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Dear Professor Daube

Attendances at Perth Metropolitan Hospital Emergency Departments Attributable to Tobacco in 2008

Thank you for requesting us to estimate the numbers of attendances at hospital emergency departments in the Perth Metropolitan Area in 2008 caused by smoking tobacco in the Western Australian population. We have completed a detailed investigation and analysis of this question and wish to advise you as follows.

Conservative nature of the estimates

We emphasise that due to data limitations, the estimates below are likely to be conservatively biased. In particular, there are two sources of error that will have most certainly caused the results to be under-estimates. The first is that the Emergency Department Information System (EDIS) in Western Australia, whilst recording information about all ED facilities at public sector teaching and non-teaching hospitals in metropolitan Perth, does not include information from the private sector ED facility at the St John of God Hospital in Murdoch. The shortfall from this omission is believed to be in the order of 5.4% of the true total metropolitan attendances. Thus, a more valid picture of the true situation may be obtained by scaling up the results presented below by an additional $100\% / (1 - 5.4\%) = +5.7\%$. The data we have analysed plus an estimate of the number of ED presentations at Murdoch accounts for approximately 53% of total state ED activity.

A second source of underestimation has been the sometimes incomplete nature of diagnostic information recorded in the EDIS system. Very often the ED medical staff are able to arrive at a reliable diagnosis, but sometimes the patient's condition recovers spontaneously before a firm conclusion can be reached or further diagnostic tests are required either as an inpatient or returning outpatient to clarify the situation. In these instances, the diagnosis shown in the EDIS data can remain non-specific (eg, 'chest pain') and as such, it has been impossible for us to estimate the correct fraction of these types of attendance to include in the analysis.

Total numbers of Perth metropolitan emergency department attendances in 2008.

The total number of recorded ED attendances in metropolitan Perth in 2008 was 435,860, consisting of 224,829 in males and 210,981 in females. Of the total attendances, 185,256 (42.5%) received a triage classification of 'urgent' (levels 0-3), meaning that the patient should wait no more than 30 minutes to receive attention. The following is a breakdown of the total attendances and the urgent attendances according to broad age groups. Please note that these numbers are not the attendances caused by tobacco, but rather include the many attendances not attributable to tobacco as well.

Age group	Number and % of attendances			
	All attendances		Urgent attendances	
	Number	%	Number	%
0-14 yr	108,342	24.9%	31,919	17.2%
15-39 yr	155,424	35.7%	59,335	32.0%
40-69yr	111,441	25.6%	57,308	30.9%
70+ yr	60,651	13.9%	36,694	19.8%
Total	435,860*	100.0%*	185,256	100.0%

* Two attendances were of patients of unknown age.

Method of estimation of tobacco-caused attendances

Aetiologic fractions enable the numbers of health-related events caused by tobacco in a given population to be estimated, provided that the fractions have been based on the prevalence of smoking in that population. The method was originally developed by one of us (Holman) with Professor Bruce Armstrong in the 1980s,¹ was subsequently adopted as a national standard by the Australian Institute of Health and Welfare,² and has been used by the Health Department of Western Australia to estimate deaths and inpatient hospital episodes caused by tobacco in the State.³

We used the categories of tobacco-related conditions recommended by Ridolfo and others from the Australian Institute of Health and Welfare,² with some adjustments and specific Western Australian aetiologic fractions recommended by Codde from the Western Australian Department of Health and consistent with methods used in a recent Commonwealth report.⁴ The fractions were stratified by gender, five-year age group and tobacco-related diagnoses.

Numbers of total and urgent (triage levels 0-3) metropolitan ED attendances in 2008 were extracted from the Western Australian EDIS system, cross-tabulated by gender, five-year age group and tobacco-related and other diagnoses. We then applied the strata-specific aetiologic fractions to the corresponding cells of the tabulated ED data to obtain the estimates of numbers of attendances caused by smoking tobacco.

¹ Holman CDJ, Armstrong BK, Arias LN, Martin CA, Hatton WM, Hayward LD, Salmon MA, Shean RE, Waddell VP. **The Quantification of Drug Caused Morbidity and Mortality in Australia.** Canberra: Commonwealth Department of Community Services and Health, 1988 (republished in 1990).

² Ridolfo B & Stevenson C. **The quantification of drug-caused mortality and morbidity in Australia,** 1998. AIHW Cat No. PHE 29, Canberra (Drug Statistics Series no. 7), 2001.

³ Unwin E, Codde JP, Bartu A. **The Impact of Tobacco Smoking on the Health of Western Australians.** Perth: Department of Health, Health Information Centre, Occasional Paper 18, 2003.

⁴ Collins DJ & Lapsley HM. **Monograph series No. 64: The costs of Tobacco, Alcohol and Illicit Drug Abuse to Australian Society in 2005/05.** National Drug Strategy, Commonwealth of Australia, Canberra, 2008.

Numbers of all emergency department attendances in 2008 caused by tobacco

The next table shows the number of ED attendances for each tobacco-related condition caused by tobacco in 2008. As indicated in this table, the major contributing condition to ED attendances caused by tobacco was chronic obstructive pulmonary disease (COPD; n=2,142, 43.9%). Comparatively, the percentage of all attendances for COPD was 62.0%. Other major contributing conditions caused by tobacco included: ischaemic heart disease (IHD; n= 898, 18.4%); lower respiratory tract infection (n=513, 10.5%); cardiac dysrhythmias (n=504, 10.3%); and stroke (n= 385, 7.9%). Lung cancer had the highest tobacco attendances as a percentage of all attendances at 79.5%, followed by COPD (62.0%), laryngeal cancer and pulmonary circulation disease (both 60%), and oesophageal cancer (50%). As a percentage of all tobacco-caused attendances, the largest contributors were COPD (43.9%), IHD (18.4%), lower respiratory tract infections (10.5%) and cardiac dysrhythmias (10.3%), stroke (7.9%) and heart failure (3.0%). All other conditions made up less than 1% of tobacco attendances. The negative values for Parkinson's disease and ulcerative colitis recognise that tobacco has a modest protective effect against these uncommon conditions.

Condition	ED attendances in 2008			
	Total number	Number caused by tobacco	% of all tobacco attendances	Tobacco attendances as a % of all attendances for condition
Oropharyngeal cancer	1	0	0.0%	0.0%
Oesophageal cancer	8	4	0.1%	50.0%
Stomach cancer	4	0	0.0%	0.0%
Pancreatic cancer	47	9	0.2%	19.1%
Laryngeal cancer	5	3	0.1%	60.0%
Lung cancer	44	35	0.7%	79.5%
Cervical cancer	20	1	0.0%	5.0%
Endometrial cancer	7	-1	0.0%	-14.3%
Kidney cancer	3	1	0.0%	33.3%
Ischaemic heart disease	5,862	898	18.4%	15.3%
Chronic obstructive pulmonary disease	3,455	2,142	43.9%	62.0%
Parkinson's disease	89	-10	-0.2%	-11.2%
Pulmonary circulation disease	20	12	0.2%	60.0%
Cardiac dysrhythmias	3,545	504	10.3%	14.2%
Heart failure	2,012	147	3.0%	7.3%
Stroke	3,252	385	7.9%	11.8%
Peripheral vascular disease	345	50	1.0%	14.5%
Lower respiratory tract infection	9,019	513	10.5%	5.7%
Crohn's disease	180	47	1.0%	26.1%
Ulcerative colitis	57	-6	-0.1%	-10.5%
Antepartum haemorrhage	2,792	0	0.0%	0.0%
Asthma (under 15 years)	4,199	47	1.0%	1.1%
Macular degeneration	179	17	0.4%	9.5%
Otitis media	1,931	81	1.7%	4.2%
Total	37,076	4,881	100.0%	13.2%
Non tobacco related conditions	398,784	0	0.0%	0.0%
Grand total	435,860	4,881	100%	1.1%

Numbers of urgent emergency department attendances in 2008 caused by tobacco

The next table shows the number of urgent ED attendances for each tobacco-related condition caused by tobacco in 2008. Urgent attendances accounted for 83% of all attendances caused by tobacco compared with only 42% of all ED attendances being classified as urgent. As indicated in this table, the major contributing conditions to urgent ED attendances caused by tobacco were COPD (42.1%), IHD (21.8%), cardiac dysrhythmias (12.1%), lower respiratory tract infections (8.7%), stroke (8.1%) and heart failure (3.2%). All other conditions made up less than 1% of urgent tobacco attendances.

Condition	Urgent ED attendances in 2008			
	Total number	Number caused by tobacco	% of tobacco attendances	Tobacco attendances as a % of all attendances for condition
Oropharyngeal cancer	1	0	0.0%	0.0%
Oesophageal cancer	4	2	0.0%	50.0%
Stomach cancer	4	0	0.0%	0.0%
Pancreatic cancer	34	6	0.2%	17.6%
Laryngeal cancer	4	2	0.1%	50.0%
Lung cancer	39	31	0.8%	79.5%
Cervical cancer	1	0	0.0%	0.0%
Endometrial cancer	2	0	0.0%	0.0%
Kidney cancer	3	1	0.0%	33.3%
Ischaemic heart disease	5,761	888	21.8%	15.4%
Chronic obstructive pulmonary disease	2,613	1,716	42.1%	65.7%
Parkinson's disease	31	-3	-0.1%	-9.7%
Pulmonary circulation disease	18	11	0.3%	61.1%
Cardiac dysrhythmias	3,420	493	12.1%	14.4%
Heart failure	1,776	129	3.2%	7.3%
Stroke	2,757	330	8.1%	12.0%
Peripheral vascular disease	197	27	0.7%	13.7%
Lower respiratory tract infection	6,262	354	8.7%	5.7%
Crohn's disease	126	33	0.8%	26.2%
Ulcerative colitis	32	-4	-0.1%	-12.5%
Antepartum haemorrhage	643	0	0.0%	0.0%
Asthma (under 15 years)	3,223	36	0.9%	1.1%
Macular degeneration	130	12	0.3%	9.2%
Otitis media	187	10	0.2%	5.3%
Total	27,268	4,074	100.0%	14.9%
Non tobacco related conditions	157,988	0	0.0%	0.0%
Grand total	185,256	4,074	100.0%	2.2%

Numbers of emergency department attendances of children aged 0-5 in 2008 caused by tobacco

During our analysis it came to attention that an important number of children aged 0-4 years attended ED departments with acute respiratory conditions caused by tobacco. These results, relating specifically to ED attendances of children aged 0-4 years, show that the percentage of urgent tobacco attendances was greater (55.4%) than the percentage of all attendances (31.7%).

ED attendances of children aged 0-4 years in 2008				
Triage level	Total number	Number caused by tobacco	% of tobacco attendances	% of all attendances for triage level
Urgent attendance	19,258	213	55.4%	31.7%
Non-urgent attendances	41,543	171	44.6%	68.3%
Total	60,801	384	100.0%	100.0%

In summary, there is an important proportion of hospital emergency department attendances in Western Australia that can be prevented by further reductions in the prevalence of tobacco smoking. We would expect the contribution of tobacco to the more urgent and resource-intensive ED department attendances to be of particular concern to the public given the strains apparent in the capacity of Perth's emergency care system to cope with peak periods of demand and the flow-on effects of emergency department pressures on inpatient bed utilisation, disruption of elective surgery waiting lists and spiraling health care costs.

We trust that these results and our comments will assist the WA Public Health Advocacy Institute in bringing the facts outlined above to the attention of the community. Please contact us should you require any further information.

Yours sincerely



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Graduate Research Assistant
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