research

Trends and geographic variations in hospital admissions for asthma in Victoria

Opportunities for targeted interventions

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OBJECTIVE To describe variations in rates of hospital admissions for asthma in Victoria as health indicators of quality of primary care services and access.
DESIGN Routine analyses of age and sex standardised admission rates of asthma in rural and metropolitan Victoria from 1993–1994 to 1999–2000.
RESULTS There were 10 079 admissions for asthma, with an average of 2.71 bed days in 1999-2000. The admission rate for asthma decreased from 3.1/1000 (95% CI: 3.1–3.2) in 1993-1994 to 2.2/1000 (2.1–2.2) in 1999-2000, with a 37% reduction in rural regions and 26% in metropolitan regions. Sixteen primary care partnerships (small areas), 13 of them rural, had significantly higher admission rates than the Victorian average.
CONCLUSION Although asthma hospital admission rates are falling faster in rural than metropolitan areas, rural areas still have higher admission rates with significant variation between small areas.

Admission to hospital for asthma is a marker of quality of primary care because it is avoidable with appropriate management and early treatment of acute episodes in the community.[1–3] However, children and adults still present to hospital with inadequate management of their asthma.[4–6]

We decided to examine variations in asthma admission rates in small areas of Victoria. Primary Care Partnerships (PCPs) are voluntary alliances of primary care providers that cover two or three local government areas. Their main goals are to improve health outcomes from primary care services, and to appropriately reduce the preventable use of hospital, medical and residential services.

Methods

Hospital separation data were obtained from the Victorian Admitted Episodes Dataset (VAED), which contains data submitted by all public and private acute hospitals.[7] Clinical data are stored as ICD-9-CM codes.[8] Asthma was identified using the ICD-9-CM code 493, as principal diagnosis only.[1,2]

We used data from 1993–1994 to 1999–2000. We collapsed the 200 statistical local areas that make up 78 local government areas into 32 PCPs. We used the Accessibility Remoteness Index of Australia (ARIA) as an objective measurement of remoteness (defined as lack of accessibility to services regarded as 'normal' in urban areas).[9] In Victoria, this index varies from <1.84 (highly accessible – relatively unrestricted accessibility to a wide range of goods and services) to 3.51–5.80 (moderately accessible – significantly restricted accessibility of goods, services and opportunities for social interaction).

Population figures by gender and five year age groups were obtained from the Australian Bureau of Statistics to use as denominators for calculating admission rates. Admission rates were age and sex

Table 1. Rates of admission and 95% confidence intervals (CI), average bed days and Accessibility Remoteness Index of Australia (ARIA) ranking for asthma, 1999/2000

Region	Primary Care Partnership	Number of admissions	Rate per 1000 persons	Lower 95% CI	Upper 95% CI	Average bed days	ARIA ranking*
Loddon Mallee	Campaspe	144	4.03	3.36	4.71	2.99	19
Hume	Lower Hume	153	3.90	3.27	4.52	3.02	21
Barwon S/W	South West	236	3.81	3.32	4.30	2.55	23
Loddon Mallee	Southern Mallee	159	3.81	3.20	4.42	3.30	30
Hume	Goulburn Valley	337	3.66	3.26	4.05	2.67	20
Grampians	Wimmera	124	3.27	2.68	3.85	2.46	32
Hume	Central Hume	187	3.18	2.71	3.65	2.57	26
Loddon Mallee	Northern Mallee	153	3.17	2.66	3.68	2.84	29
Barwon S/W	Southern Grampians/Glenelg	115	3.06	2.49	3.64	4.71	28
Grampians	Grampians Pyrenees	93	3.00	2.36	3.64	3.30	25
Gippsland	East Gippsland	94	2.81	2.20	3.41	2.63	31
Loddon Mallee	Central Victorian Health Alliance	178	2.64	2.25	3.04	2.81	15
Western Metropolitan	Brimbank/Melton	525	2.52	2.30	2.74	2.02	4
Southern Metropolitan	South East	865	2.51	2.34	2.67	2.35	10
Gippsland	Wellington	99	2.45	1.96	2.95	2.56	27
Western Metropolitan	West Bay	534	2.36	2.16	2.56	2.37	7
Barwon S/W	Barwon	508	2.24	2.05	2.44	2.55	14
Loddon Mallee	Bendigo/Loddon	217	2.24	1.94	2.54	2.97	17
Southern Metropolitan	Kingston/Bayside	464	2.18	1.98	2.38	2.94	9
Gippsland	South Coast Health Services Consortium	108	2.16	1.74	2.58	2.11	24
Grampians	Central Highlands	279	2.10	1.85	2.35	2.92	13
Southern Metropolitan	Frankston/Mornington Peninsula	494	2.08	1.90	2.27	2.71	11
Northern Metropolitan	North Central Metropolitan	594	2.06	1.89	2.23	2.78	5
Eastern Metropolitan	Central East	777	1.94	1.81	2.08	3.00	8
Northern Metropolitan	Hume/Moreland	497	1.88	1.71	2.04	2.51	16
Hume	Upper Hume	103	1.86	1.50	2.23	2.75	22
Western Metropolitan	Moonee Valley/Melbourne	255	1.85	1.62	2.08	2.44	1
Southern Metropolitan	Inner South	475	1.80	1.63	1.97	3.26	3
Gippsland	Central West	188	1.72	1.47	1.96	2.31	18
Eastern Metropolitan	Outer East	625	1.65	1.52	1.78	2.65	12
Northern Metropolitan	Banyule/Nillumbik	283	1.63	1.44	1.82	2.56	6
Eastern Metropolitan	Boroondara	216	1.46	1.26	1.66	3.11	2

* Higher ARIA ranking indicates greater degree of remoteness

standardised (direct method) using the Victorian population for 1996 as the reference. We calculated 95% confidence intervals (CI) on the standardised rates based on the Poisson distribution.

Results

There were 10 079 admissions for asthma as the principal diagnosis with an average of 2.71 bed days in 1999–2000. The overall asthma admission rate decreased from 3.11/1000, (95% CI: 3.06–3.16) in 1993–1994 to 2.15/1000 (95% CI: 2.11–2.19) in 1999–2000; a significant decrease of approximately 31% in seven years.

The rural asthma admission rates declined 37% from 4.25/1000 (95% CI: 4.14–4.37) in 1993–1994 to 2.66/1000 (95% CI: 2.58–2.75) in 1999–2000, and in metropolitan areas 26%, from 2.65/1000 (95% CI: 2.60–2.71) to 1.95/1000 (95% CI: 1.90–2.00) (Figure 1). Rural admission rates remained higher than for metropolitan areas over the seven year period

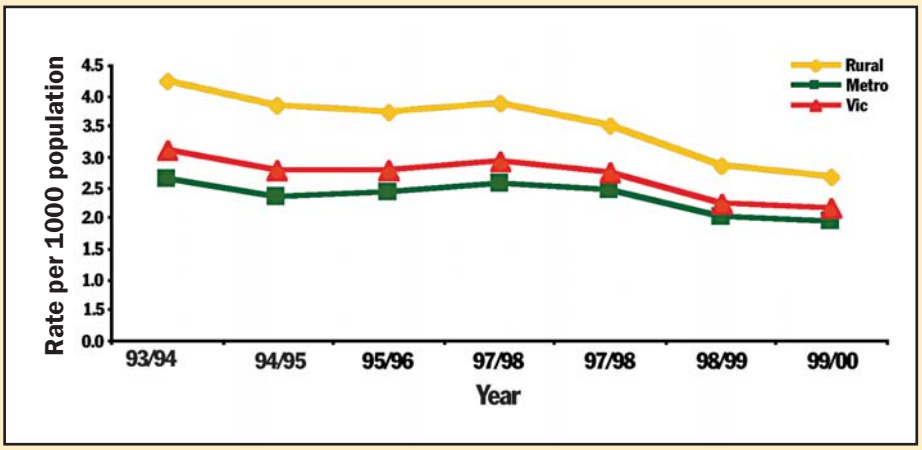

Figure 1. Asthma admission rates for rural and metropolitan areas

(Figure 1) and across different ages (data not shown).

Boroondara PCP had the lowest admission rate at 1.46/1000 (95% CI: 1.26–1.66), and Campaspe the highest at 4.03/1000 (95% CI: 3.36–4.71) in 1999–2000 (Table 1).

Primary care partnership admission rates were significantly correlated with ARIA ranking, with a Pearson correlation co-efficient of 0.61 ($p<0.01$), showing increasing admission rates with increasing remoteness (Table 1).

Discussion

We have shown asthma admission rates remain consistently higher in rural areas than in metropolitan areas, despite an overall decrease with time in the past seven years. The explanation for this is not clear. Local variations in admission rates cannot be explained by differences in prevalence rates, which are not generally higher in rural areas.[10,11] However, they may be partly explained by differences in the severity of asthma. The prevalence of parent reported severe episodes is significantly higher in rural regions.[11]

Another explanation could be differences in the threshold for admissions among rural doctors compared to their urban counterparts.[12] Rural doctors may be more likely to admit people with less severe attacks because of the larger distance should the condition deteriorate. Yet another explanation is availability of services. Many rural towns have problems with the availability of general practitioners, who could otherwise optimise continuing care. Among the factors involved, differences in quality of asthma management in primary and tertiary care, including access to services, may be important. These data provide an opportunity to target interventions at the local level to improve the outcome of asthma care in the community.

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Implications of this study for general practice

- High asthma admission rates may reflect deficits in primary care availability, accessibility, or quality.
- Asthma can be examined for its relative importance in each community and appropriate interventions designed to fit the unique ambulatory needs of each community.
- Optimal management of asthma can decrease both hospitalisations and deaths from asthma.

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