National survey of primary care physicians' perspectives about causes of obesity and solutions to improve care

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National survey of primary care physicians' perspectives about causes of obesity and solutions to improve care

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ABSTRACT

Objective: To describe physician perspectives on the causes of and solutions to obesity care and identify differences in these perspectives by number of years since completion of medical school.

Design: National cross-sectional online survey from February 9 to March 1, 2011.

Setting: United States

Participants: 500 primary care physicians

Main Measures: We evaluated physician perspectives on: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care

Results: PCPs overwhelmingly supported additional training (such as nutrition counseling) and practice-based changes (such as having scales report BMI) to help them improve their obesity care. They also identified nutritionists/dieticians as the most qualified providers to care for obese patients. Physicians with less than 20 years since completion of medical school were more likely to identify lack of information about good eating habits and lack of access to healthy food as important causes of obesity. They also reported feeling relatively more successful helping obese patients lose weight.

Conclusions: Our results indicate a need for improved medical education related to obesity care.

Article focus

- The purpose of this study is to describe primary care physician (PCP) perspectives on the causes of and solutions to obesity care and whether these perspectives differ by number of years since completion of medical school.
- We hypothesized that PCPs with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be more likely to identify increased training and practice-based changes as possible solutions to the problem of obesity.

Key messages

- There are few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school, suggesting that obesity-related medical education has changed little over time.
- PCPs who completed medical school more recently reported feeling more successful helping obese patients lose weight
- Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

Strengths and limitations of this study

- The key limitation of this study is that it is cross-sectional which only allows us to address associations rather than causal inferences.
- The key strength of this study is that is uses a nationally representative sample of PCPs.

Obesity affects one third of the U.S. adult population [1] and is estimated to cost $147 billion annually.[2] Despite national guidelines for primary care physicians (PCPs) to counsel their obese patients to lose weight, [3-4] only one third of obese patients report receiving an obesity diagnosis or weight-related counseling.[5]

While there is a growing body of research documenting physician perspectives on the causes of obesity,[6-8] little research has examined PCP perspectives on possible solutions to improve obesity care. This is an important area of research given that PCPs are in a unique position to treat obesity and assist with healthy-weight maintenance. In 2008, there were an estimated 455 million visits were made to PCPs.[9] Given the penetration of the obesity epidemic, even modest reductions in body weight at the individual-level can lead to significant health benefits and reduced costs at the population-level.[10-11]

Physician-level barriers to obesity care have been extensively explored in the literature. Many of the physician-level barriers relate to clinical knowledge and attitudes towards obese patients including: inadequate training in weight counseling, poor knowledge of the tools needed to diagnose and treat obesity.[7 12-14] negative physician attitudes (e.g., weight stigma, pessimism about patient's desire/ability to lose weight; belief that weight-loss counseling is ineffective, [15-18]) doubt that counseling will have an effect on patient behavior,[19-20] and feeling that obesity is the responsibility of the patient.[21]

Some of these physician barriers may be related to how recently PCPs completed medical school or residency. Little research has explored the association between years since completion of medical training and physician perspectives on obesity. The available evidence suggests a positive correlation between years since residency and a negative expectation of outcomes for obese patients among internists,

pediatricians, and psychiatrists.[22] Previous research has also shown that years since medical school predicts the types of treatment offered to obese patients, where physicians who completed medical school ≥20 years before the study were more likely to provide general counseling, specific dietary counseling, specific physical activity counseling, and to systematically track patients than those who completed their training <10 years ago.[23]

This is an important area of research given that obesity training can improve the quality of physician practice patterns of obesity care (such as weight-related counseling),[24] and new cohorts of medical students and residents may be more likely to receive this training as compared to older cohorts. Physicians who learn appropriate obesity screening and counseling practices in residency are more likely to report discussing diet or exercise with their obese patients.[12] Recent graduates may also be more likely to consider modest weight loss or weight maintenance a successful outcome.

Our primary goal was to describe physician perspectives on the causes of and solutions to obesity care. Our secondary goal is to identify differences in these perspectives by number of years since completion of medical school. We examined differences in perspectives by years since completing medical school for the following topics: causes of obesity, competence in treating obese patients, perspectives on the health professional most qualified to help obese patients lose or maintain weight, and solutions for improving obesity care. We hypothesized that physicians with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be

more likely to identify increased training and practice-based changes (e.g., appropriateness of medical equipment) as possible solutions to the problem of obesity.

METHODS AND PROCEDURES

Study Design

National cross-sectional internet-based survey of PCPs in the United States.

Survey Development and Implementation

We consulted SSRS/Social Science Research Solutions to design and implement the survey. The survey instrument was reviewed for content by physicians and experts in the field of obesity, and was then pretested for length and comprehensibility. The survey was revised on the basis of these pilot tests and the final version included forty-nine questions. The fieldwork for this survey was conducted via the internet by The Epocrates Honors Web Panel Company, which consists of 145,000 physicians.

We surveyed 500 General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011. These physicians were recruited from The Epocrates Honors panel. The Epocrates Honors panel is an opt-in panel of 145,000 physicians in the United States verified by the American Medical Association's (AMA's) master file. Physicians were verified by checking their first and last name, date of birth, medical school, and graduation date against the AMA's master file at the time of panel registration. A random sample of the panel was invited to participate in the survey. This sample was drawn to match AMA master file proportions for age, gender, and region. Each physician received a $25 incentive for completing the survey.

This study was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

Measures of physician perspectives on obesity care

We evaluated physician perspectives on the following topics: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care. Physician competence questions assessed whether PCPs felt competent providing diet or exercise counseling, helping their patients lose weight, and whether primary care physicians are the 'most qualified' professional to care for obese patients. Questions on how to improve obesity care assessed physicians' perspectives on the helpfulness of training in nutrition counseling, exercise counseling, patient care after bariatric surgery, patient eligibility for bariatric surgery, motivational interviewing, and weight loss medications; the helpfulness of including specific diet or exercise tips in the patient chart, having scales report body mass index (BMI), adding BMI to the patient chart, including BMI as a fifth vital sign; and the appropriateness of medical equipment in the office (e.g., gowns, chairs, exam tables).

Statistical Analyses

We performed descriptive analyses for all variables. T-tests were used to test for differences by years since completing medical school. We used weighting to address systematic under- or over-representation of the physician subpopulations in the panel, account for systematic non-response along known demographic characteristics of the PCPs, and adjust for sampling biases due to differences in non-response rates.(27)

All analyses were stratified based on years since completing medical school, comparing physicians who completed medical school fewer than 20 years ago (i.e., 1991 or later) with PCPs who completed medical school 20 or more years ago (i.e., 1990 or earlier). The weighted mean year that medical school was completed in our

sample was 1993. We elected to stratify by the 20-year threshold based on previous research suggesting differences in counseling and tracking of obese patients among those two groups of physicians.[23] We also conducted sensitivity analyses using 10- and 15-years since medical school as the thresholds. Those results are not included as they did not differ substantively from the 20 year cut points. They are available from the authors upon request. Statistical analyses were performed using the STATA, version 11.0 software package (StataCorp LP, College Station, TX), using SVY functions to adjust for the complex survey design. The weighted margin of error for the survey was +/-5.3%.

RESULTS

Sample characteristics

Table 1 shows characteristics of the survey respondents. Physician-level characteristics are comparable to national-level characteristics reported for family physicians/internists/general practitioners by the American Medical Association (AMA), with the exception of the distribution of years since completing medical school. Our sample distribution had slightly more respondents who had completed medical school more recently (in 2000) than the national sample reported by the AMA (22% vs. 21%). Specifically, 49% of physicians in the AMA sample completed medical school in 1990 or later, compared to 69% in our sample. A large majority of PCPs (84%) reported that about half of the patients in their practice were obese, and 10% reported that almost all patients in their practice were obese. Nearly all physicians reported that patient height and body weight were included in patients' charts, and 76% reported that Body Mass Index (BMI) was included in patients' charts. When asked to rate the quality of obesity-related training, 23% reported receiving good training in medical school, 35% reported

receiving good training in residency, and 60% reported receiving good training in continuing medical education.

PCP perspectives on causes of obesity

Table 2 describes PCP perspectives on the causes of and solutions to obesity care as well as differences in these perspectives by number of years since completion of medical school (≥20 years vs. <20 years). We divided possible causes of obesity into three domains: individual biological factors, individual behavioral factors, and physical/social environmental factors. Overall, 75% of PCPs identified genetics or family history as an important cause of obesity, followed by metabolic effect (47%) and endocrine disorders (25%). Individual behavioral factors were the most commonly reported causes of obesity, with nearly all physicians citing insufficient physical activity (99%), overconsumption of food (99%), restaurant or fast-food eating (95%), consumption of sugar-sweetened beverages (94%), and lack of will power as important causes of obesity (89%). PCPs also identified environmental factors as important causes of obesity: cultural factors (85%), lack of information on good eating habits (75%), and lack of access to healthy foods (59%).

We observed few differences in perspectives about possible causes of obesity between physicians who had completed medical school ≥20 years ago compared to those who had completed medical school <20 years ago. PCPs who completed medical school more recently were more likely to identify restaurant or fast-food eating (99% vs. 90%; $p < 0.01$), lack of information on good eating habits (80% vs. 69%; $p = 0.03$), and lack of access to health foods as important causes of obesity (64% vs. 52%; $p = 0.03$).

PCPs' perspectives in improving care for obese patients

Figure 1 shows PCP perspectives on the health care provider most qualified to help obese patients lose or maintain weight, stratified by years since completing medical school. No one type of provider was endorsed by a majority of PCPs as the most qualified to help patients. PCPs with <20 years since completion of medical school reported that nutritionists/dieticians were most qualified providers (48% vs. 41%), followed by primary care physicians 41% vs. 37%) and behavioral psychologists (9% vs. 20%, p = 0.01). Very few PCPs reported that endocrinologists (1% vs. 1.5%) or nurses (1% vs. 1%) were the most qualified providers to help obese patients lose or maintain weight.

PCP perspectives on solutions for improving obesity care

Table 3 shows PCPs perspectives on solutions for improving obesity care related to physician training and practice-based changes. With respect to training, PCPs who had received some training in obesity-related care (n=313) generally reported that it was helpful. In terms of practice-based solutions to improving care, 93% reported that including BMI as a fifth vital sign would be helpful; 89% reported that including diet/exercise tips in patients' charts would be helpful; 85% reported that having scales report BMI would be helpful; and 69% reported that adding BMI to patients' charts would be helpful. No significant differences were observed by year since completing medical school with one exception. Fewer PCPs who completed medical school within 20 years agreed that BMI reported by scales would be being helpful in treating obese patients (81% vs. 89%; p = 0.02). report that having scales which show BMI would be helpful (80% vs. 88%; p=.04).

PCPs' reported competence for caring for obese patients

Table 4 shows PCPs reported competence in treating obese patients, overall and stratified by years since completing medical school. Almost all PCPs reported feeling competent giving diet-related counseling (90%) and exercise-related counseling (92%) to obese patients. However, less than half (44%) reported that they were usually successful in helping obese patients lose weight. PCPs who completed medical school <20 years ago were significantly more likely to report success in helping patients lose weight (49% vs. 36%; p = 0.02).

DISCUSSION

This study updates earlier research related to primary care physician perspectives on the causes of obesity and examines physician-reported causes of obesity and solutions for improving obesity care, for PCPs overall and by years since medical school completion. Like previous research,[6] we found that PCPs overwhelmingly identified individual behavioral factors (e.g., poor diet and physical inactivity) as important causes of obesity. PCP perspectives on improving obesity care supported additional training (e.g., nutrition and exercise counseling) and practice-based changes (e.g., including BMI in the patient chart). We observed few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school. However, we found PCPs who graduated from medical school within the past 20 years, compared with those with graduated more than 20 years ago, more frequently recognized social determinants as causes of obesity, such as lack of information about good eating habits and lack of access to healthy food. While PCPs who completed medical school more recently reported feeling more successful helping obese patients lose weight, these successful providers are still a

minority. This is consistent with research suggesting that PCPs generally feel unprepared to care for obese patients.[7 12-14] Increased time since completing medical school could lead to more negative attitudes towards obesity care, as physicians may become frustrated by years of failed attempts to help their obese patients lose and maintain weight. Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

The limited differences among PCPs that we observed may suggest that obesity-related training has changed little over time. We found little evidence that any recent emphasis on obesity-related training in medical school has translated into significant differences in self-perceived competency. Interestingly, while most PCPs reported competence in diet and exercise counseling to obese patients, less than half reported success in helping those patients lose weight.

Given that obesity training has been shown to improve obesity care,[12] improvements to medical and post-graduate medical education are critical. As most practicing PCPs report inadequate training in obesity care, these physicians may be particularly receptive to continuing medical education in this area.[13-14] PCPs in our study desired additional training on nutrition and exercise counseling, care related to bariatric surgery patients, as well as motivational interviewing. In addition to addressing these gaps in medical education, we should consider transitioning some obesity care responsibilities away from primary care physicians to nutritionists/dieticians. Physicians in our study identified these health professionals as being most qualified to help obese patients lose or maintain their weight. Furthermore, incentives for care coordination under the Patient Protection and Affordable Care Act such as the Patient Centered Medical Home recommend the inclusion of dietitians as members of health teams to

support primary care practices.[25] Perhaps a new model of obesity care should join PCPs, nutritionists, and other relevant health professional together – an approach which proved effective in the recently completed POWER trial,[26] which examined the effects of behavioral weight-loss interventions among obese patients.

Future research is needed to better understand the components of obesity care primary care physicians feel most qualified to deliver and which factors would be best handled by nutritionists/dieticians. Recent work identifies successful models that include delivery of weight loss support by trained coaches via remote means (e.g., telephone, email, and web-based modules, self-monitoring tools, and feedback) along with PCP support [26] and lifestyle counseling plus meal replacement or weight-loss medication chosen in consultation with the PCP.[27]

Regardless of their years after medical school completion, most physicians desired practice-based changes to facilitate improved obesity care. Physicians endorsed using appropriate medical equipment to accommodate obese patients, as well as documenting BMI in the chart as important practice changes. Such changes would ensure accurate identification and proper care of obese patients. Finally, the practice could better support obesity counseling by including diet and exercise tips in the chart for the physician to use.

There are several limitations to this analysis. First, it is cross-sectional which only allows us to address associations rather than causal inferences. Second, our measures of physician attitudes do not represent the full possible spectrum of attitude measures in the literature (such as perceived skills[28] or comfort in caring for obese patients,[29] which may bias our results towards the null. Third, some of the included PCP's may have had extensive additional training in obesity (considering themselves "obesity specialists"), which could have biased our results positively. Years since

medical school completion is proxy for type of education they received, but we are unable to account for the huge variation in curricula across medical schools.

In conclusion, this study suggests few differences in primary care physician perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school. The differences we did observe suggest that physicians with less than 20 years since completion of medical school more frequently recognized social determinants as causes of obesity and also reported feeling more successful helping obese patients lose weight. More research is needed to understand the components of obesity care physicians feel most qualified to deliver and which factors would be best handled by other health professionals such as nutritionists/dieticians. The results from the recently completed POWER trial, suggest that having PCPs play a supportive role to weight loss health coaches – such as reviewing patient progress and using this information to provide basic guidance and motivation – may be one effective model.[26] In order to begin improving obesity care, medical education should focus on enhancing those obesity-related skills PCPs feel most qualified to deliver as well as changing the composition of healthcare teams and practice resources.

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Conflicts of interest: None

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Table 1. Characteristics of the study sample (N = 500)

	N (%)
Physician characteristics	
Gender	
Male	335 (67)
Race	
White	350 (70)
Black	15 (3)
Asian	77 (15)
Hispanic	25 (5)
Other race	6 (1)
Age, years	
Under 45	224 (45)
Aged 45-54	124 (25)
Aged 55 and older	152 (30)
Year since completed medical school	
20 years or more (1990 or earlier)	222 (44)
15 years to <20 years (1991 to 1995)	58 (12)
10 years to <15 (1996 to 2000)	162 (32)
<=10 (2001 to 2011)	57 (11)
Physician-reported demographics of their patients	
Patients in practice who are obese	
Almost all	48 (10)
About half	422 (84)
Not many	20 (4)
Race of obese patients in practice	
Most are White	174 (35)
Most are minority	41 (8)
Broad range of demographic groups	284 (57)
Income of obese patients in practice	
Most are low income	142 (28)
Most are not low income	92 (18)
Evenly split	266 (53)
Physician-reported practice characteristics	
Primary location where patients are seen†	
Hospital or inpatient setting	49 (10)
Office not attached to a hospital or outpatient	313 (63)
Both inpatient and outpatient	136 (27)
Patient chart	
Includes height	467 (93)
Includes body weight	499 (99)
Includes body mass index	378 (76)
Location of practice	
Northeast	104 (21)
North central	114 (23)
South	166 (33)

	N (%)
West	116 (23)
Physician obesity-related training rated as very or pretty good	
Medical school	115 (23)
Residency	173 (35)
Continuing medical education	298 (60)
Other training‡	313 (63)

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.
† One respondent reported the primary location where patients are seen is "another location."
‡ Other training includes in-person or online training such as a lecture, seminar, workshop, or conference.
Note: Numbers may not add up to 100% because of rounding.

Table 2. Primary care physician perception of the importance of possible causes of obesity, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 n=277	20+ n=223	*P*-value
Individual biological factors				
Genetics or family history	372 (75)	205 (74)	168 (75)	0.77
Metabolic effect	234 (47)	135 (49)	99 (44)	0.43
Endocrine disorder	140 (28)	84 (30)	56 (25)	0.30
Individual behavioral factors				
Insufficient physical activity	496 (99)	274 (98)	223 (100)	0.05
Overconsumption of food	496 (99)	276 (99)	221 (99)	0.86
Restaurant or fast food eating	474 (95)	274 (99)	200 (90)	<0.01
Consumption of sugar-sweetened beverages	470 (94)	264 (95)	206 (93)	0.36
Lack of will power	441 (89)	250 (90)	197 (88)	0.60
Physical/social environmental factors				
Cultural factors	422 (85)	239 (86)	184 (83)	0.43
Lack of information on good eating habits	375 (75)	222 (80)	154 (69)	0.03
Lack of access to healthy food	294 (59)	178 (64)	116 (52)	0.03

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

Notes: P-values are for t-tests for differences in proportions. Percentages reflect respondents rating potential causes as very or somewhat important. The mean year medical school was completed is 1993.

Table 3. Primary care physician's perspectives on solutions for improving obesity care, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=313	<20 n=161	20+ n=152	*P*-value
Physician training to improve obesity care				
Helpfulness of physician training in…*				
Nutrition counseling	290 (93)	156 (97)	134 (88)	0.04
Exercise counseling	290 (92)	154 (96)	135 (89)	0.09
Patient care after bariatric surgery	282 (90)	144 (89)	137 (90)	0.81
Motivational interviewing	270 (86)	143 (88)	127 (84)	0.37
Patient eligibility for bariatric surgery	266 (85)	136 (84)	130 (85)	0.88
Weight loss medications	202 (64)	110 (68)	92 (60)	0.24
	N=500	n=277	n=223	
Practice-based changes to improve obesity care				
Helpfulness of…				
Including BMI as a fifth vital sign	466 (93)	256 (92)	210 (95)	0.32
Including specific diet or exercise tips in patient chart	446 (89)	250 (90)	196 (88)	0.53
Having scales report BMI	423 (85)	224 (81)	198 (89)	0.02
Adding BMI to patient chart†	344 (69)	193 (69)	151 (68)	0.70
Medical equipment in office is appropriate for obese patients (e.g., gowns, chairs, exam tables, blood pressure cuffs)‡	460 (92)	253 (91)	207 (93)	0.53

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

* Questions about the helpfulness of various forms of obesity training were only asked among those physicians who reported receiving some training. Percentages represent physicians reporting training is very or somewhat helpful.

† 20% of the sample (100 respondents) reported that this feature is already available in the medical chart

‡ Percentages represent physicians reporting very/somewhat appropriate

Note: The 8% of physicians who said that medical equipment for obese patients was not appropriate were also asked to rate how important it was to improve the equipment. More than 85% of these physicians said this was an important goal for gowns, chairs, exam tables, and blood pressure cuffs.

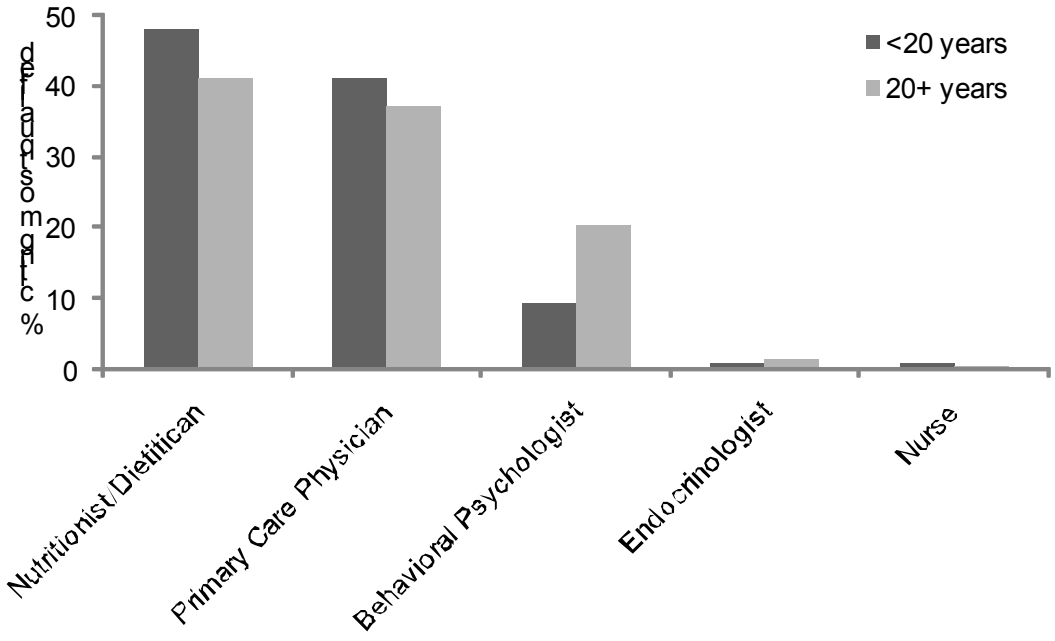
Table 4. Physician reported competence in treating obese patients, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 n=277	20+ n=223	*P*-value
Competent giving exercise-related counseling to obese patients	462 (92)	258 (93)	204 (92)	0.68
Competent giving diet-related counseling to obese patients	450 (90)	252 (91)	198 (89)	0.54
Usually successful in helping obese patients lose weight	218 (44)	137 (49)	81 (36)	0.02
Primary care physicians are the 'most qualified' professional to help obese patients	196 (39)	115 (41)	82 (37)	0.40

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

Notes: P-values are for t-tests for differences in proportions. The mean year medical school was completed is 1993.

Figure 1. Physician perspectives on health professional most qualified to help obese patients lose or maintain weight, by years since completing medical school (%)



Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

National survey of primary care physicians' perspectives about causes of obesity and solutions to improve care

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National survey of primary care physicians' perspectives about causes of obesity and solutions to improve care

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ABSTRACT

Objective: To describe physician perspectives on the causes of and solutions to obesity care and identify differences in these perspectives by number of years since completion of medical school.

Design: National cross-sectional online survey from February 9 to March 1, 2011.

Setting: United States

Participants: 500 primary care physicians

Main Measures: We evaluated physician perspectives on: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care

Results: PCPs overwhelmingly supported additional training (such as nutrition counseling) and practice-based changes (such as having scales report BMI) to help them improve their obesity care. They also identified nutritionists/dietitians as the most qualified providers to care for obese patients. Physicians with less than 20 years since completion of medical school were more likely to identify lack of information about good eating habits and lack of access to healthy food as important causes of obesity. They also reported feeling relatively more successful helping obese patients lose weight.

Conclusions: Our results indicate a need for improved medical education related to obesity care.

Article focus

- The purpose of this study is to describe primary care physician (PCP) perspectives on the causes of and solutions to obesity care and whether these perspectives differ by number of years since completion of medical school.
- We hypothesized that PCPs with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be more likely to identify increased training and practice-based changes as possible solutions to the problem of obesity.

Key messages

- There are few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school, suggesting that obesity-related medical education has changed little over time.
- PCPs who completed medical school more recently reported feeling more successful helping obese patients lose weight
- Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

Strengths and limitations of this study

- The key limitation of this study is that it is cross-sectional which only allows us to address associations rather than causal inferences.
- The key strength of this study is that is uses a national sample of PCPs.

Obesity affects one third of the U.S. adult population [1] and is estimated to cost $147 billion annually.[2] Despite national guidelines for primary care physicians (PCPs) to counsel their obese patients to lose weight, [3-4] only one third of obese patients report receiving an obesity diagnosis or weight-related counseling.[5]

While there is a growing body of research documenting physician perspectives on the causes of obesity,[6-8] little research has examined PCP perspectives on possible solutions to improve obesity care. This is an important area of research given that PCPs are in a unique position to treat obesity and assist with healthy-weight maintenance. In 2008, there were an estimated 455 million visits were made to PCPs.[9] Given the penetration of the obesity epidemic, even modest reductions in body weight at the individual-level can lead to significant health benefits and reduced costs at the population-level.[10-11]

Physician-level barriers to obesity care have been extensively explored in the literature. Many of the physician-level barriers relate to clinical knowledge and attitudes towards obese patients including: inadequate training in weight counseling, poor knowledge of the tools needed to diagnose and treat obesity.[7 12-14] negative physician attitudes (e.g., weight stigma, pessimism about patient's desire/ability to lose weight; belief that weight-loss counseling is ineffective, [15-18]) doubt that counseling will have an effect on patient behavior,[19-20] and feeling that obesity is the responsibility of the patient.[21]

Some of these physician barriers may be related to how recently PCPs completed medical school or residency. Little research has explored the association between years since completion of medical training and physician perspectives on obesity. The available evidence suggests a positive correlation between years since residency and a negative expectation of outcomes for obese patients among internists, pediatricians, and psychiatrists.[22] Previous research has also shown that years since medical school predicts the types of treatment offered to obese patients, where physicians who completed medical school ≥20 years before the study were more likely to provide general counseling, specific dietary counseling, specific physical

activity counseling, and to systematically track patients than those who completed their training <10 years ago.[23]

This is an important area of research given that obesity training can improve the quality of physician practice patterns of obesity care (such as weight-related counseling),[24] and new cohorts of medical students and residents may be more likely to receive this training as compared to older cohorts. Physicians who learn appropriate obesity screening and counseling practices in residency are more likely to report discussing diet or exercise with their obese patients.[12] Recent graduates may also be more likely to consider modest weight loss or weight maintenance a successful outcome.

Our primary goal was to describe physician perspectives on the causes of and solutions to obesity care. Our secondary goal is to identify differences in these perspectives by number of years since completion of medical school. We examined differences in perspectives by years since completing medical school for the following topics: causes of obesity, competence in treating obese patients, perspectives on the health professional most qualified to help obese patients lose or maintain weight, and solutions for improving obesity care. We hypothesized that physicians with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be more likely to identify increased training and practice-based changes (e.g., appropriateness of medical equipment) as possible solutions to the problem of obesity. This research updates earlier studies focused on physician attitudes towards obesity causes and treatment [6 8] as well as provides physician perspectives about solutions to obesity care with an emphasis on whether perspectives differ according to when physicians completed medical school.

METHODS AND PROCEDURES

Study Design

National cross-sectional internet-based survey of PCPs in the United States.

Survey Development and Implementation

We consulted SSRS/Social Science Research Solutions to design and implement the survey. The survey instrument was reviewed for content by physicians and experts in the field of obesity, and was then pretested for length and comprehensibility. The survey was revised on the basis of these pilot tests and the final version included forty-nine questions. The fieldwork for this survey was conducted via the internet by The Epocrates Honors Web Panel Company, which consists of 145,000 physicians.

We surveyed 500 General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011. These physicians were recruited from The Epocrates Honors panel. The Epocrates Honors panel is an opt-in panel of 145,000 physicians in the United States verified by the American Medical Association's (AMA's) master file. Physicians were verified by checking their first and last name, date of birth, medical school, and graduation date against the AMA's master file at the time of panel registration. A random sample of the panel was invited to participate in the survey. This sample was drawn to match AMA master file proportions for age, gender, and region. Each physician received a $25 incentive for completing the survey.

This study was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

Measures of physician perspectives on obesity care

We evaluated physician perspectives on the following topics: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care.

We assessed physician beliefs about the causes of obesity with the question, "How important is each of the following possible causes of obesity for your patients?" For each cause (over consumption of food, restaurant/fast food eating, consumption of sugar-sweetened beverages (SSB), genetics/family history, and metabolic defect), physicians indicated whether it

was very important, somewhat important, not very important, or not at all important. We dichotomized variables for each cause where 1 was “very/somewhat important” and 0 was not “very/not at all important.”

Physician competence questions assessed by the question, “Please tell me whether you agree or disagree with the following statements: I feel competent giving diet counseling to my obese patients; I feel competent giving exercise counseling to my obese patients; and I am usually successful in helping my obese patients lose weight.” For each statement, physicians indicated whether they strongly agreed, somewhat agreed, somewhat disagreed, or strongly disagreed with the statements. We dichotomized variables for each competency where 1 was “strongly/somewhat agree” and 0 was “strongly/somewhat disagree.”

We assessed perspectives about how to improve obesity training among those physicians who had already received some additional training with the survey question, “Since you have received more training on how to care for your obese patients, how helpful would each of the following types of training be: Nutrition counseling, exercise counseling, patient care after bariatric surgery, patient eligibility for bariatric surgery, motivational interviewing, and weight loss medications.” For each type of training, physicians indicated whether they believed it would be very helpful, somewhat helpful, not very helpful, or not at all helpful. We dichotomized variables for each type of training where 1 was “very/somewhat helpful” and 0 was “not very/not at all helpful.” Among all physicians, we assessed perspectives about improving obesity care with the following questions: “How helpful would it be for the patient chart to include a specific list of diet and exercise tips you could share with your obese patients to help them lose weight or manage their weight?”; “How helpful would it be for scales that measure height and body weight to also report body mass index so that medical assistants/nurses are not required to calculate it?”; “If it does not already, how helpful would it be if the medical chart clearly indicated whether the patient was clinically obese or overweight (by including BMI and the overweight/obesity status)?”; and “How important is it to include body mass index with patients’ other vital signs of heart beat, breathing rate, temperature, and blood pressure?” We

dichotomized variables for each type of improvement as 1 was “very/somewhat helpful” and 0 was “not very/not at all helpful”. Finally we assessed perspectives about medication equipment with the question, “How appropriate is the medical equipment in your office for your obese patients (e.g., gowns, chairs, exam tables, blood pressure cuffs)?” and dichotomized the response categories as 1 “very/somewhat appropriate” and 0 “not very/not at all appropriate.”

Statistical Analyses

We performed descriptive analyses for all variables. T-tests were used to test for differences by years since completing medical school. We used weighting to address systematic under- or over-representation of the physician subpopulations in the panel, account for systematic non-response along known demographic characteristics of the PCPs, and adjust for sampling biases due to differences in non-response rates.

All analyses were stratified based on years since completing medical school, comparing physicians who completed medical school fewer than 20 years ago (i.e., 1991 or later) with PCPs who completed medical school 20 or more years ago (i.e., 1990 or earlier). The weighted mean year that medical school was completed in our sample was 1993. We elected to stratify by the 20-year threshold based on previous research suggesting differences in counseling and tracking of obese patients among those two groups of physicians.[23] We also conducted sensitivity analyses using 10- and 15-years since medical school as the thresholds. Those results are not included as they did not differ substantively from the 20 year cut points. They are available from the authors upon request. Statistical analyses were performed using the STATA, version 11.0 software package (StataCorp LP, College Station, TX), using SVY functions to adjust for the complex survey design. The weighted margin of error for the survey was +/-5.3%.

RESULTS

Sample characteristics

Table 1 shows characteristics of the survey respondents. Physician-level characteristics are comparable to national-level characteristics reported for family physicians/internists/general practitioners by the American Medical Association (AMA), with the exception of the distribution of years since completing medical school. Our sample distribution had slightly more respondents who had completed medical school more recently (in 2000) than the national sample reported by the AMA (22% vs. 21%). Specifically, 49% of physicians in the AMA sample completed medical school in 1990 or later, compared to 69% in our sample. A large majority of PCPs (84%) reported that about half of the patients in their practice were obese, and 10% reported that almost all patients in their practice were obese. Nearly all physicians reported that patient height and body weight were included in patients' charts, and 76% reported that Body Mass Index (BMI) was included in patients' charts. When asked to rate the quality of obesity-related training, 23% reported receiving good training in medical school, 35% reported receiving good training in residency, and 60% reported receiving good training in continuing medical education.

PCP perspectives on causes of obesity

Table 2 describes PCP perspectives on the causes of and solutions to obesity care as well as differences in these perspectives by number of years since completion of medical school (≥20 years vs. <20 years). We divided possible causes of obesity into three domains: individual biological factors, individual behavioral factors, and physical/social environmental factors. Overall, 75% of PCPs identified genetics or family history as an important cause of obesity, followed by metabolic effect (47%) and endocrine disorders (25%). Individual behavioral factors were the most commonly reported causes of obesity, with nearly all physicians citing insufficient physical activity (99%), overconsumption of food (99%), restaurant or fast-food eating (95%), consumption of sugar-sweetened beverages (94%), and lack of will power as important causes of obesity (89%). PCPs also identified environmental factors as important causes of obesity:

cultural factors (85%), lack of information on good eating habits (75%), and lack of access to healthy foods (59%).

We observed few differences in perspectives about possible causes of obesity between physicians who had completed medical school ≥20 years ago compared to those who had completed medical school <20 years ago. PCPs who completed medical school more recently were more likely to identify restaurant or fast-food eating (99% vs. 90%; $p < 0.01$), lack of information on good eating habits (80% vs. 69%; $p = 0.03$), and lack of access to health foods as important causes of obesity (64% vs. 52%; $p = 0.03$).

PCPs' perspectives in improving care for obese patients

Figure 1 shows PCP perspectives on the health care provider most qualified to help obese patients lose or maintain weight, stratified by years since completing medical school. No one type of provider was endorsed by a majority of PCPs as the most qualified to help patients. PCPs with <20 years since completion of medical school reported that nutritionists/dietitians were most qualified providers (48% vs. 41%), followed by primary care physicians 41% vs. 37%) and behavioral psychologists (9% vs. 20%, $p = 0.01$). Very few PCPs reported that endocrinologists (1% vs. 1.5%) or nurses (1% vs. 1%) were the most qualified providers to help obese patients lose or maintain weight.

PCP perspectives on solutions for improving obesity care

Table 3 shows PCPs perspectives on solutions for improving obesity care related to physician training and practice-based changes. With respect to training, PCPs who had received some training in obesity-related care (n=313) generally reported that it was helpful. In terms of practice-based solutions to improving care, 93% reported that including BMI as a fifth vital sign would be helpful; 89% reported that including diet/exercise tips in patients' charts would be helpful; 85% reported that having scales report BMI would be helpful; and 69% reported that adding BMI to patients' charts would be helpful. No significant differences were

observed by year since completing medical school with one exception. Fewer PCPs who completed medical school within 20 years agreed that BMI reported by scales would be being helpful in treating obese patients (81% vs. 89%; p = 0.02). report that having scales which show BMI would be helpful (80% vs. 88%; p=.04).

PCPs' reported competence for caring for obese patients

Table 4 shows PCPs reported competence in treating obese patients, overall and stratified by years since completing medical school. Almost all PCPs reported feeling competent giving diet-related counseling (90%) and exercise-related counseling (92%) to obese patients. However, less than half (44%) reported that they were usually successful in helping obese patients lose weight. PCPs who completed medical school <20 years ago were significantly more likely to report success in helping patients lose weight (49% vs. 36%; p = 0.02).

DISCUSSION

This study updates earlier research related to primary care physician perspectives on the causes of obesity and examines physician-reported causes of obesity and solutions for improving obesity care, for PCPs overall and by years since medical school completion. Like previous research,[6 25-26] we found that PCPs overwhelmingly identified individual behavioral factors (e.g., poor diet and physical inactivity) as important causes of obesity. PCP perspectives on improving obesity care supported additional training (e.g., nutrition and exercise counseling) and practice-based changes (e.g., including BMI in the patient chart). We observed few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school. However, we found PCPs who graduated from medical school within the past 20 years, compared with those with graduated more than 20 years ago, more frequently recognized social determinants as causes of obesity, such as lack of information about good eating habits and lack of access to healthy food. While PCPs who completed medical school more recently reported feeling more successful helping obese

patients lose weight, these successful providers are still a minority. This is consistent with research suggesting that PCPs generally feel unprepared to care for obese patients.[7 12-14] Increased time since completing medical school could lead to more negative attitudes towards obesity care, as physicians may become frustrated by years of failed attempts to help their obese patients lose and maintain weight. Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

The limited differences among PCPs that we observed may suggest that obesity-related training has changed little over time. We found little evidence that any recent emphasis on obesity-related training in medical school has translated into significant differences in self-perceived competency. Interestingly, while most PCPs reported competence in diet and exercise counseling to obese patients, less than half reported success in helping those patients lose weight.

Given that obesity training has been shown to improve obesity care,[12] improvements to medical and post-graduate medical education are critical. As most practicing PCPs report inadequate training in obesity care, these physicians may be particularly receptive to continuing medical education in this area.[13-14] PCPs in our study desired additional training on nutrition and exercise counseling, care related to bariatric surgery patients, as well as motivational interviewing. Enhancements to medical education could potentially help improve obesity care given research suggesting consistency between physician beliefs about solutions and causes;[27] for example physicians who endorse medical solutions for obesity typically believe obesity is caused by biological factors . In addition to addressing these gaps in medical education, we should consider transitioning some obesity care responsibilities away from primary care physicians to nutritionists/dietitians. Physicians in our study identified these health professionals as being most qualified to help obese patients lose or maintain their weight. Furthermore, incentives for care coordination under the Patient Protection and Affordable Care Act such as the Patient Centered Medical Home recommend the inclusion of dietitians as members of health

teams to support primary care practices.[28] Perhaps a new model of obesity care should join PCPs, nutritionists, and other relevant health professional together – an approach which proved effective in the recently completed POWER trial,[29] which examined the effects of behavioral weight-loss interventions among obese patients.

Future research is needed to better understand the components of obesity care primary care physicians feel most qualified to deliver and which factors would be best handled by nutritionists/dietitians. Recent work identifies successful models that include delivery of weight loss support by trained coaches via remote means (e.g., telephone, email, and web-based modules, self-monitoring tools, and feedback) along with PCP support [29] and lifestyle counseling plus meal replacement or weight-loss medication chosen in consultation with the PCP.[30]

Regardless of their years after medical school completion, most physicians desired practice-based changes to facilitate improved obesity care. Physicians endorsed using appropriate medical equipment to accommodate obese patients, as well as documenting BMI in the chart as important practice changes. Such changes would ensure accurate identification and proper care of obese patients. Finally, the practice could better support obesity counseling by including diet and exercise tips in the chart for the physician to use.

There are several limitations to this analysis. First, it is cross-sectional which only allows us to address associations rather than causal inferences. Second, our measures of physician attitudes do not represent the full possible spectrum of attitude measures in the literature (such as perceived skills[31] or comfort in caring for obese patients,[32] which may bias our results towards the null. Third, some of the included PCP's may have had extensive additional training in obesity (considering themselves "obesity specialists"), which could have biased our results positively. Years since medical school completion is proxy for type of education they received, but we are unable to account for the huge variation in curricula across medical schools. Fourth, even though they survey was reviewed by experts in the field of obesity and primary care as well as pilot tested for comprehensibility, it is possible that physicians differentially interpreted some of the questions.

In conclusion, this study suggests few differences in primary care physician perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school. The differences we did observe suggest that physicians with less than 20 years since completion of medical school more frequently recognized social determinants as causes of obesity and also reported feeling more successful helping obese patients lose weight. More research is needed to understand the components of obesity care physicians feel most qualified to deliver and which factors would be best handled by other health professionals such as nutritionists/dietitians. The results from the recently completed POWER trial, suggest that having PCPs play a supportive role to weight loss health coaches – such as reviewing patient progress and using this information to provide basic guidance and motivation – may be one effective model.[29] In order to begin improving obesity care, medical education should focus on enhancing those obesity-related skills PCPs feel most qualified to deliver as well as changing the composition of healthcare teams and practice resources.

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Conflicts of interest: None

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Table 1. Characteristics of the study sample (N = 500)

	N (%)
Physician characteristics	
Gender	
Male	335 (67)
Race	
White	350 (70)
Black	15 (3)
Asian	77 (15)
Hispanic	25 (5)
Other race	6 (1)
Age, years	
Under 45	224 (45)
Aged 45-54	124 (25)
Aged 55 and older	152 (30)
Year since completed medical school	
20 years or more (1990 or earlier)	222 (44)
15 years to <20 years (1991 to 1995)	58 (12)
10 years to <15 (1996 to 2000)	162 (32)
<=10 (2001 to 2011)	57 (11)
Physician-reported demographics of their patients	
Patients in practice who are obese	
Almost all	48 (10)
About half	422 (84)
Not many	20 (4)
Race of obese patients in practice	
Most are White	174 (35)
Most are minority	41 (8)
Broad range of demographic groups	284 (57)
Income of obese patients in practice	
Most are low income	142 (28)
Most are not low income	92 (18)
Evenly split	266 (53)
Physician-reported practice characteristics	
Primary location where patients are seen†	
Hospital or inpatient setting	49 (10)
Office not attached to a hospital or outpatient	313 (63)
Both inpatient and outpatient	136 (27)
Patient chart	
Includes height	467 (93)
Includes body weight	499 (99)
Includes body mass index	378 (76)
Location of practice	
Northeast	104 (21)
North central	114 (23)
South	166 (33)

	N (%)
West	116 (23)
Physician obesity-related training rated as very or pretty good	
Medical school	115 (23)
Residency	173 (35)
Continuing medical education	298 (60)
Other training‡	313 (63)

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.
† One respondent reported the primary location where patients are seen is "another location."
‡ Other training includes in-person or online training such as a lecture, seminar, workshop, or conference.
Note: Numbers may not add up to 100% because of rounding.

Table 2. Primary care physician perception of the importance of possible causes of obesity, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 N=277	20+ N=223	*P*-value
Individual biological factors				
Genetics or family history	372 (75)	205 (74)	168 (75)	0.77
Metabolic effect	234 (47)	135 (49)	99 (44)	0.43
Endocrine disorder	140 (28)	84 (30)	56 (25)	0.30
Individual behavioral factors				
Insufficient physical activity	496 (99)	274 (98)	223 (100)	0.05
Overconsumption of food	496 (99)	276 (99)	221 (99)	0.86
Restaurant or fast food eating	474 (95)	274 (99)	200 (90)	<0.01
Consumption of sugar-sweetened beverages	470 (94)	264 (95)	206 (93)	0.36
Lack of will power	441 (89)	250 (90)	197 (88)	0.60
Physical/social environmental factors				
Cultural factors	422 (85)	239 (86)	184 (83)	0.43
Lack of information on good eating habits	375 (75)	222 (80)	154 (69)	0.03
Lack of access to healthy food	294 (59)	178 (64)	116 (52)	0.03

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

Notes: P-values are for t-tests for differences in proportions. Percentages reflect respondents rating potential causes as very or somewhat important. The mean year medical school was completed is 1993.

Table 3. Primary care physician's perspectives on solutions for improving obesity care, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=313	<20 N=161	20+ N=152	*P*-value
Physician training to improve obesity care				
Helpfulness of physician training in…*				
Nutrition counseling	290 (93)	156 (97)	134 (88)	0.04
Exercise counseling	290 (92)	154 (96)	135 (89)	0.09
Patient care after bariatric surgery	282 (90)	144 (89)	137 (90)	0.81
Motivational interviewing	270 (86)	143 (88)	127 (84)	0.37
Patient eligibility for bariatric surgery	266 (85)	136 (84)	130 (85)	0.88
Weight loss medications	202 (64)	110 (68)	92 (60)	0.24
	N=500	N=277	N=223	
Practice-based changes to improve obesity care				
Helpfulness of…				
Including BMI as a fifth vital sign	466 (93)	256 (92)	210 (95)	0.32
Including specific diet or exercise tips in patient chart	446 (89)	250 (90)	196 (88)	0.53
Having scales report BMI	423 (85)	224 (81)	198 (89)	0.02
Adding BMI to patient chart†	344 (69)	193 (69)	151 (68)	0.70
Medical equipment in office is appropriate for obese patients (e.g., gowns, chairs, exam tables, blood pressure cuffs)‡	460 (92)	253 (91)	207 (93)	0.53

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

* Questions about the helpfulness of various forms of obesity training were only asked among those physicians who reported receiving some training. Percentages represent physicians reporting training is very or somewhat helpful.

† 20% of the sample (100 respondents) reported that this feature is already available in the medical chart

‡ Percentages represent physicians reporting very/somewhat appropriate

Note: The 8% of physicians who said that medical equipment for obese patients was not appropriate were also asked to rate how important it was to improve the equipment. More than 85% of these physicians said this was an important goal for gowns, chairs, exam tables, and blood pressure cuffs.

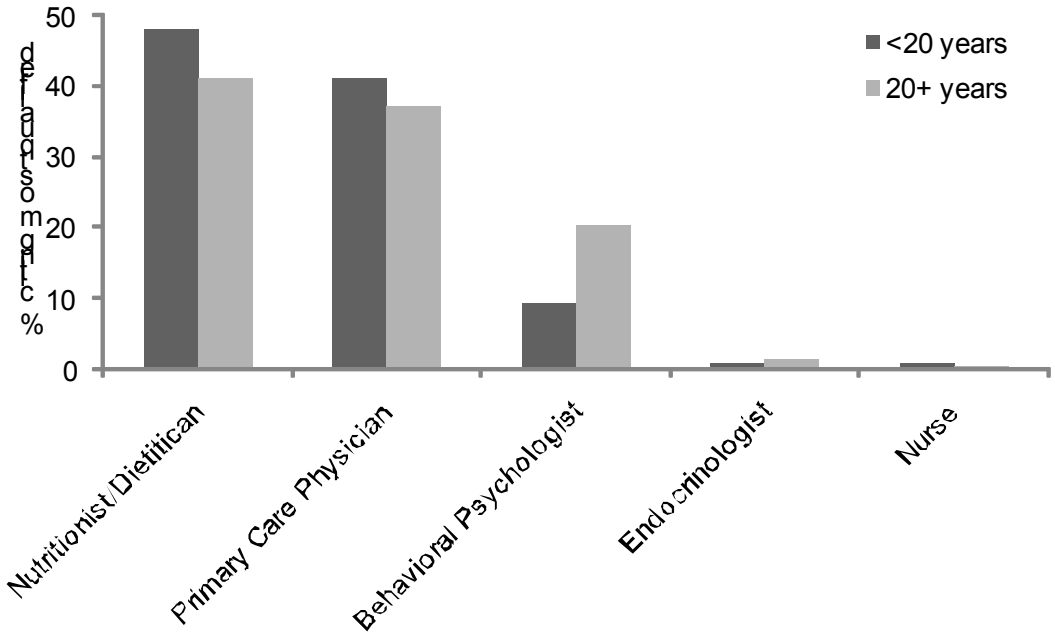
Table 4. Physician reported competence in treating obese patients, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 N=277	20+ N=223	*P*-value
Competent giving exercise-related counseling to obese patients	462 (92)	258 (93)	204 (92)	0.68
Competent giving diet-related counseling to obese patients	450 (90)	252 (91)	198 (89)	0.54
Usually successful in helping obese patients lose weight	218 (44)	137 (49)	81 (36)	0.02
Primary care physicians are the 'most qualified' professional to help obese patients	196 (39)	115 (41)	82 (37)	0.40

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

Notes: P-values are for t-tests for differences in proportions. The mean year medical school was completed is 1993.

Figure 1. Physician perspectives on health professional most qualified to help obese patients lose or maintain weight, by years since completing medical school (%)



Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

National survey of primary care physicians' perspectives about causes of obesity and solutions to improve care

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Tables: 4
Figures: 1
Word count: 3402
Running head: Physician perspectives on obesity

ABSTRACT

Objective: To describe physician perspectives on the causes of and solutions to obesity care and identify differences in these perspectives by number of years since completion of medical school.

Design: National cross-sectional online survey from February 9 to March 1, 2011.

Setting: United States

Participants: 500 primary care physicians

Main Measures: We evaluated physician perspectives on: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care

Results: PCPs overwhelmingly supported additional training (such as nutrition counseling) and practice-based changes (such as having scales report BMI) to help them improve their obesity care. They also identified nutritionists/~~dietician~~dietitians as the most qualified providers to care for obese patients. Physicians with less than 20 years since completion of medical school were more likely to identify lack of information about good eating habits and lack of access to healthy food as important causes of obesity. They also reported feeling relatively more successful helping obese patients lose weight.

Conclusions: Our results indicate a need for improved medical education related to obesity care.

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Article focus

- The purpose of this study is to describe primary care physician (PCP) perspectives on the causes of and solutions to obesity care and whether these perspectives differ by number of years since completion of medical school.
- We hypothesized that PCPs with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be more likely to identify increased training and practice-based changes as possible solutions to the problem of obesity.

Key messages

- There are few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school, suggesting that obesity-related medical education has changed little over time.
- PCPs who completed medical school more recently reported feeling more successful helping obese patients lose weight
- Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

Strengths and limitations of this study

- The key limitation of this study is that it is cross-sectional which only allows us to address associations rather than causal inferences.
- The key strength of this study is that is uses a national sample of PCPs.

Obesity affects one third of the U.S. adult population [1] and is estimated to cost $147 billion annually.[2] Despite national guidelines for primary care physicians (PCPs) to counsel their obese patients to lose weight, [3-4] only one third of obese patients report receiving an obesity diagnosis or weight-related counseling.[5]

While there is a growing body of research documenting physician perspectives on the causes of obesity,[6-8] little research has examined PCP perspectives on possible solutions to improve obesity care. This is an important area of research given that PCPs are in a unique position to treat obesity and assist with healthy-weight maintenance. In 2008, there were an estimated 455 million visits were made to PCPs.[9] Given the penetration of the obesity epidemic, even modest reductions in body weight at the individual-level can lead to significant health benefits and reduced costs at the population-level.[10-11]

Physician-level barriers to obesity care have been extensively explored in the literature. Many of the physician-level barriers relate to clinical knowledge and attitudes towards obese patients including: inadequate training in weight counseling, poor knowledge of the tools needed to diagnose and treat obesity,[7 12-14] negative physician attitudes (e.g., weight stigma, pessimism about patient's desire/ability to lose weight; belief that weight-loss counseling is ineffective, [15-18]) doubt that counseling will have an effect on patient behavior,[19-20] and feeling that obesity is the responsibility of the patient.[21]

Some of these physician barriers may be related to how recently PCPs completed medical school or residency. Little research has explored the association between years since completion of medical training and physician perspectives on obesity. The available evidence suggests a positive correlation between years since residency and a negative expectation of outcomes for obese patients among internists, pediatricians, and psychiatrists.[22] Previous research has also shown that years since medical school predicts the types of treatment offered to obese patients, where physicians who completed medical school ≥20 years before the study were more likely to provide general counseling, specific dietary counseling, specific physical

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activity counseling, and to systematically track patients than those who completed their training <10 years ago.[23]

This is an important area of research given that obesity training can improve the quality of physician practice patterns of obesity care (such as weight-related counseling),[24] and new cohorts of medical students and residents may be more likely to receive this training as compared to older cohorts. Physicians who learn appropriate obesity screening and counseling practices in residency are more likely to report discussing diet or exercise with their obese patients.[12] Recent graduates may also be more likely to consider modest weight loss or weight maintenance a successful outcome.

Our primary goal was to describe physician perspectives on the causes of and solutions to obesity care. Our secondary goal is to identify differences in these perspectives by number of years since completion of medical school. We examined differences in perspectives by years since completing medical school for the following topics: causes of obesity, competence in treating obese patients, perspectives on the health professional most qualified to help obese patients lose or maintain weight, and solutions for improving obesity care. We hypothesized that physicians with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be more likely to identify increased training and practice-based changes (e.g., appropriateness of medical equipment) as possible solutions to the problem of obesity. This research updates earlier studies focused on physician attitudes towards obesity causes and treatment[6 8] as well as provides physician perspectives about solutions to obesity care with an emphasis on whether perspectives differ according to when physicians completed medical school.

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METHODS AND PROCEDURES

Study Design

National cross-sectional internet-based survey of PCPs in the United States.

Survey Development and Implementation

We consulted SSRS/Social Science Research Solutions to design and implement the survey. The survey instrument was reviewed for content by physicians and experts in the field of obesity, and was then pretested for length and comprehensibility. The survey was revised on the basis of these pilot tests and the final version included forty-nine questions. The fieldwork for this survey was conducted via the internet by The Epocrates Honors Web Panel Company, which consists of 145,000 physicians.

We surveyed 500 General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011. These physicians were recruited from The Epocrates Honors panel. The Epocrates Honors panel is an opt-in panel of 145,000 physicians in the United States verified by the American Medical Association's (AMA's) master file. Physicians were verified by checking their first and last name, date of birth, medical school, and graduation date against the AMA's master file at the time of panel registration. A random sample of the panel was invited to participate in the survey. This sample was drawn to match AMA master file proportions for age, gender, and region. Each physician received a $25 incentive for completing the survey.

This study was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board.

Measures of physician perspectives on obesity care

We evaluated physician perspectives on the following topics: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care.

We assessed physician beliefs about the causes of obesity with the question, "How important is each of the following possible causes of obesity for your patients?" For each cause (over consumption of food, restaurant/fast food eating, consumption of sugar-sweetened beverages (SSB), genetics/family history, and metabolic defect), physicians indicated whether it

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was very important, somewhat important, not very important, or not at all important. We dichotomized variables for each cause where 1 was "very/somewhat important" and 0 was not "very/not at all important."

Physician competence questions assessed by the question, "Please tell me whether you agree or disagree with the following statements: I feel competent giving diet counseling to my obese patients; I feel competent giving exercise counseling to my obese patients; and I am usually successful in helping my obese patients lose weight." For each statement, physicians indicated whether they strongly agreed, somewhat agreed, somewhat disagreed, or strongly disagreed with the statements. We dichotomized variables for each competency where 1 was "strongly/somewhat agree" and 0 was "strongly/somewhat disagree."

~~Physician competence questions assessed~~ We assessed perspectives about how to improve obesity training among those physicians who had already received some additional training with the survey question, "Since you have received more training on how to care for your obese patients, how helpful would each of the following types of training be: Nutrition counseling, ~~whether PCPs felt competent providing diet or exercise counseling, helping their patients lose weight, and whether primary care physicians are the 'most qualified' professional to care for obese patients. Questions on how to improve obesity care assessed physicians' perspectives on the helpfulness of training in nutrition counseling,~~ exercise counseling, patient care after bariatric surgery, patient eligibility for bariatric surgery, motivational interviewing, and ~~, and~~ weight loss medications." For each type of training, physicians indicated whether they believed it would be very helpful, somewhat helpful, not very helpful, or not at all helpful. We dichotomized variables for each type of training where 1 was "very/somewhat helpful" and 0 was "not very/not at all helpful." Among all physicians, we assessed perspectives about improving obesity care with the following questions: "How helpful would it be for the patient chart to include a specific list of diet and exercise tips you could share with your obese patients to help them lose weight or manage their weight?"; "How helpful would it be for scales that measure height and body weight to also report body mass index so that medical assistants/nurses are not

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required to calculate it?"; "If it does not already, how helpful would it be if the medical chart clearly indicated whether the patient was clinically obese or overweight (by including BMI and the overweight/obesity status)?"; and "How important is it to include body mass index with patients' other vital signs of heart beat, breathing rate, temperature, and blood pressure?" We dichotomized variables for each type of improvement as 1 was "very/somewhat helpful" and 0 was "not very/not at all helpful". Finally we assessed perspectives about medication equipment with the question, "How appropriate is the medical equipment in your office for your obese patients (e.g., gowns, chairs, exam tables, blood pressure cuffs)?" and dichotomized the response categories as 1 "very/somewhat appropriate" and 0 "not very/not at all appropriate."

~~: the helpfulness of including specific diet or exercise tips in the patient chart, having scales report body mass index (BMI), adding BMI to the patient chart, including BMI as a fifth vital sign; and the appropriateness of medical equipment in the office (e.g., gowns, chairs, exam tables).~~

Statistical Analyses

We performed descriptive analyses for all variables. T-tests were used to test for differences by years since completing medical school. We used weighting to address systematic under- or over-representation of the physician subpopulations in the panel, account for systematic non-response along known demographic characteristics of the PCPs, and adjust for sampling biases due to differences in non-response rates.

All analyses were stratified based on years since completing medical school, comparing physicians who completed medical school fewer than 20 years ago (i.e., 1991 or later) with PCPs who completed medical school 20 or more years ago (i.e., 1990 or earlier). The weighted mean year that medical school was completed in our sample was 1993. We elected to stratify by the 20-year threshold based on previous research suggesting differences in counseling and tracking of obese patients among those two groups of physicians.[23] We also conducted sensitivity analyses using 10- and 15-years since medical school as the thresholds. Those results are not included as they did not differ substantively from the 20 year cut points. They are available from the authors upon request. Statistical analyses were performed using the STATA,

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version 11.0 software package (StataCorp LP, College Station, TX), using SVY functions to adjust for the complex survey design. The weighted margin of error for the survey was +/-5.3%.

RESULTS

Sample characteristics

Table 1 shows characteristics of the survey respondents. Physician-level characteristics are comparable to national-level characteristics reported for family physicians/internists/general practitioners by the American Medical Association (AMA), with the exception of the distribution of years since completing medical school. Our sample distribution had slightly more respondents who had completed medical school more recently (in 2000) than the national sample reported by the AMA (22% vs. 21%). Specifically, 49% of physicians in the AMA sample completed medical school in 1990 or later, compared to 69% in our sample. A large majority of PCPs (84%) reported that about half of the patients in their practice were obese, and 10% reported that almost all patients in their practice were obese. Nearly all physicians reported that patient height and body weight were included in patients' charts, and 76% reported that Body Mass Index (BMI) was included in patients' charts. When asked to rate the quality of obesity-related training, 23% reported receiving good training in medical school, 35% reported receiving good training in residency, and 60% reported receiving good training in continuing medical education.

PCP perspectives on causes of obesity

Table 2 describes PCP perspectives on the causes of and solutions to obesity care as well as differences in these perspectives by number of years since completion of medical school (≥20 years vs. <20 years). We divided possible causes of obesity into three domains: individual biological factors, individual behavioral factors, and physical/social environmental factors. Overall, 75% of PCPs identified genetics or family history as an important cause of obesity, followed by metabolic effect (47%) and endocrine disorders (25%). Individual behavioral factors

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were the most commonly reported causes of obesity, with nearly all physicians citing insufficient physical activity (99%), overconsumption of food (99%), restaurant or fast-food eating (95%), consumption of sugar-sweetened beverages (94%), and lack of will power as important causes of obesity (89%). PCPs also identified environmental factors as important causes of obesity: cultural factors (85%), lack of information on good eating habits (75%), and lack of access to healthy foods (59%).

We observed few differences in perspectives about possible causes of obesity between physicians who had completed medical school ≥20 years ago compared to those who had completed medical school <20 years ago. PCPs who completed medical school more recently were more likely to identify restaurant or fast-food eating (99% vs. 90%; $p < 0.01$), lack of information on good eating habits (80% vs. 69%; $p = 0.03$), and lack of access to health foods as important causes of obesity (64% vs. 52%; $p = 0.03$).

PCPs' perspectives in improving care for obese patients

Figure 1 shows PCP perspectives on the health care provider most qualified to help obese patients lose or maintain weight, stratified by years since completing medical school. No one type of provider was endorsed by a majority of PCPs as the most qualified to help patients. PCPs with <20 years since completion of medical school reported that nutritionists/~~dietician~~dietitians were most qualified providers (48% vs. 41%), followed by primary care physicians 41% vs. 37%) and behavioral psychologists (9% vs. 20%, $p = 0.01$). Very few PCPs reported that endocrinologists (1% vs. 1.5%) or nurses (1% vs. 1%) were the most qualified providers to help obese patients lose or maintain weight.

PCP perspectives on solutions for improving obesity care

Table 3 shows PCPs perspectives on solutions for improving obesity care related to physician training and practice-based changes. With respect to training, PCPs who had received some training in obesity-related care (n=313) generally reported that it was helpful. In

terms of practice-based solutions to improving care, 93% reported that including BMI as a fifth vital sign would be helpful; 89% reported that including diet/exercise tips in patients' charts would be helpful; 85% reported that having scales report BMI would be helpful; and 69% reported that adding BMI to patients' charts would be helpful. No significant differences were observed by year since completing medical school with one exception. Fewer PCPs who completed medical school within 20 years agreed that BMI reported by scales would be being helpful in treating obese patients (81% vs. 89%; p = 0.02). report that having scales which show BMI would be helpful (80% vs. 88%; p=.04).

PCPs' reported competence for caring for obese patients

Table 4 shows PCPs reported competence in treating obese patients, overall and stratified by years since completing medical school. Almost all PCPs reported feeling competent giving diet-related counseling (90%) and exercise-related counseling (92%) to obese patients. However, less than half (44%) reported that they were usually successful in helping obese patients lose weight. PCPs who completed medical school <20 years ago were significantly more likely to report success in helping patients lose weight (49% vs. 36%; p = 0.02).

DISCUSSION

This study updates earlier research related to primary care physician perspectives on the causes of obesity and examines physician-reported causes of obesity and solutions for improving obesity care, for PCPs overall and by years since medical school completion. Like previous research,[6 25-26] we found that PCPs overwhelmingly identified individual behavioral factors (e.g., poor diet and physical inactivity) as important causes of obesity. PCP perspectives on improving obesity care supported additional training (e.g., nutrition and exercise counseling) and practice-based changes (e.g., including BMI in the patient chart). We observed few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school. However, we found PCPs who graduated

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from medical school within the past 20 years, compared with those with graduated more than 20 years ago, more frequently recognized social determinants as causes of obesity, such as lack of information about good eating habits and lack of access to healthy food. While PCPs who completed medical school more recently reported feeling more successful helping obese patients lose weight, these successful providers are still a minority. This is consistent with research suggesting that PCPs generally feel unprepared to care for obese patients.[7 12-14] Increased time since completing medical school could lead to more negative attitudes towards obesity care, as physicians may become frustrated by years of failed attempts to help their obese patients lose and maintain weight. Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

The limited differences among PCPs that we observed may suggest that obesity-related training has changed little over time. We found little evidence that any recent emphasis on obesity-related training in medical school has translated into significant differences in self-perceived competency. Interestingly, while most PCPs reported competence in diet and exercise counseling to obese patients, less than half reported success in helping those patients lose weight.

Given that obesity training has been shown to improve obesity care,[12] improvements to medical and post-graduate medical education are critical. As most practicing PCPs report inadequate training in obesity care, these physicians may be particularly receptive to continuing medical education in this area.[13-14] PCPs in our study desired additional training on nutrition and exercise counseling, care related to bariatric surgery patients, as well as motivational interviewing. Enhancements to medical education could potentially help improve obesity care given research suggesting consistency between physician beliefs about solutions and causes,[27] for example physicians who endorse medical solutions for obesity typically believe obesity is caused by biological factors . In addition to addressing these gaps in medical education, we should consider transitioning some obesity care responsibilities away from primary care

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physicians to nutritionists/~~dietician~~dietitians. Physicians in our study identified these health professionals as being most qualified to help obese patients lose or maintain their weight. Furthermore, incentives for care coordination under the Patient Protection and Affordable Care Act such as the Patient Centered Medical Home recommend the inclusion of dietitians as members of health teams to support primary care practices.[28~~25~~] Perhaps a new model of obesity care should join PCPs, nutritionists, and other relevant health professional together – an approach which proved effective in the recently completed POWER trial,[29~~26~~] which examined the effects of behavioral weight-loss interventions among obese patients.

Future research is needed to better understand the components of obesity care primary care physicians feel most qualified to deliver and which factors would be best handled by nutritionists/~~dietician~~dietitians. Recent work identifies successful models that include delivery of weight loss support by trained coaches via remote means (e.g., telephone, email, and web-based modules, self-monitoring tools, and feedback) along with PCP support[29~~26~~] and lifestyle counseling plus meal replacement or weight-loss medication chosen in consultation with the PCP.[30~~27~~]

Regardless of their years after medical school completion, most physicians desired practice-based changes to facilitate improved obesity care. Physicians endorsed using appropriate medical equipment to accommodate obese patients, as well as documenting BMI in the chart as important practice changes. Such changes would ensure accurate identification and proper care of obese patients. Finally, the practice could better support obesity counseling by including diet and exercise tips in the chart for the physician to use.

There are several limitations to this analysis. First, it is cross-sectional which only allows us to address associations rather than causal inferences. Second, our measures of physician attitudes do not represent the full possible spectrum of attitude measures in the literature (such as perceived skills[31~~28~~] or comfort in caring for obese patients,[32~~29~~] which may bias our results towards the null. Third, some of the included PCP's may have had extensive additional training in obesity (considering themselves "obesity specialists"), which could have biased our results

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positively. Years since medical school completion is proxy for type of education they received, but we are unable to account for the huge variation in curricula across medical schools. Fourth, even though they survey was reviewed by experts in the field of obesity and primary care as well as pilot tested for comprehensibility, it is possible that physicians differentially interpreted some of the questions.

In conclusion, this study suggests few differences in primary care physician perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school. The differences we did observe suggest that physicians with less than 20 years since completion of medical school more frequently recognized social determinants as causes of obesity and also reported feeling more successful helping obese patients lose weight. More research is needed to understand the components of obesity care physicians feel most qualified to deliver and which factors would be best handled by other health professionals such as nutritionists/~~dietician~~dietitians. The results from the recently completed POWER trial, suggest that having PCPs play a supportive role to weight loss health coaches – such as reviewing patient progress and using this information to provide basic guidance and motivation – may be one effective model.[29~~26~~] In order to begin improving obesity care, medical education should focus on enhancing those obesity-related skills PCPs feel most qualified to deliver as well as changing the composition of healthcare teams and practice resources.

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Contributors: SNB and LAC conceived the study. SNB analyzed the data. All authors contributed to the interpretation of study findings. SNB drafted the manuscript and all authors contributed to the final draft. SNB had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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Conflicts of interest: None

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Table 1. Characteristics of the study sample (N = 500)

	N (%)
Physician characteristics	
Gender	
Male	335 (67)
Race	
White	350 (70)
Black	15 (3)
Asian	77 (15)
Hispanic	25 (5)
Other race	6 (1)
Age, years	
Under 45	224 (45)
Aged 45-54	124 (25)
Aged 55 and older	152 (30)
Year since completed medical school	
20 years or more (1990 or earlier)	222 (44)
15 years to <20 years (1991 to 1995)	58 (12)
10 years to <15 (1996 to 2000)	162 (32)
<=10 (2001 to 2011)	57 (11)
Physician-reported demographics of their patients	
Patients in practice who are obese	
Almost all	48 (10)
About half	422 (84)
Not many	20 (4)
Race of obese patients in practice	
Most are White	174 (35)
Most are minority	41 (8)
Broad range of demographic groups	284 (57)
Income of obese patients in practice	
Most are low income	142 (28)
Most are not low income	92 (18)
Evenly split	266 (53)
Physician-reported practice characteristics	
Primary location where patients are seen†	
Hospital or inpatient setting	49 (10)
Office not attached to a hospital or outpatient	313 (63)
Both inpatient and outpatient	136 (27)
Patient chart	
Includes height	467 (93)
Includes body weight	499 (99)
Includes body mass index	378 (76)
Location of practice	
Northeast	104 (21)
North central	114 (23)
South	166 (33)

	N (%)
West	116 (23)
Physician obesity-related training rated as very or pretty good	
Medical school	115 (23)
Residency	173 (35)
Continuing medical education	298 (60)
Other training‡	313 (63)

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.
† One respondent reported the primary location where patients are seen is “another location.”
‡ Other training includes in-person or online training such as a lecture, seminar, workshop, or conference.
Note: Numbers may not add up to 100% because of rounding.

Table 2. Primary care physician perception of the importance of possible causes of obesity, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 N=277	20+ N=223	*P*-value
Individual biological factors				
Genetics or family history	372 (75)	205 (74)	168 (75)	0.77
Metabolic effect	234 (47)	135 (49)	99 (44)	0.43
Endocrine disorder	140 (28)	84 (30)	56 (25)	0.30
Individual behavioral factors				
Insufficient physical activity	496 (99)	274 (98)	223 (100)	0.05
Overconsumption of food	496 (99)	276 (99)	221 (99)	0.86
Restaurant or fast food eating	474 (95)	274 (99)	200 (90)	<0.01
Consumption of sugar-sweetened beverages	470 (94)	264 (95)	206 (93)	0.36
Lack of will power	441 (89)	250 (90)	197 (88)	0.60
Physical/social environmental factors				
Cultural factors	422 (85)	239 (86)	184 (83)	0.43
Lack of information on good eating habits	375 (75)	222 (80)	154 (69)	0.03
Lack of access to healthy food	294 (59)	178 (64)	116 (52)	0.03

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

Notes: P-values are for t-tests for differences in proportions. Percentages reflect respondents rating potential causes as very or somewhat important. The mean year medical school was completed is 1993.

Table 3. Primary care physician's perspectives on solutions for improving obesity care, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=313	<20 N=161	20+ N=152	*P*-value
Physician training to improve obesity care				
Helpfulness of physician training in…*				
Nutrition counseling	290 (93)	156 (97)	134 (88)	0.04
Exercise counseling	290 (92)	154 (96)	135 (89)	0.09
Patient care after bariatric surgery	282 (90)	144 (89)	137 (90)	0.81
Motivational interviewing	270 (86)	143 (88)	127 (84)	0.37
Patient eligibility for bariatric surgery	266 (85)	136 (84)	130 (85)	0.88
Weight loss medications	202 (64)	110 (68)	92 (60)	0.24
	N=500	N=277	N=223	
Practice-based changes to improve obesity care				
Helpfulness of…				
Including BMI as a fifth vital sign	466 (93)	256 (92)	210 (95)	0.32
Including specific diet or exercise tips in patient chart	446 (89)	250 (90)	196 (88)	0.53
Having scales report BMI	423 (85)	224 (81)	198 (89)	0.02
Adding BMI to patient chart†	344 (69)	193 (69)	151 (68)	0.70
Medical equipment in office is appropriate for obese patients (e.g., gowns, chairs, exam tables, blood pressure cuffs)‡	460 (92)	253 (91)	207 (93)	0.53

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

* Questions about the helpfulness of various forms of obesity training were only asked among those physicians who reported receiving some training. Percentages represent physicians reporting training is very or somewhat helpful.

† 20% of the sample (100 respondents) reported that this feature is already available in the medical chart

‡ Percentages represent physicians reporting very/somewhat appropriate

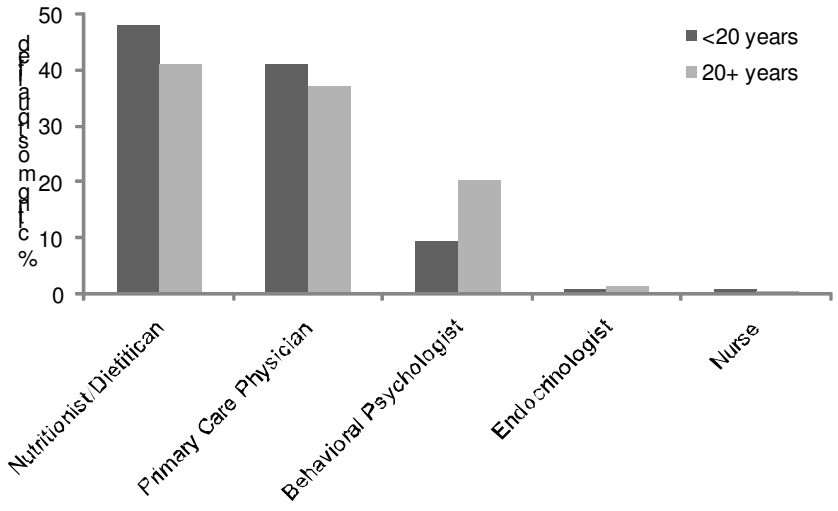
Note: The 8% of physicians who said that medical equipment for obese patients was not appropriate were also asked to rate how important it was to improve the equipment. More than 85% of these physicians said this was an important goal for gowns, chairs, exam tables, and blood pressure cuffs.

Table 4. Physician reported competence in treating obese patients, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 N=277	20+ N=223	*P*-value
Competent giving exercise-related counseling to obese patients	462 (92)	258 (93)	204 (92)	0.68
Competent giving diet-related counseling to obese patients	450 (90)	252 (91)	198 (89)	0.54
Usually successful in helping obese patients lose weight	218 (44)	137 (49)	81 (36)	0.02
Primary care physicians are the 'most qualified' professional to help obese patients	196 (39)	115 (41)	82 (37)	0.40

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.
Notes: P-values are for t-tests for differences in proportions. The mean year medical school was completed is 1993.

Figure 1. Physician perspectives on health professional most qualified to help obese patients lose or maintain weight, by years since completing medical school (%)



Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

National survey of U.S. primary care physicians' perspectives about causes of obesity and solutions to improve care

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National survey of U.S. primary care physicians' perspectives about causes of obesity and solutions to improve care

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ABSTRACT

Objective: To describe physician perspectives on the causes of and solutions to obesity care and identify differences in these perspectives by number of years since completion of medical school.

Design: National cross-sectional online survey from February 9 to March 1, 2011.

Setting: United States

Participants: 500 primary care physicians

Main Measures: We evaluated physician perspectives on: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care

Results: Primary care physicians overwhelmingly supported additional training (such as nutrition counseling) and practice-based changes (such as having scales report BMI) to help them improve their obesity care. They also identified nutritionists/dietitians as the most qualified providers to care for obese patients. Physicians with fewer than 20 years since completion of medical school were more likely to identify lack of information about good eating habits and lack of access to healthy food as important causes of obesity. They also reported feeling relatively more successful helping obese patients lose weight. The response rate for the survey was 25.6%.

Conclusions: Our results indicate a perceived need for improved medical education related to obesity care.

Article focus

- The purpose of this study is to describe primary care physician (PCP) perspectives on the causes of and solutions to obesity care and whether these perspectives differ by number of years since completion of medical school.
- We hypothesized that PCPs with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be more likely to identify increased training and practice-based changes as possible solutions to the problem of obesity.

Key messages

- There are few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school, suggesting that obesity-related medical education has changed little over time.
- PCPs who completed medical school more recently reported feeling more successful helping obese patients lose weight
- Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

Strengths and limitations of this study

- The key limitation of this study is that it is cross-sectional which only allows us to address associations rather than causal inferences.
- The key strength of this study is that is uses a national sample of PCPs.

Obesity affects one third of the U.S. adult population [1] and is estimated to cost $147 billion annually.[2] Despite national guidelines for primary care physicians (PCPs) to counsel their obese patients to lose weight, [3-4] only one third of obese patients report receiving an obesity diagnosis or weight-related counseling.[5]

While there is a growing body of research documenting physician perspectives on the causes of obesity,[6-8] little research has examined PCP perspectives on possible solutions to improve obesity care. This is an important area of research given that PCPs are in a unique position to treat obesity and assist with healthy-weight maintenance. In 2008, there were an estimated 455 million visits were made to PCPs.[9] Given the penetration of the obesity epidemic, even modest reductions in body weight at the individual-level can lead to significant health benefits and reduced costs at the population-level.[10-11]

Physician-level barriers to obesity care have been extensively explored in the literature. Many of the physician-level barriers relate to clinical knowledge and attitudes towards obese patients including: inadequate training in weight counseling, poor knowledge of the tools needed to diagnose and treat obesity.[7 12-14] negative physician attitudes (e.g., weight stigma, pessimism about patient's desire/ability to lose weight; belief that weight-loss counseling is ineffective, [15-18]) doubt that counseling will have an effect on patient behavior,[19-20] and feeling that obesity is the responsibility of the patient.[21]

Some of these physician barriers may be related to how recently PCPs completed medical school or residency. Little research has explored the association between years since completion of medical training and physician perspectives on obesity. The available evidence suggests a positive correlation between years since residency and a negative expectation of outcomes for obese patients among internists, pediatricians, and psychiatrists.[22] Previous research has also shown that years since medical school predicts the types of treatment offered to obese patients, where physicians who completed medical school ≥20 years before the study were more likely to provide general counseling, specific dietary counseling, specific physical

activity counseling, and to systematically track patients than those who completed their training <10 years ago.[23]

This is an important area of research given that obesity training can improve the quality of physician practice patterns of obesity care (such as weight-related counseling),[24] and new cohorts of medical students and residents may be more likely to receive this training as compared to older cohorts. Physicians who learn appropriate obesity screening and counseling practices in residency are more likely to report discussing diet or exercise with their obese patients.[12] Recent graduates may also be more likely to consider modest weight loss or weight maintenance a successful outcome.

Our primary goal was to describe physician perspectives on the causes of obesity and solutions to improve care of obese patients in the health care systeme. Our secondary goal is to identify differences in these perspectives by number of years since completion of medical school. We examined differences in perspectives by years since completing medical school for the following topics: causes of obesity, competence in treating obese patients, perspectives on the health professional most qualified to help obese patients lose or maintain weight, and solutions for improving obesity care. We hypothesized that physicians with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be more likely to identify increased training and practice-based changes (e.g., appropriateness of medical equipment) as possible solutions to the problem of obesity. This research updates earlier studies focused on physician attitudes towards obesity causes and treatment [6 8] as well as provides physician perspectives about solutions to obesity care with an emphasis on whether perspectives differ according to when physicians completed medical school.

METHODS AND PROCEDURES

Study Design

National cross-sectional internet-based survey of PCPs in the United States.

Survey Development and Implementation

We consulted SSRS/Social Science Research Solutions to design and implement the survey. The survey instrument was reviewed for content by physicians and experts in the field of obesity, and was then pretested for length and comprehensibility. The survey was revised on the basis of these pilot tests and the final version included forty-nine questions. The fieldwork for this survey was conducted via the internet by The Epocrates Honors Web Panel Company, which consists of 145,000 physicians.

We surveyed 500 General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011. These physicians were recruited from The Epocrates Honors panel. The Epocrates Honors panel is an opt-in panel of 145,000 physicians in the United States verified by the American Medical Association's (AMA's) master file. Physicians were verified by checking their first and last name, date of birth, medical school, and graduation date against the AMA's master file at the time of panel registration. A random sample of the panel was invited to participate in the survey. This sample was drawn to match AMA master file proportions for age, gender, and region. Each physician received a $25 incentive for completing the survey. Consent to participate was obtained by physicians choosing to complete the survey.

This study was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board and determined to be exempt.

Measures of physician perspectives on obesity care

We evaluated physician perspectives on the following topics: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care.

We assessed physician beliefs about the causes of obesity with the question, "How important is each of the following possible causes of obesity for your patients?" For each cause (over consumption of food, restaurant/fast food eating, consumption of sugar-sweetened

beverages (SSB), genetics/family history, and metabolic defect), physicians indicated whether it was very important, somewhat important, not very important, or not at all important. We dichotomized variables for each cause where 1 was "very/somewhat important" and 0 was not "very/not at all important." We categorized all of the causes of obesity into three categories (biological, individual behaviors, and physical/social environmental factors) based on the conceptual frameworks described by the 2005 and 2012 Institute of Medicine reports on obesity [25-26]. Physical/social environmental factors refer to things which influence individual behaviors but which are typically outside of a person's control.

Physician competence questions assessed by the question, "Please tell me whether you agree or disagree with the following statements: I feel competent giving diet counseling to my obese patients; I feel competent giving exercise counseling to my obese patients; and I am usually successful in helping my obese patients lose weight." For each statement, physicians indicated whether they strongly agreed, somewhat agreed, somewhat disagreed, or strongly disagreed with the statements. We dichotomized variables for each competency where 1 was "strongly/somewhat agree" and 0 was "strongly/somewhat disagree."

We assessed perspectives about how to improve obesity training among those physicians who had already received some additional training with the survey question, "Since you have received more training on how to care for your obese patients, how helpful would each of the following types of training be: Nutrition counseling, exercise counseling, patient care after bariatric surgery, patient eligibility for bariatric surgery, motivational interviewing, and weight loss medications." For each type of training, physicians indicated whether they believed it would be very helpful, somewhat helpful, not very helpful, or not at all helpful. We dichotomized variables for each type of training where 1 was "very/somewhat helpful" and 0 was "not very/not at all helpful." Among all physicians, we assessed perspectives about improving obesity care with the following questions: "How helpful would it be for the patient chart to include a specific list of diet and exercise tips you could share with your obese patients to help them lose weight or manage their weight?"; "How helpful would it be for scales that measure height and body

weight to also report body mass index so that medical assistants/nurses are not required to calculate it?"; "If it does not already, how helpful would it be if the medical chart clearly indicated whether the patient was clinically obese or overweight (by including BMI and the overweight/obesity status)?"; and "How important is it to include body mass index with patients' other vital signs of heart beat, breathing rate, temperature, and blood pressure?" We dichotomized variables for each type of improvement as 1 was "very/somewhat helpful" and 0 was "not very/not at all helpful". Finally we assessed perspectives about medication equipment with the question, "How appropriate is the medical equipment in your office for your obese patients (e.g., gowns, chairs, exam tables, blood pressure cuffs)?" and dichotomized the response categories as 1 "very/somewhat appropriate" and 0 "not very/not at all appropriate."

Statistical Analyses

We performed descriptive analyses for all variables. T-tests were used to test for differences by years since completing medical school. We used weighting to address systematic under- or over-representation of the physician subpopulations in the panel, account for systematic non-response along known demographic characteristics of the PCPs, and adjust for sampling biases due to differences in non-response rates.

All analyses were stratified based on years since completing medical school, comparing physicians who completed medical school fewer than 20 years ago (i.e., 1991 or later) with PCPs who completed medical school 20 or more years ago (i.e., 1990 or earlier). The weighted mean year that medical school was completed in our sample was 1993. We elected to stratify by the 20-year threshold based on previous research suggesting differences in counseling and tracking of obese patients among those two groups of physicians.[23] We also conducted sensitivity analyses using 10- and 15-years since medical school as the thresholds. Those results are not included as they did not differ substantively from the 20 year cut points. They are available from the authors upon request. Statistical analyses were performed using the STATA,

version 11.0 software package (StataCorp LP, College Station, TX), using SVY functions to adjust for the complex survey design. The weighted margin of error for the survey was +/-5.3%.

RESULTS

Sample characteristics

Table 1 shows characteristics of the survey respondents. Physician-level characteristics are comparable to national-level characteristics reported for family physicians/internists/general practitioners by the American Medical Association (AMA), with the exception of the distribution of years since completing medical school. Our sample distribution had slightly more respondents who had completed medical school more recently (in 2000) than the national sample reported by the AMA (22% vs. 21%). Specifically, 49% of physicians in the AMA sample completed medical school in 1990 or later, compared to 69% in our sample. A large majority of PCPs (84%) reported that about half of the patients in their practice were obese, and 10% reported that almost all patients in their practice were obese. Nearly all physicians reported that patient height and body weight were included in patients' charts, and 76% reported that Body Mass Index (BMI) was included in patients' charts. When asked to rate the quality of obesity-related training, 23% reported receiving good training in medical school, 35% reported receiving good training in residency, and 60% reported receiving good training in continuing medical education.

PCP perspectives on causes of obesity

Table 2 describes PCP perspectives on the causes of and solutions to obesity care as well as differences in these perspectives by number of years since completion of medical school (≥20 years vs. <20 years). We divided possible causes of obesity into three domains: individual biological factors, individual behavioral factors, and physical/social environmental factors. Overall, 75% of PCPs identified genetics or family history as an important cause of obesity, followed by metabolic effect (47%) and endocrine disorders (25%). Individual behavioral factors

were the most commonly reported causes of obesity, with nearly all physicians citing insufficient physical activity (99%), overconsumption of food (99%), restaurant or fast-food eating (95%), consumption of sugar-sweetened beverages (94%), and lack of will power as important causes of obesity (89%). PCPs also identified environmental factors as important causes of obesity: cultural factors (85%), lack of information on good eating habits (75%), and lack of access to healthy foods (59%).

We observed few differences in perspectives about possible causes of obesity between physicians who had completed medical school ≥20 years ago compared to those who had completed medical school <20 years ago. PCPs who completed medical school more recently were more likely to identify restaurant or fast-food eating (99% vs. 90%; $p < 0.01$), lack of information on good eating habits (80% vs. 69%; $p = 0.03$), and lack of access to health foods as important causes of obesity (64% vs. 52%; $p = 0.03$).

PCPs' perspectives in improving care for obese patients

Table 3 shows PCP perspectives on the health care provider most qualified to help obese patients lose or maintain weight, stratified by years since completing medical school. No one type of provider was endorsed by a majority of PCPs as the most qualified to help patients. PCPs with <20 years since completion of medical school reported that nutritionists/dietitians were most qualified providers (48% vs. 41%), followed by primary care physicians 41% vs. 37%) and behavioral psychologists (9% vs. 20%, $p = 0.01$). Very few PCPs reported that endocrinologists (1% vs. 1.5%) or nurses (1% vs. 1%) were the most qualified providers to help obese patients lose or maintain weight.

PCP perspectives on solutions for improving obesity care

Table 4 shows PCPs perspectives on solutions for improving obesity care related to physician training and practice-based changes. With respect to training, PCPs who had received some training in obesity-related care (n=313) generally reported that it was helpful. In

terms of practice-based solutions to improving care, 93% reported that including BMI as a fifth vital sign would be helpful; 89% reported that including diet/exercise tips in patients' charts would be helpful; 85% reported that having scales report BMI would be helpful; and 69% reported that adding BMI to patients' charts would be helpful. No significant differences were observed by year since completing medical school with one exception. Fewer PCPs who completed medical school within 20 years agreed that BMI reported by scales would be being helpful in treating obese patients (81% vs. 89%; p = 0.02). report that having scales which show BMI would be helpful (80% vs. 88%; p=.04).

PCPs' reported competence for caring for obese patients

Table 5 shows PCPs reported competence in treating obese patients, overall and stratified by years since completing medical school. Almost all PCPs reported feeling competent giving diet-related counseling (90%) and exercise-related counseling (92%) to obese patients. However, less than half (44%) reported that they were usually successful in helping obese patients lose weight. PCPs who completed medical school <20 years ago were significantly more likely to report success in helping patients lose weight (49% vs. 36%; p = 0.02).

DISCUSSION

Of the 145,000 physicians, 2010 email addresses were sent invitations 58 were returned as undeliverable. The response rate, calculated as completed interviews over the total of working emails sent an invitation was 25.6%. This study updates earlier research related to primary care physician perspectives on the causes of obesity and examines physician-reported causes of obesity and solutions for improving obesity care, for PCPs overall and by years since medical school completion. Like previous research,[6 27-28] we found that PCPs overwhelmingly identified individual behavioral factors (e.g., poor diet and physical inactivity) as important causes of obesity. PCP perspectives on improving obesity care supported additional training (e.g., nutrition and exercise counseling) and practice-based changes (e.g., including BMI in the

patient chart). We observed few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school. However, we found PCPs who graduated from medical school within the past 20 years, compared with those with graduated more than 20 years ago, more frequently recognized social determinants as causes of obesity, such as lack of information about good eating habits and lack of access to healthy food. While PCPs who completed medical school more recently reported feeling more successful helping obese patients lose weight, these successful providers are still a minority. This is consistent with research suggesting that PCPs generally feel unprepared to care for obese patients.[7 12-14] Increased time since completing medical school could lead to more negative attitudes towards obesity care, as physicians may become frustrated by years of failed attempts to help their obese patients lose and maintain weight. Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

The limited differences among PCPs that we observed may suggest that obesity-related training has changed little over time. We found little evidence that any recent emphasis on obesity-related training in medical school has translated into significant differences in self-perceived competency. Interestingly, while most PCPs reported competence in diet and exercise counseling to obese patients, less than half reported success in helping those patients lose weight.

Given that obesity training has been shown to improve obesity care,[12] improvements to medical and post-graduate medical education are critical. As most practicing PCPs report inadequate training in obesity care, these physicians may be particularly receptive to continuing medical education in this area.[13-14] PCPs in our study desired additional training on nutrition and exercise counseling, care related to bariatric surgery patients, as well as motivational interviewing. Enhancements to medical education could potentially help improve obesity care given research suggesting consistency between physician beliefs about solutions and causes;[29] for example physicians who endorse medical solutions for obesity typically believe obesity is

caused by biological factors . In addition to addressing these gaps in medical education, we should consider transitioning some obesity care responsibilities away from primary care physicians to nutritionists/dietitians. Physicians in our study identified these health professionals as being most qualified to help obese patients lose or maintain their weight. Furthermore, incentives for care coordination under the Patient Protection and Affordable Care Act such as the Patient Centered Medical Home recommend the inclusion of dietitians as members of health teams to support primary care practices.[30] Perhaps a new model of obesity care should join PCPs, nutritionists, and other relevant health professional together – an approach which proved effective in the recently completed POWER trial,[31] which examined the effects of behavioral weight-loss interventions among obese patients.

Future research is needed to better understand which components of obesity care would be best handled by PCPs and which components of obesity care would be best handled by nutritionists/dietitians. Recent work identifies successful models that include delivery of weight loss support by trained coaches via remote means (e.g., telephone, email, and web-based modules, self-monitoring tools, and feedback) along with PCP support [31] and lifestyle counseling plus meal replacement or weight-loss medication chosen in consultation with the PCP.[32]

Regardless of their years after medical school completion, most physicians desired practice-based changes to facilitate improved obesity care. Physicians endorsed using appropriate medical equipment to accommodate obese patients, as well as documenting BMI in the chart as important practice changes. Such changes would ensure accurate identification and proper care of obese patients. Finally, the practice could better support obesity counseling by including diet and exercise tips in the chart for the physician to use.

There are several limitations to this analysis. First, our measures of physician attitudes do not represent the full possible spectrum of attitude measures in the literature (such as perceived skills[33] or comfort in caring for obese patients,[34] which may bias our results towards the null). Second, some of the included PCP's may have had extensive additional training in obesity (considering themselves "obesity specialists"), which could have biased our results

positively. Years since medical school completion is proxy for type of education they received, but we are unable to account for the huge variation in curricula across medical schools. Third, even though they survey was reviewed by experts in the field of obesity and primary care as well as pilot tested for comprehensibility, it is possible that physicians differentially interpreted some of the questions. Fourth, the response rate may limit the generalizability of these results to all primary care physicians in the United States.

In conclusion, this study suggests few differences in primary care physician perspectives about the causes of obesity or solutions to improve care of obese patients, regardless of when they completed medical school. The differences we did observe suggest that physicians with fewer than 20 years since completion of medical school more frequently recognized social determinants as causes of obesity and also reported feeling more successful helping obese patients lose weight. The results from the recently completed POWER trial, suggest that having PCPs play a supportive role to weight loss health coaches – such as reviewing patient progress and using this information to provide basic guidance and motivation – may be one effective model.[31] In order to begin improving obesity care, medical education should focus on enhancing those obesity-related skills PCPs feel most qualified to deliver as well as changing the composition of healthcare teams and practice resources.

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Table 1. Characteristics of the study sample (N = 500)

	N (%)
Physician characteristics	
Gender	
Male	335 (67)
Race	
White	350 (70)
Black	15 (3)
Asian	77 (15)
Hispanic	25 (5)
Other race	6 (1)
Age, years	
Under 45	224 (45)
Aged 45-54	124 (25)
Aged 55 and older	152 (30)
Year since completed medical school	
20 years or more (1990 or earlier)	222 (44)
15 years to <20 years (1991 to 1995)	58 (12)
10 years to <15 (1996 to 2000)	162 (32)
<=10 (2001 to 2011)	57 (11)
Physician-reported demographics of their patients	
Patients in practice who are obese	
Almost all	48 (10)
About half	422 (84)
Not many	20 (4)
Race of obese patients in practice	
Most are White	174 (35)
Most are minority	41 (8)
Broad range of demographic groups	284 (57)
Income of obese patients in practice	
Most are low income	142 (28)
Most are not low income	92 (18)
Evenly split	266 (53)
Physician-reported practice characteristics	
Primary location where patients are seen†	
Hospital or inpatient setting	49 (10)
Office not attached to a hospital or outpatient	313 (63)
Both inpatient and outpatient	136 (27)
Patient chart	
Includes height	467 (93)
Includes body weight	499 (99)
Includes body mass index	378 (76)
Location of practice	
Northeast	104 (21)
North central	114 (23)
South	166 (33)

	N (%)
West	116 (23)
Physician obesity-related training rated as very or pretty good	
Medical school	115 (23)
Residency	173 (35)
Continuing medical education	298 (60)
Other training‡	313 (63)

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.
† One respondent reported the primary location where patients are seen is "another location."
‡ Other training includes in-person or online training such as a lecture, seminar, workshop, or conference.
Note: Numbers may not add up to 100% because of rounding.

Table 2. Primary care physician perception of the importance of possible causes of obesity, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 N=277	20+ N=223	*P*-value
Individual biological factors				
Genetics or family history	372 (75)	205 (74)	168 (75)	0.77
Metabolic effect	234 (47)	135 (49)	99 (44)	0.43
Endocrine disorder	140 (28)	84 (30)	56 (25)	0.30
Individual behavioral factors				
Insufficient physical activity	496 (99)	274 (98)	223 (100)	0.05
Overconsumption of food	496 (99)	276 (99)	221 (99)	0.86
Restaurant or fast food eating	474 (95)	274 (99)	200 (90)	<0.01
Consumption of sugar-sweetened beverages	470 (94)	264 (95)	206 (93)	0.36
Lack of will power	441 (89)	250 (90)	197 (88)	0.60
Physical/social environmental factors				
Cultural factors	422 (85)	239 (86)	184 (83)	0.43
Lack of information on good eating habits	375 (75)	222 (80)	154 (69)	0.03
Lack of access to healthy food	294 (59)	178 (64)	116 (52)	0.03

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

Notes: P-values are for t-tests for differences in proportions. Percentages reflect respondents rating potential causes as very or somewhat important. The mean year medical school was completed is 1993.

Table 3. Physician perspectives on health professional most qualified to help obese patients lose or maintain weight, by years since completing medical school N (%)

	Overall	Years since completing medical school		
	N=500	<20	20+	*P*-value
% citing most qualified		N=277	N=223	
Nutritionist/Dietitican	223 (45)	166 (48)	67 (41)	0.21
Primary Care Physician	199 (39)	135 (41)	64 (37)	0.40
Behavioral Psychologist	57 (14)	30 (9)	27 (20)	0.01
Endocrinologist	6 (1.0)	3 (0.7)	3 (1.5)	0.45
Nurse	3 (0.5)	2 (0.7)	1 (0.5)	0.81

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.
Notes: P-values are for t-tests for differences in proportions. The mean year medical school was completed is 1993.

Table 4. Primary care physician's perspectives on solutions for improving obesity care, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=313	<20 N=161	20+ N=152	*P*-value
Physician training to improve obesity care				
Helpfulness of physician training in…*				
Nutrition counseling	290 (93)	156 (97)	134 (88)	0.04
Exercise counseling	290 (92)	154 (96)	135 (89)	0.09
Patient care after bariatric surgery	282 (90)	144 (89)	137 (90)	0.81
Motivational interviewing	270 (86)	143 (88)	127 (84)	0.37
Patient eligibility for bariatric surgery	266 (85)	136 (84)	130 (85)	0.88
Weight loss medications	202 (64)	110 (68)	92 (60)	0.24
	N=500	N=277	N=223	
Practice-based changes to improve obesity care				
Helpfulness of…				
Including BMI as a fifth vital sign	466 (93)	256 (92)	210 (95)	0.32
Including specific diet or exercise tips in patient chart	446 (89)	250 (90)	196 (88)	0.53
Having scales report BMI	423 (85)	224 (81)	198 (89)	0.02
Adding BMI to patient chart†	344 (69)	193 (69)	151 (68)	0.70
Medical equipment in office is appropriate for obese patients (e.g., gowns, chairs, exam tables, blood pressure cuffs)‡	460 (92)	253 (91)	207 (93)	0.53

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

* Questions about the helpfulness of various forms of obesity training were only asked among those physicians who reported receiving some training. Percentages represent physicians reporting training is very or somewhat helpful.

† 20% of the sample (100 respondents) reported that this feature is already available in the medical chart

‡ Percentages represent physicians reporting very/somewhat appropriate

Note: The 8% of physicians who said that medical equipment for obese patients was not appropriate were also asked to rate how important it was to improve the equipment. More than 85% of these physicians said this was an important goal for gowns, chairs, exam tables, and blood pressure cuffs.

Table 5. Physician reported competence in treating obese patients, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 N=277	20+ N=223	*P*-value
Competent giving exercise-related counseling to obese patients	462 (92)	258 (93)	204 (92)	0.68
Competent giving diet-related counseling to obese patients	450 (90)	252 (91)	198 (89)	0.54
Usually successful in helping obese patients lose weight	218 (44)	137 (49)	81 (36)	0.02
Primary care physicians are the 'most qualified' professional to help obese patients	196 (39)	115 (41)	82 (37)	0.40

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.
Notes: P-values are for t-tests for differences in proportions. The mean year medical school was completed is 1993.

National survey of U.S. primary care physicians' perspectives about causes of obesity and solutions to improve care

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ABSTRACT

Objective: To describe physician perspectives on the causes of and solutions to obesity care and identify differences in these perspectives by number of years since completion of medical school.

Design: National cross-sectional online survey from February 9 to March 1, 2011.

Setting: United States

Participants: 500 primary care physicians

Main Measures: We evaluated physician perspectives on: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care

Results: Primary care physicians~~PCPs~~ overwhelmingly supported additional training (such as nutrition counseling) and practice-based changes (such as having scales report BMI) to help them improve their obesity care. They also identified nutritionists/dietitians as the most qualified providers to care for obese patients. Physicians with ~~less~~ fewer than 20 years since completion of medical school were more likely to identify lack of information about good eating habits and lack of access to healthy food as important causes of obesity. They also reported feeling relatively more successful helping obese patients lose weight. The response rate for the survey was 25.6%.

Conclusions: Our results indicate a perceived need for improved medical education related to obesity care.

Article focus

- The purpose of this study is to describe primary care physician (PCP) perspectives on the causes of and solutions to obesity care and whether these perspectives differ by number of years since completion of medical school.
- We hypothesized that PCPs with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be more likely to identify increased training and practice-based changes as possible solutions to the problem of obesity.

Key messages

- There are few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school, suggesting that obesity-related medical education has changed little over time.
- PCPs who completed medical school more recently reported feeling more successful helping obese patients lose weight
- Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

Strengths and limitations of this study

- The key limitation of this study is that it is cross-sectional which only allows us to address associations rather than causal inferences.
- The key strength of this study is that is uses a national sample of PCPs.

Obesity affects one third of the U.S. adult population [1] and is estimated to cost $147 billion annually.[2] Despite national guidelines for primary care physicians (PCPs) to counsel their obese patients to lose weight, [3-4] only one third of obese patients report receiving an obesity diagnosis or weight-related counseling.[5]

While there is a growing body of research documenting physician perspectives on the causes of obesity,[6-8] little research has examined PCP perspectives on possible solutions to improve obesity care. This is an important area of research given that PCPs are in a unique position to treat obesity and assist with healthy-weight maintenance. In 2008, there were an estimated 455 million visits were made to PCPs.[9] Given the penetration of the obesity epidemic, even modest reductions in body weight at the individual-level can lead to significant health benefits and reduced costs at the population-level.[10-11]

Physician-level barriers to obesity care have been extensively explored in the literature. Many of the physician-level barriers relate to clinical knowledge and attitudes towards obese patients including: inadequate training in weight counseling, poor knowledge of the tools needed to diagnose and treat obesity,[7 12-14] negative physician attitudes (e.g., weight stigma, pessimism about patient's desire/ability to lose weight; belief that weight-loss counseling is ineffective, [15-18]) doubt that counseling will have an effect on patient behavior,[19-20] and feeling that obesity is the responsibility of the patient.[21]

Some of these physician barriers may be related to how recently PCPs completed medical school or residency. Little research has explored the association between years since completion of medical training and physician perspectives on obesity. The available evidence suggests a positive correlation between years since residency and a negative expectation of outcomes for obese patients among internists, pediatricians, and psychiatrists.[22] Previous research has also shown that years since medical school predicts the types of treatment offered to obese patients, where physicians who completed medical school ≥20 years before the study were more likely to provide general counseling, specific dietary counseling, specific physical

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activity counseling, and to systematically track patients than those who completed their training <10 years ago.[23]

This is an important area of research given that obesity training can improve the quality of physician practice patterns of obesity care (such as weight-related counseling),[24] and new cohorts of medical students and residents may be more likely to receive this training as compared to older cohorts. Physicians who learn appropriate obesity screening and counseling practices in residency are more likely to report discussing diet or exercise with their obese patients.[12] Recent graduates may also be more likely to consider modest weight loss or weight maintenance a successful outcome.

Our primary goal was to describe physician perspectives on the causes of obesity and solutions to improve care of obese patients in the health care systemity care. Our secondary goal is to identify differences in these perspectives by number of years since completion of medical school. We examined differences in perspectives by years since completing medical school for the following topics: causes of obesity, competence in treating obese patients, perspectives on the health professional most qualified to help obese patients lose or maintain weight, and solutions for improving obesity care. We hypothesized that physicians with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be more likely to identify increased training and practice-based changes (e.g., appropriateness of medical equipment) as possible solutions to the problem of obesity. This research updates earlier studies focused on physician attitudes towards obesity causes and treatment[6 8] as well as provides physician perspectives about solutions to obesity care with an emphasis on whether perspectives differ according to when physicians completed medical school.

METHODS AND PROCEDURES

Study Design

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National cross-sectional internet-based survey of PCPs in the United States.

Survey Development and Implementation

We consulted SSRS/Social Science Research Solutions to design and implement the survey. The survey instrument was reviewed for content by physicians and experts in the field of obesity, and was then pretested for length and comprehensibility. The survey was revised on the basis of these pilot tests and the final version included forty-nine questions. The fieldwork for this survey was conducted via the internet by The Epocrates Honors Web Panel Company, which consists of 145,000 physicians.

We surveyed 500 General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011. These physicians were recruited from The Epocrates Honors panel. The Epocrates Honors panel is an opt-in panel of 145,000 physicians in the United States verified by the American Medical Association's (AMA's) master file. Physicians were verified by checking their first and last name, date of birth, medical school, and graduation date against the AMA's master file at the time of panel registration. A random sample of the panel was invited to participate in the survey. This sample was drawn to match AMA master file proportions for age, gender, and region. Each physician received a $25 incentive for completing the survey. Consent to participate was obtained by physicians choosing to complete the survey.

This study was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board and determined to be exempt.

Measures of physician perspectives on obesity care

We evaluated physician perspectives on the following topics: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care.

We assessed physician beliefs about the causes of obesity with the question, "How important is each of the following possible causes of obesity for your patients?" For each cause (over consumption of food, restaurant/fast food eating, consumption of sugar-sweetened

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beverages (SSB), genetics/family history, and metabolic defect), physicians indicated whether it was very important, somewhat important, not very important, or not at all important. We dichotomized variables for each cause where 1 was "very/somewhat important" and 0 was not "very/not at all important." We categorized all of the causes of obesity into three categories (biological, individual behaviors, and physical/social environmental factors) based on the conceptual frameworks described by the 2005 and 2012 Institute of Medicine reports on obesity [25-26] ~~(CITE)~~. Physical/social environmental factors refer to things which influence individual behaviors but which are typically outside of a person's control.

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Physician competence questions assessed by the question, "Please tell me whether you agree or disagree with the following statements: I feel competent giving diet counseling to my obese patients; I feel competent giving exercise counseling to my obese patients; and I am usually successful in helping my obese patients lose weight." For each statement, physicians indicated whether they strongly agreed, somewhat agreed, somewhat disagreed, or strongly disagreed with the statements. We dichotomized variables for each competency where 1 was "strongly/somewhat agree" and 0 was "strongly/somewhat disagree."

We assessed perspectives about how to improve obesity training among those physicians who had already received some additional training with the survey question, "Since you have received more training on how to care for your obese patients, how helpful would each of the following types of training be: Nutrition counseling, exercise counseling, patient care after bariatric surgery, patient eligibility for bariatric surgery, motivational interviewing, and weight loss medications." For each type of training, physicians indicated whether they believed it would be very helpful, somewhat helpful, not very helpful, or not at all helpful. We dichotomized variables for each type of training where 1 was "very/somewhat helpful" and 0 was "not very/not at all helpful." Among all physicians, we assessed perspectives about improving obesity care with the following questions: "How helpful would it be for the patient chart to include a specific list of diet and exercise tips you could share with your obese patients to help them lose weight

or manage their weight?"; "How helpful would it be for scales that measure height and body weight to also report body mass index so that medical assistants/nurses are not required to calculate it?"; "If it does not already, how helpful would it be if the medical chart clearly indicated whether the patient was clinically obese or overweight (by including BMI and the overweight/obesity status)?"; and "How important is it to include body mass index with patients' other vital signs of heart beat, breathing rate, temperature, and blood pressure?" We dichotomized variables for each type of improvement as 1 was "very/somewhat helpful" and 0 was "not very/not at all helpful". Finally we assessed perspectives about medication equipment with the question, "How appropriate is the medical equipment in your office for your obese patients (e.g., gowns, chairs, exam tables, blood pressure cuffs)?" and dichotomized the response categories as 1 "very/somewhat appropriate" and 0 "not very/not at all appropriate."

Statistical Analyses

We performed descriptive analyses for all variables. T-tests were used to test for differences by years since completing medical school. We used weighting to address systematic under- or over-representation of the physician subpopulations in the panel, account for systematic non-response along known demographic characteristics of the PCPs, and adjust for sampling biases due to differences in non-response rates.

All analyses were stratified based on years since completing medical school, comparing physicians who completed medical school fewer than 20 years ago (i.e., 1991 or later) with PCPs who completed medical school 20 or more years ago (i.e., 1990 or earlier). The weighted mean year that medical school was completed in our sample was 1993. We elected to stratify by the 20-year threshold based on previous research suggesting differences in counseling and tracking of obese patients among those two groups of physicians.[23] We also conducted sensitivity analyses using 10- and 15-years since medical school as the thresholds. Those results are not included as they did not differ substantively from the 20 year cut points. They are available from the authors upon request. Statistical analyses were performed using the STATA,

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version 11.0 software package (StataCorp LP, College Station, TX), using SVY functions to adjust for the complex survey design. The weighted margin of error for the survey was +/-5.3%.

RESULTS

Sample characteristics

Table 1 shows characteristics of the survey respondents. Physician-level characteristics are comparable to national-level characteristics reported for family physicians/internists/general practitioners by the American Medical Association (AMA), with the exception of the distribution of years since completing medical school. Our sample distribution had slightly more respondents who had completed medical school more recently (in 2000) than the national sample reported by the AMA (22% vs. 21%). Specifically, 49% of physicians in the AMA sample completed medical school in 1990 or later, compared to 69% in our sample. A large majority of PCPs (84%) reported that about half of the patients in their practice were obese, and 10% reported that almost all patients in their practice were obese. Nearly all physicians reported that patient height and body weight were included in patients' charts, and 76% reported that Body Mass Index (BMI) was included in patients' charts. When asked to rate the quality of obesity-related training, 23% reported receiving good training in medical school, 35% reported receiving good training in residency, and 60% reported receiving good training in continuing medical education.

PCP perspectives on causes of obesity

Table 2 describes PCP perspectives on the causes of and solutions to obesity care as well as differences in these perspectives by number of years since completion of medical school (≥20 years vs. <20 years). We divided possible causes of obesity into three domains: individual biological factors, individual behavioral factors, and physical/social environmental factors. Overall, 75% of PCPs identified genetics or family history as an important cause of obesity, followed by metabolic effect (47%) and endocrine disorders (25%). Individual behavioral factors

were the most commonly reported causes of obesity, with nearly all physicians citing insufficient physical activity (99%), overconsumption of food (99%), restaurant or fast-food eating (95%), consumption of sugar-sweetened beverages (94%), and lack of will power as important causes of obesity (89%). PCPs also identified environmental factors as important causes of obesity: cultural factors (85%), lack of information on good eating habits (75%), and lack of access to healthy foods (59%).

We observed few differences in perspectives about possible causes of obesity between physicians who had completed medical school ≥20 years ago compared to those who had completed medical school <20 years ago. PCPs who completed medical school more recently were more likely to identify restaurant or fast-food eating (99% vs. 90%; $p < 0.01$), lack of information on good eating habits (80% vs. 69%; $p = 0.03$), and lack of access to health foods as important causes of obesity (64% vs. 52%; $p = 0.03$).

PCPs' perspectives in improving care for obese patients

~~Figure 1~~Table 3 shows PCP perspectives on the health care provider most qualified to help obese patients lose or maintain weight, stratified by years since completing medical school. No one type of provider was endorsed by a majority of PCPs as the most qualified to help patients. PCPs with <20 years since completion of medical school reported that nutritionists/dietitians were most qualified providers (48% vs. 41%), followed by primary care physicians 41% vs. 37%) and behavioral psychologists (9% vs. 20%, $p = 0.01$). Very few PCPs reported that endocrinologists (1% vs. 1.5%) or nurses (1% vs. 1%) were the most qualified providers to help obese patients lose or maintain weight.

PCP perspectives on solutions for improving obesity care

Table ~~43~~ shows PCPs perspectives on solutions for improving obesity care related to physician training and practice-based changes. With respect to training, PCPs who had received some training in obesity-related care (n=313) generally reported that it was helpful. In

terms of practice-based solutions to improving care, 93% reported that including BMI as a fifth vital sign would be helpful; 89% reported that including diet/exercise tips in patients' charts would be helpful; 85% reported that having scales report BMI would be helpful; and 69% reported that adding BMI to patients' charts would be helpful. No significant differences were observed by year since completing medical school with one exception. Fewer PCPs who completed medical school within 20 years agreed that BMI reported by scales would be being helpful in treating obese patients (81% vs. 89%; p = 0.02). report that having scales which show BMI would be helpful (80% vs. 88%; p=.04).

PCPs' reported competence for caring for obese patients

Table 54 shows PCPs reported competence in treating obese patients, overall and stratified by years since completing medical school. Almost all PCPs reported feeling competent giving diet-related counseling (90%) and exercise-related counseling (92%) to obese patients. However, less than half (44%) reported that they were usually successful in helping obese patients lose weight. PCPs who completed medical school <20 years ago were significantly more likely to report success in helping patients lose weight (49% vs. 36%; p = 0.02).

DISCUSSION

Of the 145,000 physicians, 2010 email addresses were sent invitations 58 were returned as undeliverable. The response rate, calculated as completed interviews over the total of working emails sent an invitation was 25.6%. This study updates earlier research related to primary care physician perspectives on the causes of obesity and examines physician-reported causes of obesity and solutions for improving obesity care, for PCPs overall and by years since medical school completion. Like previous research,[6 27-28 6 25-26] we found that PCPs overwhelmingly identified individual behavioral factors (e.g., poor diet and physical inactivity) as important causes of obesity. PCP perspectives on improving obesity care supported additional training (e.g., nutrition and exercise counseling) and practice-based changes (e.g., including

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BMI in the patient chart). We observed few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school. However, we found PCPs who graduated from medical school within the past 20 years, compared with those with graduated more than 20 years ago, more frequently recognized social determinants as causes of obesity, such as lack of information about good eating habits and lack of access to healthy food. While PCPs who completed medical school more recently reported feeling more successful helping obese patients lose weight, these successful providers are still a minority. This is consistent with research suggesting that PCPs generally feel unprepared to care for obese patients.[7 12-14] Increased time since completing medical school could lead to more negative attitudes towards obesity care, as physicians may become frustrated by years of failed attempts to help their obese patients lose and maintain weight. Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

The limited differences among PCPs that we observed may suggest that obesity-related training has changed little over time. We found little evidence that any recent emphasis on obesity-related training in medical school has translated into significant differences in self-perceived competency. Interestingly, while most PCPs reported competence in diet and exercise counseling to obese patients, less than half reported success in helping those patients lose weight.

Given that obesity training has been shown to improve obesity care,[12] improvements to medical and post-graduate medical education are critical. As most practicing PCPs report inadequate training in obesity care, these physicians may be particularly receptive to continuing medical education in this area.[13-14] PCPs in our study desired additional training on nutrition and exercise counseling, care related to bariatric surgery patients, as well as motivational interviewing. Enhancements to medical education could potentially help improve obesity care given research suggesting consistency between physician beliefs about solutions and causes;[2927] for example physicians who endorse medical solutions for obesity typically believe

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obesity is caused by biological factors . In addition to addressing these gaps in medical education, we should consider transitioning some obesity care responsibilities away from primary care physicians to nutritionists/dietitians. Physicians in our study identified these health professionals as being most qualified to help obese patients lose or maintain their weight. Furthermore, incentives for care coordination under the Patient Protection and Affordable Care Act such as the Patient Centered Medical Home recommend the inclusion of dietitians as members of health teams to support primary care practices.[30~~28~~] Perhaps a new model of obesity care should join PCPs, nutritionists, and other relevant health professional together – an approach which proved effective in the recently completed POWER trial,[31~~29~~] which examined the effects of behavioral weight-loss interventions among obese patients.

Future research is needed to better understand which ~~the~~ components of obesity care would be best handled by ~~primary care physician~~PCPs and which components of obesity care would be best handled by ~~feel most qualified to deliver and which factors would be best handled by~~ nutritionists/dietitians. Recent work identifies successful models that include delivery of weight loss support by trained coaches via remote means (e.g., telephone, email, and web-based modules, self-monitoring tools, and feedback) along with PCP support [31~~29~~] and lifestyle counseling plus meal replacement or weight-loss medication chosen in consultation with the PCP.[32~~30~~]

Regardless of their years after medical school completion, most physicians desired practice-based changes to facilitate improved obesity care. Physicians endorsed using appropriate medical equipment to accommodate obese patients, as well as documenting BMI in the chart as important practice changes. Such changes would ensure accurate identification and proper care of obese patients. Finally, the practice could better support obesity counseling by including diet and exercise tips in the chart for the physician to use.

There are several limitations to this analysis. ~~First, it is cross-sectional which only allows us to address associations rather than causal inferences. Second~~First, our measures of physician attitudes do not represent the full possible spectrum of attitude measures in the

literature (such as perceived skills[33~~31~~] or comfort in caring for obese patients,[34~~32~~] which may bias our results towards the null). Second~~Third~~, some of the included PCP's may have had extensive additional training in obesity (considering themselves "obesity specialists"), which could have biased our results positively. Years since medical school completion is proxy for type of education they received, but we are unable to account for the huge variation in curricula across medical schools. ~~Fourth~~Third, even though they survey was reviewed by experts in the field of obesity and primary care as well as pilot tested for comprehensibility, it is possible that physicians differentially interpreted some of the questions. Fourth, the response rate may limit the generalizability of these results to all primary care physicians in the United States.

In conclusion, this study suggests few differences in primary care physician perspectives about the causes of obesity or solutions to improve care of obese patients, regardless of when they completed medical school. The differences we did observe suggest that physicians with ~~less than 20 years~~fewer than 20 years since completion of medical school more frequently recognized social determinants as causes of obesity and also reported feeling more successful helping obese patients lose weight. ~~More research is needed to understand the components of obesity care physicians feel most qualified to deliver and which factors would be best handled by other health professionals such as nutritionists/dietitians.~~ The results from the recently completed POWER trial, suggest that having PCPs play a supportive role to weight loss health coaches – such as reviewing patient progress and using this information to provide basic guidance and motivation – may be one effective model.[31~~29~~] In order to begin improving obesity care, medical education should focus on enhancing those obesity-related skills PCPs feel most qualified to deliver as well as changing the composition of healthcare teams and practice resources.

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Contributors: SNB and LAC conceived the study. SNB analyzed the data. All authors contributed to the interpretation of study findings. SNB drafted the manuscript and all authors contributed to the final draft. SNB had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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Conflicts of interest: None

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Table 1. Characteristics of the study sample (N = 500)

	N (%)
Physician characteristics	
Gender	
Male	335 (67)
Race	
White	350 (70)
Black	15 (3)
Asian	77 (15)
Hispanic	25 (5)
Other race	6 (1)
Age, years	
Under 45	224 (45)
Aged 45-54	124 (25)
Aged 55 and older	152 (30)
Year since completed medical school	
20 years or more (1990 or earlier)	222 (44)
15 years to <20 years (1991 to 1995)	58 (12)
10 years to <15 (1996 to 2000)	162 (32)
<=10 (2001 to 2011)	57 (11)
Physician-reported demographics of their patients	
Patients in practice who are obese	
Almost all	48 (10)
About half	422 (84)
Not many	20 (4)
Race of obese patients in practice	
Most are White	174 (35)
Most are minority	41 (8)
Broad range of demographic groups	284 (57)
Income of obese patients in practice	
Most are low income	142 (28)
Most are not low income	92 (18)
Evenly split	266 (53)
Physician-reported practice characteristics	
Primary location where patients are seen†	
Hospital or inpatient setting	49 (10)
Office not attached to a hospital or outpatient	313 (63)
Both inpatient and outpatient	136 (27)
Patient chart	
Includes height	467 (93)
Includes body weight	499 (99)
Includes body mass index	378 (76)
Location of practice	
Northeast	104 (21)
North central	114 (23)
South	166 (33)

	N (%)
West	116 (23)
Physician obesity-related training rated as very or pretty good	
Medical school	115 (23)
Residency	173 (35)
Continuing medical education	298 (60)
Other training‡	313 (63)

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.
† One respondent reported the primary location where patients are seen is “another location.”
‡ Other training includes in-person or online training such as a lecture, seminar, workshop, or conference.
Note: Numbers may not add up to 100% because of rounding.

Table 2. Primary care physician perception of the importance of possible causes of obesity, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 N=277	20+ N=223	*P*-value
Individual biological factors				
Genetics or family history	372 (75)	205 (74)	168 (75)	0.77
Metabolic effect	234 (47)	135 (49)	99 (44)	0.43
Endocrine disorder	140 (28)	84 (30)	56 (25)	0.30
Individual behavioral factors				
Insufficient physical activity	496 (99)	274 (98)	223 (100)	0.05
Overconsumption of food	496 (99)	276 (99)	221 (99)	0.86
Restaurant or fast food eating	474 (95)	274 (99)	200 (90)	<0.01
Consumption of sugar-sweetened beverages	470 (94)	264 (95)	206 (93)	0.36
Lack of will power	441 (89)	250 (90)	197 (88)	0.60
Physical/social environmental factors				
Cultural factors	422 (85)	239 (86)	184 (83)	0.43
Lack of information on good eating habits	375 (75)	222 (80)	154 (69)	0.03
Lack of access to healthy food	294 (59)	178 (64)	116 (52)	0.03

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

Notes: P-values are for t-tests for differences in proportions. Percentages reflect respondents rating potential causes as very or somewhat important. The mean year medical school was completed is 1993.

Table 3. Physician perspectives on health professional most qualified to help obese patients lose or maintain weight, by years since completing medical school N (%)

	Overall	Years since completing medical school		
	N=500	<20	20+	*P*-value
% citing most qualified		N=277	N=223	
Nutritionist/Dietitican	223 (45)	166 (48)	67 (41)	0.21
Primary Care Physician	199 (39)	135 (41)	64 (37)	0.40
Behavioral Psychologist	57 (14)	30 (9)	27 (20)	0.01
Endocrinologist	6 (1.0)	3 (0.7)	3 (1.5)	0.45
Nurse	3 (0.5)	2 (0.7)	1 (0.5)	0.81

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.
Notes: P-values are for t-tests for differences in proportions. The mean year medical school was completed is 1993.

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Table 43. Primary care physician's perspectives on solutions for improving obesity care, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=313	<20 N=161	20+ N=152	*P*-value
Physician training to improve obesity care				
Helpfulness of physician training in…*				
Nutrition counseling	290 (93)	156 (97)	134 (88)	0.04
Exercise counseling	290 (92)	154 (96)	135 (89)	0.09
Patient care after bariatric surgery	282 (90)	144 (89)	137 (90)	0.81
Motivational interviewing	270 (86)	143 (88)	127 (84)	0.37
Patient eligibility for bariatric surgery	266 (85)	136 (84)	130 (85)	0.88
Weight loss medications	202 (64)	110 (68)	92 (60)	0.24
	N=500	N=277	N=223	
Practice-based changes to improve obesity care				
Helpfulness of…				
Including BMI as a fifth vital sign	466 (93)	256 (92)	210 (95)	0.32
Including specific diet or exercise tips in patient chart	446 (89)	250 (90)	196 (88)	0.53
Having scales report BMI	423 (85)	224 (81)	198 (89)	0.02
Adding BMI to patient chart†	344 (69)	193 (69)	151 (68)	0.70
Medical equipment in office is appropriate for obese patients (e.g., gowns, chairs, exam tables, blood pressure cuffs)‡	460 (92)	253 (91)	207 (93)	0.53

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

* Questions about the helpfulness of various forms of obesity training were only asked among those physicians who reported receiving some training. Percentages represent physicians reporting training is very or somewhat helpful.

† 20% of the sample (100 respondents) reported that this feature is already available in the medical chart

‡ Percentages represent physicians reporting very/somewhat appropriate

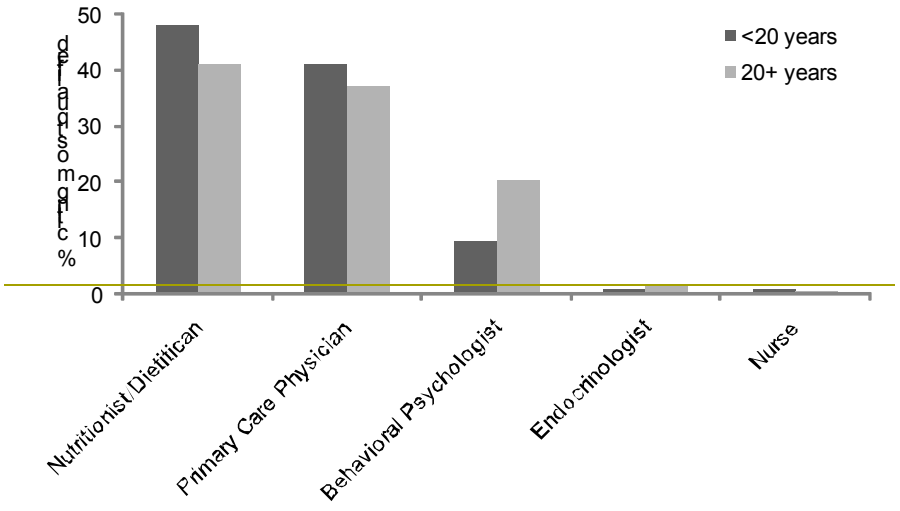
Note: The 8% of physicians who said that medical equipment for obese patients was not appropriate were also asked to rate how important it was to improve the equipment. More than 85% of these physicians said this was an important goal for gowns, chairs, exam tables, and blood pressure cuffs.

Table 54. Physician reported competence in treating obese patients, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 N=277	20+ N=223	*P*-value
Competent giving exercise-related counseling to obese patients	462 (92)	258 (93)	204 (92)	0.68
Competent giving diet-related counseling to obese patients	450 (90)	252 (91)	198 (89)	0.54
Usually successful in helping obese patients lose weight	218 (44)	137 (49)	81 (36)	0.02
Primary care physicians are the 'most qualified' professional to help obese patients	196 (39)	115 (41)	82 (37)	0.40

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.
Notes: P-values are for t-tests for differences in proportions. The mean year medical school was completed is 1993.

Figure 1. Physician perspectives on health professional most qualified to help obese patients lose or maintain weight, by years since completing medical school (%)



Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

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National survey of U.S. primary care physicians' perspectives about causes of obesity and solutions to improve care

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National survey of U.S. primary care physicians' perspectives about causes of obesity and solutions to improve care

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ABSTRACT

Objective: To describe physician perspectives on the causes of and solutions to obesity care and identify differences in these perspectives by number of years since completion of medical school.

Design: National cross-sectional online survey from February 9 to March 1, 2011.

Setting: United States

Participants: 500 primary care physicians

Main Measures: We evaluated physician perspectives on: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care

Results: Primary care physicians overwhelmingly supported additional training (such as nutrition counseling) and practice-based changes (such as having scales report BMI) to help them improve their obesity care. They also identified nutritionists/dietitians as the most qualified providers to care for obese patients. Physicians with fewer than 20 years since completion of medical school were more likely to identify lack of information about good eating habits and lack of access to healthy food as important causes of obesity. They also reported feeling relatively more successful helping obese patients lose weight. The response rate for the survey was 25.6%.

Conclusions: Our results indicate a perceived need for improved medical education related to obesity care.

Article focus

- The purpose of this study is to describe primary care physician (PCP) perspectives on the causes of and solutions to obesity care and whether these perspectives differ by number of years since completion of medical school.
- We hypothesized that PCPs with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be more likely to identify increased training and practice-based changes as possible solutions to the problem of obesity.

Key messages

- There are few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school, suggesting that obesity-related medical education has changed little over time.
- PCPs who completed medical school more recently reported feeling more successful helping obese patients lose weight
- Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

Strengths and limitations of this study

- The key limitation of this study is that our measures of physician attitudes do not represent the full possible spectrum of attitude measures in the literature (such as perceived skills or comfort in caring for obese patients) which may bias our results towards the null
- The key strength of this study is that is uses a national sample of PCPs.

Obesity affects one third of the U.S. adult population [1] and is estimated to cost $147 billion annually.[2] Despite national guidelines for primary care physicians (PCPs) to counsel their obese patients to lose weight, [3-4] only one third of obese patients report receiving an obesity diagnosis or weight-related counseling.[5]

While there is a growing body of research documenting physician perspectives on the causes of obesity,[6-8] little research has examined PCP perspectives on possible solutions to improve obesity care. This is an important area of research given that PCPs are in a unique position to treat obesity and assist with healthy-weight maintenance. In 2008, there were an estimated 455 million visits were made to PCPs.[9] Given the penetration of the obesity epidemic, even modest reductions in body weight at the individual-level can lead to significant health benefits and reduced costs at the population-level.[10-11]

Physician-level barriers to obesity care have been extensively explored in the literature. Many of the physician-level barriers relate to clinical knowledge and attitudes towards obese patients including: inadequate training in weight counseling, poor knowledge of the tools needed to diagnose and treat obesity.[7 12-14] negative physician attitudes (e.g., weight stigma, pessimism about patient's desire/ability to lose weight; belief that weight-loss counseling is ineffective, [15-18]) doubt that counseling will have an effect on patient behavior,[19-20] and feeling that obesity is the responsibility of the patient.[21]

Some of these physician barriers may be related to how recently PCPs completed medical school or residency. Little research has explored the association between years since completion of medical training and physician perspectives on obesity. The available evidence suggests a positive correlation between years since residency and a negative expectation of outcomes for obese patients among internists, pediatricians, and psychiatrists.[22] Previous research has also shown that years since medical school predicts the types of treatment offered to obese patients, where physicians who completed medical school ≥20 years before the study were more likely to provide general counseling, specific dietary counseling, specific physical

activity counseling, and to systematically track patients than those who completed their training <10 years ago.[23]

This is an important area of research given that obesity training can improve the quality of physician practice patterns of obesity care (such as weight-related counseling),[24] and new cohorts of medical students and residents may be more likely to receive this training as compared to older cohorts. Physicians who learn appropriate obesity screening and counseling practices in residency are more likely to report discussing diet or exercise with their obese patients.[12] Recent graduates may also be more likely to consider modest weight loss or weight maintenance a successful outcome.

Our primary goal was to describe physician perspectives on the causes of obesity and solutions to improve care of obese patients in the health care systeme. Our secondary goal is to identify differences in these perspectives by number of years since completion of medical school. We examined differences in perspectives by years since completing medical school for the following topics: causes of obesity, competence in treating obese patients, perspectives on the health professional most qualified to help obese patients lose or maintain weight, and solutions for improving obesity care. We hypothesized that physicians with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be more likely to identify increased training and practice-based changes (e.g., appropriateness of medical equipment) as possible solutions to the problem of obesity. This research updates earlier studies focused on physician attitudes towards obesity causes and treatment [6 8] as well as provides physician perspectives about solutions to obesity care with an emphasis on whether perspectives differ according to when physicians completed medical school.

METHODS AND PROCEDURES

Study Design

National cross-sectional internet-based survey of PCPs in the United States.

Survey Development and Implementation

We consulted SSRS/Social Science Research Solutions to design and implement the survey. The survey instrument was reviewed for content by physicians and experts in the field of obesity, and was then pretested for length and comprehensibility. The survey was revised on the basis of these pilot tests and the final version included forty-nine questions. A total of 10 pretest interviews were conducted by inviting panel members to participate in the study and asking them for comments they had about any of the questions. Following the pretest, several changes were incorporated into the final questionnaire. For example, we changed the response categories for some questions and the stem question for others. The pilot interviews were conducted by the survey firm (Social Science Research Solutions) which is external to Hopkins. Two polling experts from Social Science Research Solutions also reviewed the survey for comprehensibility. Four obesity experts, internal to Hopkins, commented on the content of the survey questions. The fieldwork for this survey was conducted via the internet by The Epocrates Honors Web Panel Company, which consists of 145,000 physicians.

We surveyed 500 General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011. These physicians were recruited from The Epocrates Honors panel. The Epocrates Honors panel is an opt-in panel of 145,000 physicians in the United States verified by the American Medical Association's (AMA's) master file. Physicians were verified by checking their first and last name, date of birth, medical school, and graduation date against the AMA's master file at the time of panel registration. A random sample of the panel was invited to participate in the survey. This sample was drawn to match AMA master file proportions for age, gender, and region. Each physician received a $25 incentive for completing the survey. Consent to participate was obtained by physicians choosing to complete the survey.

This study was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board and determined to be exempt.

Measures of physician perspectives on obesity care

We evaluated physician perspectives on the following topics: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care.

We assessed physician beliefs about the causes of obesity with the question, "How important is each of the following possible causes of obesity for your patients?" For each cause (over consumption of food, restaurant/fast food eating, consumption of sugar-sweetened beverages (SSB), genetics/family history, and metabolic defect), physicians indicated whether it was very important, somewhat important, not very important, or not at all important. We dichotomized variables for each cause where 1 was "very/somewhat important" and 0 was not "very/not at all important." We categorized all of the causes of obesity into three categories (biological, individual behaviors, and physical/social environmental factors) based on the conceptual frameworks described by the 2005 and 2012 Institute of Medicine reports on obesity [25-26]. Physical/social environmental factors refer to things which influence individual behaviors but which are typically outside of a person's control.

Physician competence questions assessed by the question, "Please tell me whether you agree or disagree with the following statements: I feel competent giving diet counseling to my obese patients; I feel competent giving exercise counseling to my obese patients; and I am usually successful in helping my obese patients lose weight." For each statement, physicians indicated whether they strongly agreed, somewhat agreed, somewhat disagreed, or strongly disagreed with the statements. We dichotomized variables for each competency where 1 was "strongly/somewhat agree" and 0 was "strongly/somewhat disagree."

We assessed perspectives about how to improve obesity training among those physicians who had already received some additional training with the survey question, "Since you have received more training on how to care for your obese patients, how helpful would each of the following types of training be: Nutrition counseling, exercise counseling, patient care after

bariatric surgery, patient eligibility for bariatric surgery, motivational interviewing, and weight loss medications." For each type of training, physicians indicated whether they believed it would be very helpful, somewhat helpful, not very helpful, or not at all helpful. We dichotomized variables for each type of training where 1 was "very/somewhat helpful" and 0 was "not very/not at all helpful." Among all physicians, we assessed perspectives about improving obesity care with the following questions: "How helpful would it be for the patient chart to include a specific list of diet and exercise tips you could share with your obese patients to help them lose weight or manage their weight?"; "How helpful would it be for scales that measure height and body weight to also report body mass index so that medical assistants/nurses are not required to calculate it?"; "If it does not already, how helpful would it be if the medical chart clearly indicated whether the patient was clinically obese or overweight (by including BMI and the overweight/obesity status)?"; and "How important is it to include body mass index with patients' other vital signs of heart beat, breathing rate, temperature, and blood pressure?" We dichotomized variables for each type of improvement as 1 was "very/somewhat helpful" and 0 was "not very/not at all helpful". Finally we assessed perspectives about medication equipment with the question, "How appropriate is the medical equipment in your office for your obese patients (e.g., gowns, chairs, exam tables, blood pressure cuffs)?" and dichotomized the response categories as 1 "very/somewhat appropriate" and 0 "not very/not at all appropriate."

Statistical Analyses

We performed descriptive analyses for all variables. T-tests were used to test for differences by years since completing medical school. We used weighting to address systematic under- or over-representation of the physician subpopulations in the panel, account for systematic non-response along known demographic characteristics of the PCPs, and adjust for sampling biases due to differences in non-response rates.

All analyses were stratified based on years since completing medical school, comparing physicians who completed medical school fewer than 20 years ago (i.e., 1991 or later) with

PCPs who completed medical school 20 or more years ago (i.e., 1990 or earlier). The weighted mean year that medical school was completed in our sample was 1993. We elected to stratify by the 20-year threshold based on previous research suggesting differences in counseling and tracking of obese patients among those two groups of physicians.[23] We also conducted sensitivity analyses using 10- and 15-years since medical school as the thresholds. Those results are not included as they did not differ substantively from the 20 year cut points. They are available from the authors upon request. Statistical analyses were performed using the STATA, version 11.0 software package (StataCorp LP, College Station, TX), using SVY functions to adjust for the complex survey design. The weighted margin of error for the survey was +/-5.3%.

RESULTS

Of the 145,000 physicians, 2010 email addresses were sent invitations 58 were returned as undeliverable. The response rate, calculated as completed interviews over the total of working emails sent an invitation was 25.6%.

Sample characteristics

Table 1 shows characteristics of the survey respondents. Physician-level characteristics are comparable to national-level characteristics reported for family physicians/internists/general practitioners by the American Medical Association (AMA), with the exception of the distribution of years since completing medical school. Our sample distribution had slightly more respondents who had completed medical school more recently (in 2000) than the national sample reported by the AMA (22% vs. 21%). Specifically, 49% of physicians in the AMA sample completed medical school in 1990 or later, compared to 69% in our sample. A large majority of PCPs (84%) reported that about half of the patients in their practice were obese, and 10% reported that almost all patients in their practice were obese. Nearly all physicians reported that patient height and body weight were included in patients' charts, and 76% reported that Body Mass Index (BMI) was included in patients' charts. When asked to rate the quality of obesity-

related training, 23% reported receiving good training in medical school, 35% reported receiving good training in residency, and 60% reported receiving good training in continuing medical education.

PCP perspectives on causes of obesity

Table 2 describes PCP perspectives on the causes of and solutions to obesity care as well as differences in these perspectives by number of years since completion of medical school (≥20 years vs. <20 years). We divided possible causes of obesity into three domains: individual biological factors, individual behavioral factors, and physical/social environmental factors. Overall, 75% of PCPs identified genetics or family history as an important cause of obesity, followed by metabolic effect (47%) and endocrine disorders (25%). Individual behavioral factors were the most commonly reported causes of obesity, with nearly all physicians citing insufficient physical activity (99%), overconsumption of food (99%), restaurant or fast-food eating (95%), consumption of sugar-sweetened beverages (94%), and lack of will power as important causes of obesity (89%). PCPs also identified environmental factors as important causes of obesity: cultural factors (85%), lack of information on good eating habits (75%), and lack of access to healthy foods (59%).

We observed few differences in perspectives about possible causes of obesity between physicians who had completed medical school ≥20 years ago compared to those who had completed medical school <20 years ago. PCPs who completed medical school more recently were more likely to identify restaurant or fast-food eating (99% vs. 90%; $p < 0.01$), lack of information on good eating habits (80% vs. 69%; $p = 0.03$), and lack of access to health foods as important causes of obesity (64% vs. 52%; $p = 0.03$).

PCPs' perspectives in improving care for obese patients

Table 3 shows PCP perspectives on the health care provider most qualified to help obese patients lose or maintain weight, stratified by years since completing medical school. No

one type of provider was endorsed by a majority of PCPs as the most qualified to help patients. PCPs with <20 years since completion of medical school reported that nutritionists/dietitians were most qualified providers (48% vs. 41%), followed by primary care physicians 41% vs. 37%) and behavioral psychologists (9% vs. 20%, p = 0.01). Very few PCPs reported that endocrinologists (1% vs. 1.5%) or nurses (1% vs. 1%) were the most qualified providers to help obese patients lose or maintain weight.

PCP perspectives on solutions for improving obesity care

Table 4 shows PCPs perspectives on solutions for improving obesity care related to physician training and practice-based changes. With respect to training, PCPs who had received some training in obesity-related care (n=313) generally reported that it was helpful. In terms of practice-based solutions to improving care, 93% reported that including BMI as a fifth vital sign would be helpful; 89% reported that including diet/exercise tips in patients' charts would be helpful; 85% reported that having scales report BMI would be helpful; and 69% reported that adding BMI to patients' charts would be helpful. No significant differences were observed by year since completing medical school with one exception. Fewer PCPs who completed medical school within 20 years agreed that BMI reported by scales would be being helpful in treating obese patients (81% vs. 89%; p = 0.02). report that having scales which show BMI would be helpful (80% vs. 88%; p=.04).

PCPs' reported competence for caring for obese patients

Table 5 shows PCPs reported competence in treating obese patients, overall and stratified by years since completing medical school. Almost all PCPs reported feeling competent giving diet-related counseling (90%) and exercise-related counseling (92%) to obese patients. However, less than half (44%) reported that they were usually successful in helping obese patients lose weight. PCPs who completed medical school <20 years ago were significantly more likely to report success in helping patients lose weight (49% vs. 36%; p = 0.02).

DISCUSSION

This study updates earlier research related to primary care physician perspectives on the causes of obesity and examines physician-reported causes of obesity and solutions for improving obesity care, for PCPs overall and by years since medical school completion. Like previous research,[6 27-28] we found that PCPs overwhelmingly identified individual behavioral factors (e.g., poor diet and physical inactivity) as important causes of obesity. PCP perspectives on improving obesity care supported additional training (e.g., nutrition and exercise counseling) and practice-based changes (e.g., including BMI in the patient chart). We observed few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school. However, we found PCPs who graduated from medical school within the past 20 years, compared with those with graduated more than 20 years ago, more frequently recognized social determinants as causes of obesity, such as lack of information about good eating habits and lack of access to healthy food. While PCPs who completed medical school more recently reported feeling more successful helping obese patients lose weight, these successful providers are still a minority. This is consistent with research suggesting that PCPs generally feel unprepared to care for obese patients.[7 12-14] Increased time since completing medical school could lead to more negative attitudes towards obesity care, as physicians may become frustrated by years of failed attempts to help their

obese patients lose and maintain weight. Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

The limited differences among PCPs that we observed may suggest that obesity-related training has changed little over time. We found little evidence that any recent emphasis on obesity-related training in medical school has translated into significant differences in self-perceived competency. Interestingly, while most PCPs reported competence in diet and exercise counseling to obese patients, less than half reported success in helping those patients lose weight.

Given that obesity training has been shown to improve obesity care,[12] improvements to medical and post-graduate medical education are critical. As most practicing PCPs report inadequate training in obesity care, these physicians may be particularly receptive to continuing medical education in this area.[13-14] PCPs in our study desired additional training on nutrition and exercise counseling, care related to bariatric surgery patients, as well as motivational interviewing. Enhancements to medical education could potentially help improve obesity care given research suggesting consistency between physician beliefs about solutions and causes;[29] for example physicians who endorse medical solutions for obesity typically believe obesity is caused by biological factors . In addition to addressing these gaps in medical education, we should consider transitioning some obesity care responsibilities away from primary care physicians to nutritionists/dietitians. Physicians in our study identified these health professionals as being most qualified to help obese patients lose or maintain their weight. Furthermore, incentives for care coordination under the Patient Protection and Affordable Care Act such as the Patient Centered Medical Home recommend the inclusion of dietitians as members of health teams to support primary care practices.[30] Perhaps a new model of obesity care should join PCPs, nutritionists, and other relevant health professional together – an approach which proved effective in the recently completed POWER trial,[31] which examined the effects of behavioral weight-loss interventions among obese patients.

Future research is needed to better understand which components of obesity care would be best handled by PCPs and which components of obesity care would be best handled by nutritionists/dietitians. Recent work identifies successful models that include delivery of weight loss support by trained coaches via remote means (e.g., telephone, email, and web-based modules, self-monitoring tools, and feedback) along with PCP support [31] and lifestyle counseling plus meal replacement or weight-loss medication chosen in consultation with the PCP.[32]

Regardless of their years after medical school completion, most physicians desired practice-based changes to facilitate improved obesity care. Physicians endorsed using appropriate medical equipment to accommodate obese patients, as well as documenting BMI in the chart as important practice changes. Such changes would ensure accurate identification and proper care of obese patients. Finally, the practice could better support obesity counseling by including diet and exercise tips in the chart for the physician to use.

There are several limitations to this analysis. First, our measures of physician attitudes do not represent the full possible spectrum of attitude measures in the literature (such as perceived skills[33] or comfort in caring for obese patients[34]) which may bias our results towards the null. Second, some of the included PCP's may have had extensive additional training in obesity (considering themselves "obesity specialists"), which could have biased our results positively. Years since medical school completion is proxy for type of education they received, but we are unable to account for the huge variation in curricula across medical schools. Third, even though they survey was reviewed by experts in the field of obesity and primary care as well as pilot tested for comprehensibility, it is possible that physicians differentially interpreted some of the questions. Fourth, the response rate may limit the generalizability of these results to all primary care physicians in the United States.

In conclusion, this study suggests few differences in primary care physician perspectives about the causes of obesity or solutions to improve care of obese patients, regardless of when they completed medical school. The differences we did observe suggest that physicians with fewer than 20 years since completion of medical school more frequently

recognized social determinants as causes of obesity and also reported feeling more successful helping obese patients lose weight. The results from the recently completed POWER trial, suggest that having PCPs play a supportive role to weight loss health coaches – such as reviewing patient progress and using this information to provide basic guidance and motivation – may be one effective model.[31] In order to begin improving obesity care, medical education should focus on enhancing those obesity-related skills PCPs feel most qualified to deliver as well as changing the composition of healthcare teams and practice resources.

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Table 1. Characteristics of the study sample (N = 500)

	N (%)
Physician characteristics	
Gender	
Male	335 (67)
Race	
White	350 (70)
Black	15 (3)
Asian	77 (15)
Hispanic	25 (5)
Other race	6 (1)
Age, years	
Under 45	224 (45)
Aged 45-54	124 (25)
Aged 55 and older	152 (30)
Year since completed medical school	
20 years or more (1990 or earlier)	222 (44)
15 years to <20 years (1991 to 1995)	58 (12)
10 years to <15 (1996 to 2000)	162 (32)
<=10 (2001 to 2011)	57 (11)
Physician-reported demographics of their patients	
Patients in practice who are obese	
Almost all	48 (10)
About half	422 (84)
Not many	20 (4)
Race of obese patients in practice	
Most are White	174 (35)
Most are minority	41 (8)
Broad range of demographic groups	284 (57)
Income of obese patients in practice	
Most are low income	142 (28)
Most are not low income	92 (18)
Evenly split	266 (53)
Physician-reported practice characteristics	
Primary location where patients are seen†	
Hospital or inpatient setting	49 (10)
Office not attached to a hospital or outpatient	313 (63)
Both inpatient and outpatient	136 (27)
Patient chart	
Includes height	467 (93)
Includes body weight	499 (99)
Includes body mass index	378 (76)
Location of practice	
Northeast	104 (21)
North central	114 (23)
South	166 (33)

	N (%)
West	116 (23)
Physician obesity-related training rated as very or pretty good	
Medical school	115 (23)
Residency	173 (35)
Continuing medical education	298 (60)
Other training‡	313 (63)

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

† One respondent reported the primary location where patients are seen is “another location.”

‡ Other training includes in-person or online training such as a lecture, seminar, workshop, or conference.

Note: Numbers may not add up to 100% because of rounding.

Table 2. Primary care physician perception of the importance of possible causes of obesity, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 N=277	20+ N=223	*P*-value
Individual biological factors				
Genetics or family history	372 (75)	205 (74)	168 (75)	0.77
Metabolic effect	234 (47)	135 (49)	99 (44)	0.43
Endocrine disorder	140 (28)	84 (30)	56 (25)	0.30
Individual behavioral factors				
Insufficient physical activity	496 (99)	274 (98)	223 (100)	0.05
Overconsumption of food	496 (99)	276 (99)	221 (99)	0.86
Restaurant or fast food eating	474 (95)	274 (99)	200 (90)	<0.01
Consumption of sugar-sweetened beverages	470 (94)	264 (95)	206 (93)	0.36
Lack of will power	441 (89)	250 (90)	197 (88)	0.60
Physical/social environmental factors				
Cultural factors	422 (85)	239 (86)	184 (83)	0.43
Lack of information on good eating habits	375 (75)	222 (80)	154 (69)	0.03
Lack of access to healthy food	294 (59)	178 (64)	116 (52)	0.03

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.
Notes: P-values are for t-tests for differences in proportions. Percentages reflect respondents rating potential causes as very or somewhat important. The mean year medical school was completed is 1993.

Table 3. Physician perspectives on health professional most qualified to help obese patients lose or maintain weight, by years since completing medical school N (%)

	Overall	Years since completing medical school		
	N=500	<20	20+	*P*-value
% citing most qualified		N=277	N=223	
Nutritionist/Dietitican	223 (45)	166 (48)	67 (41)	0.21
Primary Care Physician	199 (39)	135 (41)	64 (37)	0.40
Behavioral Psychologist	57 (14)	30 (9)	27 (20)	0.01
Endocrinologist	6 (1.0)	3 (0.7)	3 (1.5)	0.45
Nurse	3 (0.5)	2 (0.7)	1 (0.5)	0.81

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

Notes: P-values are for t-tests for differences in proportions. The mean year medical school was completed is 1993.

Table 4. Primary care physician's perspectives on solutions for improving obesity care, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=313	<20 N=161	20+ N=152	*P*-value
Physician training to improve obesity care				
Helpfulness of physician training in…*				
Nutrition counseling	290 (93)	156 (97)	134 (88)	0.04
Exercise counseling	290 (92)	154 (96)	135 (89)	0.09
Patient care after bariatric surgery	282 (90)	144 (89)	137 (90)	0.81
Motivational interviewing	270 (86)	143 (88)	127 (84)	0.37
Patient eligibility for bariatric surgery	266 (85)	136 (84)	130 (85)	0.88
Weight loss medications	202 (64)	110 (68)	92 (60)	0.24
	N=500	N=277	N=223	
Practice-based changes to improve obesity care				
Helpfulness of…				
Including BMI as a fifth vital sign	466 (93)	256 (92)	210 (95)	0.32
Including specific diet or exercise tips in patient chart	446 (89)	250 (90)	196 (88)	0.53
Having scales report BMI	423 (85)	224 (81)	198 (89)	0.02
Adding BMI to patient chart†	344 (69)	193 (69)	151 (68)	0.70
Medical equipment in office is appropriate for obese patients (e.g., gowns, chairs, exam tables, blood pressure cuffs)‡	460 (92)	253 (91)	207 (93)	0.53

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

* Questions about the helpfulness of various forms of obesity training were only asked among those physicians who reported receiving some training. Percentages represent physicians reporting training is very or somewhat helpful.

† 20% of the sample (100 respondents) reported that this feature is already available in the medical chart

‡ Percentages represent physicians reporting very/somewhat appropriate

Note: The 8% of physicians who said that medical equipment for obese patients was not appropriate were also asked to rate how important it was to improve the equipment. More than 85% of these physicians said this was an important goal for gowns, chairs, exam tables, and blood pressure cuffs.

Table 5. Physician reported competence in treating obese patients, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 N=277	20+ N=223	*P*-value
Competent giving exercise-related counseling to obese patients	462 (92)	258 (93)	204 (92)	0.68
Competent giving diet-related counseling to obese patients	450 (90)	252 (91)	198 (89)	0.54
Usually successful in helping obese patients lose weight	218 (44)	137 (49)	81 (36)	0.02
Primary care physicians are the 'most qualified' professional to help obese patients	196 (39)	115 (41)	82 (37)	0.40

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

Notes: P-values are for t-tests for differences in proportions. The mean year medical school was completed is 1993.

National survey of U.S. primary care physicians' perspectives about causes of obesity and solutions to improve care

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ABSTRACT

Objective: To describe physician perspectives on the causes of and solutions to obesity care and identify differences in these perspectives by number of years since completion of medical school.

Design: National cross-sectional online survey from February 9 to March 1, 2011.

Setting: United States

Participants: 500 primary care physicians

Main Measures: We evaluated physician perspectives on: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care

Results: Primary care physicians overwhelmingly supported additional training (such as nutrition counseling) and practice-based changes (such as having scales report BMI) to help them improve their obesity care. They also identified nutritionists/dietitians as the most qualified providers to care for obese patients. Physicians with fewer than 20 years since completion of medical school were more likely to identify lack of information about good eating habits and lack of access to healthy food as important causes of obesity. They also reported feeling relatively more successful helping obese patients lose weight. The response rate for the survey was 25.6%.

Conclusions: Our results indicate a perceived need for improved medical education related to obesity care.

Article focus

- The purpose of this study is to describe primary care physician (PCP) perspectives on the causes of and solutions to obesity care and whether these perspectives differ by number of years since completion of medical school.
- We hypothesized that PCPs with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be more likely to identify increased training and practice-based changes as possible solutions to the problem of obesity.

Key messages

- There are few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school, suggesting that obesity-related medical education has changed little over time.
- PCPs who completed medical school more recently reported feeling more successful helping obese patients lose weight
- Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

Strengths and limitations of this study

- The key limitation of this study is that our measures of physician attitudes do not represent the full possible spectrum of attitude measures in the literature (such as perceived skills or comfort in caring for obese patients) which may bias our results towards the null
- The key strength of this study is that is uses a national sample of PCPs.

Obesity affects one third of the U.S. adult population [1] and is estimated to cost $147 billion annually.[2] Despite national guidelines for primary care physicians (PCPs) to counsel their obese patients to lose weight, [3-4] only one third of obese patients report receiving an obesity diagnosis or weight-related counseling.[5]

While there is a growing body of research documenting physician perspectives on the causes of obesity,[6-8] little research has examined PCP perspectives on possible solutions to improve obesity care. This is an important area of research given that PCPs are in a unique position to treat obesity and assist with healthy-weight maintenance. In 2008, there were an estimated 455 million visits were made to PCPs.[9] Given the penetration of the obesity epidemic, even modest reductions in body weight at the individual-level can lead to significant health benefits and reduced costs at the population-level.[10-11]

Physician-level barriers to obesity care have been extensively explored in the literature. Many of the physician-level barriers relate to clinical knowledge and attitudes towards obese patients including: inadequate training in weight counseling, poor knowledge of the tools needed to diagnose and treat obesity.[7 12-14] negative physician attitudes (e.g., weight stigma, pessimism about patient's desire/ability to lose weight; belief that weight-loss counseling is ineffective, [15-18]) doubt that counseling will have an effect on patient behavior,[19-20] and feeling that obesity is the responsibility of the patient.[21]

Some of these physician barriers may be related to how recently PCPs completed medical school or residency. Little research has explored the association between years since completion of medical training and physician perspectives on obesity. The available evidence suggests a positive correlation between years since residency and a negative expectation of outcomes for obese patients among internists, pediatricians, and psychiatrists.[22] Previous research has also shown that years since medical school predicts the types of treatment offered to obese patients, where physicians who completed medical school ≥20 years before the study were more likely to provide general counseling, specific dietary counseling, specific physical

activity counseling, and to systematically track patients than those who completed their training <10 years ago.[23]

This is an important area of research given that obesity training can improve the quality of physician practice patterns of obesity care (such as weight-related counseling),[24] and new cohorts of medical students and residents may be more likely to receive this training as compared to older cohorts. Physicians who learn appropriate obesity screening and counseling practices in residency are more likely to report discussing diet or exercise with their obese patients.[12] Recent graduates may also be more likely to consider modest weight loss or weight maintenance a successful outcome.

Our primary goal was to describe physician perspectives on the causes of obesity and solutions to improve care of obese patients in the health care systeme. Our secondary goal is to identify differences in these perspectives by number of years since completion of medical school. We examined differences in perspectives by years since completing medical school for the following topics: causes of obesity, competence in treating obese patients, perspectives on the health professional most qualified to help obese patients lose or maintain weight, and solutions for improving obesity care. We hypothesized that physicians with a shorter duration of time since completing medical school (less than twenty years) would be more likely to identify environmental factors (rather than biological or individual factors) as the cause of obesity, feel more competent providing obesity-related care, and be more likely to identify increased training and practice-based changes (e.g., appropriateness of medical equipment) as possible solutions to the problem of obesity. This research updates earlier studies focused on physician attitudes towards obesity causes and treatment [6 8] as well as provides physician perspectives about solutions to obesity care with an emphasis on whether perspectives differ according to when physicians completed medical school.

METHODS AND PROCEDURES

Study Design

National cross-sectional internet-based survey of PCPs in the United States.

Survey Development and Implementation

We consulted SSRS/Social Science Research Solutions to design and implement the survey. The survey instrument was reviewed for content by physicians and experts in the field of obesity, and was then pretested for length and comprehensibility. The survey was revised on the basis of these pilot tests and the final version included forty-nine questions. A total of 10 pretest interviews were conducted by inviting panel members to participate in the study and asking them for comments they had about any of the questions. Following the pretest, several changes were incorporated into the final questionnaire. For example, we changed the response categories for some questions and the stem question for others. The pilot interviews were conducted by the survey firm (Social Science Research Solutions) which is external to Hopkins. Two polling experts from Social Science Research Solutions also reviewed the survey for comprehensibility. Four obesity experts, internal to Hopkins, commented on the content of the survey questions. The fieldwork for this survey was conducted via the internet by The Epocrates Honors Web Panel Company, which consists of 145,000 physicians.

We surveyed 500 General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011. These physicians were recruited from The Epocrates Honors panel. The Epocrates Honors panel is an opt-in panel of 145,000 physicians in the United States verified by the American Medical Association's (AMA's) master file. Physicians were verified by checking their first and last name, date of birth, medical school, and graduation date against the AMA's master file at the time of panel registration. A random sample of the panel was invited to participate in the survey. This sample was drawn to match AMA master file proportions for age, gender, and region. Each physician received a $25 incentive for completing the survey. Consent to participate was obtained by physicians choosing to complete the survey.

This study was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board and determined to be exempt.

Measures of physician perspectives on obesity care

We evaluated physician perspectives on the following topics: 1) causes of obesity, 2) competence in treating obese patients, 3) perspectives on the health professional most qualified to help obese patients lose or maintain weight, and 4) solutions for improving obesity care.

We assessed physician beliefs about the causes of obesity with the question, "How important is each of the following possible causes of obesity for your patients?" For each cause (over consumption of food, restaurant/fast food eating, consumption of sugar-sweetened beverages (SSB), genetics/family history, and metabolic defect), physicians indicated whether it was very important, somewhat important, not very important, or not at all important. We dichotomized variables for each cause where 1 was "very/somewhat important" and 0 was not "very/not at all important." We categorized all of the causes of obesity into three categories (biological, individual behaviors, and physical/social environmental factors) based on the conceptual frameworks described by the 2005 and 2012 Institute of Medicine reports on obesity [25-26]. Physical/social environmental factors refer to things which influence individual behaviors but which are typically outside of a person's control.

Physician competence questions assessed by the question, "Please tell me whether you agree or disagree with the following statements: I feel competent giving diet counseling to my obese patients; I feel competent giving exercise counseling to my obese patients; and I am usually successful in helping my obese patients lose weight." For each statement, physicians indicated whether they strongly agreed, somewhat agreed, somewhat disagreed, or strongly disagreed with the statements. We dichotomized variables for each competency where 1 was "strongly/somewhat agree" and 0 was "strongly/somewhat disagree."

We assessed perspectives about how to improve obesity training among those physicians who had already received some additional training with the survey question, "Since you have received more training on how to care for your obese patients, how helpful would each of the following types of training be: Nutrition counseling, exercise counseling, patient care after

bariatric surgery, patient eligibility for bariatric surgery, motivational interviewing, and weight loss medications." For each type of training, physicians indicated whether they believed it would be very helpful, somewhat helpful, not very helpful, or not at all helpful. We dichotomized variables for each type of training where 1 was "very/somewhat helpful" and 0 was "not very/not at all helpful." Among all physicians, we assessed perspectives about improving obesity care with the following questions: "How helpful would it be for the patient chart to include a specific list of diet and exercise tips you could share with your obese patients to help them lose weight or manage their weight?"; "How helpful would it be for scales that measure height and body weight to also report body mass index so that medical assistants/nurses are not required to calculate it?"; "If it does not already, how helpful would it be if the medical chart clearly indicated whether the patient was clinically obese or overweight (by including BMI and the overweight/obesity status)?"; and "How important is it to include body mass index with patients' other vital signs of heart beat, breathing rate, temperature, and blood pressure?" We dichotomized variables for each type of improvement as 1 was "very/somewhat helpful" and 0 was "not very/not at all helpful". Finally we assessed perspectives about medication equipment with the question, "How appropriate is the medical equipment in your office for your obese patients (e.g., gowns, chairs, exam tables, blood pressure cuffs)?" and dichotomized the response categories as 1 "very/somewhat appropriate" and 0 "not very/not at all appropriate."

Statistical Analyses

We performed descriptive analyses for all variables. T-tests were used to test for differences by years since completing medical school. We used weighting to address systematic under- or over-representation of the physician subpopulations in the panel, account for systematic non-response along known demographic characteristics of the PCPs, and adjust for sampling biases due to differences in non-response rates.

All analyses were stratified based on years since completing medical school, comparing physicians who completed medical school fewer than 20 years ago (i.e., 1991 or later) with

PCPs who completed medical school 20 or more years ago (i.e., 1990 or earlier). The weighted mean year that medical school was completed in our sample was 1993. We elected to stratify by the 20-year threshold based on previous research suggesting differences in counseling and tracking of obese patients among those two groups of physicians.[23] We also conducted sensitivity analyses using 10- and 15-years since medical school as the thresholds. Those results are not included as they did not differ substantively from the 20 year cut points. They are available from the authors upon request. Statistical analyses were performed using the STATA, version 11.0 software package (StataCorp LP, College Station, TX), using SVY functions to adjust for the complex survey design. The weighted margin of error for the survey was +/-5.3%.

RESULTS

Of the 145,000 physicians, 2010 email addresses were sent invitations 58 were returned as undeliverable. The response rate, calculated as completed interviews over the total of working emails sent an invitation was 25.6%.

Sample characteristics

Table 1 shows characteristics of the survey respondents. Physician-level characteristics are comparable to national-level characteristics reported for family physicians/internists/general practitioners by the American Medical Association (AMA), with the exception of the distribution of years since completing medical school. Our sample distribution had slightly more respondents who had completed medical school more recently (in 2000) than the national sample reported by the AMA (22% vs. 21%). Specifically, 49% of physicians in the AMA sample completed medical school in 1990 or later, compared to 69% in our sample. A large majority of PCPs (84%) reported that about half of the patients in their practice were obese, and 10% reported that almost all patients in their practice were obese. Nearly all physicians reported that patient height and body weight were included in patients' charts, and 76% reported that Body Mass Index (BMI) was included in patients' charts. When asked to rate the quality of obesity-

related training, 23% reported receiving good training in medical school, 35% reported receiving good training in residency, and 60% reported receiving good training in continuing medical education.

PCP perspectives on causes of obesity

Table 2 describes PCP perspectives on the causes of and solutions to obesity care as well as differences in these perspectives by number of years since completion of medical school (≥20 years vs. <20 years). We divided possible causes of obesity into three domains: individual biological factors, individual behavioral factors, and physical/social environmental factors. Overall, 75% of PCPs identified genetics or family history as an important cause of obesity, followed by metabolic effect (47%) and endocrine disorders (25%). Individual behavioral factors were the most commonly reported causes of obesity, with nearly all physicians citing insufficient physical activity (99%), overconsumption of food (99%), restaurant or fast-food eating (95%), consumption of sugar-sweetened beverages (94%), and lack of will power as important causes of obesity (89%). PCPs also identified environmental factors as important causes of obesity: cultural factors (85%), lack of information on good eating habits (75%), and lack of access to healthy foods (59%).

We observed few differences in perspectives about possible causes of obesity between physicians who had completed medical school ≥20 years ago compared to those who had completed medical school <20 years ago. PCPs who completed medical school more recently were more likely to identify restaurant or fast-food eating (99% vs. 90%; $p < 0.01$), lack of information on good eating habits (80% vs. 69%; $p = 0.03$), and lack of access to health foods as important causes of obesity (64% vs. 52%; $p = 0.03$).

PCPs' perspectives in improving care for obese patients

Table 3 shows PCP perspectives on the health care provider most qualified to help obese patients lose or maintain weight, stratified by years since completing medical school. No

one type of provider was endorsed by a majority of PCPs as the most qualified to help patients. PCPs with <20 years since completion of medical school reported that nutritionists/dietitians were most qualified providers (48% vs. 41%), followed by primary care physicians 41% vs. 37%) and behavioral psychologists (9% vs. 20%, p = 0.01). Very few PCPs reported that endocrinologists (1% vs. 1.5%) or nurses (1% vs. 1%) were the most qualified providers to help obese patients lose or maintain weight.

PCP perspectives on solutions for improving obesity care

Table 4 shows PCPs perspectives on solutions for improving obesity care related to physician training and practice-based changes. With respect to training, PCPs who had received some training in obesity-related care (n=313) generally reported that it was helpful. In terms of practice-based solutions to improving care, 93% reported that including BMI as a fifth vital sign would be helpful; 89% reported that including diet/exercise tips in patients' charts would be helpful; 85% reported that having scales report BMI would be helpful; and 69% reported that adding BMI to patients' charts would be helpful. No significant differences were observed by year since completing medical school with one exception. Fewer PCPs who completed medical school within 20 years agreed that BMI reported by scales would be being helpful in treating obese patients (81% vs. 89%; p = 0.02). report that having scales which show BMI would be helpful (80% vs. 88%; p=.04).

PCPs' reported competence for caring for obese patients

Table 5 shows PCPs reported competence in treating obese patients, overall and stratified by years since completing medical school. Almost all PCPs reported feeling competent giving diet-related counseling (90%) and exercise-related counseling (92%) to obese patients. However, less than half (44%) reported that they were usually successful in helping obese patients lose weight. PCPs who completed medical school <20 years ago were significantly more likely to report success in helping patients lose weight (49% vs. 36%; p = 0.02).

DISCUSSION

This study updates earlier research related to primary care physician perspectives on the causes of obesity and examines physician-reported causes of obesity and solutions for improving obesity care, for PCPs overall and by years since medical school completion. Like previous research,[6 27-28] we found that PCPs overwhelmingly identified individual behavioral factors (e.g., poor diet and physical inactivity) as important causes of obesity. PCP perspectives on improving obesity care supported additional training (e.g., nutrition and exercise counseling) and practice-based changes (e.g., including BMI in the patient chart). We observed few differences in PCP perspectives about the causes of obesity or solutions to improve care, regardless of when they completed medical school. However, we found PCPs who graduated from medical school within the past 20 years, compared with those with graduated more than 20 years ago, more frequently recognized social determinants as causes of obesity, such as lack of information about good eating habits and lack of access to healthy food. While PCPs who completed medical school more recently reported feeling more successful helping obese patients lose weight, these successful providers are still a minority. This is consistent with research suggesting that PCPs generally feel unprepared to care for obese patients.[7 12-14] Increased time since completing medical school could lead to more negative attitudes towards obesity care, as physicians may become frustrated by years of failed attempts to help their

obese patients lose and maintain weight. Regardless of when PCPs completed medical school, they overwhelmingly supported additional training and practice-based changes to help them improve their obesity care.

The limited differences among PCPs that we observed may suggest that obesity-related training has changed little over time. We found little evidence that any recent emphasis on obesity-related training in medical school has translated into significant differences in self-perceived competency. Interestingly, while most PCPs reported competence in diet and exercise counseling to obese patients, less than half reported success in helping those patients lose weight.

Given that obesity training has been shown to improve obesity care,[12] improvements to medical and post-graduate medical education are critical. As most practicing PCPs report inadequate training in obesity care, these physicians may be particularly receptive to continuing medical education in this area.[13-14] PCPs in our study desired additional training on nutrition and exercise counseling, care related to bariatric surgery patients, as well as motivational interviewing. Enhancements to medical education could potentially help improve obesity care given research suggesting consistency between physician beliefs about solutions and causes;[29] for example physicians who endorse medical solutions for obesity typically believe obesity is caused by biological factors . In addition to addressing these gaps in medical education, we should consider transitioning some obesity care responsibilities away from primary care physicians to nutritionists/dietitians. Physicians in our study identified these health professionals as being most qualified to help obese patients lose or maintain their weight. Furthermore, incentives for care coordination under the Patient Protection and Affordable Care Act such as the Patient Centered Medical Home recommend the inclusion of dietitians as members of health teams to support primary care practices.[30] Perhaps a new model of obesity care should join PCPs, nutritionists, and other relevant health professional together – an approach which proved effective in the recently completed POWER trial,[31] which examined the effects of behavioral weight-loss interventions among obese patients.

Future research is needed to better understand which components of obesity care would be best handled by PCPs and which components of obesity care would be best handled by nutritionists/dietitians. Recent work identifies successful models that include delivery of weight loss support by trained coaches via remote means (e.g., telephone, email, and web-based modules, self-monitoring tools, and feedback) along with PCP support [31] and lifestyle counseling plus meal replacement or weight-loss medication chosen in consultation with the PCP.[32]

Regardless of their years after medical school completion, most physicians desired practice-based changes to facilitate improved obesity care. Physicians endorsed using appropriate medical equipment to accommodate obese patients, as well as documenting BMI in the chart as important practice changes. Such changes would ensure accurate identification and proper care of obese patients. Finally, the practice could better support obesity counseling by including diet and exercise tips in the chart for the physician to use.

There are several limitations to this analysis. First, our measures of physician attitudes do not represent the full possible spectrum of attitude measures in the literature (such as perceived skills[33] or comfort in caring for obese patients[34]) which may bias our results towards the null. Second, some of the included PCP's may have had extensive additional training in obesity (considering themselves "obesity specialists"), which could have biased our results positively. Years since medical school completion is proxy for type of education they received, but we are unable to account for the huge variation in curricula across medical schools. Third, even though they survey was reviewed by experts in the field of obesity and primary care as well as pilot tested for comprehensibility, it is possible that physicians differentially interpreted some of the questions. Fourth, the response rate may limit the generalizability of these results to all primary care physicians in the United States.

In conclusion, this study suggests few differences in primary care physician perspectives about the causes of obesity or solutions to improve care of obese patients, regardless of when they completed medical school. The differences we did observe suggest that physicians with fewer than 20 years since completion of medical school more frequently

recognized social determinants as causes of obesity and also reported feeling more successful helping obese patients lose weight. The results from the recently completed POWER trial, suggest that having PCPs play a supportive role to weight loss health coaches – such as reviewing patient progress and using this information to provide basic guidance and motivation – may be one effective model.[31] In order to begin improving obesity care, medical education should focus on enhancing those obesity-related skills PCPs feel most qualified to deliver as well as changing the composition of healthcare teams and practice resources.

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Table 1. Characteristics of the study sample (N = 500)

	N (%)
Physician characteristics	
Gender	
Male	335 (67)
Race	
White	350 (70)
Black	15 (3)
Asian	77 (15)
Hispanic	25 (5)
Other race	6 (1)
Age, years	
Under 45	224 (45)
Aged 45-54	124 (25)
Aged 55 and older	152 (30)
Year since completed medical school	
20 years or more (1990 or earlier)	222 (44)
15 years to <20 years (1991 to 1995)	58 (12)
10 years to <15 (1996 to 2000)	162 (32)
<=10 (2001 to 2011)	57 (11)
Physician-reported demographics of their patients	
Patients in practice who are obese	
Almost all	48 (10)
About half	422 (84)
Not many	20 (4)
Race of obese patients in practice	
Most are White	174 (35)
Most are minority	41 (8)
Broad range of demographic groups	284 (57)
Income of obese patients in practice	
Most are low income	142 (28)
Most are not low income	92 (18)
Evenly split	266 (53)
Physician-reported practice characteristics	
Primary location where patients are seen†	
Hospital or inpatient setting	49 (10)
Office not attached to a hospital or outpatient	313 (63)
Both inpatient and outpatient	136 (27)
Patient chart	
Includes height	467 (93)
Includes body weight	499 (99)
Includes body mass index	378 (76)
Location of practice	
Northeast	104 (21)
North central	114 (23)
South	166 (33)

	N (%)
West	116 (23)
Physician obesity-related training rated as very or pretty good	
Medical school	115 (23)
Residency	173 (35)
Continuing medical education	298 (60)
Other training‡	313 (63)

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

† One respondent reported the primary location where patients are seen is "another location."

‡ Other training includes in-person or online training such as a lecture, seminar, workshop, or conference.

Note: Numbers may not add up to 100% because of rounding.

Table 2. Primary care physician perception of the importance of possible causes of obesity, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 N=277	20+ N=223	*P*-value
Individual biological factors				
Genetics or family history	372 (75)	205 (74)	168 (75)	0.77
Metabolic effect	234 (47)	135 (49)	99 (44)	0.43
Endocrine disorder	140 (28)	84 (30)	56 (25)	0.30
Individual behavioral factors				
Insufficient physical activity	496 (99)	274 (98)	223 (100)	0.05
Overconsumption of food	496 (99)	276 (99)	221 (99)	0.86
Restaurant or fast food eating	474 (95)	274 (99)	200 (90)	<0.01
Consumption of sugar-sweetened beverages	470 (94)	264 (95)	206 (93)	0.36
Lack of will power	441 (89)	250 (90)	197 (88)	0.60
Physical/social environmental factors				
Cultural factors	422 (85)	239 (86)	184 (83)	0.43
Lack of information on good eating habits	375 (75)	222 (80)	154 (69)	0.03
Lack of access to healthy food	294 (59)	178 (64)	116 (52)	0.03

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.
Notes: P-values are for t-tests for differences in proportions. Percentages reflect respondents rating potential causes as very or somewhat important. The mean year medical school was completed is 1993.

Table 3. Physician perspectives on health professional most qualified to help obese patients lose or maintain weight, by years since completing medical school N (%)

	Overall	Years since completing medical school		
	N=500	<20	20+	*P*-value
% citing most qualified		N=277	N=223	
Nutritionist/Dietitican	223 (45)	166 (48)	67 (41)	0.21
Primary Care Physician	199 (39)	135 (41)	64 (37)	0.40
Behavioral Psychologist	57 (14)	30 (9)	27 (20)	0.01
Endocrinologist	6 (1.0)	3 (0.7)	3 (1.5)	0.45
Nurse	3 (0.5)	2 (0.7)	1 (0.5)	0.81

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

Notes: P-values are for t-tests for differences in proportions. The mean year medical school was completed is 1993.

Table 4. Primary care physician's perspectives on solutions for improving obesity care, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=313	<20 N=161	20+ N=152	*P*-value
Physician training to improve obesity care				
Helpfulness of physician training in…*				
Nutrition counseling	290 (93)	156 (97)	134 (88)	0.04
Exercise counseling	290 (92)	154 (96)	135 (89)	0.09
Patient care after bariatric surgery	282 (90)	144 (89)	137 (90)	0.81
Motivational interviewing	270 (86)	143 (88)	127 (84)	0.37
Patient eligibility for bariatric surgery	266 (85)	136 (84)	130 (85)	0.88
Weight loss medications	202 (64)	110 (68)	92 (60)	0.24
	N=500	N=277	N=223	
Practice-based changes to improve obesity care				
Helpfulness of…				
Including BMI as a fifth vital sign	466 (93)	256 (92)	210 (95)	0.32
Including specific diet or exercise tips in patient chart	446 (89)	250 (90)	196 (88)	0.53
Having scales report BMI	423 (85)	224 (81)	198 (89)	0.02
Adding BMI to patient chart†	344 (69)	193 (69)	151 (68)	0.70
Medical equipment in office is appropriate for obese patients (e.g., gowns, chairs, exam tables, blood pressure cuffs)‡	460 (92)	253 (91)	207 (93)	0.53

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

* Questions about the helpfulness of various forms of obesity training were only asked among those physicians who reported receiving some training. Percentages represent physicians reporting training is very or somewhat helpful.

† 20% of the sample (100 respondents) reported that this feature is already available in the medical chart

‡ Percentages represent physicians reporting very/somewhat appropriate

Note: The 8% of physicians who said that medical equipment for obese patients was not appropriate were also asked to rate how important it was to improve the equipment. More than 85% of these physicians said this was an important goal for gowns, chairs, exam tables, and blood pressure cuffs.

Table 5. Physician reported competence in treating obese patients, overall and by years since completing medical school, N (%)

	Overall	Years since completing medical school		
	N=500	<20 N=277	20+ N=223	*P*-value
Competent giving exercise-related counseling to obese patients	462 (92)	258 (93)	204 (92)	0.68
Competent giving diet-related counseling to obese patients	450 (90)	252 (91)	198 (89)	0.54
Usually successful in helping obese patients lose weight	218 (44)	137 (49)	81 (36)	0.02
Primary care physicians are the 'most qualified' professional to help obese patients	196 (39)	115 (41)	82 (37)	0.40

Source: Survey of General Practitioners, Family Practitioners and General Internists between February 9 and March 1, 2011.

Notes: P-values are for t-tests for differences in proportions. The mean year medical school was completed is 1993.