

# Comparing clinical practice habits among obesity medicine physicians by patient, physician and clinic factors

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## ABSTRACT

**Background:** While clinical practice habits vary by patient, physician and clinic factors in primary care, limited research has examined whether differences exist in obesity medicine. Our objective was to compare practice habits by such factors among obesity medicine physicians certified by the American Board of Obesity Medicine (ABOM).

**Methods:** We conducted secondary analyses of cross-sectional data from the 2023 ABOM Practice Analysis Validation Survey. We included three obesity medicine practice habits – prescribing anti-obesity medications (AOMs), off-label prescribing of medications for weight reduction, and obesity medicine clinical practice hours (4–20 h/week versus >20 h/week). We included patient (patient population), physician (primary medical specialty, years of obesity medicine experience) and clinic factors (practice setting, geographic catchment, accepts insurance for obesity care). We conducted bivariate analyses using X<sup>2</sup> tests.

**Results:** Among 565 ABOM-certified physicians, 71.5 % had primary medical specialties within primary care and 9.2 % predominantly treated children/adolescents with obesity. Overall, 97.5 % prescribed AOMs and 85.1 % prescribed off-label medications for weight reduction. Fewer physicians who predominantly treated children/adolescents prescribed AOMs compared to physicians with no or limited treatment of children (88.5 % versus 98.4 % and 98.5 %, respectively;  $p < 0.001$ ). Overall, 41.4 % reported practicing obesity medicine >20 h/week, which was more likely to occur as years of obesity medicine experience increased (i.e., 21.9 % among physicians with 1–2 years of experience versus 58.5 % with 10+ years;  $p < 0.001$ ). No significant differences in practice habits occurred by primary medical specialty, practice setting, geographic catchment, or accepting insurance.

**Conclusion:** Our findings may suggest that ABOM-certified physicians have consistent obesity medication prescribing practices regardless of physician or clinic factors, which may be particularly important to patients seeking pharmacologic treatment. Most ABOM-certified physicians who predominantly treat children/adolescents prescribe obesity medications. These current rates are relatively higher than prior findings among pediatric ABOM-certified physicians, which might help support pharmacologic access for pediatric patients.

## 1. Introduction

The American Board of Obesity Medicine (ABOM) serves the public and field of obesity medicine by maintaining standards for assessment and credentialing physicians [1]. The number of ABOM-certified physicians has increased from approximately 590 physicians in 2012 to now exceeding 8000 in 2024 [1,2]. A 2019 study demonstrated that

ABOM-certified obesity medicine physicians were practicing in every U. S. state [3] – multiple physicians were available to treat adults living with obesity in each state and every state had at least one physician able to treat children living with obesity [3].

Understanding the care delivered by ABOM-certified obesity medicine physicians is important, particularly given physicians' gaps in obesity education and training in obesity treatment [4]. Prior research

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demonstrated that clinicians often did not apply evidence-based approaches to counseling on obesity treatment in the primary care setting [5,6]. In contrast, a 2019 survey of ABOM-certified physicians found that they offered guideline-concordant services to treat obesity, including nutrition, physical activity, anti-obesity medications (AOMs), and perioperative metabolic-bariatric surgical care [7]. This study reported that 83 % of ABOM-certified physicians prescribed AOMs approved by the Food and Drug Administration (FDA) and 77 % prescribed medications off-label for weight reduction. Since this time point, the treatment landscape for obesity has changed substantially [8,9], and therefore, reassessment is warranted.

Physician practice habits are known to vary by factors related to patient, physician and clinic characteristics [10]. Differences in self-reported clinical obesity services may differ between ABOM-certified physicians who predominantly treat adults versus children/adolescents [7], particularly regarding AOM prescribing habits. The prior 2019 survey found that 86 % of adult-focused physicians reported prescribing AOMs compared to 54 % among pediatric physicians. However, the number of effective AOMs FDA-approved for use in youth aged 12 years and older have increased in recent years, and the 2023 American Academy of Pediatrics guidelines have endorsed use of AOMs in treating adolescents living with obesity [11]. These changes may have influenced ABOM-certified pediatric physicians' practices. In addition, prior studies of ABOM-certified obesity medicine physicians were unable to evaluate clinical practice variability with factors beyond patient population. Physician characteristics including specialty and years of practice have been associated with medical practice variation among primary care physicians [10], which warrants examining whether primary medical specialty and years of obesity medicine experience are associated with differences in practice habits among ABOM-certified physicians. In general, clinic factors, such as practice setting and geographic location, have been associated with differences in physician practice habits and patient outcomes [12,13]. Whether practice habits differ by clinic factors among ABOM-certified physicians is unknown. Therefore, the objective of this study was to compare the clinical practice habits by patient, physician and clinic factors among ABOM-certified obesity medicine physicians.

## 2. Methods

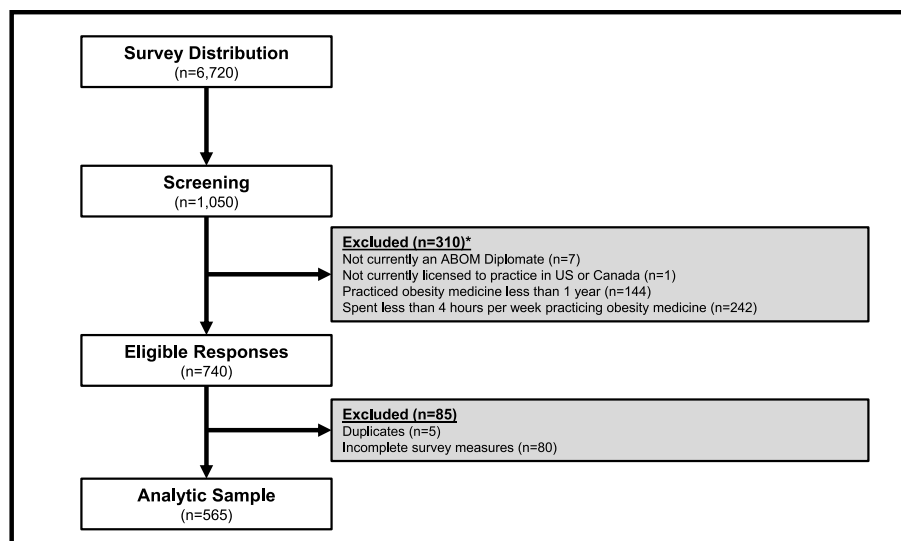
### 2.1. Design & study sample

We conducted secondary analyses of cross-sectional data from the 2023 ABOM Practice Analysis Validation Survey, which has been described previously [14]. The Johns Hopkins University School of Medicine Institutional Review Board acknowledged this study as not human subjects research as only de-identified data was used (IRB00473598, 11/04/2024).

In March–April 2023, the ABOM emailed invitations to all current 6720 ABOM-certified physicians and 1050 physicians responded (response rate 16 %). To be eligible to participate, physicians had to be an ABOM Diplomate, licensed to practice medicine in the United States or Canada, have practiced obesity medicine for 1 year or more, and spent at least 4 h per week practicing obesity medicine. As compensation for their time, physicians who completed the survey received discounted registration fees to the 2023 national meetings of The Obesity Society and/or Obesity Medicine Association (approximate value \$50-\$100US), which were provided by these organizations. For these secondary analyses, we limited the sample to eligible physicians with complete data for our dependent variables (Fig. 1).

### 2.2. Dependent variables

The survey data included three obesity medicine clinical practice habits – use of FDA-approved AOMs, off-label use of medications for weight reduction (“off-label AOMs”), and obesity medicine clinical practice time. Regarding AOMs, participants answered, “Do you prescribe FDA-approved anti-obesity medications?” and “Do you prescribe off-label medications for weight reduction?” (response options: yes, no). For obesity medicine clinical practice time, participants answered, “On average, how many hours do you currently spend each week practicing obesity medicine (i.e., evaluating and treating obesity through direct patient care)?” (response options: 4–10 h, 11–20 h, 21–30 h, 31–40 h, and more than 40 h per week). We dichotomized responses as “4–20 h/week” and “>20 h/week”. We selected this threshold based on response distributions within the data. Given that prior research reported that physicians work 48.6 h per week on average [15], a threshold of >20 h/week may also identify physicians whose professional effort is predominantly allocated to the clinical practice of obesity medicine.



**Fig. 1. Study Flow Diagram for Analytic Sample of Survey Participants.** This figure displays the study flow. Abbreviations: ABOM – American Board of Obesity Medicine; US – United States. \*Candidates could have been excluded for more than one reason; therefore, numbers presented for each exclusion category are not mutually exclusive.

### 2.3. Independent variables

We identified several factors, *a priori*, that we hypothesized might be associated with differences in clinical practice. For patient factors, we examined patient population. For physician factors, we examined primary medical specialty and years of obesity medicine experience. For clinic factors, we examined practice setting, geographic catchment, and acceptance of insurance for obesity care services.

#### 2.3.1. Patient factor

For patient population, participants reported the typical age ranges for the patients seen for obesity treatment, where a percentage was given for children (2–10 years), adolescents (11–17 years) and adults (18 years and older). All response percentages needed to add to 100 %. We categorized physicians as “no treatment of children” who reported that 0 % of their patients were children/adolescents (adults only), “limited treatment of children” if 1–49 % of their patients were children/adolescents, and “predominantly treating children” if 50 % or more of their patients were children/adolescents.

#### 2.3.2. Physician factors

Participants reported their primary medical specialty from a list of fields recognized by the American Board of Medical Specialties. Based on their responses, we assigned participants to one of the following groups: internal medicine, pediatrics, family medicine/medicine-pediatrics, endocrinology, other medical subspecialties (e.g., cardiology, gastroenterology), surgery, obstetrics/gynecology, or other specialties (e.g., psychiatry, neurology, emergency medicine). For analysis, we dichotomized primary medical specialty as “primary care field” versus “another field,” where we considered primary care specialties to be internal medicine, family medicine, medicine-pediatrics, and pediatrics without other specialty certification (e.g., endocrinology).

For years of obesity medicine experience, participants answered, “Approximately how many years have you been practicing obesity medicine?” (response options: 1–2 years, 3–4 years, 5–9 years, 10–14 years, and 15 years or more), which we categorized as 1–2 years, 3–4 years, 5–9 years, and 10 years or more.

#### 2.3.3. Clinic factors

To characterize practice setting, participants described their current employer (response options: academic medical center, solo practice, single-specialty physician group practice, multi-specialty physician group practice, federally qualified health center, health maintenance organization, hospital, locum tenens, other). We categorized responses as academic medical center, private practice, hospital, and other setting. We defined private practice as solo practice, single-specialty physician group practice, or multi-specialty physician group practice.

To determine geographic catchment of the clinic, participants reported the states, provinces and territories where they were currently licensed to practice medicine. We grouped U.S. states by their U.S. census region, and we included physicians practicing in Puerto Rico ( $n = 2$ ) in the U.S. South census region. We grouped all Canadian provinces and territories as Canada. Some participants had licenses in multiple regions. Therefore, we labeled each participant as either U.S. Northeast, U.S. Midwest, U.S. West, U.S. South, Canada, or multiple regions to define the geographic catchment of their clinic.

To determine acceptance of insurance for obesity care services, participants answered, “Do you accept insurance as reimbursement for obesity-related medical care?” (response options: yes, no).

### 2.4. Descriptive variables

We examined the following demographic characteristics: age, gender, race (White, Black, Asian, Other), and Hispanic ethnicity. We identified whether the participant provided non-surgical or surgical bariatric procedures. We calculated the years practicing medicine using

the year they reported receiving their medical degree, which was categorized as less than 10 years, 10–19 years, 20–29 years, and 30 years or more. We calculated the years since initial ABOM certification for each participant, which we categorized as less than 5 years, 5–9 years, and 10 years or more.

### 2.5. Analysis

We conducted descriptive analyses of all variables. We conducted bivariate analyses using  $X^2$  tests to determine the relationship between each independent and dependent variable. Given the multiple comparisons, we used Bonferroni correction to define a statistically significant association as  $p\text{-value} < 0.003$ .

## 3. Results

We included 565 survey participants in our analysis. All were ABOM-certified obesity medicine physicians. Table 1 displays participants' characteristics. Few participants predominantly treated children with obesity (9.2 %), while over a third had limited treatment of children (36.5 %). Most participants only treated adults with obesity (54.3 %). Most (71.5 %) had their primary medical specialty within a primary care field (Internal Medicine, Family Medicine, Medicine-Pediatrics, or Pediatrics). Participants were distributed relatively equally across the years they reported practicing obesity medicine. A majority (57.7 %) reported being ABOM Diplomates for less than 5 years. Most participants reported being in private practice (51.9 %) and most accepted insurance for obesity care services (80.5 %).

Among participants who predominantly treated children, their mean patient population was 33.0 % children (SD 16.1) and 54.6 % adolescents (SD 12.4). No participants exclusively treated obesity in children (max: 65 % children). Their primary medical specialties included Pediatrics (51.9 %), Family Medicine/Medicine-Pediatrics (7.7 %), Endocrinology (21.2 %), or another medical subspecialty (19.2 %). A majority practiced in an academic medical center (57.7 %), while 19.2 % were in private practice, 11.5 % in a hospital setting, and 11.5 % in other practice settings. Most accepted insurance for obesity care (94.2 %).

Few ABOM-certified obesity medicine physicians denied prescribing FDA-approved AOMs (2.5 %), and few denied prescribing off-label AOMs (14.9 %). Most reported prescribing both FDA-approved and off-label AOMs (84.6 %), whereas 12.9 % only prescribed FDA-approved AOMs, and 1.9 % prescribed neither. Table 2 displays associations between patient, physician and clinic attributes with obesity medication prescribing habits in bivariate analyses. Prescribing FDA-approved AOMs significantly differed by patient population, as fewer physicians who predominantly treated children prescribe these medications compared to physicians with no or limited treatment of children (88.5 % versus 98.4 % and 98.5 %, respectively). We found no significant differences in FDA-approved AOM prescribing by primary medical specialty or years of obesity medicine experience (Table 2). We also found no significant differences in FDA-approved AOM prescribing by clinic attributes including practice setting, geographic catchment or acceptance of insurance for obesity care (Table 2). We found no statistically significant differences in off-label AOM prescribing habits by any attribute, although we noted that 87.1 % of physicians from a primary care field prescribed off-label AOMs compared to 79.2 % of physicians from other fields ( $p = 0.02$ ) and 86.8 % of physician practicing at a clinic who accepts insurance for obesity care services prescribed off-label AOMs compared to 78.0 % of physicians practicing at self-pay clinics ( $p = 0.02$ ).

Overall, 41.4 % reported practicing clinical obesity medicine >20 h/week. Table 3 displays associations between patient, physician and clinic attributes with obesity medicine clinical practice time in bivariate analyses. Although not statistically significant, 28.9 % physicians who predominantly treat children reported >20 h/week of obesity medicine

**Table 1**  
Characteristics of obesity medicine physician survey participants.

	Physicians (n = 565)
<b>Physician Demographics</b>	
Age Group, n (%) <sup>a</sup>	
39 years or younger	133 (23.5 %)
40–49 years	228 (40.4 %)
50–59 years	139 (24.6 %)
60 years or older	54 (9.6 %)
Women, n (%) <sup>a</sup>	381 (67.4 %)
Race, n (%) <sup>a</sup>	
White	277 (49.0 %)
Black	40 (7.1 %)
Asian	142 (25.1 %)
Other	102 (18.1 %)
Hispanic Ethnicity, n (%) <sup>a</sup>	44 (7.8 %)
<b>Patient Attributes</b>	
Patient Population, n (%) <sup>b</sup>	
No treatment of children (adults only)	307 (54.3 %)
Limited treatment of children	206 (36.5 %)
Predominantly treats children	52 (9.2 %)
<b>Physician Attributes</b>	
Primary Medical Specialty, n (%) <sup>a</sup>	
Internal Medicine	171 (30.3 %)
Family Medicine or Medicine-Pediatrics	205 (36.3 %)
Pediatrics	28 (5.0 %)
Endocrinology	56 (9.9 %)
Other medical subspecialties	41 (7.3 %)
Surgery	26 (4.6 %)
Obstetrics-Gynecology	18 (3.2 %)
Other specialties	13 (2.3 %)
Years of Obesity Medicine Experience, n (%)	
1–2 years	114 (20.2 %)
3–4 years	136 (24.1 %)
5–9 years	151 (26.7 %)
10 years or more	164 (29.0 %)
Years Practicing Medicine, n (%)	
Less than 10 years	60 (10.6 %)
10–19 years	209 (37.0 %)
20–29 years	193 (34.2 %)
30 years or more	103 (18.2 %)
Years ABOM Diplomate, n (%) <sup>a</sup>	
Less than 5 years	326 (57.7 %)
5–9 years	169 (29.9 %)
10 years or more	64 (11.3 %)
<b>Clinic Attributes</b>	
Practice Setting, n (%)	
Academic medical center	152 (26.9 %)
Private practice	293 (51.9 %)
Hospital	66 (11.7 %)
Other settings <sup>c</sup>	54 (9.6 %)
Geographic Catchment, n (%) <sup>d</sup>	
U.S. Northeast	95 (16.8 %)
U.S. Midwest	104 (18.4 %)
U.S. West	76 (13.5 %)
U.S. South	159 (28.2 %)
Canada	26 (4.6 %)
Multiple regions	105 (18.6 %)
Accepts Insurance for Obesity Care, n (%) <sup>a</sup>	455 (80.5 %)
Performs Non-Surgical Bariatric Procedures, n (%) <sup>a</sup>	18 (3.2 %)
Performs Metabolic-Bariatric Surgery, n (%) <sup>a</sup>	30 (5.3 %)

Abbreviations: ABOM – American Board of Obesity Medicine; U.S. – United States.

<sup>a</sup> Groups may not add up to 100 % due to missing data.

<sup>b</sup> Limited treatment of children included physicians who reported that 1–49 % of their patient population were children/adolescents whom they treat for obesity, and predominantly treats children were physicians who reported that 50 % or greater of their patient population were children/adolescents whom they treat for obesity.

<sup>c</sup> Other practice settings include federally qualified health center, health maintenance organization, etc.

<sup>d</sup> U.S. states categorized by census region.

clinical practice time as compared to 39.7 % and 47.1 % among physicians with no or limited treatment of children, respectively ( $p = 0.04$ ). Obesity medicine clinical practice time significantly differed by years of obesity medicine experience, where more years practicing obesity medicine was associated with having >20 clinical hours/week in obesity medicine. We found no significant differences in obesity medicine clinical practice time by primary medical specialty (Table 3). We found also found no significant differences in obesity medicine clinical practice time by clinic attributes including practice setting, geographic catchment or acceptance of insurance for obesity care (Table 3). Of note, there was no statistically significant association between obesity medicine clinical practice time and prescribing either FDA-approved AOMs (4–20 h/week: 97.9 %; >20 h/week: 97.0 % ( $p = 0.51$ )) or off-label AOMs (4–20 h/week: 84.0 %; >20 h/week: 86.8 % ( $p = 0.36$ )).

#### 4. Discussion

We examined obesity medication prescribing habits and obesity medicine clinical practice time among ABOM-certified obesity medicine physicians. This study is the first to compare ABOM-certified obesity medicine physicians' clinical practice habits by physician and clinic factors and provides an updated evaluation of these habits by patient population.

We found that nearly all ABOM-certified physicians reported prescribing FDA-approved AOMs (97.5 %), and most physicians prescribed medications off-label for weight reduction (85.1 %). These characteristics appear to have increased over time, as a 2019 survey of ABOM Diplomates reported that 83.4 % prescribed FDA-approved AOMs and 76.9 % prescribed off-label AOMs [7]. Prior studies often found extremely low use of AOMs among patients with obesity – less than 2 % of eligible patients [16,17] – although their use may be increasing among some groups [18]. Physicians' limited training in obesity care and lack of familiarity with AOMs has been hypothesized to negatively impact their prescribing of these medications [19], contributing to their low usage among patients. ABOM certification signifies that the physician has achieved competency in obesity care, and certification has benefits to patients and physicians [20]. Our results may therefore imply that ABOM-certified physicians have gained the knowledge needed to incorporate FDA-approved and off-label AOM prescribing into their practices.

Over the last 20 years, the U.S. prevalence of childhood obesity has increased [21] and nearly 40 % of U.S. adolescents report attempting to lose weight in the last year [22]. Therefore, we were particularly interested in examining clinical practice habits among ABOM-certified obesity medicine physicians who predominantly treat children. Among these physicians, we found that nearly 90 % prescribed FDA-approved AOMs, and similarly, nearly 90 % prescribed off-label medications to reduce weight. The 2019 survey of ABOM Diplomates found that only 54 % of ABOM-certified obesity medicine physicians who predominantly treat children prescribe FDA-approved AOMs and 67 % prescribed off-label AOMs [7]. In comparing these results, a proportionately higher percentage of pediatric physicians may now be prescribing AOMs. This increase in prescribing may in part be attributable to the increase in available FDA-approved treatment options for adolescents [23] as well as a greater acceptance of pharmacotherapy as part of evidence-based treatment for childhood obesity [11]. There were still overall fewer physicians who predominantly treated children prescribing FDA-approved AOMs compared to physicians with no or limited treatment of children, although there was no difference in off-label prescribing by patient population. We suspect that the relative paucity of AOMs approved for use in children under age 12 years may be an influential factor in driving prescribing practices, as well as lack of AOM coverage for Medicaid beneficiaries in many states [24]. Given that over



**Table 2**

Associations of patient, physician, and clinic attributes with obesity medication prescribing habits among ABOM-Certified obesity medicine physicians.

	Prescribe FDA-Approved AOMs			Prescribe Off-Label AOMs		
	No (n = 14)	Yes (n = 551)	p-value <sup>e</sup>	No (n = 84)	Yes (n = 481)	p-value <sup>e</sup>
<b>Patient Population, n (%)<sup>f</sup></b>						
No treatment of children (adults only)	5 (1.6 %)	302 (98.4 %)	<0.001	53 (17.3 %)	254 (82.7 %)	0.22
Limited treatment of children	3 (1.5 %)	203 (98.5 %)		25 (12.1 %)	181 (87.9 %)	
Predominantly treats children	6 (11.5 %)	46 (88.5 %)		6 (11.5 %)	46 (88.5 %)	
<b>Primary Medical Specialty, n (%)<sup>a</sup></b>						
Primary care field	10 (2.5 %)	394 (97.5 %)	0.93	52 (12.9 %)	352 (87.1 %)	0.02
Another field	4 (2.6 %)	150 (97.4 %)		32 (20.8 %)	122 (79.2 %)	
<b>Years of Obesity Medicine Experience, n (%)</b>						
1–2 years	4 (3.5 %)	110 (96.5 %)	0.87	19 (16.7 %)	95 (83.3 %)	0.72
3–4 years	3 (2.2 %)	133 (97.8 %)		19 (14.0 %)	117 (86.0 %)	
5–9 years	3 (2.0 %)	148 (98.0 %)		19 (12.6 %)	132 (87.4 %)	
10 years or more	4 (2.4 %)	160 (97.6 %)		27 (16.5 %)	137 (83.5 %)	
<b>Practice Setting, n (%)</b>						
Academic medical center	4 (2.6 %)	148 (97.4 %)	0.23	19 (12.5 %)	133 (87.5 %)	0.21
Private practice	5 (1.7 %)	288 (98.3 %)		40 (13.7 %)	253 (86.3 %)	
Hospital	4 (6.1 %)	62 (93.9 %)		13 (19.7 %)	53 (80.3 %)	
Other settings <sup>b</sup>	1 (1.9 %)	53 (98.1 %)		12 (22.2 %)	42 (77.8 %)	
<b>Geographic Catchment, n (%)<sup>c</sup></b>						
U.S. Northeast	3 (3.2 %)	92 (96.8 %)	0.91	21 (22.1 %)	74 (77.9 %)	0.11
U.S. Midwest	2 (1.9 %)	102 (98.1 %)		15 (14.4 %)	89 (85.6 %)	
U.S. West	3 (4.0 %)	73 (96.0 %)		14 (18.4 %)	62 (81.6 %)	
U.S. South	3 (1.9 %)	156 (98.1 %)		20 (12.6 %)	139 (87.4 %)	
Canada	1 (3.8 %)	25 (96.2 %)		5 (19.2 %)	21 (80.8 %)	
Multiple regions	2 (1.9 %)	103 (98.1 %)		9 (8.6 %)	96 (91.4 %)	
<b>Accepts Insurance for Obesity Care, n (%)<sup>d</sup></b>						
Yes	10 (2.2 %)	445 (97.8 %)	0.38	60 (13.2 %)	395 (86.8 %)	0.02
No	4 (3.7 %)	105 (96.3 %)		24 (22.0 %)	85 (78.0 %)	

Abbreviations: ABOM – American Board of Obesity Medicine; AOM – anti-obesity medication; FDA – Food and Drug Administration; U.S. – United States.

<sup>a</sup> Primary care fields include physicians with primary board certification in Internal Medicine, Family Medicine, Medicine-Pediatrics, or Pediatrics without other specialty certification (e.g., endocrinology). Of note, medical specialty information was missing in 7 participants.<sup>b</sup> Other practice settings include federally qualified health center, health maintenance organization, etc.<sup>c</sup> U.S. states categorized by census region.<sup>d</sup> Insurance information missing in 1 participant.<sup>e</sup> p-values calculated using Chi<sup>2</sup> tests. Using Bonferroni correction for multiple comparisons, statistically significant associations defined if p-value < 0.003.<sup>f</sup> Limited treatment of children included physicians who reported that 1–49 % of their patient population were children/adolescents whom they treat for obesity, and predominantly treats children were physicians who reported that 50 % or greater of their patient population were children/adolescents whom they treat for obesity.

a third of U.S. children are publicly insured [25], this group may be particularly impacted by Medicaid benefits coverage. It was also notable that most pediatric obesity medicine physicians worked in an academic medical center, and few spent >20 h/week in obesity medicine clinical practice. These factors may have implications for accessibility to obesity treatment among children and adolescents, as academic medical centers may require substantial travel time for families and limited clinical hours may contribute to considerable wait times for appointments. The proportion of ABOM-certified obesity medicine physicians who predominantly treat children did not change substantially between 2019 and 2023 (8.7 % and 9.2 %, respectively). Given the critical need for pediatric obesity treatment, future research may consider exploring the differences in how practice setting impacts pediatric obesity care delivery as well as strategies to increase the number of obesity medicine physicians who predominantly care for children.

We also compared obesity medication prescribing habits by physician and clinic factors. There were no statistically significant differences in prescribing FDA-approved AOMs by primary medical specialty, years of obesity medicine experience, practice setting, geographic catchment or acceptance of insurance for obesity care. Similarly, there were no statistically significant differences in prescribing medications off-label for weight reduction by these physician and clinic factors. These findings may be particularly important to patients seeking AOM treatment, as they suggest that their healthcare experience with an ABOM-certified obesity medicine physician is likely to be similar regardless of the physician seen or clinic visited. Prior research has found that primary care clinicians want support from peers trained in obesity medicine to

improve obesity care [26]. Our results may reassure clinicians who refer patients to ABOM-certified obesity medicine physicians that their patients will be assisted with medication management. Given the well-documented gaps in education and training on obesity care [4], many clinicians may be seeking physicians or clinical practices where they can refer patients for obesity treatment that includes AOMs.

Equitable access to AOMs, particularly among U.S. patients, is an increasingly important issue [27]. Many people in the U.S. lack insurance coverage for AOMs, and often must pay high out-of-pocket costs for FDA-approved AOMs [23]. Prescribing off-label medications for weight reduction may have lower costs for patients, particularly as the medications that ABOM Diplomates most commonly prescribe off-label for this purpose – metformin, topiramate and bupropion [7] – are available as low-cost generic medications and may be covered by insurance. We note that more physicians who worked at a clinic that accepted insurance prescribed off-label AOMs compared to physicians at self-pay clinics. By accepting insurance for obesity care and using off-label AOMs, these physicians may be helping to address the financial challenges that many patients face in the U.S. healthcare system. Physicians and clinics who deliver obesity medicine care may need to carefully consider their roles in creating patient-centered care experiences that address individuals' preferences, needs and values inclusive of financial considerations.

Obesity medicine clinical practice time was another key clinical practice habit. We found that 41.4 % of ABOM-certified obesity medicine physicians reported >20 h/week dedicated to evaluating and treating obesity through direct patient care. Prior studies have evaluated

**Table 3**

Associations of patient, physician, and clinic attributes with obesity medicine clinical practice time among ABOM-Certified obesity medicine physicians.

	4–20 h/week (n = 331)	>20 h/week (n = 234)	p-value <sup>d</sup>
<b>Patient Population, n (%)<sup>c</sup></b>			
No treatment of children (adults only)	185 (60.3 %)	122 (39.7 %)	0.04
Limited treatment of children	109 (52.9 %)	97 (47.1 %)	
Predominantly treats children	37 (71.1 %)	15 (28.9 %)	
<b>Primary Medical Specialty, n (%)<sup>f</sup></b>			
Primary care field	231 (57.2 %)	173 (42.8 %)	0.27
Another field	96 (62.3 %)	58 (37.7 %)	
<b>Years of Obesity Medicine Experience, n (%)</b>			
1–2 years	89 (78.1 %)	25 (21.9 %)	<0.001
3–4 years	98 (72.1 %)	38 (27.9 %)	
5–9 years	76 (50.3 %)	75 (49.7 %)	
10 years or more	68 (41.5 %)	96 (58.5 %)	
<b>Practice Setting, n (%)</b>			
Academic medical center	93 (61.2 %)	59 (38.8 %)	0.72
Private practice	167 (57.0 %)	126 (43.0 %)	
Hospital	37 (56.1 %)	29 (43.9 %)	
Other settings <sup>a</sup>	34 (63.0 %)	20 (37.0 %)	
<b>Geographic Catchment, n (%)<sup>b</sup></b>			
U.S. Northeast	62 (65.3 %)	33 (34.7 %)	0.08
U.S. Midwest	65 (62.5 %)	39 (37.5 %)	
U.S. West	47 (61.8 %)	29 (38.2 %)	
U.S. South	93 (58.5 %)	66 (41.5 %)	
Canada	16 (61.5 %)	10 (38.5 %)	
Multiple regions	48 (45.7 %)	57 (54.3 %)	
<b>Accepts Insurance for Obesity Care, n (%)<sup>e</sup></b>			
Yes	266 (58.5 %)	189 (41.5 %)	0.96
No	64 (58.7 %)	45 (41.3 %)	

Abbreviations: ABOM – American Board of Obesity Medicine; U.S. – United States.

<sup>a</sup> Other practice settings include federally qualified health center, health maintenance organization, etc.

<sup>b</sup> U.S. states categorized by census region.

<sup>c</sup> Insurance information missing in 1 participant.

<sup>d</sup> p-values calculated using Chi<sup>2</sup> tests. Using Bonferroni correction for multiple comparisons, statistically significant associations defined if p-value<0.003.

<sup>e</sup> Limited treatment of children included physicians who reported that 1–49 % of their patient population were children/adolescents whom they treat for obesity, and predominantly treats children were physicians who reported that 50 % or greater of their patient population were children/adolescents whom they treat for obesity.

<sup>f</sup> Primary care fields include physicians with primary board certification in Internal Medicine, Family Medicine, Medicine-Pediatrics, or Pediatrics without other specialty certification (e.g., endocrinology). Of note, medical specialty information was missing in 7 participants.

obesity medicine clinical practice time differently, which makes comparisons challenging. For example, a 2017 report found that approximately 30 % of ABOM Diplomates spent over 50 % of their practice time in obesity medicine [2]. A 2019 survey identified that 68 % of ABOM Diplomates reported having ≥6 sessions in clinic (4-h sessions); however, these could be any clinical sessions – not just those limited to obesity medicine [7]. Our assessment of obesity medicine clinical practice time was limited to evaluating and treating obesity through direct patient care, and did not include other time dedicated to obesity medicine (e.g., advocacy, practice management, education, research). The 2023 ABOM practice analysis identified non-clinical activities as important components for the ABOM-certified obesity medicine physician [14]. In this study, we also identified that physicians are more likely to have >20 clinical hours/week in obesity medicine as they continue in the field. We found no significant differences in obesity medicine clinical practice time by primary medical specialty, practice setting, geographic catchment or acceptance of insurance for obesity care. While clinical

practice time spent in obesity medicine may signify physicians' capacity to care for patients, this measure is unable to assess the effectiveness or safety of physicians' practice habits. While future research is needed to understand the factors that promote greater allocation of clinical time to obesity medicine, this finding may be reassuring to early career ABOM-certified physicians that their clinical practice is likely to focus more on obesity medicine over time.

## 5. Limitations

This study has several limitations. This study was a secondary analysis of the 2023 ABOM Practice Analysis Validation Survey data, which required physicians to have practiced obesity medicine for at least 1 year and spend at least 4 h per week practicing obesity medicine. Therefore, our results may not reflect the clinical practice characteristics among newly ABOM-certified obesity medicine physicians or those physicians with limited time spent delivering obesity care. However, it is important to note that most participants (72.4 %) had their primary medical specialty within a primary care field (Internal Medicine, Family Medicine, Medicine-Pediatrics, or Pediatrics), which a prior report of ABOM Diplomates also described [2]. Our distributions for gender and geographic catchment were also similar to this prior study [2]. The survey response rate may be considered low, but it was similar to other practice analysis studies [28]. Given our low response rate and inability to compare characteristics between survey responders and non-responders, our findings may not reflect the practice of all ABOM Diplomates. Physicians self-reported their clinical practice habits, which may be subject to recall and social-desirability bias, and therefore may not reflect actual practice. However, prior research has found physicians report of delivering a specific service to be accurate [29]. As noted above, our assessment of obesity medicine clinical practice time differed from prior studies and does not include non-clinical obesity medicine activities. We were also unable to consider other clinic attributes that have been associated with medical practice variability in other settings, such as practice size, resources, and workload [10], as this information was unavailable in the data. Finally, the data did not include additional questions to determine which off-label AOMs physicians prescribed, although a 2019 survey of ABOM Diplomates identified metformin, topiramate and bupropion as the most commonly prescribed off-label medications for weight reduction [7]. Future research is needed to update the specific prescribing practices of ABOM-certified physicians for both FDA-approved and off-label AOMs as well as supplements. Examining these prescribing practices at a state-level may help clarify the impacts of state policies for both AOM coverage and legal restrictions for prescribers.

## 6. Conclusions

Our findings may suggest that ABOM-certified obesity medicine physicians have consistent FDA-approved and off-label AOM prescribing practices regardless of primary medical specialty, obesity medicine experience, practice setting, geographic catchment, and acceptance of insurance for obesity care – which may be particularly important to patients seeking pharmacologic treatment of obesity. Although physicians who predominantly treat children (age 2–17 years) may be less likely to prescribe AOMs than other obesity medicine physicians, the percentage of physicians treating children who prescribe AOMs has increased from prior studies [7].

## Summary takeaway messages

- Nearly all ABOM-certified obesity medicine physicians reported prescribing FDA-approved AOMs and most prescribed medications off-label for weight reduction.

- Adult patients' healthcare experiences with ABOM-certified obesity medicine physicians are likely to be similar regarding pharmacologic treatment across physician and clinic settings.
- Physicians may be more likely to spend more clinical time practicing obesity medicine as they continue in the field.

## Disclosures

SR has no conflicts to disclose. DRB is employed as the Executive Director of the American Board of Obesity Medicine and Executive Director of the American Board of Obesity Medicine Foundation. TJR, EPW and JK currently serve on American Board of Obesity Medicine as Secretary, Vice-Chair, and Chair, respectively. EPW receives research funding support from Novo Nordisk. TJR received royalties from UpToDate. JK serves on scientific advisory boards for Morpheic Medical and Gila Therapeutics; is a medical advisor for Found; received lecture fees and travel from Endocrine Society; royalties from UpToDate; and received consultant fees from Apotex Inc. KAG is employed by the American Board of Obesity Medicine Foundation as Chief Medical Officer. She has received personal fees from Johns Hopkins ACG System and PRI-MED; personal fees for participation on advisory boards for Eli Lilly and Company and Novo Nordisk; and travel support from Eli Lilly and Company and Novo Nordisk. Her former institution (Johns Hopkins) received grant funding from Novo Nordisk.

## Ethical adherence

This work only involved analysis of de-identified data, and therefore, would not be considered human subjects research per U.S. Department of Health & Human Services definitions.

## Declaration of artificial intelligence (AI) and AI-assisted technologies

During the preparation of this work the authors did not use AI.

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## Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Kimberly Gudzone reports a relationship with Novo Nordisk that includes: consulting or advisory, funding grants, and travel reimbursement. Kimberly Gudzone reports a relationship with Eli Lilly and Company that includes: consulting or advisory and travel reimbursement. Edmond Wickham III reports a relationship with Novo Nordisk Inc that includes: funding grants. Judith Korner reports a relationship with Morpheic Medical that includes: consulting or advisory. Judith Korner reports a relationship with Gila Therapeutics that includes: consulting or advisory. Judith Korner reports a relationship with Found that includes: consulting or advisory. Judith Korner reports a relationship with Apotex Inc that includes: consulting or advisory. Tirissa Reid received royalties from UpToDate. Judith Korner received royalties from UpToDate. Kimberly Gudzone received royalties from the Johns Hopkins ACG System. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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