottom et al. 2003: 23). (This 30% rate is regarded as conservative). If we were to apply this same rate to an estimate of the 2006 Indigenous population of the West Kimberley in the same age group then an estimate of 1,392 Indigenous diabetics is derived. It is worth noting the implications of this finding in terms of potential labour force numbers, since this estimated number of diabetics alone in 2006 (to say nothing of other disabling conditions) is somewhat more than the projected number of 1,304 in mainstream employment in the same year (Taylor 2006: 37).

DISABILITY

One aspect of health status that can have a direct impact on the capacity of individuals to participate in economic activity is physical or mental disability, defined as any continuing condition that restricts everyday activities. Such restriction can be due to an intellectual, cognitive, neurological, sensory or physical impairment, or a combination of these; it may also be permanent or episodic in nature. However, with appropriate aids and services the restrictions experienced by many people with a disability may be overcome. Overall, in Western Australia, the most recently available measure of the labour force participation rate of adults with a disability from the 2003 Survey of Disability, Ageing and Carers conducted by the ABS indicates that this is surprisingly high at 56 per cent, although this compares to 80 per cent among those without a disability (ABS 2004). It also indicates that the rate of labour force participation is negatively correlated with the degree of severity of disability from profound/severe to moderate/mild.

Establishing the number of people with a disability in local government areas (LGAs) in Western Australia (and especially in the Kimberley) remains problematic, notwithstanding the 2003 Survey. This is because the survey sample excluded sparsely settled areas altogether whilst the sample size in remaining LGAs provides only for reliable estimates at the broad remoteness category level (excluding very remote). One option, then, might be to use administrative data from the Western Australia Disability Services Commission. However, they advise that these report program recipients only and this is known to be a smaller figure than the actual numbers of people with disabilities.

Aside from sample size problems, none of these sources provide separate estimates of the numbers of Indigenous people with a disability. However, one indication of this is available from Centrelink records of disability payments that record the Indigenous status of clients, at least for those who declare it. In May 2006, a total of 688 disability support payments were made by Centrelink to Indigenous clients in the West

Table 25. Indigenous males and females with a core activity need for assistance: Broome and Derby-West Kimberley Shires, 2006

	Males	Females	Total
Broome	42 (21)	69 (37)	111 (58)
Derby-West Kimberley	87 (40)	99 (49)	186 (89)
Total West Kimberley	129 (61)	168 (86)	297 (147)

Note: Those aged 15-64 years are given in parenthesis.
Source: ABS 2006 Census of Population and Housing Cat no. 2068.0.

Kimberley, and this represented 68 per cent of all such payments to clients in that region (Taylor 2006: 79). Of course, this provides no indication of the severity of disability, but if the 2003 ABS survey estimate that 20 per cent of Western Australians with a disability had a profound/severe disability is any guide, then somewhere in the region of 138 Indigenous people in the West Kimberley might fall into this category, although fewer than this would be of working-age. In terms of labour force participation, applying the 2003 ABS estimate for Western Australia as a whole for disabled adults suggests that around 385 Indigenous people in the West Kimberley with a disability may be outside of the labour force.

These crude estimates may now be benchmarked against census data, as the 2006 Census included questions on disability for the first time and provided for Indigenous status to be recorded. In the West Kimberley, a total of 297 Indigenous persons were recorded with a core activity need for assistance. This variable has been developed by the ABS to measure the number of people with a profound or severe disability—defined as needing help in one of more of the three core activity areas of self-care, mobility and communication because of a disability, long-term health condition (lasting 6 months or more), or old age. Furthermore, a strong negative correlation has been found between the presence of core activity needs for assistance and labour force participation for Indigenous adults in Western Australia (Biddle & Taylor 2007). With this in mind, Table 25 shows the distribution by males and females in each Shire and also indicates the number of people of prime working-age (15-64 years) with a core activity need for assistance.

In both Shires, females outnumber males, including among those of working-age. Almost half of all persons with a disability (49%) are in the prime working age group, although the aged (over 65 years) also account for a large share (43%) especially in Derby-West Kimberley. However, some caution is required when comparing between Shires, since the rate of non-response for this census question was twice as high in the Broome Shire (8% compared to 4% in Derby-West Kimberley). Of course, the census count is itself only a sample (albeit a large one) of the population. To produce a final estimate of the true levels of disability we can apply the rates implied in Table 25 to an estimate of the West Kimberley Indigenous population derived from 2001 Census-based projections (Taylor 2006). On this basis there are an estimated 164 Indigenous persons

in Broome Shire with a core activity need for assistance, and 241 in Derby-West Kimberley, a total of 405 across the West Kimberley.

INTERACTION WITH THE CRIMINAL JUSTICE SYSTEM

Interaction with the police, and subsequently with the courts and various custodial institutions, is a pervasive element of Indigenous social and economic life in the West Kimberley, and has major consequences for successful and prolonged labour force participation. In the 1994 National Aboriginal and Torres Strait Islander Survey (NATSIS), for example, an estimated 25 per cent of Indigenous people aged 13 years and over in the Broome ATSIC Region reported that they had been arrested by police in the previous five years (ABS 1996a: 70). This amounted to some 580 individuals. The equivalent proportion in the Derby ATSIC Region was 16 per cent, representing some 490 individuals (ABS 1996b: 70). In Western Australia, as a whole, the rate was 25 per cent. In the same survey, 82 per cent of respondents in the Broome ATSIC Region perceived family violence to be a problem in the local area. This was the highest rate of any ATSIC Region in the country. In Derby ATSIC Region, the equivalent figure was 71 per cent. In both regions, the primary reasons given for arrest included (in descending order) disorderly conduct, drink driving offences, assault, and outstanding warrants.

A NOTE ON DATA SOURCES

Crime statistics in Western Australia are available from a variety of sources, reflecting different stages of interaction with the criminal justice system. The initiating factor, of course, is contact with the police either by way of crime reporting, or via an apprehension (arrest), or a summons. Thus, the profile presented here does not represent all criminal activity, only that processed by the criminal justice system. Nonetheless, such processing yields a range of data concerning the nature of offences and offenders, with separate reporting for juveniles (aged 10–17 years), and adults (aged 18 and over). Individuals who are charged with an offence are further processed by the courts (a charge being an allegation laid by the police before the court or other prosecuting agency that a person has committed a criminal offence). Statistics relating to the activities of the lower courts are captured by the Department of Justice Childrens Court and Petty Sessions database. As for those charged who are found guilty of an offence, imprisonment data are available from the Department of Justice's Total Offender Management System (TOMS), while non-custodial community corrections data can be extracted from the records of the Community and Juvenile Justice division of the Department of Justice. Data regarding those held in police lock-ups are provided via the Western Australia Police Lock-up Admissions System, which records all admissions to and exits from police lock-ups across the state.

The Crime Research Centre (CRC) at the University of Western Australia has access to all of these data for analysis and reporting under agreements with the Western Australia Police and Western Australia Department of Justice. Using this access, the CRC produces an annual comprehensive compendium of crime and justice statistics for the state, Crime and Justice Statistics for Western Australia,

<**http://www.crc.law.uwa.edu.au/publications**>, detailing the nature and pattern of offences and sentences, and the characteristics of offenders and those sentenced. Among the characteristics explored is ethnicity, and the basic ethnic classification employed by the CRC in its reporting is Indigenous/non-Indigenous. However, the manner in which Indigenous status is determined varies between police and courts data. In the Police Offence Information System (P49), 'ethnic appearance' is a term used to describe the visual appearance of victims and offenders. The field is completed on the basis of the attending police officer's subjective assessment of the person's appearance, and is recorded for operational purposes only. As the CRC cautions, given the subjective nature of the assessment upon which these data are based, it is possible that a person attributed to a particular group does not belong to that group. Data from the lower courts presents far greater difficulty in terms of establishing Indigenous participation in the criminal justice system since in Western Australia as a whole the Indigenous status of defendants is unknown in 85 per cent of cases (Loh & Ferrante 2001: 20).

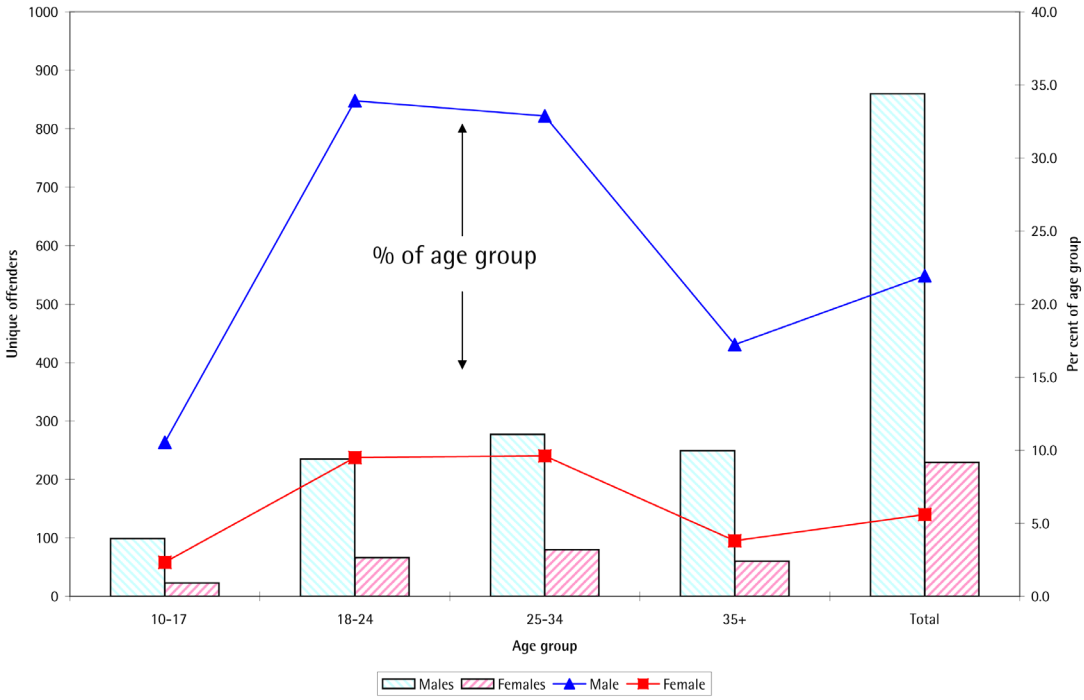
ESTIMATED ARREST RATES BY AGE

Current (2007) data on unique offenders arrested in the East Kimberley were not forthcoming. However, the Office of Crime Prevention in Perth does publish community safety and crime prevention statistics for each Shire in Western Australia, and the latest available are for 2004. In that year, a total of 1,089 unique Indigenous offenders over the age of 10 years were arrested in the two West Kimberley Shires (Government of Western Australia 2004b,c). This represented 14 per cent of the estimated Indigenous population over 10 years of age at that time (8,007). Some caution is required here, as the numerator represents arrests of persons within the two Shires, though not necessarily of the Indigenous usual residents in the denominator. At the same time, the usual resident population as estimated in any region at any given time is inevitably an amalgam of long-term and more recent residents and establishing a precise population at risk is fraught with uncertainty. With this in mind, any 'rates' provided here are indicative only.

The vast majority of Indigenous persons arrested (80%) were male. As for the distribution of arrests by age and sex, this is shown in Fig. 2 together with age- and sex- specific arrest 'rates'. The results suggest that around one-third of all Indigenous males in the region between the ages of 18-34 were arrested in 2004, along with some 10 per cent of all females in the same age range. Overall, it appears that 22 per cent of all Indigenous males aged 10 years and over, and 6 per cent of all females, were arrested in 2004.

Furthermore, of all those arrested in 2004 (including 415 non-Indigenous offenders) only 27 per cent were arrested for the first time suggesting a high recidivist rate. The principle offence categories for which individuals were arrested include in descending order of occurrence: driving and traffic offences (410 or 27%); offences against the person (mostly assaults) (353 or 23%), and offences against good order (329 or 22%). As for actual numbers, as many as 512 Indigenous males and 146 Indigenous females in the prime working age group of 18-34 were arrested. These figures are very substantial when set against numbers in the workforce at equivalent ages. From a labour market perspective, they raise major questions concerning the impact of

Fig. 2. Unique Indigenous offenders arrested by age and sex: West Kimberley, 2004



Source: Government of Western Australia 2004a,b.

interaction with the criminal justice system and its potential to impose constraints on participation either through the issuing of a criminal record, or through actual detention.

COURTS DATA

As for the findings of court proceedings in the form of penalties (sentences), these can be grouped into four broad categories: custodial, non-custodial, fines and dismissals. According to the ABS sentence type classification (ABS 2003: 71), custodial orders involve custody in a correctional institution as life imprisonment, imprisonment with a determined term, or periodic detention. They also include custody in the community under an Intensive Corrections Order or home detention. Suspended sentences also fall under custodial orders. Non-custodial orders include a variety of community supervision or work orders and community service orders, as well as probation and treatment orders. Other non-custodial orders include good behaviour bonds and recognisance orders, while monetary orders basically refer to fines or recompense to victims as well as licence disqualification/suspension/amendment and forfeiture of property.

As non-custodial sentences are the most common, it is worth defining some further aspects of these. For example, Community Based Orders (CBOs) allow the court to order an offender to be managed by a Community Corrections Officer for the purposes of any one or more requirements of supervision, community service of between 40 to 120 hours, and/or programs aimed at the offender's behaviour. Intensive Supervision Orders (ISOs) are similar but provide for longer and more stringent supervision including curfews. Work and Development Orders (WDOs) are the last option prior to imprisonment for people who are in default of a fine. The order requires that the offender perform a specified number of hours of community work and personal development.

In the West Kimberley, as in all remote Indigenous communities in Western Australia, these non-custodial orders are carried out under the Indigenous Community Supervision Agreement which offers communities a key role in the decision making about offender management. As Parriman and Daley (1999) point out, communities decide themselves whether to accept an offender under supervision, they determine the most appropriate person to administer the supervision order, and they are largely responsible for determining the supervision regime. One consequence has been a tendency on the part of the courts to make greater use of community-based sentencing (Parriman & Daley 1999: 3), and this is reflected in the sentencing data.

Working out the net impact of court penalties on the Indigenous population of the West Kimberley is no easy task given the lack of self-identified Indigenous status in court reporting. However, information provided by the Department of Corrective Services indicates that as of 30th June 2006 a total of 160 distinct Indigenous adults from the West Kimberley aged 18 years and over were imprisoned, and 90 percent of these (144) were males. These Indigenous prisoners represented 88 per cent of all prisoners in custody at that time with a last known address in the West Kimberley. At the same point in time, a total of 98 Indigenous adults from the West Kimberley (76% of them males) were also served with court orders. More than half of these (56%) were under the age of 30 years, compared to only 36 per cent of those in prisons which may reflect the impact of diversionary programs. For those in prison, by far the most common reasons were offences against the person (61%), followed by traffic offences (17%). Court orders related to a wider range of offences including burglary with intent, breach of bail, breach of suspended order, assault, driving under the influence, driving without a licence, motor vehicle theft, and grievous bodily harm. All but 5 Indigenous adults in prison or on supervision orders were under the age of 55 years. Overall then, around 5 per cent of Indigenous adults in the West Kimberley aged 18-55 years were detained in one form or other in June 2006.

Of course, over the span of an entire year the numbers involved would be much greater. That is, the flow of individuals subject to custodial/non-custodial sentencing over a given year would be higher than the number at any one time. Previous data from the Pilbara (Taylor & Scambary 2005) suggests that the ratio between the total number of distinct Indigenous prisoners in any one year and the actual number imprisoned at any one time, is 3.25. The equivalent ratio for those on court orders is 6.0 (Taylor & Scambary 2005: 141). Applying these same ratios to the West Kimberley, we can obtain an estimate of the possible annual number of distinct prisoners and persons served with imprisonment or court orders for the year preceding 30th June 2006 of 520 and 558 respectively, although there is no way of knowing how distinct, in terms of actual individuals, these estimates might be.

At the very least, we can say that the number of persons imprisoned or under supervision in mid-2006 was equivalent to one fifth of the number of Indigenous workers estimated to be in mainstream employment in the West Kimberley (Taylor 2006: 37). Viewed another way, 10 per cent of Indigenous persons not in the labour force might be under custodial and non-custodial sentences at any one time, a proportion that is likely to be much higher among males. Clearly, simple availability to participate in the regional workforce is substantially hampered by this enforced withdrawal of labour, to say nothing of the lingering negative effects of incarceration on work-readiness. There may, of course be positive impacts of rehabilitation, as envisaged in the Kimberley Custodial Plan (Government of Western Australia 2005), but these are not quantified here.

POLICY IMPLICATIONS

The West Kimberley is the latest region in Western Australia poised to reap huge benefits from a super-cycle of resource exploitation. Labour demand is at an all-time high and challenges in securing an adequate labour supply are already emerging. It is ironic, then, that the very people whose land base is exploited to generate much of this economic activity and wealth, who are located in a region of rising labour demand, and who have sizeable cohorts moving into working-age groups, are so poorly situated to share in the benefits of economic growth for want of adequate capacities to participate. At the same time, it should be noted that Indigenous people in the region are insistent that development should occur in ways that protect environmental and cultural values and this introduces necessary complexity to the regional matrix of costs and benefits. To the extent that these contradictions and dilemmas form the basis for urgent discussion between Indigenous peoples, their representative organisations, government, and industry, the aim of this paper is to make available the latest statistical information and analysis.

Previous analysis has highlighted the sizeable scale of formal labour market exclusion for Indigenous peoples in the West Kimberley, pointing to the potential role in this of low educational achievement and limited acquisition of formal qualifications (Taylor 2006). While there is no doubt that such human capital skills are essential for mainstream labour market participation, their relative absence forms only part of a complex of factors that impact on Indigenous labour supply. Leaving aside the (unquantified) effect of Indigenous life projects that can emphasise the building of social, over human, capital (Trigger 2005; Peterson 2005), a recent innovative proposition highlights the consequences for Indigenous disadvantage of long-term structural government disengagement in remote communities:

> ... we observe over and over that in the Indigenous domain, governments have, particularly in remote regions, failed to create and maintain the institutional frameworks which establish the foundation of the Australian nation state, and which underpin citizenship rights and responsibilities, and often the operation of markets. These institutional deficits can relate to deficits in legislative arrangements, in enforcement of laws both criminal and civil, in capital investment, recurrent government programs, or the mere presence of government officials. (Dillon & Westbury 2007: 5).

When it comes to the profile constructed here of long-standing and sizeable deficits in social housing and environmental health infrastructure, of the persistence and high prevalence of preventable disease, and of continuing recidivism and over-representation of Indigenous people in the criminal justice system, then the idea proposed that the underpinnings of economic exclusion stem fundamentally from a failure of governments to 'establish the institutional architecture and frameworks which underpin citizenship and public and private service provision' (Dillon & Westbury 2007: 10), appears well supported by stark evidence.

Such argument has resonance, for example, in the inability to be confident about Indigenous population trends and levels. With an Indigenous net census undercount rate in 2006 of 24 per cent across Western Australia (higher still away from Perth), and a decline for the first time in decades in the census count of Indigenous people in the West Kimberley, establishing the basic demographic parameters of labour supply has become a tenuous exercise, and is symptomatic of shortcomings in the administrative systems for data collection (Morphy 2007). The confusion wrought here is as much about adequate projections for the future—if these suggest a growing population and rising numbers in workforce ages, yet census counts point to the opposite trend, what then are we to do? How are we to calibrate and plan for future needs?

Certainly, it would prove difficult to convince many living in discrete Aboriginal communities across the region that their numbers are receding when housing occupancy rates remain as high as they are. Of course, overcrowding is exacerbated to a degree by the poor quality of housing stock and one of the more remarkable findings is that over half of this stock in the 117 discrete communities across the region requires major repair or replacement. Against this requirement, a net annual increase of 14 new dwellings appears a less than adequate response, to say nothing about meeting the growth in accommodation needs due to new household formation. (Although, of course, assessing this comes back to the issue of quality population data). There is something here also in the housing affordability crisis in Broome—how can local Aboriginal families, even of reasonable financial means by mainstream standards, manage to break into home ownership in their own milieu under conditions of excessively inflated housing valuation?

As for the continuing poor state of Aboriginal health, the profile here only captures the broad surface contours. No analysis of social and emotional well-being (including suicide) is provided, although results from the Western Australian Aboriginal Child Health Survey provide some guidance by indicating that the proportion of children aged 4-17 years in the West Kimberley at high risk of mental health problems is much the same as in Western Australia as a whole, if not somewhat lower. Proportions of youth with suicidal tendencies and attempts were also lower in the West Kimberley than the State Indigenous average, except in the Broome ATSIC Region, where 22 per cent of youth reported suicidal tendencies compared to 16 per cent State-wide (Zubrick et al. 2004b,c). Likewise, there is no analysis of the social, economic and health impacts of alcohol and substance abuse, although no doubt these are reflected to a degree in the general morbidity and criminal justice profiles.

From a labour market perspective, though, it seems likely that some of these effects take hold even before individuals are eligible to join the workforce. This is suggested by relationships established the Western Australian Aboriginal Child Health Survey between low academic performance and risk of clinically significant emotional or behavioural difficulties. In the West Kimberley as a whole, as many as 500 students were found to be at moderate risk or above of clinically significant emotional or behavioural difficulties and two-thirds of these were rated by teachers as being at low academic performance (Zubrick et al. 2004d,e). Beyond the school years, there is also the prospect that many individuals do not seek work due to responsibilities in caring for sick relatives.

One of the best internationally-established relationships in the area of health transition is the link between low socioeconomic status and poor health outcomes (Berkman & Kawachi 2000) and for some time now questions surrounding Indigenous health development have focused on the pursuit of socially and economically productive lifestyles closely bound to notions of community control and development (Atkinson et al. 1999; Boughton 2000; Torzillo & Kerr 1991: 326-7). By these yardsticks, the evidence presented suggests that the preconditions for optimal health and economic outcomes are far from being established in the West Kimberley.

The final labour supply constraint considered is that arising from interaction with the criminal justice system. Among the more telling facts is that the number of persons imprisoned or under supervision in mid-2006 was equivalent to one fifth of the number of Indigenous workers estimated to be in mainstream employment in the West Kimberley at that time. Also, up to one-third of all Indigenous males and some 10 per cent of all females in the region between the ages of 18-34 might be arrested in any one year. Once again there appears to be feedback loops—of the factors contributing to high arrest rates among Indigenous people, high unemployment (or lack of meaningful work) and poor educational achievement have consistently been identified (Hunter 2001), although the effects of drugs and alcohol and a breakdown in adherence to rules of customary law are also factors that emerge from research by the Law Reform Commission of Western Australia (Trees 2004).

More recent research indicates that if governments are concerned about Indigenous social and economic wellbeing, then a priority should be to ensure as far as possible that they stay out of the criminal justice system in the first place (Weatherburn et al. 2006). As for how this might be achieved, it is worth noting that the most significant group of factors identified in this study that contributed to Indigenous over-representation in the criminal justice system was substance use. Also of interest was the finding that labour market programs or policies (including CDEP participation) that reduce the level of Indigenous unemployment are a potentially fruitful line of attack on Indigenous contact with the justice system (Weatherburn et al. 2006: 12). From this, there appears nothing new in terms of what programs might be devised, although it may say something about the intensity with which existing programs are applied and resourced.

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