

Predictors of Canadian Physicians' Prevention Counseling Practices

Erica Frank, MD, MPH,^{1,2} Carolina Segura, MD,¹ Hui Shen, PhD,¹ Erica Oberg, ND, MPH³

ABSTRACT

Objective: To understand predictors of Canadian physicians' prevention counseling practices.

Methods: A national mailed survey of a random sample of Canadian physicians conducted November 2007-May 2008.

Results: Primary care physicians (n=3,213) responded to the survey (41% response rate); those with better personal health habits, female physicians, and physicians aged 45-64 years old were more likely to report "usually/always" counseling patients than did others, but there were no significant differences by province, origin of one's MD degree, or practice location. There was a clear and consistent relationship between personal and clinical prevention practices: non-smokers were significantly more likely to report counseling patients on smoking cessation; those who drank alcohol less frequently, drank lower quantities or binged less often were more likely to counsel on alcohol; those exercising more to counsel patients more about exercise; those eating more fruits and vegetables to counsel patients more often about nutrition; and those with lower weight were more likely to counsel about nutrition, weight or exercise. Physicians who strongly agreed or agreed that "they will perform better counseling if they have healthy habits" averaged higher rates of counseling ($p < 0.001$).

Conclusions: Personal characteristics of Canadian physicians help predict prevention counseling. These data suggest that by encouraging physicians to be healthy, we can improve healthy habits among their patients – an innovative, beneficent, evidence-based approach to encouraging physicians to counsel patients about prevention.

Key words: Physician; health; health education; counseling; patient counseling; Canada; prevention

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

Can J Public Health 2010;101(5):390-95.

It is a health policy goal across North America to increase the proportion of persons appropriately counseled about health behaviours.¹⁻⁶ Some literature from outside Canada has suggested that one way to promote counseling may be to encourage physicians to have healthier personal practices, as doctors may "preach what we practice".⁷ However, this personal-clinical relationship has only been reasonably well established in the United States,⁷⁻⁹ a country that is socio-culturally similar to Canada but with a very different health system. We therefore had two questions to investigate: 1) whether this personal-clinical relationship held in a second country (or whether there were unusual factors in the US that created this relationship), and 2) specifically whether the personal-clinical relationship was a function of the peculiarities of the US system or could be found in a system with universal access. We investigated these questions with a large survey of Canadian physicians.

METHODS

Our survey was developed in collaboration with the Canadian Medical Association (CMA), with input from the Association of Faculties of Medicine of Canada, Physician Health Program of British Columbia, Canadian Association of Interns and Residents, Canadian Physician Health Network, the College of Family Physicians of Canada, and the Royal College of Physicians and Surgeons of Canada. Ethical approval was obtained from the University of British Columbia.

Prior to distribution, the survey was promoted in several CMA-related venues, and the protocol was piloted and University of British Columbia Institutional Review Board-approved. We sent the questionnaires and cover letters to 8,100 randomly selected physi-

cians, excluding residents and retired physicians. From the original mailing list, 166 physicians had no known mailing address, or were retired, residents, or working abroad; eliminating these cases reduced the original study population to 7,934.

All materials were available in English and French. The initial survey mailing (late November 2007) and first follow-up mailing (mid-December 2007) were sent to the entire sample of 7,934 physicians. A reminder e-mail was sent (where e-mail addresses were available) in January 2008, followed by a third survey mailing to all non-responders, and a fourth follow-up to British Columbia physicians in March 2008. Survey responses were accepted until May 2008. To ensure anonymity, an external third party created a blinded system. As an incentive, all sampled physicians could participate in a draw for two \$1,000 prizes.

Author Affiliations

1. School of Population and Public Health, University of British Columbia, Vancouver, BC
2. Department of Family Practice in the Faculty of Medicine, University of British Columbia, Vancouver, BC
3. School of Public Health and Community Medicine, University of Washington, Seattle, WA

Correspondence and reprint requests: Dr. Erica Frank, Professor, School of Population and Public Health, Faculty of Medicine, University of British Columbia, 5804 Fairview Avenue, Mather Building, Vancouver, BC V6T 1Z3, Tel: 604-822-4925, E-mail: erica.frank@ubc.ca

Acknowledgements: We thank our CMA colleagues for their remarkable collaboration on this effort: Jacqueline Burke, Lynda Buske, Tara Chauhan, Shelley Martin, Todd Watkins, and Susan Yungblut. We acknowledge the financial support of the British Columbia Knowledge Development Fund, BC Medical Association, Canada Foundation for Innovation, Canada Research Chair program, Canadian Medical Foundation, Healthy Heart Society of BC, Michael Smith Foundation for Health Research, and the Physician Health Program of BC. We also thank the Canadian physicians who took the time to help us paint this portrait of our colleagues.

Conflict of Interest: None to declare.

Predictor variables and outcome measures were chosen based on prior literature on predictors of physician prevention counseling, with particular attention to variables that would allow us to address our primary question of the relationship between personal and clinical prevention practices.^{10,11} To assess overall personal health behaviours, a personal health index (PHI) was summed (with higher scores indicating healthier habits) using physicians' smoking, drinking, exercise and diet habits. We employed a method suggested by the US Centers for Disease Control and Prevention.^{9,10,12,13} For tobacco, participants who smoked daily or who smoked >10 cigarettes on the days they smoked in the last month were classified as heavy users and scored as 1; participants who smoked occasionally or who smoked ≤10 cigarettes on the days they smoked in the last month were classified as light users and scored as 2; and past and never-smokers were scored as 3 and 4, respectively. For alcohol, women averaging ≥4 and men averaging ≥5 drinks/episode during the past month were classified as high consumers and scored as 1; women averaging 3 or men averaging 3-4 drinks/episode during the past month were scored as 2; physicians of either gender averaging ≤2 drinks during the past month were classified as moderate consumers and scored as 3; and those who consumed lower or no alcohol intake were scored as 4. Exercise was queried as frequency and duration of minimal, moderate and strenuous exercise, as defined by Godin, with MET-based exercise scores divided into quartiles.¹⁴ For both the validated dietary screener for fruit and vegetable consumption, and the cumulative personal health index (PHI), responses were ranked by quartile. Additional measures of physicians' personal health behaviours were analyzed for specific behaviours, where such analyses lent more depth than would be allowed by the simpler summative statistics required for an index.

There were 12 counseling topics: nutrition, exercise, pedometer use, weight management, tobacco cessation, alcohol abuse, mental health, workplace safety, safe sex, calcium supplementation (for post-menopausal women), cholesterol testing, and mammography (for women 50-75). Responses to each topic were scored 1 (Never/rarely), 2 (Sometimes) or 3 (Usually/always).¹⁵ The counseling index used in Table 1 was calculated by averaging all the 12 counseling scores and rounding to an integer between 1 and 3. The scores for averaged counseling index had the same meaning as those for each topic.

To validate our counseling question, we compared 88 senior medical students' questionnaire responses about counseling frequency (for diet, exercise, alcohol and cigarette smoking) with their clinical assessments of four Standardized Patient (SP) cases with these same risk factors.¹⁵ Analyses were conducted in SAS based on weighted data.¹⁶ Chi-square tests were implemented to obtain the p-values in the tables (using PROC FREQ in SAS).

RESULTS

We evaluated 3,213 physicians (41% response rate). We weighted data for non-response using the raking ratio method to match

Table 1. Relationship Between Canadian Physicians' Demographic and Professional Characteristics and Their Related Counseling Practices

Characteristic	Average of All the Counseling Variables				p-value
	Total	Never/ rarely %	Some- times %	Usually/ always %	
Total	3213	16	60	24	
Gender	2982				<0.0001
Male	1883 (63%)	19	62	19	
Female	1099 (37%)	10	57	33	
Age group	3004				0.0005
<35	245 (8%)	18	63	19	
35-44	704 (23%)	17	62	21	
45-54	969 (32%)	16	56	28	
55-64	737 (25%)	15	58	27	
≥65	349 (12%)	14	67	20	
Personal Health Index by Quartile	2802				<0.0001
Quartile 1	360 (13%)	19	65	16	
Quartile 2	885 (32%)	18	61	20	
Quartile 3	587 (21%)	16	57	27	
Quartile 4	970 (35%)	12	59	29	
MD degree from	2956				0.1
Canadian medical school	2347 (79%)	16	60	24	
US medical school	22 (1%)	9	66	25	
Medical school in another country	586 (20%)	14	58	28	
Intended Specialty	3016				0.0001
PCP	1409 (47%)	2	53	45	
Non-PCP	1606 (53%)	28	66	6	
Primary practice	2963				0.2
BC	552 (19%)	15	57	28	
AB	336 (11%)	14	66	20	
SK	70 (2%)	22	51	27	
MB	115 (4%)	12	68	20	
ON	1043 (35%)	17	59	24	
QC	559 (19%)	15	58	27	
NB	61 (2%)	13	66	21	
NS	158 (5%)	17	59	24	
PE	9 (0.3%)	16	84	0	
NL	45 (2%)	12	69	19	
YT	7 (0.2%)	0	53	47	
NT	4 (0.1%)	0	54	46	
NU	4 (0.1%)	0	100	0	
Main Practice Setting	2946				<0.0001
Inner city	541 (18%)	24	59	17	
Urban/suburban	1773 (60%)	16	60	24	
Rural/small town/remote	632 (21%)	7	60	33	
Work settings	3016				<0.0001
Private office/clinic (excluding free-standing walk-in clinics)	1735 (58%)	9	58	32	
Community clinic/community health centre	338 (11%)	4	62	34	
Free-standing walk-in clinic	217 (7%)	1	49	50	
Academic health sciences centre	809 (27%)	26	63	12	
Community hospital	1082 (36%)	18	61	21	
Emergency department (communitary hospital or academic centre)	480 (16%)	11	71	18	
Nursing home/home for the aged	368 (12%)	1	59	40	
Administrative office	152 (5%)	19	62	19	
Research unit	87 (3%)	20	67	13	
Free-standing lab/ diagnostic clinic	39 (1%)	54	41	6	
Other	204 (7%)	10	60	29	
Primary professional income source	2895				0.0001
Fee-for-service (insured/uninsured)	2078 (72%)	16	59	25	
Salary	335 (12%)	19	60	22	
Capitation	77 (3%)	1	58	40	
Sessional/per diem/hourly	169 (6%)	12	65	23	
Service contracts	147 (5%)	22	63	15	
Other	90 (3%)	21	59	20	

physicians' demographic characteristics known to CMA: province by type of physician (family/general versus other specialist), and sex by age group (<35, 35-44, 45-54, 55-64, ≥65). An examination

Table 2. Relationship Between Canadian Physicians' Personal Health Practices and Their Related Counseling Practices

Independent Variables and Effects	Total	Never/ rarely %	Some- times %	Usually/ always %	p-value
Doctors' physical activity (PA) habits vs. their patient PA counseling					
PA by quartiles including mild PA	2989				0.002
Quartile 1 (<percentile 25)	696 (23%)	17	39	45	
Quartile 2 (percentile 25-50)	747 (25%)	13	43	44	
Quartile 3 (percentile 50-75)	798 (27%)	12	37	51	
Quartile 4 (percentile 75-100)	747 (25%)	12	35	54	
PA by quartiles without mild PA	2885				<0.001
Quartile 1 (<percentile 25)	631 (22%)	18	39	43	
Quartile 2 (percentile 25-50)	822 (29%)	12	42	46	
Quartile 3 (percentile 50-75)	657 (23%)	13	37	50	
Quartile 4 (percentile 75-100)	775 (27%)	12	34	54	
Doctors' nutritional habits vs. their patient nutrition counseling	2977				<0.0001
Fruits and vegetables consumption by quartiles					
Quartile 1 (<percentile 25)	743 (25%)	22	49	29	
Quartile 2 (percentile 25-50)	811 (27%)	20	45	35	
Quartile 3 (percentile 50-75)	659 (22%)	15	46	39	
Quartile 4 (percentile 75-100)	764 (26%)	13	39	48	
Doctors' BMI vs. doctors' counseling patients on nutrition	2937				0.003
<18.5	45 (2%)	13	44	42	
18.5-<25	1583 (54%)	19	41	40	
25-<30	1075 (37%)	18	49	34	
≥30	234 (8%)	15	50	35	
Doctors' BMI vs. doctors' counseling patients on exercise/physical activity	2937				0.003
<18.5	45 (2%)	13	44	42	
18.5-<25	1583 (54%)	19	41	40	
25-<30	1075 (37%)	18	49	34	
≥30	234 (8%)	15	50	35	
Doctors' BMI vs. doctors' counseling patients on weight	2938				0.02
<18.5	44 (1%)	3	52	45	
18.5-<25	1586 (54%)	13	42	45	
25-<30	1075 (37%)	11	44	45	
≥30	234 (8%)	8	52	40	
Doctors' physical activity (PA) habits vs. their patient PA counseling					
PA by quartiles including mild PA	2989				0.002
Quartile 1 (<percentile 25)	696 (23%)	17	39	45	
Quartile 2 (percentile 25-50)	747 (25%)	13	43	44	
Quartile 3 (percentile 50-75)	798 (27%)	12	37	51	
Quartile 4 (percentile 75-100)	747 (25%)	12	35	54	
PA by quartiles without mild PA	2885				<0.001
Quartile 1 (<percentile 25)	631 (22%)	18	39	43	
Quartile 2 (percentile 25-50)	822 (29%)	12	42	46	
Quartile 3 (percentile 50-75)	657 (23%)	13	37	50	
Quartile 4 (percentile 75-100)	775 (27%)	12	34	54	
Doctors' nutritional habits vs. their patient nutrition counseling	2977				<0.0001
Fruits and vegetables consumption by quartiles					
Quartile 1 (<percentile 25)	743 (25%)	22	49	29	
Quartile 2 (percentile 25-50)	811 (27%)	20	45	35	
Quartile 3 (percentile 50-75)	659 (22%)	15	46	39	
Quartile 4 (percentile 75-100)	764 (26%)	13	39	48	
Doctors' BMI vs. doctors' counseling patients on nutrition	2937				0.003
<18.5	45 (2%)	13	44	42	
18.5-<25	1583 (54%)	19	41	40	
25-<30	1075 (37%)	18	49	34	
≥30	234 (8%)	15	50	35	
Doctors' BMI vs. doctors' counseling patients on exercise/physical activity	2937				0.003
<18.5	45 (2%)	13	44	42	
18.5-<25	1583 (54%)	19	41	40	
25-<30	1075 (37%)	18	49	34	
≥30	234 (8%)	15	50	35	
Doctors' BMI vs. doctors' counseling patients on weight	2938				0.02
<18.5	44 (1%)	3	52	45	
18.5-<25	1586 (54%)	13	42	45	
25-<30	1075 (37%)	11	44	45	
≥30	234 (8%)	8	52	40	

data as well, and we did not find significant differences.

As shown in Table 1, 37% were female, 79% had a Canadian MD degree, and half (47%) were primary care physicians (PCPs). Table 1 also shows the relationships between our major outcome of interest (counseling frequency) and its potential predictors. Physicians who were women, aged 45-64, had healthier personal habits, were primary care practitioners, rural, working in walk-in clinics or nursing homes, or were capitated or fee-for-service, were most likely to report that they "usually/always" counseled patients on our examined counseling topics. We found no significant counseling frequency differences by place of MD degree or by province. Physicians who were under 44 or over 64 years old, practiced in the inner city or in a free-standing lab/diagnostic clinic, worked under a service contract, or worked in academe or in a research unit were least likely to counsel. To determine whether the lesser academicians (n=809) interest in counseling was attributable to the higher proportion of non-PCPs in academic settings, we compared (data not shown) our 131 PCPs and 678 non-PCPs. The frequency of averaged counseling was 3% (Never/rarely), 52% (Sometimes) and 45% (Usually/always) for academic PCPs (almost identical to the 2%, 53% and 45%, respectively, for all PCPs); and 30% (Never/rarely), 65% (Sometimes) and 5% (Usually/always) for academic non-PCPs (also almost identical to the 28%, 66% and 6%, respectively, for all non-PCPs, p<0.0001 for PCP/non-PCP differences).

Table 2 presents the relationship between personal and clinical prevention practices. Non-smokers were significantly more likely to report counseling patients on smoking cessation; those who drank alcohol less frequently, drank lower quantities or binged less often were more likely to counsel on alcohol; those exercising more to counsel patients more about exercise; those eating more fruits and vegetables to counsel patients more often about nutrition; and those with lower BMIs to more often counsel about nutrition, weight or exercise. For every risk factor, the proportion of SPs actually counseled was higher for those students who self-reported discussing that risk factor

by mailing wave of general health status, BMI, smoking and drinking habits revealed no consistent or major trends, showing that later responders did not have meaningfully different health habits than earlier responders. The analyses were run using unweighted

more frequently with their patients. Additionally, the odds of counseling an SP for any risk factor was significantly higher (OR=1.76-2.80, p<0.05) when students reported more frequent counseling.

Table 3. The Association of Counseling Frequency With Canadian Physicians' Health Care Opinions

Health Care Opinions	Performing Counseling			p-value
	Total	Never/ rarely %	Sometimes %	
Please indicate the extent to which you agree with the following statement: To effectively encourage patient adherence to a healthy lifestyle, a physician must adhere to one him/herself.				
	2927			<0.0001
Strongly agree	773 (26%)	16	52	32
Agree	1554 (53%)	16	62	22
Neither agree nor disagree	383 (13%)	12	68	19
Disagree	191 (7%)	23	58	19
Strongly disagree	26 (1%)	24	53	23
Please indicate the extent to which you agree with the following statement: Prevention is less interesting to me than treatment.				
	2951			0.02
Strongly agree	442 (15%)	14	61	24
Agree	1675 (57%)	15	61	24
Neither agree nor disagree	616 (21%)	18	60	22
Disagree	196 (7%)	13	53	34
Strongly disagree	22 (1%)	13	44	43
Please indicate the extent to which you agree with the following statement: Specifically, I will be able to provide more credible and effective counseling if I:				
Eat a healthy diet (vs. doctor's counseling patients on nutrition)				
	2960			<0.0001
Strongly agree	807 (27%)	15	35	50
Agree	1700 (57%)	17	49	34
Neither agree nor disagree	294 (10%)	21	50	29
Disagree	136 (5%)	25	43	32
Strongly disagree	23 (1%)	29	48	23
Exercise and stay fit (vs. doctor's counseling patients on exercise/physical activity)				
	2970			<0.0001
Strongly agree	909 (31%)	11	30	59
Agree	1691 (57%)	13	42	45
Neither agree nor disagree	242 (8%)	21	41	38
Disagree	110 (4%)	22	37	41
Strongly disagree	18 (1%)	21	44	35
Please indicate the extent to which you agree with the following statements: Specifically, I will be able to provide more credible and effective counseling if I:				
Maintain a healthy weight (vs. doctor's counseling patients on weight)				
	2950			<0.0001
Strongly agree	920 (31%)	10	39	52
Agree	1732 (59%)	12	46	43
Neither agree nor disagree	210 (7%)	14	50	36
Disagree	76 (3%)	19	51	30
Strongly disagree	12 (0.4%)	23	45	31
Drink alcohol in moderation or not at all (vs. doctor's counseling patients on alcohol)				
	2953			<0.0001
Strongly agree	804 (27%)	15	46	40
Agree	1636 (55%)	19	52	30
Neither agree nor disagree	354 (12%)	23	51	26
Disagree	140 (5%)	19	55	26
Strongly disagree	20 (1%)	41	33	27
Do not use tobacco (vs. doctors' counseling patients on smoking cessation)				
	2953			<0.0001
Strongly agree	1354 (46%)	9	22	69
Agree	1281 (43%)	13	30	57
Neither agree nor disagree	200 (7%)	16	34	50
Disagree	104 (4%)	8	33	59
Strongly disagree	14 (0.5%)	23	23	54

Canadian physicians' health care opinions are related to their habits and counseling practices. Physicians who strongly agreed or agreed with the fact that "they will perform better counseling if they have healthy habits" showed higher rates of performing counseling on average ($p < 0.001$; data not shown) and for each counseling topic (Table 3). Physicians who were more interested in prevention were more likely to list "usually/always" for counseling practices than those more interested in treatment.

Table 4 shows the considerable diversity in counseling frequency, both within specialty type, and between PCPs and non-PCPs. Some counseling, such as pedometer use, is rarely provided by any type of physician, while others (e.g., smoking cessation) are standard among PCPs and common among non-PCPs.

DISCUSSION

These data demonstrate that Canadian physicians report typically engaging their patients in health promotion and prevention counseling; only 16% report rarely or never counseling. This compares

favourably to rates of counseling seen in US physicians.¹⁷⁻¹⁹ Like US physicians, Canadian physicians who were more likely to counsel were female, primary care practitioners, or in a rural location.^{10,11} Data from other countries describing counseling practices in rural settings may provide insight; rural/remote practitioners in Australia have been found to play greater roles in providing psychosocial care, patient advocacy, and direct patient education as compared to urban providers.²⁰ Also, in a 1996 study of 1,600 US primary care providers practicing in a rural setting, rural providers reported that the most professionally satisfying aspect of rural practice was the clinical relationship with their patients; high-quality and high-frequency counseling typically promote and are supported by these relationships.²¹

The higher frequency of counseling among women physicians and primary care providers is consistent with a large body of literature.²²⁻²⁴ Differences in communication styles, attitudes, and prioritization of prevention are typically offered explanations for these differences. Women physicians have frequently been shown to

Table 4. Frequency of Counseling for 12 Counseling Areas for PCP and Non-PCP

Counseling Area	PCP			Non-PCP			P-value
	Never/ rarely	Sometimes	Usually/ always	Never/ rarely	Sometimes	Usually/ always	
Nutrition	4%	45%	51%	29%	45%	26%	<0.0001
Exercise	2%	33%	65%	23%	43%	34%	<0.0001
Pedometer use	77%	21%	2%	91%	8%	1%	<0.0001
Weight	2%	37%	60%	20%	50%	30%	<0.0001
Smoking cessation	1%	14%	85%	20%	38%	42%	<0.0001
Alcohol	2%	55%	43%	32%	46%	22%	<0.0001
Mental health	5%	57%	38%	40%	35%	25%	<0.0001
Workplace safety	42%	53%	5%	66%	30%	4%	<0.0001
Safe sex	11%	62%	27%	61%	30%	9%	<0.0001
Calcium supplements	5%	24%	72%	59%	25%	16%	<0.0001
Cholesterol testing	3%	13%	84%	52%	28%	20%	<0.0001
Mammography (for women 50-75)	4%	6%	90%	67%	16%	16%	<0.0001

spend more time on preventive services and psychosocial counseling; male doctors spend more time on technical practice behaviours, such as medical history taking and physical examination.²⁴ Higher counseling rates among primary care providers have also been consistently demonstrated; because primary care providers interact with a significant proportion of the population, they represent an efficient conduit for health promotion messages. Interventions that have promoted positive health behaviours through primary care providers have had modest effects in Canada, yet none of these interventions have focused on the providers' personal health behaviours.²⁵

Variables that we found associated with lower rates of prevention counseling included practicing in the inner city, a free-standing lab/diagnostic clinic, academic health centres, or in a research unit; these findings may be an alert regarding the training of future physicians. Just as modeling positive health behaviours influences patients,¹⁰ modeling of counseling practices influences medical students.^{26,27} If, as we found, physicians in academic clinical settings are predominantly non-primary care physicians who are infrequently modeling counseling of their patients, then medical students are at risk for similarly not counseling their patients. Likewise, if health promotion counseling is infrequently delivered in research settings, it is unlikely that researchers are prioritizing investigations in this important area.

From a policy perspective, it also bears noting that counseling practices were highest among the small number of physicians who practiced in capitated health systems, and indeed, this was part of the intention behind alternative remuneration strategies in the Canadian health system and the move away from fee-for-service reimbursement.²⁸ Randomized trials conducted in the United States from the early 1990s found no difference between capitated vs. fee-for service models;^{29,30} our data suggest otherwise, but we cannot determine if this is due to differences in the US and Canadian health systems or other factors.

Worth noting from a training perspective is the marked variability in counseling practices both within PCPs and non-PCPs, and between them. Some counseling practices such as pedometer use or workplace safety are understandably rare for any type of physician. Other areas, such as nutrition counseling, should likely be offered much more regularly by the half of PCPs or the three quarters of non-PCPs who only offer it sometimes, rarely or never.

One study limitation was our reliance on self-report; while many of these variables (e.g., alcohol, vitamin, or caffeine intake) have no practical alternatives for data collection, it does limit their reliability.^{25-27,31-33} Our response rate was 41%; this compares favourably

to many physician surveys, including other large surveys of Canadian physicians (36% in a 2004 national study^{28,34}). Our weighting adjusted our data to reflect national physician data for specialty, sex, and age group; analyses comparing weighted and unweighted data showed no significant differences. As explained in our methods section, another suggestion of a low response bias is our examination by mailing wave of health behaviours, showing no consistent or major trends. This technique demonstrates that later responders (and suggests that non-responders) were not meaningfully different from earlier responders.

Perhaps the most important finding of this study is that a strong, consistent and positive relationship exists between personal and clinical prevention practices for smoking, drinking alcohol, exercise, fruit and vegetable consumption, and BMI. With this article, this personal-clinical relationship has now been established in large populations of Canadian physicians, US physicians, and medical students in the US and Colombia.^{9,10,35} Furthermore, physicians who agreed that "they will perform better counseling if they have healthy habits" showed higher average rates of performing counseling, and of counseling for each specific topic. Also, physicians who were more interested in prevention were more likely to state that they "usually/always" counseled on prevention than did those more interested in treatment. These correlations suggest relevant strategies for the design and implementation of prevention and health promotion programs to change populations' health behaviours by changing the health practices of providers. Our previous research has demonstrated that health promotion interventions can be designed to improve the health habits of future physicians (medical students) and that these changes translate into improved performance in health promotion and prevention counseling.^{36,37}

CONCLUSIONS

Several demographic characteristics, attitudes and personal practices of Canadian physicians are predictors of their reported prevention counseling. These data about the relationships between personal and clinical practices reinforce the importance of promoting physician health as an innovative, beneficent, evidence-based approach to encourage physicians to counsel patients about prevention. Our findings suggest that by encouraging physicians to be healthy, we can encourage them to increase healthy habits among their patients.

REFERENCES

1. Health Canada 2009. Maintaining Healthy Habits. Available at: <http://www.hc-sc.gc.ca/fin-an/food-guide-aliment/maintain-adopt/index-eng.php> (Accessed September 13, 2009).

2. Centers for Disease Control and Prevention 2009. Healthy Living. Available at: <http://www.cdc.gov/HealthyLiving/> (Accessed September 13, 2009).
3. Levi J, Vinter S, St. Laurent R, Segal LM. F as in Fat: How obesity policies are falling in America. *Trust for America's Health* August 2008. <http://healthyamericans.org/reports/obesity2008/Obesity2008Report.pdf> (Accessed February 19, 2009).
4. Centers for Disease Control and Prevention. Obesity: Halting the Epidemic by Making Health Easier: At A Glance 2009. Available at: <http://www.cdc.gov/chronicdisease/resources/publications/aag/obesity/htm> (Accessed February 19, 2009).
5. Health Canada 2009. Nutrition Labelling. Available at: <http://www.hc-sc.gc.ca/fn-an/label-etiquet/nutrition/index-eng.php> (Accessed February 19, 2009).
6. Siedentop DL. National plan for physical activity: Education sector. *J Phys Act Health* 2009;6(2):168-80.
7. Frank E. Physician health and patient care. *JAMA* 2004;291(5):637.
8. Frank E, Rothenberg R, Lewis C, Belodoff BF. Correlates of physicians' prevention-related practices. *Arch Fam Med* 2000;9:359-67.
9. Frank E, Elon E, Carrera JS, Hertzberg VS. Predictors of US medical students' prevention counseling practices. *Prev Med* 2007;44(1):76-81.
10. Frank E, Breyan J, Elon L. Physician disclosure of healthy personal behaviors improves credibility and ability to motivate. *Arch Fam Med* 2000;9(3):287-90.
11. Rafferty M, Frank E. Office-based prevention: How can we make it happen? *West J Med* 1994;161(2):190-91.
12. National Center for Chronic Disease Prevention and Health Promotion. Behavioral Risk Factor Surveillance System. Prevalence Data: Nationwide 2002.
13. National Institute of Alcohol Abuse and Alcoholism 2004. Binge Drinking Defined: National Institutes of Health, 2004.
14. Godin G, Shephard RJ. A simple method to assess exercise behavior in the community. *Can J Appl Sport Sci* 1985;10(3):141-46.
15. Frank E, McLendon L, Elon L, Denniston M, Fitzmaurice D, Hertzberg V. Medical students' self-reported typical counseling practices are similar to those assessed using Standardized Patients. *Medscape Gen Med* 2005;7(1):2.
16. SAS Institute Inc. SAS Online Doc. Cary, NC: SAS Institute, 1999.
17. Ma J, Urizar GG Jr, Alehegn T, Stafford RS. Diet and physical activity counseling during ambulatory care visits in the United States. *Prev Med* 2004;39(4):815-22.
18. Mosca L, Linfante AH, Benjamin EJ, Berra K, Hayes SN, Walsh BW, et al. National study of physician awareness and adherence to cardiovascular disease prevention guidelines. *Circulation* 2005;111(4):499-510.
19. Stafford RS, Farhat JH, Misra B, Schoenfeld DA. National patterns of physician activities related to obesity management. *Arch Fam Med* 2000;9(7):631-38.
20. Hanks H, Veitch P, Harris M. A rural/urban comparison of the roles of the general practitioner in colorectal cancer management. *Aust J Rural Health* 2008;16(6):376-82.
21. Pathman DE, Williams ES, Konrad TR. Rural physician satisfaction: Its sources and relationship to retention. *J Rural Health* 1996;12(5):366-77.
22. Frank E, Harvey L. Prevention advice rates of women and men physicians in primary care and other disciplines. *Arch Fam Med* 1996;5:215-19.
23. Roter D, Hall J, Aoki Y. Physician gender effects in medical communication: A meta-analytic review. *JAMA* 2002;288:756-64.
24. Bertakis KD. The influence of gender on the doctor-patient interaction. *Patient Educ Couns* 2009;76(3):356-60.
25. Fleming P, Godwin M. Lifestyle interventions in primary care: Systematic review of randomized controlled trials. *Can Fam Phys* 2008;54(12):1706-13.
26. Wright S, Wong A, Newill C. The impact of role models on medical students. *J Gen Intern Med* 1997;12(1):53-56.
27. Baernstein A, Oelschlager AM, Chang TA, Wenrich MD. Learning professionalism: Perspectives of preclinical medical students. *Acad Med* 2009;84(5):574-81.
28. Wranik DW, Durier-Copp M. Physician remuneration methods for family physicians in Canada: Expected outcomes and lessons learned. *Health Care Anal* 2009;18(1):35-59.
29. Lurie N, Moscovic IS, Finch M, Christianson JB, Popkin MK. Does capitation affect the health of the chronically mentally ill? Results from a randomized trial. *JAMA* 1992;267(24):3300-4.
30. Lurie N, Christianson J, Finch M, Moscovic I. The effects of capitation on health and functional status of the Medicaid elderly. A randomized trial. *Ann Intern Med* 1994;120(6):506-11.
31. Kimberlin CL, Winterstein AG. Validity and reliability of measurement instruments used in research. *Am J Health Syst Pharm* 2008;65(23):2276-84.
32. Dekkers JC, van Wier MF, Hendriksen IJ, Twisk JW, van Mechelen W. Accuracy of self-reported body weight, height and waist circumference in a Dutch overweight working population. *BMC Med Res Methodol* 2008;28(8):69.
33. Corder K, van Sluijs EM, Wright A, Whincup P, Wareham NJ, Ekelund U. Is it possible to assess free-living physical activity and energy expenditure in young people by self-report? *Am J Clin Nutr* 2009;89(3):736-37.
34. Canadian Institute for Health Information. Understanding the Physician Labour Market: Results of the 2004 National Physician Survey. Available at: http://www.cerforum.org/conferences/200505/papers/buske_cerf05.pdf (Accessed September 24, 2008).
35. Duperly J, Lobelo F, Segura C, Sarmiento F, Herrera D, Sarmiento OL, et al. The association between Colombian medical students' healthy personal habits and a positive attitude toward preventive counseling: Cross-sectional analyses. *BMC Public Health* 2009;9:218.
36. Frank E, Elon L, Hertzberg V. A Quantitative assessment of a 4-year intervention that improved patient counseling through improving medical student health. *Med Gen Med* 2007;9(2):58.
37. Frank E, Smith D, Fitzmaurice D. A description and qualitative assessment of a 4 year intervention to improve medical student health. *Med Gen Med* 2005;7(2):4.

Received: January 5, 2010

Accepted: May 9, 2010

RÉSUMÉ

Objectifs : Connaître les prédicteurs du counseling en prévention offert par les médecins canadiens.

Méthode : Sondage postal national mené entre novembre 2007 et mai 2008 auprès d'un échantillon aléatoire de médecins canadiens de premier recours.

Résultats : Quarante-et-un p. cent des médecins contactés (n=3213) ont répondu au questionnaire. Les répondants ayant de meilleures habitudes de santé, les femmes et les répondants de 45 à 64 ans avaient plus tendance à conseiller leurs patients « habituellement/toujours », mais il n'y avait pas de différences significatives selon la province, l'origine du diplôme de médecine ou le lieu d'exercice. Le lien entre les habitudes personnelles et les pratiques de prévention clinique était clair et systématique : les non-fumeurs avaient significativement plus tendance à conseiller l'arrêt du tabac à leurs patients; les répondants dont la consommation d'alcool était plus faible, moins fréquente ou moins sujette aux excès occasionnels étaient plus susceptibles d'offrir des conseils sur l'alcool; ceux qui faisaient davantage d'exercice physique avaient plus tendance à donner des conseils sur l'exercice physique; ceux qui mangeaient davantage de fruits et légumes avaient plus tendance à donner des conseils de nutrition; et ceux qui n'étaient pas en surpoids avaient plus tendance à donner des conseils sur la nutrition, le poids ou l'exercice physique. Les médecins qui étaient d'accord ou tout à fait d'accord avec l'énoncé « leurs conseils seront meilleurs s'ils ont eux-mêmes de saines habitudes » affichaient en moyenne de taux de counseling supérieurs (p<0,001).

Conclusion : Les caractéristiques personnelles des médecins canadiens sont des prédicteurs du counseling en prévention. En incitant les médecins à être en bonne santé, il serait possible d'améliorer les habitudes de santé de leurs patients. C'est une approche novatrice, bénéfique et éprouvée pour encourager les médecins à donner des conseils de prévention aux patients.

Mots clés : médecins; santé; éducation sanitaire; conseil; counseling du patient; Canada; prévention