

# Presentations to selected Melbourne hospitals with cardiovascular disease by Indigenous and non-Indigenous people, 2011–19: a linked administrative data analysis

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**T**he overall cardiovascular disease (CVD) mortality risk in Australia is 1.5 times as high for Aboriginal and Torres Strait Islander (Indigenous) people as for other Australians.<sup>1</sup> The difference in risk in Victoria, however, is unknown: data for Indigenous Victorians have been excluded from national reports on Indigenous cardiovascular mortality because of concerns regarding the quality of Indigenous identification in Victorian administrative data.

Led by an Aboriginal cardiologist, we analysed administrative data to characterise CVD events and outcomes for Indigenous Victorians. Supported by an Indigenous governance framework, we linked administrative health records (the Victorian Admitted Episodes and Emergency Minimum datasets) for adults (18 years or older) who presented to two large metropolitan public hospitals (Royal Melbourne Hospital, Northern Hospital) or to any of the Western Health hospitals (Footscray Hospital, Sunshine Hospital, Bacchus Marsh and Melton Regional Hospital, Sunbury Day Hospital, Williamstown Hospital) for whom at least one CVD event was recorded during 1 July 2011 – 30 June 2019. The areas served by these hospitals are on the traditional country of the Kulin Nations; data governance arrangements included Aboriginal hospital liaison officers at each hospital, facilitating oversight of the datasets from the Indigenous perspective.

In our descriptive analysis, we compared the characteristics of Indigenous and non-Indigenous patients. They were characterised according to CVD event type, age, gender, and postcode-level socio-economic status (Index of Relative Socio-Economic Disadvantage, IRSD<sup>2</sup>) and remoteness (Australian Statistical Geography Standard<sup>3</sup>). CVD events (coronary heart disease, stroke, congestive heart failure, peripheral vascular disease) were identified by International Classification of Diseases, tenth revision (ICD-10) codes for the final diagnosis (people who presented to emergency departments) or the principal diagnosis (people admitted to hospital). Only the first CVD event recorded for an individual during the study period was included in our analysis. People were defined as being Indigenous if this identification was recorded at least once in the linked datasets. The statistical significance of differences was assessed in  $\chi^2$  tests for categorical variables and in Mann–Whitney

*U* tests for continuous variables. All analyses were conducted in Stata 17. The Royal Melbourne Hospital Human Research Ethics Committee approved our study (201808/5).

Of the 84383 people who presented to hospital with CVD events during 2011–19, 881 were Indigenous people (1.0%). In a 2016 national survey, 0.8% of Victorians and 0.5% of Melbourne people identified themselves as Indigenous people.<sup>4</sup> The median age at the first CVD event was 60.1 years (interquartile range [IQR], 50.2–70.5 years) for Indigenous people and 71.3 years (IQR, 59.7–81.1 years) for non-Indigenous people ( $P < 0.001$ ). The most frequent CVD event was coronary heart disease for both Indigenous (451 of 881 patients, 51.2%) and non-Indigenous people (37893 of 82467 patients, 45.9%). A total of 419 of 819 Indigenous patients (51.2%) and 33473 of 76682 non-Indigenous patients (43.7%) lived in postcodes in the two lowest socio-economic status quintiles; 581 of 826 Indigenous patients (70.3%) and 66166 of 76997 non-Indigenous patients lived in major cities (85.9%) (Box).

Our study was limited by its including only the first CVD event recorded during the study period for each person; further, people may have experienced CVD events before the study period or presented to other hospitals with CVD events. Our findings may not be generalisable to the entire Victorian population. The included hospitals were large tertiary centres that admitted patients transferred from rural hospitals, but our analysis did not include people treated only in regional and rural areas. Finally, administrative datasets do not facilitate detailed insights into factors that influence the disclosure of Indigenous identity.

Our study derived Indigenous community-relevant insights from administrative health data. The median age of people who presented to hospital with CVD events was eleven years lower for Indigenous than non-Indigenous people, and a larger proportion (more than half) lived in areas of lower socio-economic status. These findings indicate the importance of taking social health determinants into account when attempting to reduce the CVD burden for Indigenous people in Victoria. Our findings will inform the development of culturally appropriate CVD prevention and treatment programs in collaboration with Victorian Indigenous communities.

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### Characteristics of people who presented with cardiovascular disease events to the Royal Melbourne Hospital, the Northern Hospital, or Western Health hospitals, 1 July 2011 – 30 June 2019, by Indigenous status\*

Characteristic	Indigenous people	Non-Indigenous people	P
Overall	881	82 467	
Hospital/health service of first presentation			0.004
Northern Hospital	180 (20.4%)	20 857 (25.3%)	
Royal Melbourne Hospital	326 (37.0%)	29 105 (35.3%)	
Western Health hospitals	375 (42.6%)	32 505 (39.4%)	
Gender			0.22
Men	492 (55.8%)	47 751 (57.9%)	
Women	389 (44.2%)	34 716 (42.1%)	
Age at event (years), median (IQR)	60.1 (50.2–70.5)	71.3 (59.7–81.1)	< 0.001
Under 50	217 (24.6%)	8976 (10.9%)	
50–59 years	220 (25.0%)	12 024 (14.6%)	
60–69 years	212 (24.1%)	17 765 (21.5%)	
70–79 years	159 (18.0%)	20 641 (25.0%)	
80 or older	73 (8.3%)	23 061 (28.0%)	
Type of cardiovascular event			< 0.001
Coronary heart disease	451 (51.2%)	37 893 (45.9%)	
Stroke	219 (24.9%)	21 836 (26.5%)	
Congestive heart failure	137 (15.6%)	17 623 (21.4%)	
Peripheral vascular disease	73 (8.3%)	5113 (6.2%)	
Socio-economic status (IRSD quintile) <sup>2</sup>			< 0.001
1 (most disadvantaged)	243 (29.7%)	16 584 (21.6%)	
2	176 (21.5%)	16 889 (22.0%)	
3	164 (20.0%)	15 803 (20.6%)	
4	165 (20.1%)	17 695 (23.1%)	
5 (least disadvantaged)	71 (8.7%)	9711 (12.7%)	
Missing data	62 [7.0%]	5785 [7.0%]	
Remoteness <sup>3</sup>			< 0.001
Major cities	581 (70.3%)	66 166 (85.9%)	
Inner regional	161 (19.5%)	8883 (11.5%)	
Outer regional	80 (9.7%)	1910 (2.5%)	
Remote/very remote	4 (0.5%)	38 (0.1%)	
Missing data	55 [6.2%]	5470 [6.6%]	

IQR = interquartile range; IRSD = Index of Relative Socio-Economic Disadvantage. \* Only the first cardiovascular disease event during the study period was included for an individual. Indigenous status was not available for 1035 people (1.2% of all presentations); the Victorian Admitted Episodes Dataset or Victorian Emergency Minimum Dataset recorded "refused to answer", "not asked", or "missing". Data for these people were excluded from our analysis by Indigenous status. ◆

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