Mortality Attributable to Tobacco Use in Canada and its Regions, 1998

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ABSTRACT

Objectives: The purpose of this report is to calculate 1998 smoking attributable mortality (SAM) and to explore whether SAM estimates have changed from the late 1980s to the late 1990s.

Methods: Using the data from the National Population Health Survey and the Canadian Mortality Database, a modified Smoking-Attributable Mortality, Morbidity and Economic Cost (SAMMEC) method was applied to estimate national and regional smoking-attributable mortality for 1998.

Findings: The results indicate that in 1998, 30,230 men and 17,351 women died as a result of both active and passive smoking, including 96 children under the age of 1. This includes 1,107 Canadians who died from both lung cancer and ischemic heart disease attributable to environmental tobacco smoke. The total of 47,581 deaths represents an increase of 9,224 deaths since 1989, with females accounting for 6,531 of these increased deaths. The increase in female mortality is divided between cancers (2,452), cardiovascular diseases (1,646), and respiratory diseases (2,283). In 1998, the top causes of adult smoking-related deaths were lung cancer (13,951 deaths), ischemic heart disease (9,289 deaths) and chronic airways obstruction (6,457 deaths).

Conclusion: Cigarette smoking remains the number one preventable cause of death in Canada and its impact on the health of Canadians continues to be an unacceptable burden.

La traduction du résumé se trouve à la fin de l'article.

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On an ongoing basis, the Tobacco Control Programme at Health Canada has published directly comparable smoking-attributable mortality (SAM) estimates for survey years: 1989,[1,2] 1991,[3] 1994,[4] and 1996.[4] In all of these reports, the Smoking-Attributable Mortality, Morbidity and Economic Cost (SAMMEC) method,[5] considered to be a reliable method,[1] was used to estimate both national and regional SAM for 26 disease categories known to be attributable to cigarette smoking. Recently, mortality data and smoking prevalence data have become available for the year 1998. The purpose of this report is to calculate 1998 SAM and to explore whether SAM estimates have changed from the late 1980s to the late 1990s.

METHODS

The 1998 Canadian mortality data[6] and smoking prevalence rates,[7] combined with the American Cancer Society's Cancer Prevention Study II (CPS-II) relative risks,[8,9] provide the basis for SAM estimates presented in this report. The 1998 mortality data for 22 adult smoking-related diseases and 4 paediatric diseases linked with maternal smoking, were drawn from the Canadian Mortality Database,[6] maintained at the Health Statistics Division, Statistics Canada. Deaths were categorized by diagnosis, region, gender, and five-year age group, for persons aged 35 years and over and infants aged under 1 year. Diagnoses were designated by code using the International Classification of Diseases, 9th Revision. Data on fire deaths due to smoking were not available for inclusion in our 1998 SAM calculations.

Smoking prevalence rates for adults aged 35 years or older and for women of child-bearing age (15 to 44 years) were obtained from the National Population Health Survey (NPHS) 1998/99 (third cycle).[7] Data included current, former and never smoker rates, by region, gender and age group. Current smokers are those who reported smoking cigarettes daily and occasionally in the NPHS.[7] Prevalence rates of non-smokers married to current smokers aged 35 years and older (unavailable in the NPHS[7]) were obtained from the Survey on Smoking in Canada 1994/95, cycle 3,[10] to calculate 1998 passive smoking deaths.[4]

TABLE I

Relative Risks for Current (RR_1) and Former (RR_2) Cigarette Smokers and Smoking Attributable Mortality (SAM) by Region, by Disease Category, Canada, 1998 – Males

Disease Category	ICD-9	RR_1 Current Smokers	RR_2 Former Smokers	SAM by Region					
				Atlantic	Quebec	Ontario	Prairies	B.C.	Canada
Adult Diseases (35+ yrs of age)		n/a	n/a	**2,958**	**8,409**	**9,992**	**4,856**	**3,347**	**29,563**
Cancers		n/a	n/a	1,139	3,809	4,037	1,706	1,360	12,052
Lip, oral cavity, pharynx	140-149	27.48	8.8	46	190	231	70	72	610
Esophagus	150	7.6	5.83	68	163	296	121	113	761
Pancreas	157	2.14	1.12	40	114	128	86	47	415
Larynx	161	10.48	5.24	27	108	117	37	31	320
Trachea, lung, bronchus	162	22.36	9.36	874	2,996	2,967	1,235	995	9,067
Cervix uteri	180	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Urinary bladder	188	2.86	1.9	41	122	162	87	54	467
Kidney, other urinary	189	2.95	1.95	43	116	136	69	49	413
Cardiovascular Diseases		n/a	n/a	1,170	2,873	3,948	2,096	1,218	11,305
Rheumatic heart disease	390-398	1.85	1.32	2	13	11	8	7	41
Hypertension	401-405	1.85	1.32	16	24	53	33	19	145
Ischemic heart disease (IHD)	410-414								
Ages 35-64		2.81	1.75	223	639	788	317	204	2,171
Ages 65+		1.62	1.29	403	1,046	1,477	700	382	4,007
Pulmonary heart disease	415-417	1.85	1.32	11	31	37	26	16	120
Other heart disease	420-429	1.85	1.32	183	389	443	414	217	1,645
Cerebrovascular disease	430-438								
Ages 35-64		3.67	1.38	29	93	145	56	38	361
Ages 65+		1.94	1.27	131	307	461	264	148	1,310
Atherosclerosis	440	4.06	2.33	32	63	141	83	36	356
Aortic aneurysm	441	4.06	2.33	104	190	256	142	102	794
Other arterial disease	442-448	4.06	2.33	36	79	138	53	49	354
Respiratory Diseases		n/a	n/a	649	1,727	2,008	1,054	769	6,206
Respiratory tuberculosis	010-012	1.99	1.56	1	6	7	4	2	20
Pneumonia/Influenza	480-487	1.99	1.56	138	267	504	290	219	1,418
Bronchitis/Emphysema	491-492	9.65	8.75	74	247	232	122	77	751
Asthma	493	1.99	1.56	3	10	16	16	10	55
Chronic airways obstruction	496	9.65	8.75	433	1,198	1,248	622	463	3,963
Paediatric Diseases (<1 yr of age)		n/a	n/a	**5**	**14**	**22**	**10**	**4**	**55**
Low birth weight	765	1.76	n/a	1	5	8	2	1	17
Respiratory distress syndrome	769	1.76	n/a	1	4	2	1	1	8
Respiratory conditions-newborn	770	1.76	n/a	1	1	6	2	1	11
Sudden infant death syndrome	798.0	1.75	n/a	2	4	6	6	1	19
Fire Deaths (all ages)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total PSAM		n/a	n/a	**68**	**233**	**248**	**34**	**29**	**612**
Lung cancer PSAM		n/a	n/a	24	97	77	10	10	218
IHD PSAM		n/a	n/a	44	136	171	24	19	394
TOTAL		n/a	n/a	**3,031**	**8,656**	**10,263**	**4,900**	**3,381**	**30,230**
SAM as percentage of deaths from all causes*		n/a	n/a	3	8	9	4	3	27
Male-to-female SAM ratio		n/a	n/a	2.0	1.9	1.7	1.8	1.4	1.7

Relative risks, taken from CPS-II Study, are relative to never smokers.[8]
PSAM - Passive smoking attributable mortality was calculated using RR_{ets}=1.3 for lung cancer and RR_{ets}=1.24 for IHD.[8,14]
n/a - not applicable or not available
* In Canada, 113,007 males died from all causes in 1998.[15]

SAM estimates were calculated according to methods developed by Rice and Max[11] which are similar to those produced by SAMMEC II,[5] modified to run in Microsoft Excel. Diagnosis-specific relative risks for smoking-related diseases,[8] defined as the ratio of mortality among current or former smokers to that of never smokers, were obtained by diagnosis, gender and age group from the CPS-II. Current and former relative risks are denoted as RR_1 and RR_2, where RR_1 is notably higher than RR_2. Never, current and former smoker rates[7] for adults 35 years of age or older are denoted as p_0, p_1 and p_2. The female current smoker rate for women of childbearing age (15 to 44 years) is denoted as p_1*.

The smoking-attributable fraction (SAF), calculated for each smoking-related disease, is the proportion of deaths that results from smoking for that particular disease. For adults, SAF is a function of current and former smoking prevalence rates and relative risks:[5,11]

$$SAF_{AD} = \frac{[p_0+p_1(RR_1)+p_2(RR_2)]-1}{[p_0+p_1(RR_1)+p_2(RR_2)]}$$

For paediatric diseases, the SAF was derived from the following attributable risk formula:[12]

$$SAF_{PD} = \frac{p_1^*(RR_1-1)}{p_1^*(RR_1-1)+1}$$

SAM by region, gender and age group was estimated as the product of the numbers of deaths for each smoking-related disease and SAF.

In 1989[1,2] and 1991,[3] passive smoking attributable mortality (PSAM) was derived by applying estimated age- and sex-specific rates of death from lung cancer attributable to exposure to tobacco smoke (ETS) from spouses and other sources to the population of Canadians who have never smoked.[13] For each of the years 1994,[4]

TABLE II

Relative Risks for Current (RR_1) and Former (RR_2) Cigarette Smokers and Smoking Attributable Mortality (SAM) by Region, by Disease Category, Canada, 1998 – Females

Disease Category	ICD-9	RR_1 Current Smokers	RR_2 Former Smokers	SAM by Region						TOTAL SAM Canada (M+F)
				Atlantic	Quebec	Ontario	Prairies	B.C.	Canada	
Adult Diseases (35+ yrs of age)		n/a	n/a	**1,487**	**4,501**	**5,941**	**2,619**	**2,267**	**16,815**	**46,378**
Cancers		n/a	n/a	524	1,757	2,230	885	899	6,295	**18,347**
Lip, oral cavity, pharynx	140-149	5.59	2.88	10	56	83	36	22	207	**817**
Esophagus	150	10.25	3.16	20	50	101	32	40	244	**1,005**
Pancreas	157	2.33	1.78	46	148	181	94	71	540	**955**
Larynx	161	17.78	11.88	6	22	20	8	5	62	**382**
Trachea, lung, bronchus	162	11.94	4.69	407	1,378	1,721	659	719	4,884	**13,951**
Cervix uteri	180	2.14	1.94	15	33	52	22	14	136	**136**
Urinary bladder	188	2.58	1.85	13	51	54	23	19	161	**628**
Kidney, other urinary	189	1.41	1.16	6	19	17	12	8	62	**475**
Cardiovascular Diseases		n/a	n/a	548	1,590	2,129	1,074	767	6,109	**17,413**
Rheumatic heart disease	390-398	1.69	1.16	3	23	15	6	8	55	**96**
Hypertension	401-405	1.69	1.16	16	36	52	31	18	153	**298**
Ischemic heart disease (IHD)	410-414									
Ages 35-64		3	1.43	53	142	174	79	41	489	**2,660**
Ages 65+		1.6	1.29	210	687	970	438	317	2,622	**6,629**
Pulmonary heart disease	415-417	1.69	1.16	7	22	26	13	11	80	**200**
Other heart disease	420-429	1.69	1.16	126	303	317	218	170	1,133	**2,779**
Cerebrovascular disease	430-438									
Ages 35-64		4.8	1.41	23	80	121	56	48	327	**687**
Ages 65+		1.47	1.01	39	122	139	88	67	455	**1,765**
Atherosclerosis	440	3	1.34	19	41	126	65	24	274	**630**
Aortic aneurysm	441	3	1.34	28	70	100	45	37	281	**1,075**
Other arterial disease	442-448	3	1.34	24	64	90	36	26	240	**595**
Respiratory Diseases		n/a	n/a	415	1,153	1,582	660	602	4,411	**10,618**
Respiratory tuberculosis	010-012	2.18	1.38	1	2	2	2	1	6	**26**
Pneumonia/Influenza	480-487	2.18	1.38	139	269	516	235	206	1,364	**2,782**
Bronchitis/Emphysema	491-492	10.47	7.04	33	172	142	59	67	473	**1,224**
Asthma	493	2.18	1.38	7	15	29	13	12	75	**130**
Chronic airways obstruction	496	10.47	7.04	237	696	893	351	316	2,494	**6,457**
Paediatric Diseases (<1 yr of age)		n/a	n/a	**4**	**13**	**13**	**8**	**3**	**41**	**96**
Low birth weight	765	1.76	n/a	1	5	6	2	1	15	**31**
Respiratory distress syndrome	769	1.76	n/a	1	2	2	1	0	6	**14**
Respiratory conditions-newborn	770	1.76	n/a	1	3	3	2	1	9	**21**
Sudden infant death syndrome	798.0	1.75	n/a	1	3	3	4	1	11	**30**
Fire Deaths (all ages)		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total PSAM		n/a	n/a	**47**	**126**	**177**	**66**	**79**	**495**	**1,107**
Lung cancer PSAM		n/a	n/a	13	39	46	17	28	143	**361**
IHD PSAM		n/a	n/a	34	87	131	49	51	352	**746**
TOTAL		n/a	n/a	**1,538**	**4,639**	**6,131**	**2,693**	**2,349**	**17,351**	**47,581**
SAM as percentage of deaths from all causes*		n/a	n/a	1	4	6	3	2	17	**21**

Relative risks, taken from CPS-II Study, are relative to never smokers.[8]
PSAM - Passive smoking attributable mortality was calculated using RR_{ets}=1.3 for lung cancer and RR_{ets}=1.24 for IHD.[8,14]
n/a - not applicable or not available
* In Canada, 105,084 females died from all causes in 1998.[15]

1996,[4] and 1998, lung cancer PSAM was derived by multiplying the passive smoking attributable fraction ($PSAF_{ets}$) by the number of lung cancer deaths among men or women, aged 35 years and over:

$$PSAF_{ets} = \frac{p_{ets}*(RR_{ets}-1)}{p_{ets}*(RR_{ets}-1)+1}$$

The estimate of 1.3[8] was used for the relative risk for ETS, denoted as RR_{ets} . The proportion of population with exposure (non-smokers married to current smokers, aged 35 years and over) is denoted as p_{ets}.[10]

Recently, relative risk, associated with ischemic heart disease (IHD) and ETS, has become available.[14] For the year 1998, IHD $PSAF_{ets}$ was calculated using the above formula, where RR_{ets}=1.24.[14] IHD PSAM was then calculated as the product of IHD $PSAF_{ets}$ and the number of deaths from IHD among men or women, aged 35 years and over. Total PSAM is the sum of IHD PSAM and lung cancer PSAM. These estimates, however, may be low.

Total 1998 SAM was calculated by summing all Adult Disease SAM, Paediatric Disease SAM, and Total PSAM, for each region and gender.

In order to compare the 1989[1,2] SAM estimates to those Adult Disease SAM estimates for years 1991,[3] 1994, [4] 1996, [4] and 1998, 1989 SAM[1,2] from cancers, cerebrovascular diseases (CVD) and respiratory diseases were summed.

RESULTS

SAM estimates, by disease, and Total PSAM, by region, are presented by gender in Tables I and II. The results indicate there were 30,230 male and 17,351 female smoking-attributable deaths in 1998, including 55 boys and 41 girls under the age of 1 who died as a result of smoking-related causes. Cancers accounted for

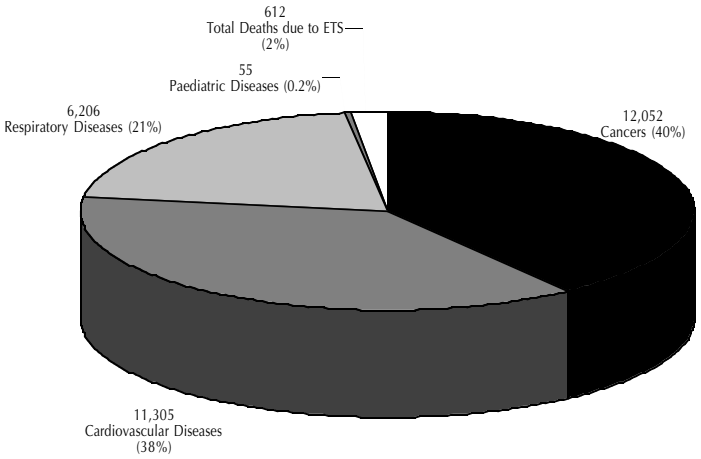

Figure 1A. Proportion and number of deaths due to smoking in Canada, 1998 – Males

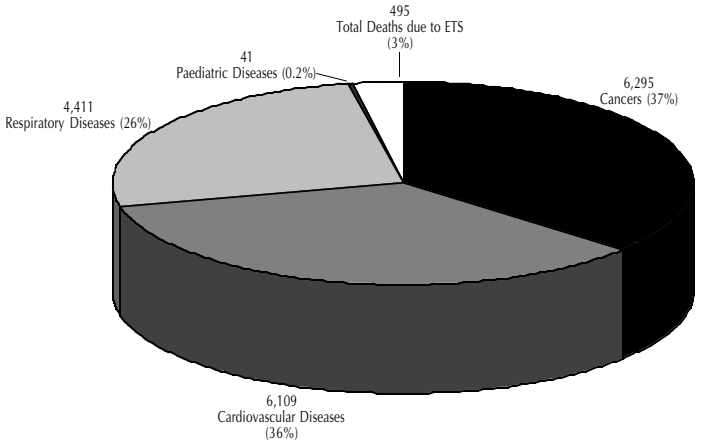

Figure 1B. Proportion and number of deaths due to smoking in Canada, 1998 – Females

18,347 of the total number of smoking-attributable deaths, while cardiovascular diseases accounted for another 17,413 and respiratory diseases, 10,618.

In addition, 612 men and 495 women, aged 35 years and over, died as a result of ETS exposure in 1998. Specifically, 218 men and 143 women died from lung cancer PSAM while 394 men and 352 women died from IHD PSAM.

Figure 1 shows the proportions of SAM, by gender, for smoking-related deaths in 1998. Lung cancer accounted for 9,067 (30%) males and 4,884 (28%) females; IHD accounted for 6,178 (20%) males and 3,111 (18%) females; and chronic airways obstruction accounted for 3,963 (13%) males and 2,494 (14%) females. These three adult diseases together accounted for almost two thirds of all SAM in Canada in 1998.

Of the total 47,581 smoking-attributable 1998 deaths in Canada, 16,394 occurred in Ontario, 13,295 in Quebec, 7,593 in the Prairies, 5,730 in British Columbia and 4,569 in the Atlantic region (Tables I and II).

Tables III and IV provide national and regional SAM estimates for Adult Diseases, Paediatric Diseases, Fire Deaths (where available), and Lung Cancer Deaths PSAM, by gender from 1989 to 1998. SAM among women rose from 10,820 in 1989 to 16,999, an increase of 57% (6,179 deaths). Among men, the number of

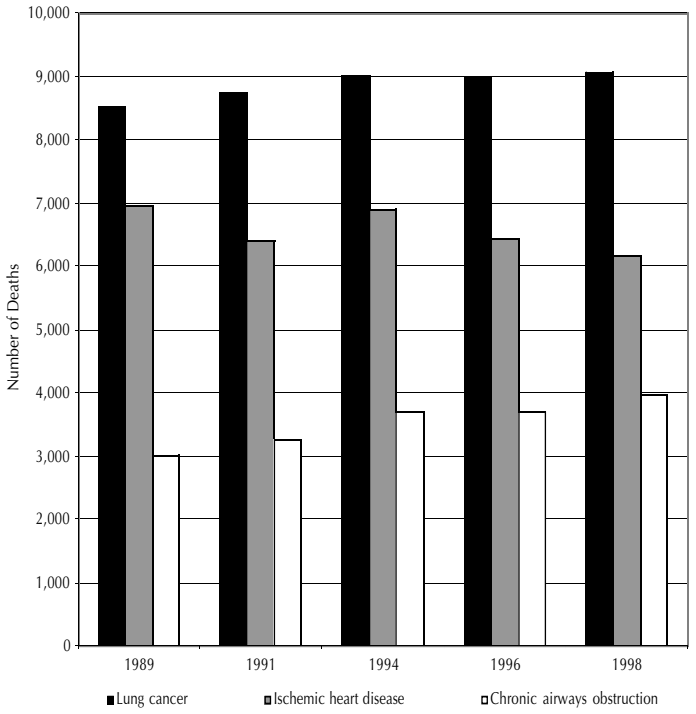

Figure 2A. Leading causes of smoking-related deaths, 1989 to 1998 – Males

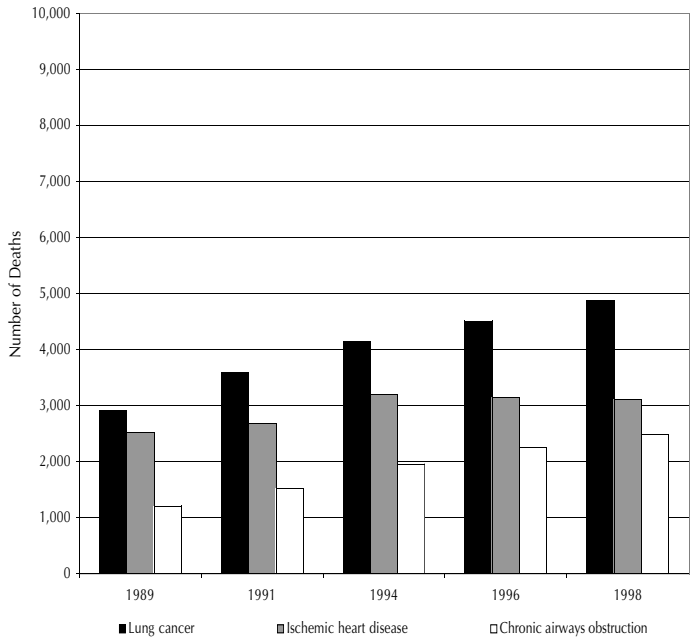

Figure 2B. Leading causes of smoking-related deaths, 1989 to 1998 – Females

deaths remained relatively constant throughout this period – from 27,537 in 1989 to 29,836 in 1998. The number of smoking-related deaths among women is rising faster than among men, resulting in a decrease in the male-to-female SAM ratio, 2.6 in 1989 and 1.8 in 1998.

The large increase in national female SAM between 1989 and 1998 was mainly due to large increases in the number of deaths from smoking-related cancers (64% or 2,452 deaths), CVD (37%

TABLE III

Estimated Smoking Attributable Mortality (SAM) by Year, by Cause of Death and Region, Canada, 1989-1998 – Males

Cause of Death	Region	SAM by Year 1989[1,2*]	1991[3]	1994[4]	1996[4]	1998
Adult Diseases (35 years +)	**Canada**	**27,273[1]**	**27,646**	**29,657**	**28,952**	**29,563**
Cancers + CVD + Respiratory Diseases	Atlantic	2,721[2]	2,761	3,024	2,838	2,958
	Quebec	7,807[2]	8,094	8,467	8,144	8,409
	Ontario	9,686[2]	9,503	10,251	9,841	9,992
	Prairies	4,061[2]	3,912	4,528	4,535	4,856
	B.C.	2,972[2]	3,376	3,386	3,594	3,347
Cancers (35 years +)	**Canada**	**10,978[1]**	**11,435**	**11,895**	**11,844**	**12,052**
ICD-9 140-149; 150; 157;161; 162; 188; 189.	Atlantic	958[2]	1,065	1,168	1,087	1,139
	Quebec	3,457[2]	3,622	3,722	3,772	3,809
	Ontario	3,878[2]	3,903	4,105	3,981	4,037
	Prairies	1,448[2]	1,524	1,575	1,615	1,706
	B.C.	1,218[2]	1,321	1,326	1,389	1,360
CVD (35 years +)	**Canada**	**11,372[1]**	**11,003**	**12,005**	**11,429**	**11,305**
ICD-9 390-398; 401-405; 410-414; 415-417;	Atlantic	1,250[2]	1,173	1,235	1,182	1,170
and 420-429; 430-438; 440; 441; 442-448.	Quebec	2,994[2]	2,980	3,174	2,877	2,873
	Ontario	4,189[2]	3,776	4,166	3,964	3,948
	Prairies	1,783[2]	1,663	2,022	1,959	2,096
	B.C.	1,162[2]	1,411	1,408	1,448	1,218
Respiratory Diseases (35 years +)	**Canada**	**4,923[1]**	**5,208**	**5,758**	**5,679**	**6,206**
ICD-9 010-012; 480-487; 491-492; 493; 496.	Atlantic	513[2]	523	622	569	649
	Quebec	1,356[2]	1,492	1,571	1,495	1,727
	Ontario	1,619[2]	1,824	1,981	1,897	2,008
	Prairies	830[2]	725	931	961	1,054
	B.C.	592[2]	644	653	757	769
Paediatric Diseases (<1 year of age)	**Canada**	**118[1]**	**101**	**90**	**63**	**55**
ICD-9 765; 769; 770; 798.0	Atlantic	7[2]	9	6	4	5
	Quebec	26[2]	23	21	16	14
	Ontario	39[2]	35	34	24	22
	Prairies	26[2]	20	21	15	10
	B.C.	18[2]	14	8	4	4
Fire (All Ages)	**Canada**	**81[1]**	**54**	**29**	**n/a**	**n/a**
	Atlantic	14[2]	4	3	n/a	n/a
	Quebec	14[2]	7	0	n/a	n/a
	Ontario	30[2]	16	12	n/a	n/a
	Prairies	13[2]	17	7	n/a	n/a
	B.C.	9[2]	10	7	n/a	n/a
Lung Cancer PSAM	**Canada**	**65[1]**	**66**	**215**	**214**	**218**
	Atlantic	7[2]	7	25	23	24
	Quebec	19[2]	19	92	94	97
	Ontario	23[2]	23	79	77	77
	Prairies	10[2]	10	10	10	10
	B.C.	7[2]	7	9	10	10
TOTAL	**Canada**	**27,537[1]**	**27,867**	**29,991**	**29,229**	**29,836**
	Atlantic	2,752[2]	2,781	3,059	2,865	2,987
	Quebec	7,866[2]	8,143	8,580	8,254	8,520
	Ontario	9,779[2]	9,577	10,376	9,942	10,092
	Prairies	4,108[2]	3,959	4,566	4,560	4,876
	B.C.	3,004[2]	3,407	3,410	3,608	3,362

* 1989 Canada[1] and regional[2] SAM from Adult Diseases were calculated in this paper for comparison purposes.
For 1989 estimates only, Canada is not the sum of the regions.
CVD - Cardiovascular Diseases
Lung cancer PSAM - Passive attributable mortality from lung cancer
n/a - not available
Superscripts 1-4 refer to references in article.

or 1,646 deaths), and respiratory diseases (107% or 2,283 deaths). Lung cancer (+68%; 1,973 deaths), IHD (+24%; 597 deaths), and chronic airways obstruction (+106%; 1,283 deaths) accounted for most of this increase.

Among men, SAM from cancers and respiratory diseases rose nationally by 10% (1,074 deaths) and 26% (1,283 deaths) respectively but for CVD declined minimally by 0.6% between 1989 and 1998. Increases in both lung cancer (+7%; 559 deaths) and chronic airways obstruction (+32%; 957 deaths) and a decrease in IHD (-11%; -785 deaths) accounted for most of the changes.

Figure 2 presents national SAM estimates, by gender, between 1989 to 1998, from lung cancer, IHD and chronic airways obstruction – the leading causes of smoking-related deaths in adults aged 35 years and over.

DISCUSSION

The number of deaths from all causes continues to increase each year because the population is growing and aging.[15] In 1998, 113,007 males and 105,084 females died in Canada,[15] with the five leading causes of death for both genders being 1) diseases of the circulatory system or CVD, 2) cancers, 3) respiratory diseases, 4) external causes of injury and poisoning, and 5) diseases of the digestive system.[16]

Cigarette smoking, the primary risk factor for the top three causes of death,[8,16] was estimated to be responsible for 22% of all deaths (27% of all male deaths and 17% of all female deaths) in 1998. Accounting for more than 47,000 deaths in 1998, smoking far exceeded the second most important preventable cause of death – external causes of injury and poisoning (over 13,200 deaths),

TABLE IV

Estimated Smoking Attributable Mortality (SAM) by Year, by Cause of Death and Region, Canada, 1989-1998 – Females

Cause of Death	Region	SAM by Year 1989[1,2*]	1991[3]	1994[4]	1996[4]	1998
Adult Diseases (35 years +)	**Canada**	**10,434[1]**	**13,172**	**15,287**	**15,811**	**16,815**
Cancers + CVD + Respiratory Diseases	Atlantic	835[2]	1,125	1,455	1,423	1,487
	Quebec	2,905[2]	3,599	3,966	4,027	4,501
	Ontario	3,563[2]	4,792	5,484	5,645	5,941
	Prairies	1,614[2]	1,868	2,311	2,492	2,619
	B.C.	1,464[2]	1,788	2,071	2,224	2,267
Cancers (35 years +)	**Canada**	**3,843[1]**	**4,833**	**5,523**	**5,859**	**6,295**
ICD-9 140-149; 150; 157;161; 162;	Atlantic	291[2]	378	476	508	524
and 180; 188; 189.	Quebec	986[2]	1,290	1,472	1,577	1,757
	Ontario	1,410[2]	1,818	2,002	2,047	2,230
	Prairies	574[2]	679	808	905	885
	B.C.	544[2]	668	766	822	899
CVD (35 years +)	**Canada**	**4,463[1]**	**5,390**	**6,228**	**6,133**	**6,109**
ICD-9 390-398; 401-405; 410-414; 415-417;	Atlantic	357[2]	483	644	557	548
and 420-429; 430-438; 440; 441; 442-448.	Quebec	1,328[2]	1,577	1,634	1,538	1,590
	Ontario	1,481[2]	1,856	2,183	2,257	2,129
	Prairies	711[2]	737	963	982	1,074
	B.C.	581[2]	737	803	798	767
Respiratory Diseases (35 years +)	**Canada**	**2,128[1]**	**2,949**	**3,536**	**3,819**	**4,411**
ICD-9 010-012; 480-487; 491-492; 493; 496.	Atlantic	187[2]	264	335	358	415
	Quebec	591[2]	732	861	912	1,153
	Ontario	672[2]	1,118	1,299	1,341	1,582
	Prairies	329[2]	452	540	605	660
	B.C.	339[2]	383	502	604	602
Paediatric Diseases (<1 year of age)	**Canada**	**79[1]**	**70**	**60**	**42**	**41**
ICD-9 765; 769; 770; 798.0	Atlantic	6[2]	5	5	4	4
	Quebec	18[2]	18	13	11	13
	Ontario	29[2]	21	23	13	13
	Prairies	17[2]	16	14	10	8
	B.C.	11[2]	10	6	4	3
Fire (All Ages)	**Canada**	**38[1]**	**31**	**12**	**n/a**	**n/a**
	Atlantic	9[2]	2	0	n/a	n/a
	Quebec	11[2]	6	0	n/a	n/a
	Ontario	14[2]	12	9	n/a	n/a
	Prairies	9[2]	6	3	n/a	n/a
	B.C.	4[2]	5	0	n/a	n/a
Lung Cancer PSAM	**Canada**	**268[1]**	**268**	**121**	**133**	**143**
	Atlantic	21[2]	21	11	13	13
	Quebec	75[2]	75	32	36	39
	Ontario	91[2]	91	40	42	46
	Prairies	43[2]	43	16	18	17
	B.C.	38[2]	38	22	24	28
TOTAL	**Canada**	**10,820[1]**	**13,541**	**15,481**	**15,986**	**16,999**
	Atlantic	873[2]	1,153	1,471	1,440	1,504
	Quebec	3,007[2]	3,698	4,011	4,075	4,552
	Ontario	3,696[2]	4,916	5,555	5,700	6,000
	Prairies	1,685[2]	1,933	2,344	2,520	2,644
	B.C.	1,546[2]	1,841	2,100	2,251	2,298

* 1989 Canada[1] and regional[2] SAM from Adult Diseases were calculated in this paper for comparison purposes.
For 1989 estimates only, Canada is not the sum of the regions.
CVD - Cardiovascular Diseases
Lung cancer PSAM - Passive attributable mortality from lung cancer
n/a - not available

which include suicide, accidental falls and motor vehicle accidents.[16] These statistics again confirm that cigarette smoking remains the number one preventable cause of death in Canada, causing six times more deaths than murders (about 470 deaths), alcohol (about 800 deaths), car accidents (about 2,900 deaths) and suicides (about 3,700 deaths) combined.[6]

The leading causes of SAM in 1998 were the same as in 1989: lung cancer, IHD and chronic airways obstruction. Of note is that IHD SAM has declined for the age group 35 to 64 years, but has increased among women aged 65 years and over. Chronic airways obstruction SAM has increased faster than other SAM but has not surpassed lung cancer as the leading cause of SAM.

There is consensus that ETS is linked to lung cancer and IHD in adults.[14,17] In Canada, it was estimated that in 1998, non-smokers' exposure to ETS in the home caused just over 1,100 deaths – an underestimate as workplace exposure to ETS was not calculated.

Current trends in SAM continue to reflect the smoking behaviour of the population two to three decades earlier. The

effect of the drop in tobacco consumption among men, beginning in the mid-1960s, is reflected by the levelling off in the mid-1980s and then continuous decline in male lung cancer rates. In contrast, female smoking rates peaked in the late 1970s and declined slightly in the past three decades. As a result, female lung cancer death rates more than quadrupled between 1969 to 1998[18] and can be expected to rise for the next few years.

In addition, it can be expected that large numbers of aging "baby-boomers" will continue to die in the short term from smoking-related causes, reflecting the growth and age of the Canadian population as well as past smoking behaviour.

Of particular concern is the increasing connection of ETS to mortality. This report cites two outcomes of exposure to ETS: lung cancer and IHD. As time goes on and as the data become more conclusive, PSAM will increase in significance. In 1998, ETS accounted for approximately 1,000 of 47,000 deaths or 2% of all SAM. Much of the increase in deaths from the previous SAM estimate[4] is explained by new estimates for IHD PSAM (800 deaths).

It should be noted that there are various ways of estimating SAM.[5,19-21] While the major difference among these methods centres around the choice of relative risk, no method is incorrect. Relative risks are dependent on many factors, including where the population is in the smoking life cycle. If the smoking population is relatively young, the relative risks will be small. As the smoking population ages and continues to smoke, the relative risks will increase. The authors of this report have chosen to use CPS-II relative risk estimates to continue a SAM time series, as seen in Tables III and IV, in the belief that CPS-II provides the closest approximation of the current population of Canadian smokers.

As a greater effort is placed on encouraging smokers to quit and discouraging potential smokers from starting, there should be even greater variability in smoker's behaviour and consequently on relative risk. In any event, whatever set of relative risks is chosen, the resulting SAM is an unacceptable burden on Canadians.

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RÉSUMÉ

Objectifs : Notre étude visait à calculer la mortalité attribuable au tabagisme en 1998 et à déterminer si les estimations de ce type de mortalité ont changé entre la fin des années 1980 et la fin des années 1990.

Méthode : À l'aide des données de l'Enquête nationale sur la santé de la population et de la Base canadienne de données sur la mortalité, nous avons appliqué une version modifiée de la méthode de calcul de la mortalité, de la morbidité et du coût économique liés au tabagisme (SAMMEC) pour estimer le taux national et régional de mortalité attribuable au tabagisme pour 1998.

Constatations : Nos résultats indiquent que le tabagisme actif et passif a entraîné le décès de 30 230 hommes et de 17 351 femmes en 1998, dont 96 enfants de moins de 1 an. Ces chiffres comprennent les 1 107 Canadiens décédés de cancers du poumon et de cardiopathies ischémiques attribuables à la fumée secondaire du tabac. Le bilan total de 47 581 décès indique une progression depuis 1989, avec 9 224 décès de plus, dont 6 531 chez les femmes. La hausse de la mortalité chez les femmes est imputable au cancer (2 452), aux maladies cardiovasculaires (1 646) et aux maladies respiratoires (2 283). En 1998, les principales causes de décès liés au tabagisme à l'âge adulte étaient le cancer du poumon (13 951 décès), les cardiopathies ischémiques (9 289) et l'obstruction chronique des voies respiratoires (6 457).

Conclusion : L'usage de la cigarette demeure la première cause évitable de mortalité au Canada, et ses répercussions sur la santé des Canadiens représentent encore un fardeau inacceptable.