High length-of-stay outliers under casemix funding of a remote rural community with a high proportion of Aboriginal patients

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Abstract

The diagnosis related groups (DRG) classification was designed primarily to categorise patients of acute short-stay hospitals in urban areas. As one might expect, many studies have shown it is a less effective predictor of the needs – and consequently the costs of care – of remote and socio-economically disadvantaged communities.

One way of improving the equity of funding involves separating the cases in each DRG into inlier and outlier episodes, and making different resource allocations for each category. This paper summarises the outlier payment model used by the Health Department of Western Australia, with emphasis on high length of stay outliers. The model provides additional funds for high length of stay outliers, but funding levels are deliberately set below the actual estimated costs of care, on the assumption that some of the additional costs are a consequence of poor care management.

All high length of stay outlier episodes in the East Pilbara Health Service in 1997–98 were examined. It was found that the outliers were predominantly Aboriginal patients from remote communities with higher than average needs for care as indicated by their greater tendency to have multiple conditions requiring treatment. The age distribution of high length of stay outliers was quite different from that found in most Australian hospitals, in that there was a higher proportion of young children.

It is concluded that, although the ideas on which the funding model is based are sound, revisions of detail need to be considered to reduce the risk that the burden of cost containment will fall to a disproportionate degree on the most disadvantaged groups of patients.

The HDWA's casemix funding model

The Health Department of Western Australia (HDWA) uses a budget-share casemix funding model. In other words, episode types are defined (mainly by DRG), and the capped State health budget is allocated among service providers in proportion to their workloads. Each hospital's workload is calculated as the sum across all episode types of the expected volumes by casemix class multiplied by the relative expected costs of each class (or cost weights). Several sources have been used to determine the cost weights, including 1992–1993 National DRG Costing Project (Smith and Cook, 1995) and more recent costing results from Victoria and Western Australia.

Different amounts are paid for outliers (called exceptional episodes in Western Australia) compared with inliers (called central episodes). Exceptional episodes are of several types. They include episodes with lengths of stay (LOS) of more than 3 times the average length of stay (ALOS) for the DRG, for which additional payments are made; and episodes of less than one-third the ALOS for the DRG, for which reduced payments are made relative to central episodes. Other categories of exceptional episodes include those lasting more than three months, and those involving high costs not associated with length of stay (such as use of high-cost drugs).

The focus of attention in this paper are the high-LOS exceptional episodes – those with lengths of stay greater than 3 times the average for the DRG. This is the most important category for rural health service providers like the East Pilbara.

It is necessary to decide how much will be paid for the high-LOS episode types, and one basis is the estimated actual costs of care. One recent study found that, in each public hospital sector (teaching, metro non-teaching and country), exceptional episodes of all types accounted for nearly 30% of hospital costs but less than 10% of admissions (HDWA 1997a). The largest proportion of costs (12% to 15% of the total) related to high-LOS episodes. Of these costs, around two-thirds concerned care additional to that provided for central episodes (HDWA, 1997a).

In practice, the HDWA uses an estimate of the costs that it believes should be incurred through the care of exceptional episodes. For the year subjected to investigation in this paper, approximately 15% of the available budget was set aside for high-LOS exceptional episodes, although actual costs were estimated to range from 20% to 23% (HDWA, 1997b).

The Department justified these arrangements by noting that some patients stay too long, and therefore some of the additional costs are a consequence of poor management rather than appropriate responses to higher levels of need for care. Indeed, the Department has made it clear that it wishes to improve the management of "... that portion of the exception pool cases that involve avoidable and inappropriate" clinical practice (EEIP Working Group, 1997).

The idea of using payment rates to create incentives for improved care (and cost containment in particular) is fundamentally sound. However, the justification for targeting high-LOS episodes to the current extent – and for giving particular emphasis to the costs of exceptional rather than central episodes – is largely missing in the available documentation. Moreover, no valid analyses have been reported that support the application of identical levels of cost containment across all hospital and patient categories.

The funds for payment of hospitals for exceptional episodes are capped, and placed in what is known as the Exceptional Episode Insurance Pool (EEIP) at the start of each year. Care providers make claims for payment from the Pool during the course of the year. This process was designed to encourage hospitals to compare their practices in a critical way, and look critically at their own practices.

Each health service's contribution to the pool is identified in its annual service agreement. For illustration the East Pilbara Health Service's contribution for 1998/1999 was $617,000. Any costs incurred in treating exceptional episodes not refunded to individual health services would need to be absorbed within that health service's budget.

Origins of the concerns

The East Pilbara Health Service (East Pilbara) is an integrated health service covering a large rural area that includes the towns of Port Hedland, Newman, Marble Bar, Nullagine, and Yandeyarra. Its service area is over 600,000 square kilometers (or nearly three times the size of the UK), from the north-west coast of Western Australia to the Northern Territory border. It includes remote Aboriginal communities in the Western Desert such as Jigalong, Punmu, Cotton Creek, and Well 33 which are between 12 and 36 hours by road to the nearest acute care hospital at Port Hedland or Newman. Port Hedland has a population of 16,000, and contains the main referral hospital which draws patients from an area stretching a distance of 2500 km from Carnarvon to Kununurra. Newman is a smaller town in the inland Pilbara with a population of 3,500. Its hospital can handle basic acute services, although most acute patients are referred to Port Hedland.

When the EEIP was introduced, there was considerable concern among staff of rural and remote health services. They argued that the arrangements failed to take account of the unavoidably higher costs they would have to bear. They had little direct evidence to support their concerns, since no analyses had been conducted at that time. However, there were some plausible arguments. For example, Stoelwinder (1994) pointed out the potential risks to some patient populations, including Aboriginal and Torres Strait Islander (ATSI) and remote rural communities. These concerns were supported by analyses of hospital costs in the Northern Territory in 1994 (Harkin and Hindle 1994). Plant, Condon, and Durling (1995) demonstrated poor health outcomes for ATSI communities, in spite of high hospital utilisation rates.

Stamp, Duckett, and Fisher (1998) studied age-specific acute hospital separation rates for ambulatory sensitive conditions, and found that ATSI admission rates were 1.7 to 11 times higher than for non-ATSI populations. They concluded that much ATSI morbidity and mortality is preventable, and that more needs to be done to reform funding and service delivery methods at all levels in the health system. Spencer *et al* (1998) analysed data from 1993 to 1996 and predicted that the incidence of End Stage Renal Disease would double among Aboriginal people by the year 2000, and greatly increase the resource needs.

Hogan (1998) reported an audit of 37 paediatric high-LOS exceptional episodes admitted to Port Hedland Hospital between July 1997 and March 1998. 74% were Aboriginal, the average age was 37.7 months (range 0 to 16 years), and 76% lived more than 200km from Port Hedland. The sample included three patients who had each been admitted three times during the survey period and who had become high-LOS exceptional episodes on each occasion. The average age

of these patients was 15 months, all lived in remote Aboriginal communities, had at least 3 comorbidities, and had major social problems. Each record was reviewed by a medical officer and a health information manager, and it was concluded that there was no evidence of unnecessary prolongation of the stay.

These paediatric data reflect the Aboriginal infant mortality and morbidity data for the Pilbara as a whole, where the rate of low birth weight (<2500g) infants born is 11.7%, twice that of the population of Western Australia generally. The Pilbara infant mortality rate was 26.1 per 1000 livebirths in 1996, 5.7 times higher than the infant mortality rate of all infants in Western Australia.

Incidentally, a few recent studies have suggested that some of the health status differentials between ATSI and non-ATSI populations have been underestimated. For example, a study by Coory (1998) confirmed the long-held view that the risk of stillbirth for Aboriginal peoples is more than twice the risk for non-Aboriginal peoples at full term, and found that (contrary to previous views) the same patterns are present in preterm babies. Roberts and Lancaster (1999) found that Australian Indigenous women were more than twice as likely to give birth preterm (< 37 weeks' gestation) and to give birth to small-for-gestational-age infants at term.

Two recent studies are particularly persuasive. First, Fisher *et al* (1998) demonstrated that ATSI patients in ten hospitals in Western Australia, the Northern Territory, South Australia, and Queensland have higher than average length of stay and significant variations in relative frequency of admissions than non-ATSI patients. They found that ATSI patients had 20% higher casemix-adjusted costs per episode (ATSI $1856, non-ATSI $1558).

Second, in a study of paediatric admissions to Royal Darwin Hospital, Ruben and Fisher (1998) found significant differences in the proportion of children with multiple comorbidities between ATSI and non-ATSI children, both in rural and urban dwelling children. A higher proportion of ATSI compared with non-ATSI children had prolonged hospital stays (22.6% v 1.5%), with variables influencing length of stay in ATSI children including age under two 2 years, living in a remote area, and presence of two or more comorbidities. The authors concluded that there are dangers in imposing a casemix classification system for a 'typical' Australian population on a region with a high proportion of people of ATSI descent, and "... a potential for inappropriate funding of inpatient Aboriginal children".

In summary, the literature suggests that Aboriginal patients are sicker at time of admission to hospital. They (and remote rural dwellers in general) are also more difficult to discharge promptly for reasons such as unavailability of transport, concern about completion of treatment, or risks associated with unpredicted deterioration after their return to an isolated place of residence. A typical finding is that by Kruske, Ruben, and Brewster (1999) who showed that iron treatment for anaemia in Aboriginal children under six years of age was significantly less effective when unsupervised, mainly as a consequence of poor compliance. One consequence is the view that remote (and particularly remote Aboriginal or otherwise socio-economically disadvantaged) communities may need more costly care per admitted patient episode.

For these and other reasons, several States and Territories (the Northern Territory, South Australia and New South Wales) have incorporated funding adjustments for ATSI patients (Fisher *et al*, 1998). The same kinds of ideas are applied in other countries. For example, the US federal government has long made higher payments to hospitals treating 'socially disadvantaged' communities, and to isolated hospitals.

Method

All the high-LOS exceptional episodes within the East Pilbara Health Service for the financial year 1997–1998 were identified from the computerised discharge records. This gave a study database of 257 episodes, all of whom were treated at either Port Hedland or Newman hospitals.

For each episode, we abstracted DRG (Australian National Diagnosis Related Groups version 3), age at admission, length of stay in days, ethnicity (Aboriginal or Non-Aboriginal), postcode and other indicators of normal place of residence, and significant secondary diagnoses. Significant secondary diagnoses are conditions additional to the principal diagnosis that are considered to have affected the course of hospitalisation as defined in the Australian Coding Standards. There is some degree of imprecision in the coding rules (which affects all hospitals in Australia), but there is no reason to believe there was any systematic bias of coding across subsets of patients described in this study (outliers and inliers, Aborigines and non-Aborigines, and so on).

We chose not to count only those significant secondary diagnoses that are actually used by the DRG assignment process to split diagnosis or procedure clusters according to the presence of comorbidities or complications (CCs). This is because not all clusters are split on the basis of secondary conditions. For example, the most common DRG in the high-LOS exceptional episodes in East Pilbara, DRG 885 (injuries, age under 65), does not use CCs as the basis for splitting.

The medical record files were consulted where data items were missing or of questionable accuracy in the routine computerised database. In the event, no edits were needed that affected the results shown below. No attempt was made to re-abstract (to check the accuracy and completeness of the recording of diagnoses by consulting the medical records).

Results

Figure 1 shows that 70% of high-LOS exceptional episodes (180 of 257) were Aboriginal patients. However, Aboriginal patients represented only 42% of admissions, and only 14% of the population in East Pilbara. In simple terms, Aboriginal people are three times more likely to be admitted and Aboriginal patients are nearly twice as likely to become high-LOS exceptional episodes as non-Aboriginal patients. The differences for these two ratios are statistically significant (χ^2, $p < 0.01$).

There are around 5600 Aboriginals in the Pilbara as a whole, of which 35% live in discrete Aboriginal communities. They differ markedly from the rest of the served community in many respects. Of particular interest here, 55% of Aboriginal people in the Pilbara are under 25 years of age, compared with 36% in the Australian community as a whole (AIHW 1998).

Figure 1: Ethnicity in high-LOS exceptions, admissions, and service area, East Pilbara Health Service, 1997–1998

Ethnic group	High-LOS exceptional episodes		Admissions		Population	
	Number	Percentage	Number	Percentage	Number	Percentage
Aboriginal	180	70%	2683	42%	3920	14%
Non-Aboriginal	77	30%	3704	58%	24080	86%
Total	257	100%	6387	100%	28000	100%

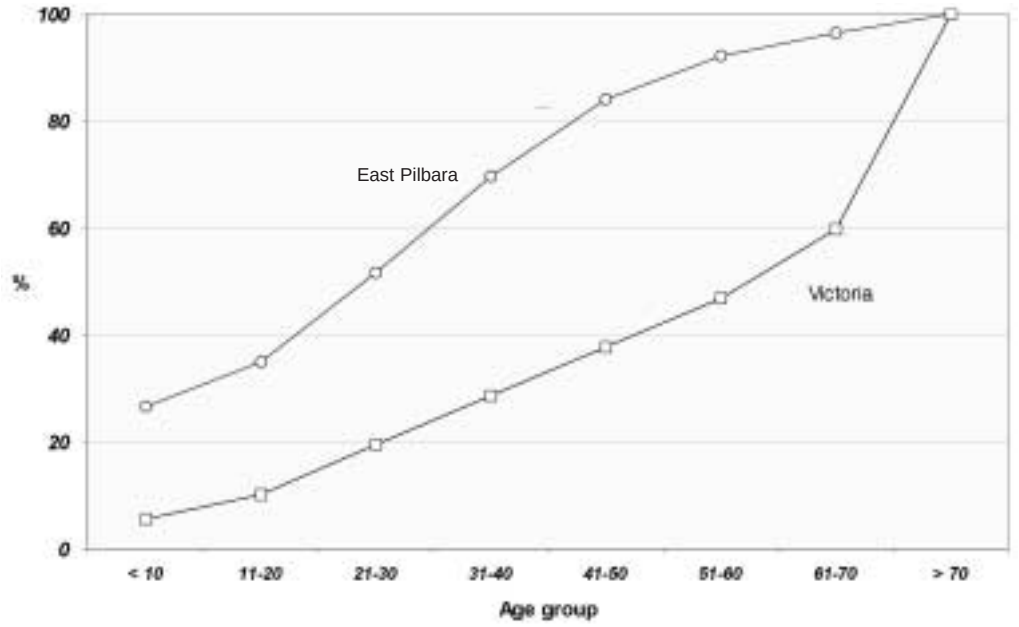
This predominance of younger people is reflected in both admissions and exceptional episodes. Figure 2 shows that over 26% of the exceptional episodes are under age 10. In most other Australian communities, long-stay outliers are more likely to be elderly patients with multiple system problems.

Figure 2: High-LOS exceptional episodes and total admissions by age group, East Pilbara Health Service, 1997–1998

Age group	High-LOS exceptional episodes			Admissions		
	Number	Percentage	Cum %	Number	Percentage	Cum %
Under 10	68	26.46	26.46	1398	21.89	21.89
11 to 20	22	8.56	35.02	453	7.09	28.98
21 to 30	43	16.73	51.75	1502	23.52	52.50
31 to 40	46	17.90	69.65	1290	20.20	72.69
41 to 50	37	14.40	84.05	737	11.54	84.23
51 to 60	21	8.17	92.22	463	7.25	91.48
61 to 70	11	4.28	96.50	286	4.48	95.96
71 and over	9	3.50	100.00	258	4.04	100.00
All	257	100.00	6387	100.00		

The atypical age distribution of high-LOS exceptional episodes in East Pilbara is illustrated in Figure 3. The data from East Pilbara are compared with the high-LOS exceptional episodes for all public hospitals in Victoria in 1998–99, using the same threshold of three times the average length of stay.

Table 3: Cumulative % high-LOS exceptional episodes by age group, East Pilbara and Victoria



While patients under age 10 accounted for over 26% of the East Pilbara high-LOS exceptional episodes, they represented only 5.7% of the Victorian exceptional episodes. At the other extreme, only 3.5% of East Pilbara exceptional episodes were aged 71 or over. In Victoria, over 40% were aged 71 or over.

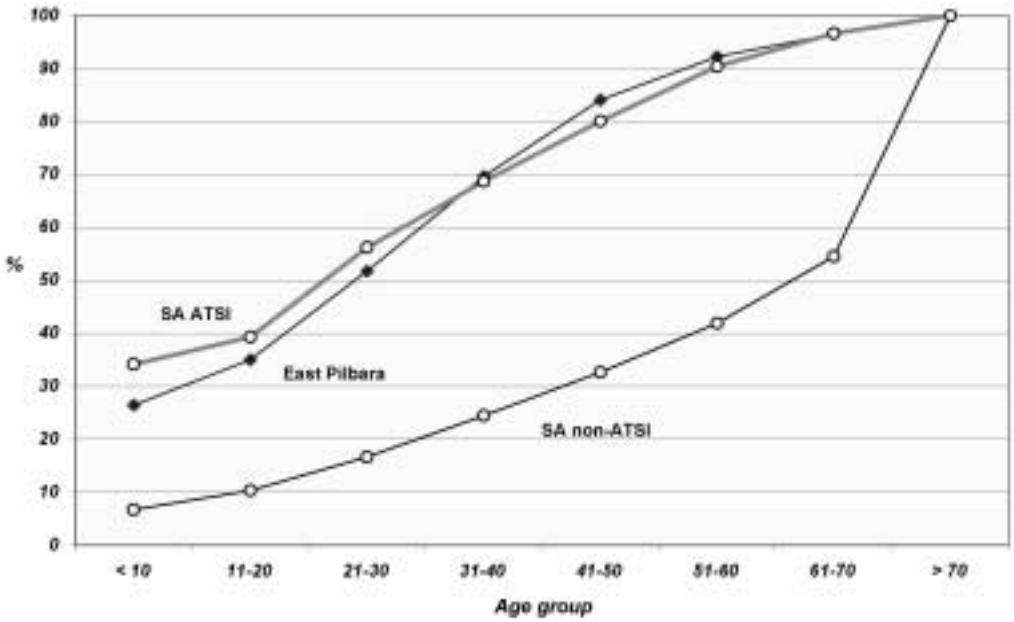
The differences are partly explained by the age distribution of total admissions. Patients in Victorian hospitals tend to be older overall than those in East Pilbara.

However, there is an important residual difference, as shown in Figure 4. While East Pilbara and Victoria have a similar proportion of high-LOS exceptional episodes overall (just over 4% of admissions), a much larger proportion of young patients become high-LOS exceptional episodes in East Pilbara (4.86% compared with 1.88%). The reverse is true for the oldest age group. Only 3.49% of East Pilbara's patients aged 71 or over became high-LOS exceptional episodes, compared with 7.73% in Victorian public hospitals.

Figure 4: Proportion of admissions becoming high-LOS exceptional episodes, East Pilbara and Victoria

Age group	Victoria (1998–99)			East Pilbara (1997–98)		
	Admissions	High-LOS exceptional episodes	% high-LOS exceptional episodes	Admissions	High-LOS exceptional episodes	% high-LOS exceptional episodes
≤ 10	125,658	2,359	1.88	1,398	68	4.86
11–20	52,277	1,895	3.62	453	22	4.86
21–30	124,101	3,915	3.15	1,502	43	2.86
31–40	122,843	3,787	3.08	1,290	46	3.57
41–50	103,727	3,743	3.61	737	37	5.02
51–60	116,429	3,850	3.31	463	21	4.54
61–70	145,999	5,354	3.67	286	11	3.85
> 70	216,564	16,739	7.73	258	9	3.49
All	1,007,598	41,642	4.13	6,387	257	4.02

Figure 5: Cumulative % high-LOS exceptional episodes by age group, East Pilbara and SA



The relationship between ethnicity and age distribution is illustrated in Figure 5, where high-LOS exceptional episodes are compared for East Pilbara and South Australia. The South Australian data are for all public hospitals in 1998–99, using the same threshold of three times the average length of stay. However, separate plots are shown for South Australian Aboriginal (ATSI) and other (non-ATSI) high-LOS exceptional episodes. The South Australian Aboriginal patients have a similar age distribution to the East Pilbara patients, whereas the South Australian non-Aboriginal patients are distributed in much the same way as all Victorian patients.

Figure 6 shows normal place of residence of high-LOS exceptional episodes in East Pilbara. The split was made in part by use of postcode of usual place of residence. However, two postcode areas – Port Hedland (6721) and South Hedland (6722) – had to be split because they include both urban and remote communities. The 'remote' category is therefore best considered as including patients who live 100km or more from an acute care hospital.

Figure 6: Distribution of high-LOS exceptional episodes by remoteness, East Pilbara Health Service, 1997–1998

Area of patient's usual place of residence	Number of high-LOS exceptional episodes	% of high-LOS exceptional episodes
Urban (most of postcodes 6721, 6722, 6724)	49	19%
Remote (over 100 km from acute care hospital)	208	81%
Total	257	100%

81% of high-LOS exceptional episodes meet this criterion. The difficulties associated with management of patients living so far from the acute care hospital were noted in general terms above. In the particular case of the Port Hedland and Newman hospitals, it is common that patients arrive in extremely poor condition because the seeking of care and any subsequent referral have been delayed due to the difficulties of transportation, and the social and economic costs. There are frequent difficulties of discharge. For example, patients from communities in areas like the Western Desert may need to have much longer periods of convalescence in hospital than would apply in urban Australia, in order to ensure they can sustain a long road journey, or to be able to be returned by the Royal Flying Doctor Service. Concerns about the availability of continuing care in certain settings may prolong these patients' stays in hospital, especially where they are children.

Figure 7 shows the incidence of significant secondary diagnoses in the high-LOS exceptional episodes, and its relation to Aboriginality. In total, 76% of the sample records had one or more significant secondary diagnosis. However, 90% of Aboriginal patients had significant secondary diagnoses, compared with only 43% of non-Aboriginal patients. The difference in the study data is statistically significant ($\chi^2 = 3.85$, $p < 0.05$).

Figure 7: High-LOS exceptional episodes by ethnicity and presence of significant secondary diagnoses, East Pilbara Health Service, 1997–1998

Ethnic group	Presence of significant secondary diagnoses		
	All high-LOS exceptional episodes	Not present	One or more
Non-Aboriginal	77	44 (57.14%)	33 (42.86%)
Aboriginal	180	18 (10.00%)	162 (90.00%)
All episodes	257	62 (24.12%)	195 (75.88%)

The association between multiple comorbidity and Aboriginality is consistent with the findings of other studies. However, the frequency of occurrence tends to be underestimated when DRGs are used because – as noted earlier – some important DRGs for high-LOS exceptional episodes in East Pilbara are not defined by the use of CCs.

This point is illustrated in Figure 8, which shows the distribution of high-LOS exceptional episodes in the study sample by DRG. Only the 16 most frequent DRGs are shown separately. The most common DRGs not defined by CC are DRG 885 (Injuries, aged under 65 years), DRG 514 (miscellaneous skin disorders), and DRG 188 (whooping cough and acute bronchiolitis).

However, several DRGs that frequently appear in the set of high-LOS exceptional cases are defined to be without significant comorbidities or complications. They include DRG 727 (neonate, admission weight <2499g without significant operating procedures, without problems), DRG 533 (miscellaneous metabolic disorders without CC), DRG 476 (fracture, sprain, strain & dislocation of upper arm or lower leg age <65 without CC), and DRG 187 (bronchitis and asthma age <50 without CC).

It seems incongruous to suggest that a patient who has remained in hospital for more than three times the average length of stay for the DRG has no significant comorbidities or complications. There are three obvious possibilities. One is that the patient was retained in hospital without good reason, as a consequence of poor discharge management. The second is that there are data errors: perhaps the patient was incorrectly assigned to the DRG as a consequence of (say) failure to record a significant comorbidity. The third is that the classification rules (for ICD diagnosis and procedure, or for DRG) are inadequate to measure the appropriate reasons for retaining the patient in hospital for so long. All three possibilities may apply. From the clinical appraisal of the 257 high-LOS outliers studied here, the last appears to be the most common explanation. For example, DRG assignment rules hardly ever take account of such clinically significant factors as (say) that a child is desperately undernourished and cannot possibly be expected to convalesce adequately in an impoverished community 200 kilometers from a reliable water supply.

Figure 8: Number of exception pool episodes in highest-volume DRGs, East Pilbara Health Service, 1997–1998

DRG		Episodes
885	Injuries age <65	21
727	Neonate, admission weight <2499g without significant operating procedures, without problems	17
533	Miscellaneous metabolic disorders without CC	9
514	Miscellaneous skin disorders	8
476	Fracture, sprain, strain & dislocation of upper arm or lower leg age <65 without CC	6
188	Whooping cough and acute bronchiolitis	6
187	Bronchitis and asthma age <50 without CC	5
350	Gastroenteritis age <10	5
686	Other antenatal admission with moderate or no complicating factors	5
902	Other procedures for other injuries without CC	5
47	Seizure <65 without CC	4
367	Cholecystectomy without CDE	4
455	Medical back problem age <65 without CC	4
505	Other skin graft and debridement procedures without CC	4
685	Other antenatal admission with severe complicating diagnosis	4
943	Other factors influencing health status age <80 without CC	4
Other DRGs		146
All episodes		257

Figure 9 shows the distribution of exceptional episodes by MDC. MDC 21 (Injury and poisoning) has the largest number of cases (13.6%), followed by MDC 8 (Musculoskeletal and connective tissue) with 12.1%, and MDC 15 (Newborn and neonate) with 5.9% of the total cases.

Figure 9: Number of high-LOS exceptional episodes by Major Diagnostic Category, East Pilbara Health Service, 1997–1998

Major diagnostic category		Number	Percentage
1	Nervous system	9	3.5
2	Eye	6	2.3
3	Ear, nose, mouth & throat	8	3.1
4	Respiratory system	15	5.8
5	Circulatory system	7	2.7
6	Digestive system	19	7.4
7	Hepatobiliary system & pancreas	9	3.5
8	Musculoskeletal system & connective tissue	31	12.1
9	Skin, subcutaneous tissue & breast.	17	6.6
10	Endocrine, nutritional and metabolic	14	5.4
11	Kidney and urinary tract	14	5.4
12	Male reproductive tract	2	0.8
13	Female reproductive tract	3	1.2
14	Pregnancy, childbirth and puerperium	18	7.0
15	Newborn and neonate	21	8.2
16	Blood & immunology	5	1.9
17	Myeloproliferative & poorly defined neoplastic	2	0.8
18	Infectious and parasitic	2	0.8
19	Mental disorders	7	2.7
20	Alcohol / drug use	3	1.2
21	Injury / poisoning	35	13.6
22	Burns	1	0.4
23	Factors influencing health status	9	3.5
All		257	100.0

In 1996–1997, the leading causes of hospitalisation for Aboriginal people in the Pilbara were infectious, haematological and respiratory diseases, followed by injury and poisoning. However, the leading cause of death was cardiovascular disease, for both Aboriginal males (26%) and females (22%), ostensibly from ischaemic heart disease. The second most common cause of death was injury and poisoning, with death rates twice as high for Aboriginal males as Aboriginal females.

It is difficult to interpret these kinds of data. The key constraint is probably that the DRG system is weak is describing morbidity patterns in Aboriginal and similar communities where there is a high burden of disease and multiple comorbidities are commonplace.

As shown in Figure 2, there is a high proportion of high-LOS exceptional episodes aged under 10 (68 of 257). The DRG patterns are worth noting in these children. As might be expected, most are in MDCs 21 (Newborn and Neonate), 4 (Respiratory), and 11 (Kidney and Urinary Tract). 55 out of the 68 cases in these MDCs were Aboriginal (82%), while 45 out of the 68 cases (66%) had one or more significant secondary diagnoses.

Discussion

The high-LOS exceptional episodes in East Pilbara acute hospitals are significantly different in many respects from those in most other Australian hospitals. They are much younger on average, and many are Aboriginal people who live a long distance from an acute hospital and have multiple problems at time of admission.

The HDWA casemix funding model is a step forward, in that it encourages efficient use of scarce resources, and increases the equity of resource allocation among care providers (and consequently among patients). However, there is reason to believe that the model, as currently configured, may give undue emphasis to containing costs of care of some of the most socio-economically disadvantaged groups in Australia. There may be more potential for containment of the costs of more typical patients, as well as fewer risks to patient wellbeing and social justice.

In this sense, there is a parallel with the recent introduction of a 30% private health insurance rebate. Regardless of the overall appropriateness of the rebate, it acted (perhaps in a manner not intended by its proponents) to increase the degree of disadvantage to indigenous Australians and remote rural communities, since they are not (and will not) be heavy users of private health insurance for reasons such as lack of wealth and unavailability of private health care facilities. They will receive hardly any of the estimated $2.2 billion per annum provided from public funds.

The core idea of casemix funding is that similar patients should be provided with similarly costly care, and care providers should be given financial incentives to avoid waste. However, it is increasingly evident that patients from Aboriginal and remote rural communities have health care needs that are not adequately measured by the DRG classification alone. It makes sense to provide additional payments for patients expected to need more care, by use of a measure of length of stay (and hence cost) when clinical indicators of greater need are unavailable.

However, it is possible that the current model places too much pressure on high-LOS exceptional episodes treated by service providers like East Pilbara. As Fisher *et al* (1998) put it, their findings of higher needs and costs associated with remote Aboriginal communities highlight "... the need for recognition of some hospitals' atypical populations and special funding requirements". Incidentally, it would make much more sense to evaluate the performance of East Pilbara in its handling of high-LOS exceptional episodes by comparing it with hospitals in other States that have similarly large proportions of remote and Aboriginal patients.

There is a general need to do more for the most disadvantaged Australians. Ring and Firman (1998) note that mortality rates from all causes have fallen much more rapidly in indigenous minority communities in other countries. Inter alia, they concluded that comparable mortality rates for Aboriginal Australians are at or above the rates that applied more than twenty years previously in Maori and Native American communities. As Morgan and Allen (1998) put it, Australian governments have a responsibility "... to repay our accrued debt to Indigenous Australians through the allocation of resources independent of issues of equity."

The HDWA, like other State and Territory health authorities, is under pressure from all sides and there are no easy answers. However, we believe the issues raised in this brief investigation are technically, politically, and socially important, and merit further investigation.

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