

POLLS—TRENDS

NORTH AMERICAN PUBLIC OPINION ON HEALTH AND SMOKING

RAYMOND M. DUCH*

KENT L. TEDIN

LARON K. WILLIAMS

Abstract Public opinion regarding smoking and health has been of interest to polling companies since the 1940s. This article documents the rate of change in the public's awareness and beliefs about smoking and health in North America (the United States and Canada). It reports on four broad categories of opinions: public awareness of reports that smoking has been linked to lung cancer; beliefs that smoking is harmful to health and a cause of lung cancer; beliefs that smoking is a cause of diseases other than lung cancer; and beliefs about the health hazards of secondhand smoke.

Public Concerns about Smoking and Health

This article documents the evolution of public attitudes and reported behavior related to smoking from 1950 to 2015—a period in which public health officials informed the public about the health risks associated with smoking. We draw upon a rich corpus of survey data on attitudes regarding smoking and health (Saad 1998; Pacheco 2011). This is a comprehensive overview of trends in public opinion concerning health and smoking that includes public opinion surveys from both Canada and the United States. A number of factors suggest that public opinion in the two countries trend in a similar fashion. These include strong similarities in media consumption (Grabb and Curtis 2010), and similar responses by policymakers to concerns regarding smoking and health. For example, the 1964 US Surgeon General's report was closely followed in Canada by the Isabelle report that called for significant restrictions on the advertising and promotion of tobacco products (Isabelle 1969).

RAYMOND M. DUCH is an Official Fellow of Politics at Nuffield College, University of Oxford, Oxford, UK. KENT L. TEDIN is Kenneth Lay Professor of Political Science at the University of Houston, Houston, TX, USA. LARON K. WILLIAMS is an associate professor and the Major Garrett Fellow in Political Science at the University of Missouri, Columbia, MO, USA. *Address correspondence to: Raymond Duch, Nuffield College, University of Oxford, New Road, Oxford, UK OX1 1NF; e-mail: raymond.duch@nuffield.ox.ac.uk.

doi:10.1093/poq/nfx034

Advance Access publication January 9, 2018

© The Author(s) 2018. Published by Oxford University Press on behalf of the American Association for Public Opinion Research. All rights reserved. For permissions, please e-mail: journals.permissions@oup.com

Awareness of Studies Linking Smoking and Lung Cancer

The 1950s saw increasing information that associated smoking with lung cancer, with scientific evidence appearing in leading academic journals (Doll and Hill 1950; Wynder and Graham 1950). The late 1950s marks the beginning of highly visible public pronouncements regarding the link between smoking and lung cancer. An example is the 1957 report on the health effects of smoking released by the American Cancer Society (Schmeck 1957).

Reports linking smoking and lung cancer attracted levels of public attention that are rarely recorded in public opinion data. For instance, 77 percent of the US population (and 82 percent of smokers) indicated that they had read or heard of the 1957 American Cancer Society report. As George Gallup pointed out at the time, this kind of attention to medical or scientific reporting is virtually unheard of—“a phenomenal figure in polling annals” (Gallup 1957).

Since the early 1950s, Gallup has asked the US and Canadian public whether they were aware of reports that smoking may be a cause of lung cancer. Table 1 indicates that awareness in the early 1950s was high: Gallup US asked the question twice in 1954. In one reading, 82 percent were aware of reports linking smoking to lung cancer, and in the second the result was 90 percent awareness. In 1954 Canadian awareness stood at 89 percent (Gallup Canada 1954). A 1964 survey conducted for the Canadian government found that 90 percent of Canadians were aware of reports that smoking is harmful (LaMarsh 1965). Awareness of studies reporting the link between smoking and lung cancer was high in the 1950s, and by the 1960s levels approached 90 percent in both countries.

Beliefs that Smoking Is Harmful to Health

Since the late 1940s, Gallup has asked whether cigarette smoking is harmful to health, with the item “Do you think cigarette smoking is or is not harmful?”

Table 1. Awareness That Smoking May Be a Cause of Lung Cancer.
GALLUP: Have you heard or read anything recently that cigarette smoking may be a cause of cancer of the lung?

	United States			Canada	
	1/54 (%)	6/54 (%)	9/99 (%)	5/54 (%)	6/63 (%)
Yes	82	90	87	89	96
No	17	10	13	11	4
DK/Refused			*		
Missing	1	*		*	
N	1,567	1,434	1,039	1,865	709

Blank cells indicate no cases reported in this category.
*less than .5%.

Tables 2 and 3 present the results for the United States and Canada, respectively. In 1946, 42 percent of US smokers agreed with this statement, and in 1949, 60 percent of the US adult population thought that smoking is harmful. By 1977 this had risen to over 90 percent, reaching 95 percent in 1999. In Canada, beliefs about harmful effects and the hazards of smoking increased from 63 percent in 1961 to 97 percent in 1996.

Table 4 presents results for a similarly worded harm question that allowed for strength of agreement. In the early 1960s in the United States, 81 percent either strongly or mildly agreed that smoking is harmful to health. By 1975, this had risen to 90 percent (92 percent in Canada in 1996).

In 2002, US Gallup began asking adults about the extent to which smoking is harmful to one’s health. As table 5 indicates, from 2002 to 2015, roughly 80 percent consistently thought smoking is very harmful and 15 percent considered it somewhat harmful.

Between 1977 and 1987, US respondents were asked about the amount of smoking that would be harmful to health. As table 6 indicates, virtually no one thought smoking was not harmful; 59 percent answered that “any amount” is harmful in 1977, while 38 percent answered “only in excess.” These percentages shifted to 71 percent and 26 percent, respectively, in 1987.

The combined harm questions indicate how public acceptance that smoking is harmful for health has evolved over 70 years.¹ In the United States, levels of agreement were about 42 percent in 1946. These levels rose to about two-thirds in the 1950s and early 1960s and reached over 85 percent from the mid-1960s onward. This trend is similar in Canada, although levels were slightly lower until the mid-1990s. In the early 1960s, about 60

Table 2. Smoking Is Harmful to One’s Health (United States). GALLUP:
Do you think cigarette smoking is harmful?

	9–10/46	10–11/49	1/54	8/77 ^a	6/81 ^a	6/87	7/90	9/99
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Agree/Yes/Is	42	60	70	90	91	94	96	95
Disagree/No/Is not	54	34	23	7	7	4	3	4
Doubtful/Undecided/DK	4	6	6	3	2	*	1	1
NA/Missing/DNS	*	1	*				*	
N	706	1,419	1,567	1,507	1,535	2,059	1,240	1,039

Blank cells indicate no cases reported in this category.
^aDo you think your smoking is or is not harmful to your health? (smokers only).
*less than .5%.

1. For response options that are not Agree/Disagree, “agreement” means Strongly Agree + Mildly Agree; or Very Harmful + Somewhat Harmful. Table 4 questions are excluded because of differences in wording.

Table 3. Smoking Is Harmful to One's Health (Canada). Some people think smoking is injurious to health.

	CCS 1961 (%)	DNHW ^a 11/64–1/65 (%)	CCS 1967 (%)	DNHW ^{a,y} 1972 (%)	GALLUP ^{b,s} 7/77 (%)	DNHW ^a 2/1978 (%)	Goldfarb ^{c,p} 7/81 (%)	Goldfarb ^{d,y} 7/81 (%)	STATCAN ^e 4–6/94 (%)	STATCAN ^e 6/96–2/97 (%)
Agree/Yes/Is	63	60	77	76	79	86	85	91	97	97
Disagree/No/Is not	n/a	18	n/a	n/a	17	4	n/a	n/a	2	3
Doubtful/Undecided/DK	n/a	19	n/a	n/a	4	10	n/a	n/a	1	
NA/Missing/DNS	n/a	4	n/a	n/a		*	*	n/a		
N	n/a	n/a	2,048	78,617	471	105,149	979	471	12,741	55,202

Blank cells indicate no cases reported in this category.

^aDo you believe smoking is a health hazard?

^bDo you think that your smoking is harmful to your health?

^cSmoking causes serious health problems.

^dOther than lung cancer, smoking is hazardous to one's health.

^eDo you believe that smoking cigarettes can cause health problems in a smoker?

All samples are adults only, except for ^p (parents), ^s (smokers), and ^y (youths).

*less than .5%.

Table 4. Strength of Agreement That Smoking Is Harmful to One’s Health. Smoking cigarettes is harmful to one’s health.

	United States				Canada
	Adult Use Tobacco Survey				Enviro-nics
	Fall/64 (%)	4–7/66 (%)	1970 (%)	1975 (%)	3–4/1996 ^a (%)
Strongly agree	57	50	70	74	70
Mildly agree	24	32	17	16	22
Mildly disagree	8	9	4	3	5
Strongly disagree	5	4	3	3	2
No opinion	5	5	5	3	n/a
No answer	1	1	*	*	n/a
<i>N</i>	5,794	5,770	5,875	12,029	2,034

^aPeople who smoke put their personal health in serious jeopardy.
*less than .5%.

percent of the population believed smoking is harmful to health, rising to over 75 percent in the late 1960s, and to over 85 percent by the late 1970s.

Acceptance That Smoking Causes Lung Cancer

In the early 1950s, public health officials and the media became increasingly concerned and vocal about the link between smoking and lung cancer. Lung cancer represented one of the diseases that the average person most feared. In 1939, a US Gallup survey asked: “Which disease would you hate most to have?” From a list of four diseases, 76 percent of the respondents chose cancer, 13 percent tuberculosis, 9 percent heart trouble, and 2 percent pneumonia. In 1947, US Gallup asked an open-ended question: “What disease would you dread having most?” Fully 59 percent said cancer. No other disease was mentioned by more than 10 percent (Patterson 1987).

In 1954, Gallup began asking: “What is your own opinion—do you think cigarette smoking is one of the causes of lung cancer or not?” Table 7 presents US results for this variant of the lung cancer survey questions. The earliest available surveys (from 1954) showed that about 40 percent answered yes. From 1957 to 1960, about 50 percent of the US population indicated that they believed smoking is one of the causes of lung cancer. This had increased to 67 percent by the end of the decade. The trend continued upward, such that 81 percent agreed that smoking is one of the causes of lung cancer in 1977. After 1981, we identified 17 US surveys asking this question; with one exception (1998), 85 percent or more of the sample responded positively to this question.

Table 5. Extent to Which Smoking Is Harmful to One's Health (United States). GALLUP: How harmful do you feel smoking is to adults?

	7/02	7/03	7/04	7/05	7/06	7/07	7/08	7/10	7/11	7/12	7/13	7/14	7/15
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Very harmful	80	82	83	81	84	79	82	81	81	80	82	80	80
Somewhat harmful	15	15	14	16	10	14	14	15	14	15	13	16	15
Not too harmful	2	2	1	2	2	3	2	2	2	1	2	2	2
Not at all harmful	1	1	1	1	2	2	2	2	1	3	2	1	1
Depends	1	*	*	*	*	1	1	*	*	*	*	n/a	1
No opinion	1	*	1	*	*	*	*	1	1	1	1	1	1
N	1,004	1,006	2,250	1,006	1,007	1,001	1,016	1,020	1,016	1,014	2,027	1,013	1,009

*less than .5%.

Table 6. Amount of Smoking That Is Harmful to One’s Health (United States). ROPER: Would you tell me whether you think any amount of [cigarette smoking] is harmful to health, or only harmful if you do it in excess, or not really harmful at all?

	2/77 (%)	2/79 (%)	2/81 (%)	2/87 (%)
Any amount	59	58	63	71
Only in excess	38	39	35	26
Not harmful	2	2	2	2
Don’t know	1	1	1	2
N	2,004	2,004	2,005	1,996

As [table 8](#) indicates, responses to this lung cancer question were very similar in Canada. In 1954, 25 percent of Canadians surveyed answered “yes” to the question, and 16 percent provided a qualified answer. Incorporating information from the positive qualified responses results in an estimated 38 percent believing that smoking is one of the causes of lung cancer.² In June 1963, 54 percent of Canadians surveyed said that smoking is “one of” the causes of getting lung cancer, and 22 percent said they did not know. In the late 1970s, almost 90 percent of Canadians agreed that smoking causes lung cancer. By the early 1980s, levels of agreement were over 90 percent, and this level persists through the 1990s, with only minor exceptions (1986 and 1988).

Respondents were asked about the likelihood that smoking causes lung cancer or the strength of its relationship to lung cancer. [Table 9](#) indicates that about 65 percent of respondents to a 1966 US government survey definitely or probably considered smoking a major cause of lung cancer. In 1985, over 90 percent of US respondents thought smoking definitely or probably increased the chances of lung cancer. Canadian surveys during a similar time period echoed this trend.

Between 2000 and 2004, Environics asked Canadians how much they agreed with the statement that cigarette smoking may or may not cause lung cancer. Results in [table 10](#) indicate that the “strongly agree” response always represents 87 percent or more of the sample.

In summary, approximately 40 percent of the North American population in the 1950s believed smoking is one of the causes of lung cancer. More than 50 percent of the public believed that smoking is one of the causes of lung cancer by the early 1960s, and this increased to 70 percent in the early 1970s. After 1981, most surveys indicated that over 90 percent of the North American population believed smoking is one of the causes of lung cancer.

2. The 1954 Canadian “yes” and “no” responses have been adjusted to include estimated allocations of the qualified responses to the question. Details of the allocation method are provided in the online appendix.

Table 7. Belief That Smoking Causes Lung Cancer (United States). Do you think smoking is one of the causes of lung cancer?

	GALLUP 1/54 (%)	GALLUP 6/54 (%)	GALLUP 6–7/57 (%)	GALLUP 11–12/57 (%)	GALLUP 7/58 (%)	GALLUP 6/59 (%)	GALLUP 5/60 (%)	GALLUP 6/61 (%)
Yes/Is/True	39	39	50	47	44	55	50	50
No/Is not/False	29	28	24	32	30	22	28	27
Qualified	1	4	1	*			*	
No opinion/DK	27	28	26	21	26	23	21	23
NA/Missing/DNS	4	2					*	
N	1,567	1,435	1,520	1,541	1,513	1,537	3,044	1,502

	GALLUP 6/62 (%)	GALLUP 7/63 (%)	GALLUP 3/64 (%)	SANFERN ^{a,y} 1/67 (%)	GALLUP 7/69 (%)	ROPERTT ^b 7/70 (%)	GALLUP 5/71 (%)	GALLUP 4/72 (%)
Yes/Is/True	47	53	62	85	67	77	71	71
No/Is not/False	24	22	17	n/a	12	n/a	16	13
Qualified				n/a		n/a		
No opinion/DK		25	21	n/a	17	n/a	13	16
NA/Missing/DNS	29			n/a	4	n/a		
N	1,503	1,606	1,663	4,504	1,555	n/a	1,491	1,547

Continued

Table 7. Continued

	ROPERTT ^b 6/72 (%)	HARRIS ^c 2/74 (%)	HARRIS ^c 3/75 (%)	GALLUP 8/77 (%)	GALLUP 6/81 (%)	NSF ^d 85 (%)	AUTS ^e 8/86–1/87 (%)	GALLUP 6/87 (%)
Yes/Is/True	77	74	74	81	83	95	92	87
No/Is not/False	n/a	19	20	11	10	4	5	7
Qualified	n/a							
No opinion/DK	n/a	7	6	9	7	1	2	6
NA/Missing/DNS	n/a					*	*	
N	n/a	1,474	1,555	1,507	1,535	2,003	12,752	2,059
	NSF ^d 88 (%)	NSF ^d 90 (%)	GALLUP 7/90 (%)	NSF ^d 92 (%)	GALLUP ^s 7–8/93 (%)	NSF ^d 95 (%)	NSF ^d 97 (%)	HARRIS ^f 3/97 (%)
Yes/Is/True	96	95	94	94	85	91	93	90
No/Is not/False	3	3	3	4	15	5	4	8
Qualified					n/a			
No opinion/DK	1	2	2	2	n/a	3	3	2
NA/Missing/DNS			*		n/a		*	*
N	2,041	2,005	1,240	1,995	1,032	2,006	2,000	1,006

Continued

Table 7. Continued

	GALLUP 7-8/98 (%)	NSF ^d 99 (%)	GALLUP 9/99 (%)	HARRIS ^{e,s} 00 (%)	HARRIS ^{e,s} 01 (%)	NSF ^d 01 (%)
Yes/Is/True	84	93	92	89	88	94
No/Is not/False	16	3	6	8	9	3
Qualified						
No opinion/DK		3	2	3	3	3
NA/Missing/DNS		*				*
N	862	1,882	1,039	1,010	253	1,574

Blank cells indicate no cases reported in this category.
^aCigarette smokers are more likely to get cancer (definitely + probably).
^bSmokers are more likely to get lung cancer.
^cDo you believe cigarette smoking can give people lung cancer, or do you feel this claim has not been proven?
^dCigarette smoking causes lung cancer.
^eCigarette smoking increases likelihood of lung cancer.
^fDo you believe that smoking causes cancer or not?
^gDo you believe that smoking increases your risk of getting lung cancer or not?
All samples are adults only except for ^s (smokers) and ^y (youths).
*less than .5%.

Table 8. Belief That Smoking Causes Lung Cancer (Canada). Do you think smoking is one of the causes of lung cancer?

	GALLUP 5/54 (%)	GALLUP 6/63 (%)	GALLUP ^{d,y} 7/71 (%)	DNHW ^a 72 (%)	DNHW ^a 2/78 (%)	CCS ^b 79 (%)
Yes/Is/True	38	54	58	70	81	89
No/Is not/False	37	23	24	n/a	4	n/a
Qualified		2		n/a		n/a
No opinion/DK	25	22	19	n/a	15	n/a
NA/Missing/DNS				n/a	1	n/a
N	1,865	709	719	74,812	105,149	1,158

	GOLDFARB ^{c,p} 7/81 (%)	GOLDFARB ^{c,y} 7/81 (%)	GALLUP ^{d,y} 5/82 (%)	GALLUP ^{e,x} 83 (%)	GALLUP ^{e,x} 84 (%)	GALLUP ^{e,x} 85 (%)
Yes/Is/True	82	94	92	91	94	94
No/Is not/False	n/a	n/a	5	9	7	6
Qualified	n/a	n/a				
No opinion/DK	n/a	n/a				
NA/Missing/DNS	n/a	n/a	3			
N	970	416	1,544	2,404	2,225	2,212

Continued

Table 8. Continued

	GALLUP ^{a,x}	CCS ^f	CCS ^f	STATCAN ^g	STATCAN ^h
	86 (%)	86 (%)	9/88 (%)	4–6/94 (%)	6/96–2/97 (%)
Yes/Is/True	86	80	88	91	97
No/Is not/False	15	n/a	n/a	8	1
Qualified		n/a	n/a		
No opinion/DK		n/a	n/a	1	2
NA/Missing/DNS		n/a	n/a		
N	2,307	2,382	1,049	9,491	53,122

Blank cells indicate no cases reported in this category.

^aDo you believe smoking causes lung cancer?

^bCigarettes can cause lung cancer.

^cSmoking causes lung cancer.

^dTobacco can cause cancer.

^eAgree/disagree with risks of smoking including [lung cancer].

^fWhat do you think are the health hazards related to firsthand smoking ... [lung cancer]?

^gQuelles problèmes de santé les gens risquent d'avoir s'ils fument pendant de nombreuses années? Cancer du poumon?

^hSmoking cigarettes can cause lung cancer in a smoker?

All samples are adults only except for ^p (parents), ^y (youths), and ^x (12–29-year-olds).

Table 9. Smoking Is a Major Cause of Lung Cancer. Would you say that cigarette smoking is definitely, probably, possibly, or definitely not a major source of lung cancer, or that you don't have an opinion either way?

	United States						Canada		
	AUTS FALL/64 (%)	AUTS 4-7/66 (%)	HARRIS ^a 1/65 (%)	HARRIS ^a 10/66 (%)	HARRIS ^a 3/69 (%)	IHIS ^b 85 (%)	IHIS ^b 90 (%)	CRG ^c 2-3/86 (%)	CRG ^c 7-8/88 (%)
Definitely/Major	26	25	40	36	50	79	84	83	79
Probably/Medium	41	41				15	11	10	9
Probably not/Minor	12	12	21	25	16	1	1	3	3
Can't tell yet			39	29	27				
Definitely not	4	4				1	1	1	2
No opinion/DK	18	19		10	8	5	4		
N	5,756	5,794	1,250	1,120	1,455	33,613	41,104	1,022	1,036

Blank cells indicate no cases reported in this category.

^aCigarette smoking is a major cause of lung cancer, a minor cause, or science hasn't yet been able to tell what the relation is between cigarette smoking and lung cancer?

^bTell me if you think cigarette smoking definitely increases, probably increases, probably does not, or definitely does not increase a person's chance of getting lung cancer.

^cIn your opinion, is smoking a major, medium, or minor factor in contributing to ... [cancer of the lung]?

Table 10. Strength of Agreement That Smoking Causes Lung Cancer (Canada). ENVIRONICS: I am going to read you a list of human health effects and diseases that may or may not be caused by cigarette smoking ... [lung cancer].

	11–12/00 (%)	3/01 (%)	4/01 ^y (%)	7/01 (%)	11/01 (%)	7/02 (%)	11/02 (%)	7/03 (%)	12/03 (%)	11/04 (%)
Strongly agree	94	92	97	91	90	90	92	89	92	87
Somewhat agree	5	6	3	6	8	8	7	9	6	11
Somewhat disagree	*	1	*	1	1	1	1	1	*	*
Strongly disagree	1	1	1	1	1	1	*	*	1	1
No opinion/DK	*	1	*	*	*	*	*	1	*	1
N	1,000	730	1,003	n/a	n/a	n/a	n/a	n/a	n/a	629

^yyouths-only sample.
*less than 1%.

Table 11. Beliefs about Smoking and Diseases Other Than Lung Cancer (Canada). Do you agree that smoking has harmful effects on health (other than lung cancer)?

	DNHW ^y 72 (%)	DNHW ^y 2/78 (%)	GOLDFARB ^{a,p} 7/81 (%)	GOLDFARB ^{a,y} 7/81 (%)
Agree/Yes/True	76	86	86	90
Disagree/No/False	n/a	4	7	3
Undecided/DK	n/a	10	6	5
NA/Did not say	n/a	*	1	2
N	74,812	105,149	979	471

^aOther than the lung cancer issue, is smoking hazardous to one’s health?
^p(parents) and ^y (youths).
*less than .5%.

Beliefs about Smoking and Other Diseases

Public acceptance that smoking is one of the causes of lung cancer grew rapidly in the 1950s and 1960s. Public acceptance that smoking is one of the causes of other diseases was also high by the early 1960s, although not quite at the same levels as lung cancer. Public opinion organizations gauged the belief that smoking caused other diseases by asking them directly: “Do you agree that smoking has harmful effects on health (other than lung cancer)?” Table 11 indicates that three-quarters of a 1972 sample of young Canadians

Table 12. Smoking Causes Heart Disease (United States). Do you think smoking is one of the causes of heart disease?

	GALLUP 6-7/57 (%)	GALLUP 11-12/57 (%)	GALLUP 7/58 (%)	GALLUP 6/59 (%)	GALLUP 5/60 (%)	GALLUP 6/61 (%)	GALLUP 6/62 (%)	GALLUP 7/63 (%)	GALLUP 3/64 (%)
Yes/Is/True	38	36	33	34	34	36	32	43	50
No/Is not/False	34	42	37	n/a	38	37	31	28	22
Qualified	1	1		n/a	*				
No opinion/DK	28	22	30	n/a	28	27	37	29	28
NA/Missing/DNS				n/a	*				
N	1,520	1,541	1,513	1,537	3,044	1,502	1,503	1,606	1,663

	AUTS ^a FALL/64 (%)	AUTS ^a 4-7/66 (%)	SANFERN ^{by} 1/67 (%)	GALLUP 7/69 (%)	ROPERTI ^c 7/70 (%)	ROPERTI ^c 6/72 (%)	GALLUP 8/77 (%)	GALLUP 6/81 (%)	IHIS ^d 85 (%)
Yes/Is/True	40	42	40	57	43	43	68	74	90
No/Is not/False	n/a	n/a	n/a	15	n/a	n/a	17	14	n/a
Qualified	n/a	n/a	n/a		n/a	n/a			n/a
No opinion/DK	n/a	n/a	n/a	24	n/a	n/a	15	12	n/a
NA/Missing/DNS	n/a	n/a	n/a	4	n/a	n/a	n/a	n/a	n/a
N	5,794	5,768	4,504	1,555	n/a	n/a	1,507	1,535	n/a

Continued

Table 12. Continued

	AUTS ^a 8/86–1/87 (%)	GALLUP 7/90 (%)	GALLUP ^{c,s} 7–8/93 (%)	GALLUP ^{c,s} 7–8/98 (%)	GALLUP 9/99 (%)	HARRIS ^f 00 (%)	HARRIS ^f (%)
Yes/Is/True	79	85	75	74	80	97	84
No/Is not/False Qualified	14	9	25	26	13	3	12
No opinion/DK	7	6					3
NA/Missing/DNS	*	1			7		1
N	12,748	1,240	1,032	1,149	1,039	1,010	253

Blank cells indicate no cases reported in this category.
^aSmoking cigarettes can cause heart disease.
^bCigarette smokers are more likely to get heart disease than nonsmokers (definitely + probably).
^cSmokers are more likely to get heart trouble.
^dSmoking cigarettes causes heart disease.
^eAs far as you know, does smoking make coronary heart disease worse?
^fDo you believe that smoking increases your risk of getting heart disease or not?
All samples are adults only except for ^s (smokers) and ^y (youths).
*less than .5%.

agreed with this statement; this had risen to 90 percent by 1981 (86 percent for a sample of parents).

In the 1950s, polling firms started asking about the link between smoking and other specific diseases. We focus on the most frequently asked heart disease question. [Table 12](#) summarizes US responses to the question as to whether smoking is one of the causes of heart disease. In the period 1957 to 1959, levels of agreement were in the mid- to high-30 percent range. In 1964, the year the US Surgeon General's report was released, agreement that smoking is one of the causes of heart disease reached 50 percent, another 28 percent responded "do not know," and the remaining 22 percent did not agree. To compare, a US survey in the same year found that 62 percent of the population believed that smoking was probably linked to *lung cancer*—roughly a 10 percent spread.

In the early 1980s, over 70 percent of the population was aware that smoking is one of the causes of heart disease. Putting this in perspective, a 1981 US survey found that 83 percent believed that smoking is a cause of lung cancer. By the late 1980s, approximately 80 percent were aware of the link between smoking and heart disease. In the 1990s and 2000s, US survey results for this question ranged between 74 and 97 percent.

As [table 13](#) indicates, in the 1980s an average of 77 percent of Canadian respondents agreed that smoking causes heart disease, which is similar to the United States. This increased to 94 percent of Canadians in 1996.

Heart disease questions asked between 1994 and 2004 in Canada adopted a strength of agreement format. [Table 14](#) indicates that those agreeing strongly or somewhat made up over 80 percent of the sample in 1994 and over 90 percent in 2004. In the 1980s, Project Viking asked whether smoking is a major, medium, or minor factor in causing heart disease (see [table 15](#)); roughly 75 percent of respondents believed smoking was either a major or medium cause of heart disease. Overall, these surveys indicate that beliefs that smoking causes heart disease lagged about 10 percent behind those associating lung cancer with smoking. They rose from between 35 and 40 percent in the 1950s to over 60 percent in the 1970s and 80 percent in the 1980s.

The Harmful Effects of Secondhand Smoke

In 1972, the US Surgeon General identified nonsmokers' exposure to cigarette smoke as a health hazard for the first time ([US Department of Health, Education, and Welfare 1972](#)). This led to efforts to reduce nonsmokers' exposure to secondhand smoke. In 1986, the US Surgeon General's report concluded that "involuntary smoking is a cause of disease, including lung cancer, in healthy nonsmokers" ([US Department of Health, Education, and Welfare 1986](#)). Public opinion surveys about secondhand smoke began in the United States in the early 1970s.

Table 13. Smoking Causes Heart Disease (Canada). Cigarettes cause heart disease.

	CCS (%)	GOLDFARB ^{a,p} 7/81 (%)	GOLDFARB ^{a,y} 7/81 (%)	GALLUP ^{b,x} 84 (%)	GALLUP ^{b,x} 85 (%)	CCS ^c 86 (%)	CCS ^d 9/88 (%)	STATCAN ^e 6/96–2/97 (%)
Yes/Is/True	81	67	70	78	78	80	88	94
No/Is not/False	n/a	n/a	n/a	2	22	n/a	n/a	2
No opinion/DK	n/a	n/a	n/a			n/a	n/a	4
NA/Missing/Did not say	n/a	n/a	n/a	21		n/a	n/a	
N	1,158	979	421	2,225	2,212	n/a	1,049	52,844

Blank cells indicate no cases reported in this category.

^aDo you believe it is true that a smoker is twice as likely as a nonsmoker to die of heart disease?

^bAgree/disagree with risks of smoking including increased risk of heart disease?

^cWhat do you think are the health hazards related to firsthand smoking ... [heart disease]?

^dWhat do you think are the health hazards related to firsthand smoking ... [heart attacks]?

^eSmoking cigarettes can cause heart disease in a smoker.

All samples are adults only except for ^p (parents), ^y (youths), and ^x (12–29-year-olds).

Table 14. Strength of Agreement That Smoking Causes Heart Disease (Canada). ENVIRONICS: I am going to read you a list of human health effects and diseases that may or may not be caused by cigarette smoking ... [heart disease].

	5–6/94 ^a	12/00 ^s	3/01	4/01	7/01	11/01	7/02	11/02	7/03	12/03	11/04
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
Strongly agree	38	65	74	78	70	75	73	73	72	74	68
Somewhat agree	44	24	19	18	20	19	21	20	21	18	24
Somewhat disagree	n/a	5	3	2	3	2	4	4	3	3	4
Strongly disagree	8	5	2	1	3	2	1	2	2	3	1
No opinion/DK	1	1	3	1	3	2	1	2	2	2	3
N	4,055	1,000	730	1,003	n/a	n/a	n/a	n/a	n/a	n/a	n/a

^aCTMC: Smoking is a major cause of heart disease.
All samples are adults only except for ^s (smokers).

Table 15. Smoking Is a Major Cause of Heart Disease (Canada). CRG: Will you tell me which of these list of diseases you personally believe are related to ... [heart disease]?

	2–3/86	7–8/88
	(%)	(%)
Major factor	54	52
Medium factor	24	19
Minor factor	6	5
No opinion/Don’t know	13	1
N	867	1,036

Beginning in 1974, Roper asked Americans: “Is smoking hazardous to non-smokers’ health?” As [table 16](#) indicates, 46 percent agreed with this statement. In 1984, when it was last asked, 68 percent were in agreement. After that, US polling firms asked about the harmful health effects of secondhand smoke. In 1986, over 80 percent agreed that exposure of nonsmokers to smoke is harmful. This 80 percent agreement level remained relatively constant over the 1986-to-2000 period.

[Table 16](#) reports results from the 1996 Canadian National Population Health Survey. Depending on the disease associated with secondhand smoke, agreement that it is a cause of the disease varies between 72 (heart disease) and 84 percent (asthma and breathing problems).

[Table 17](#) reports results from survey questions that employed a strength of agreement response option. A 1992 US Harris study found that 65 percent of respondents “strongly” agreed that breathing someone else’s cigarette smoke

Table 16. Secondhand Smoke Causes Other Illnesses and Diseases, ROPERTI: Is smoking hazardous to nonsmokers' health?

	United States							
	ROPERTI 4/74 (%)	ROPERTI 3/76 (%)	ROPERTI 3/78 (%)	ROPERTI 3/80 (%)	ROPERTI 5/82 (%)	ROPERTI 4/84 (%)	AUTS ^a 8/86–1/87 (%)	IHIS ^b 87 (%)
Yes/Is/Agree	46	52	58	58	65	68	81	81
No/Is Not/Disagree	48	40	33	34	29	29	11	11
No Opinion/DK	6	8	9	8	6	4	8	7
NA/Missing/Did not say							*	2
N	2,487	2,507	2,511	2,512	2,500	2,500	12,771	22,043
USAT ^c	6/89 (%)	IHIS ^b 92 (%)	CHILTON ^d 2/93 (%)	MKI ^{e,v} 4/93 (%)	CHILTON ^d 3/94 (%)	AJC ^{f,z} 9–10/95 (%)	IHIS ^b 00 (%)	
Yes/Is/Agree	73	84	84	70	78	84	79	
No/Is not/Disagree	23	7	15	22	21	12	7	
No opinion/DK	5		1	7	1	4	9	
NA/Missing/Did not say	*	9					5	
N	1,063	12,035	1,216	1,500	1,029	1,286	32,374	

Continued

Table 16. Continued

	Canada			
	STATCAN ^g 6/96–2/97 (%)	STATCAN ^h 6/96–2/97 (%)	STATCAN ⁱ 6/96–2/97 (%)	STATCAN ^j 6/96–2/97 (%)
Yes/Is/Agree	80	72	84	78
No/Is not/Disagree	7	10	6	12
No opinion/DK	13	18	10	10
NA/Missing/Did not say				
N	44,229	43,791	44,650	55,369

Blank cells indicate no cases reported in this category.

^aIs exposure of nonsmokers to smoke harmful?

^bThe smoke from other people's cigarettes is harmful to you.

^cDo you believe that being around people who smoke is harmful to you?

^dDo you feel that secondhand smoke is a health risk or not?

^eDo you believe that secondhand smoke can give nonsmokers cancer and other serious diseases that have been attributed or do you believe that while secondhand smoke may be annoying, it is not likely to cause cancer or other diseases?

^fDo you believe that breathing secondhand smoke is harmful to you?

^gSecondhand smoke can cause [lung cancer] in a nonsmoker.

^hSecondhand smoke can cause [heart disease] in a nonsmoker.

ⁱSecondhand smoke can cause [asthma and breathing problems] in a nonsmoker.

^jSecondhand smoke can cause [ill health and developmental problems in children] in a nonsmoker.

All samples are adults only except for ^v (voters in 1992 elections), and ^z (southerners).

^{*}less than .5%.

Table 17. Strength of Agreement of Risks Associated with Secondhand Smoke. Secondhand smoke is harmful to nonsmokers.

	United States		Canada				Canada			
	HARRIS ^a	CTMC ^b	CTMC	ENVIRONICS ^{e,s}	ENVIRONICS ^c	ENVIRONICS ^{e,y}	ENVIRONICS ^{d,s}	ENVIRONICS ^d	ENVIRONICS ^{d,y}	
	92 (%)	5/79 (%)	94 (%)	12/00 (%)	3/01 (%)	4/01 (%)	12/00 (%)	3/01 (%)	4/01 (%)	
Strongly agree	65	40	45	38	56	61	26	36	40	
Somewhat agree	20	31	42	34	29	28	33	37	39	
Neither		8	3							
Somewhat disagree	7	11	6	10	6	6	17	12	12	
Strongly disagree	6	9	2	15	6	5	20	11	7	
No opinion/DK	2	3	3	3	2	1	5	5	2	
N	1,202	2,217	4,055	1,000	730	1,003	1,000	730	1,003	

^aIt's a real health hazard if you have to breathe someone else's smoke continually.

^bCigarette smoking is harmful to the health of nonsmokers.

^cPlease tell me if you strongly agree, somewhat agree, somewhat disagree, or strongly disagree that secondhand smoke causes [lung cancer].

^dPlease tell me if you strongly agree, somewhat agree, somewhat disagree, or strongly disagree that secondhand smoke causes [heart disease].

All samples are adults only except for ^s (smokers) and ^y (youths).

Table 18. Severity of Harm Associated with Secondhand Smoke. How harmful do you feel secondhand smoke is to adults?

	United States							
	CR ^a 10/85 (%)	CR ^a 7/87 (%)	GALLUP ^{b,n} 11/91 (%)	CNN 3/94 (%)	CNN 5/96 (%)	CNN 6/97 (%)	GALLUP 9/99 (%)	GALLUP 7/01 (%)
Very harmful	31	32	20	36	48	55	43	52
Somewhat harmful	38	37	26	42	36	30	39	33
Not too harmful	18	18	25	12	10	9	11	9
Not at all harmful	10	10	28	6	4	5	5	5
No opinion/DK	4	2	1	4	2	2	2	2
N	1,500	1,500	546	1,007	1,001	1,013	1,039	1,038

	United States							
	GALLUP 7/02 (%)	GALLUP 7/03 (%)	GALLUP 7/04 (%)	GALLUP 7/05 (%)	GALLUP 7/06 (%)	GALLUP 7/07 (%)	GALLUP 7/08 (%)	GALLUP 7/10 (%)
Very harmful	56	51	55	53	56	56	56	55
Somewhat harmful	31	36	30	31	29	29	30	31
Not too harmful	7	9	9	12	8	10	9	10
Not at all harmful	4	3	4	3	4	5	4	4
No opinion/DK	3	2	2	2	2	1	2	2
N	1,004	1,006	2,250	1,006	1,007	1,001	1,016	1,020

Continued

Table 18. Continued

	United States					Canada	
	GALLUP 7/11 (%)	GALLUP 7/12 (%)	GALLUP 7/13 (%)	GALLUP 7/14 (%)	GALLUP 7/15 (%)	GOLDFARB ^{c,p} 7/81 (%)	GOLDFARB ^{c,y} 7/81 (%)
Very harmful	54	56	59	57	56	32	42
Somewhat harmful	30	32	29	31	31	33	32
Not too harmful	9	8	7	7	9	18	16
Not at all harmful	4	4	3	4	3	14	8
No opinion/DK	2	2	2	2	2	3	2
<i>N</i>	1,016	1,014	2,027	1,013	1,009	979	421

^aHow serious a health threat to you personally is the inhaling of secondhand smoke, often called passive smoking? Is it a very serious health threat, somewhat serious, not too serious, or not serious at all?

^bHow worried are you that your exposure to secondhand (cigarette) smoke might result in serious health problems for you someday?

^cSecondhand smoke is very harmful to the health of others, somewhat harmful, a little harmful, not harmful at all, or no opinion?

All samples are adults only except for ⁿ (nonsmokers), ^p (parents), and ^y (youths).

is a real health hazard, and another 21 percent “somewhat” agreed. A 1979 Canadian Tobacco Manufacturing Council (CTMC) survey found that 40 percent of Canadians “strongly” agreed and 31 percent “somewhat” agreed that “Cigarette smoking is harmful to the health of non-smokers.” In 1994 this rose to 45 and 42 percent agreeing strongly and somewhat, respectively. Levels of agreement found in surveys conducted by Environics Canada in 2000 and 2001 ranged from 59 to 79 percent (heart disease) and 72 to 89 percent (lung cancer).

Table 18 presents results for secondhand smoke and health questions asked in a “severity of harm” format, with response options that include “very harmful,” “somewhat harmful,” “not too harmful,” and “not at all harmful.” Almost 70 percent of US respondents in the late 1980s indicated that the severity of harm from secondhand smoke was either very or somewhat harmful. By the late 1990s, about 85 percent responded either very or somewhat harmful. This 85 percent persisted throughout the period from 2001 to 2015. Health Canada surveys conducted in 1981 suggest that about 65 percent of parents and 75 percent of youths considered secondhand smoke either very or somewhat harmful to health.

Table 19 summarizes survey results about the seriousness of the health risks associated with secondhand smoke in Canada. In 2006, 77 percent indicated that nonsmoker exposure was a very serious harm, and 18 percent opted for somewhat serious harm. In 2004, a large majority indicated that exposure to secondhand smoke either definitely or probably contributed to lung cancer

Table 19. Degree of Risks Associated with Secondhand Smoke (Canada).
EKOS: Please tell me whether you think secondhand smoke definitely, probably, probably not, or definitely not contributes to the following conditions [...]

	3/04 ^a (%)	3/04 ^b (%)	3/04 ^c (%)	8–9/06 ^d (%)
Definitely/Very serious	61	47	57	77
Probably/Somewhat serious	31	39	32	18
Probably not/Not very serious	6	8	7	3
Definitely Not/not at all serious	2	3	2	1
No answer	1	3	2	1
<i>N</i>	803	803	803	1,705

^aPlease tell me whether you think secondhand smoke definitely, probably, probably not, or definitely not contributes to the following conditions [lung cancer].

^bPlease tell me whether you think secondhand smoke definitely, probably, probably not, or definitely not contributes to the following conditions [heart disease].

^cPlease tell me whether you think secondhand smoke definitely, probably, probably not, or definitely not contributes to the following conditions [asthma and breathing problem].

^dThe harm to the health of nonsmokers caused by breathing in secondhand smoke from cigarettes that other people are smoking is very serious, somewhat serious, not very serious, or not at all serious.

Table 20. Likelihood of Harm Associated with Secondhand Smoke (United States). CDC: Do you think the smoke from other people's cigarettes is harmful to you?

	Fall/99 (%)	Spring/00 (%)	Spring/02 (%)	3–6/04 (%)	3–6/06 (%)	2–6/09 (%)	2–6/11 (%)
Definitely yes	70	70	72	69	70	67	63
Probably yes	19	20	18	21	21	21	22
Probably no	4	4	4	4	4	5	4
Definitely no	6	4	5	4	4	4	3
No answer	2	2	2	2	1	3	8
<i>N</i>	15,058	35,828	26,149	27,933	27,038	22,679	18,866

NOTE.—All respondents are 9–21 years old.

(92 percent), heart disease (86 percent), and asthma and breathing problems (89 percent). The US National Youth Tobacco Survey asked 9–21-year-olds to evaluate the likelihood of harm to themselves associated with secondhand smoke. Table 20 shows that for the period 1999 to 2011, roughly 70 percent answered “definitely yes” and another 20 percent responded “probably yes,” though these figures declined slightly in 2011.

In the 1970s, about half of the public believed that secondhand smoke is harmful to health. Public acceptance of the health hazards of secondhand smoke rose rapidly to 80 percent in the 1990s and 85 percent in the subsequent decade.

Discussion

US and Canadian attitudes toward smoking and health evolved similarly over this 70-year period. In the course of about 15 years—between 1954 and 1969—public belief that smoking is a cause of lung cancer rose from 40 to 70 percent. Attitudes regarding the link between smoking and other diseases responded with a slight lag. Nevertheless, in 1957 about 40 percent of the population believed smoking may cause heart disease, and by 1980 this had risen to 70 percent of the population. Public acceptance of the health hazards of secondhand smoke rose rapidly, from 50 percent in the 1970s to 80 percent in the 1990s.

Appendix

The surveys referenced below³ are all representative of the adult population of Canada or the United States, except in the case of youth (DNHW 1972; DNHW 1978; GOLDFARB 1981; GALLUP 1982; ENVIRONICS

3. The detailed citations appear in the online appendix.

4/2001; CDC 1999–2011), 12–29-year-olds (GALLUP 1983; GALLUP 1984; GALLUP 1985; GALLUP 1986), parents (GOLDFARB 1981), American southerners (AJC 1995), registered voters (MKI 1993), nonsmokers (Gallup 1991), or smokers only (GALLUPCAN 1977; GALLUPCAN 1981; GALLUP 1993; HARRIS 2000; HARRIS 2001; ENVIRONICS 3/2001; ENVIRONICS 12/2000) samples (or where otherwise noted).

Adults are defined as 18 years and over, except in the following samples: 15 years and over (DNHW 1964–65; EKOS 2004; EKOS 2006), 17 years and over (AUTS 1986; ROPERTI 1968–84), and 21 years and over (CCS 1961; CCS 1967; AUTS 1964; AUTS 1966; AUTS 1970; AUTS 1975).

Abbreviations

Abbreviation	Polling Agency
ABCWP	ABC News/ <i>Washington Post</i>
AJC	<i>Atlanta Journal-Constitution</i>
AUTS	Adult Use of Tobacco Survey
CCS	Canadian Cancer Society
CDC	Centers for Disease Control, Office on Smoking and Health
CHILTON	Chilton Research Services
CNN	Gallup/CNN/ <i>USA Today</i>
CR	Cambridge Research/Research International
CRG	Creative Research Group
CTMC	Canadian Tobacco Manufacturers' Council
DNHW	Department of National Health and Welfare (Canada)
EKOS	EKOS Research Associates, Inc.
ENVIRONICS	Environics Research Group Limited
GALLUP	Gallup Organization
GALLUPCAN	Canadian Institute of Public Opinion
GOLDFARB	Goldfarb Consultants
IHIS	Integrated Health Interview Series/National Health Interview Series
MKI	Marttila & Kiley, Inc.
NSF	National Science Foundation, Miller, et al. (1979–2001)
ROPER	Roper Research Associates, Inc./ Roper Organization
ROPERTI	Roper Research Associates, Inc./Tobacco Institute
SANFERN	San Fernando Valley State College
STATCAN	Statistics Canada
USAT	<i>USA Today</i>

Interview Mode

For face-to-face surveys, all households were determined by random walks within a designated area (e.g., GOLDFARB 1981). The non-telephone surveys conducted in AUTS 1975 were to allow greater representation of geographic areas with non-telephone households. All telephone surveys used random-digit dialing, unless otherwise noted. Interviews were conducted primarily in English but also in French for some Canadian provinces in the following surveys (DNHW 1972; STATCAN 1994; STATCAN 1996–97; GALLUP 1988; all ENVIRONICS; CTMC 1994).

ABCWP	Telephone
AJC	Telephone
AUTS	Face-to-face (1964), Face-to-face + Telephone (1966, 1970, 1975), Telephone (1986)
CCS	Face-to-face
CDC	Questionnaire
CHILTON	Telephone
CNN	Telephone
CR	Face-to-face
CRG	Face-to-face
CTMC	Telephone
DNHW	Questionnaire
EKOS	Telephone
ENVIRONICS	Face-to-face (1996), Telephone (1999–2005)
GALLUP	Face-to-face (1946–81), Telephone (1989–2009), Landline + Cellular (2010–13)
GALLUPCAN	Face-to-face (1946–86), Telephone (1990–94)
GOLDFARB	Face-to-face
IHIS	Face-to-face
MKI	Telephone
NSF	Face-to-face (1979), Telephone (1980–2001)
ROPER	Face-to-face
ROPERTI	Face-to-face
SANFERN	Questionnaire
STATCAN	Telephone
USAT	Telephone

Response Rates

Response rates were requested from all polling agencies; those surveys without response rates listed below are either unavailable or did not respond to the request. Polling agencies that reported a response rate, but not the methods used to calculate that rate, are designated “RR.” Respondents were randomly selected within households unless otherwise noted.

AUTS	1964, 1966 (RR1: 82.0%), 1970, 1975, 1986 (RR1: 74.3%) (all random selection within household with smoker oversample)
CDC	2004 (RR: 82%), 2006 (RR: 80.2%), 2009 (RR: 84.8%), 2011 (RR: 73%)
CTMC	1994 (RR1: 26.4%)
DNHW	1978 (RR: 81.2%)
EKOS	2004 (RR1: 1.3%), 2006 (RR1: 9.7%)
ENVIRONICS	1999 (RR1: 19.8%), 2000 (RR1: 12.5%), March 2001 (RR1: 14.5%), April 2001 (RR1: 6.1%), 2003 (RR1: 7.0%), 2005 Adult (RR1: 11.4%), 2005 Youth (RR1: 3.9%)
GOLDFARB	Pre-selection procedure determines respondent in household to be interviewed
IHIS	> 90% of eligible households
NSF	1979–2000 (Cooperation rate: >70%), 2001 (Cooperation rate: 51%); most recent birthday selection method
STATCAN	1994–95 (RR1: 54.3%), 1996–97 (RR: 82.6%)

Supplementary Data

Supplementary data are freely available at *Public Opinion Quarterly* online.

References

- LaMarsh,. 1965. *Nine Out of Ten Canadians Aware of Cigarette Issue*. The Canada Department of Health and Welfare.
- Doll, Richard, and Austin B. Hill. 1950. "Smoking and Carcinoma of the Lung: Preliminary Report." *British Medical Journal* 2:739–48.
- Gallup Canada. 1954. *Gallup Canada Poll No. 1954-236*. Toronto: Gallup Canada.
- Gallup, George. 1957. "America Speaks." Technical report.
- Grabb, Edward, and James Curtis. 2010. *Regions Apart: The Four Societies of Canada and the United States*. Oxford: Oxford University Press.
- Isabelle, Gaston, ed. 1969. *Report of the Standing Committee of Health Welfare and Social Affairs on Tobacco and Cigarette Smoking*. Standing Committee on Health, Welfare and Social Affairs on Tobacco and Cigarette Smoking, Queen's Printer.
- Pacheco, Julianna. 2011. "Trends—Public Opinion on Smoking and Anti-Smoking Policies." *Public Opinion Quarterly* 75:576–62.
- Patterson, James T. 1987. *The Dread Disease: Cancer and Modern American Culture*. Cambridge, MA: Harvard University Press.
- Saad, Lydia. 1998. "A Half-Century of Polling on Tobacco: Most Don't Like Smoking but Tolerate It." *Public Perspective* (August–September):1–4.
- Schmeck, Harold M. 1957. "Cigarette Smoking Linked to Cancer in High Degree." *New York Times*, June 5:A1.
- US Department of Health, Education, and Welfare. 1972. *The Health Consequences of Smoking: A Report of the Surgeon General*. Washington, DC: US Department of Health, Education, and Welfare, Public Health Service, Health Services and Mental Health Administration.
- . 1986. *The Health Consequences of Involuntary Smoking: A Report of the Surgeon General*. Washington, DC: US Department of Health, Education, and Welfare, Public Health Service, Health Services and Mental Health Administration.
- Wynder, Ernest L., and Everts A. Graham. 1950. "Tobacco Smoking as a Possible Etiologic Factor in Bronchogenic Carcinoma: A Study of Six Hundred and Eighty-Four Proved Cases." *Journal of the American Medical Association* 143:329–36.