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Trends in Obesity Among Social Security Disability Applicants, 2007–2013

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ABSTRACT

Project Number

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Title

Trends in Obesity Among Social Security Disability Applicants, 2007–2013

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Key Findings and Policy Implications

In recent decades, obesity prevalence in the United States has increased dramatically. At the same time, applications to federal disability programs have also increased. Because obesity can lead to functional limitations that might qualify an individual for disability benefits, it is possible that obesity trends are contributing to growth in disability applications and awards.

This paper examines trends in obesity among applicants to Social Security Administration (SSA) disability programs from 2007 through 2013 using data collected electronically at the time of application. The analysis is feasible because of an electronic method for collecting disability applications introduced in 2004, which includes self-reported height and weight data for virtually all applicants from 2007 onward. We used these data to construct Body Mass Index (BMI), a measure commonly used to identify obesity.

We produce obesity statistics for applicants overall, as well as stratified by age, sex, education level, program title, and state of application. We compare these to nationally representative survey data to assess the obesity of applicants relative to other working-age adults. In addition, we assess the extent to which applicants with obesity face a different trajectory in the disability determination process than their non-obese peers.

We find the following:

- Initial disability applicants on the whole are much more likely to be obese than the working-age population (40.2 percent versus 28.8 percent in 2013), with that difference partly reflecting differences in other characteristics between the two groups. After controlling for age, sex, race, and education, the gap is approximately halved, but still substantial.
- Obesity among disability applicants has risen steadily in recent years, from 37.4 percent in 2007 to 40.2 percent in 2013. This increase of 2.8 percentage points was higher than the 1.8

percent growth in obesity prevalence within the working-age population over the same period (from 27.0 to 28.8 percent). Obesity prevalence among initial applicants is highest among those with impairments affecting the musculoskeletal, endocrine, cardiovascular, and special/other body systems.

- Obese applicants face higher levels of adjudication before receiving an allowance. Among initial determinations in 2013, there was no strong correlation between body system and obesity, though in many body systems, obese applicants had lower allowance rates than their non-obese peers. Among applications at the ALJ level in 2013, obese applicants were at least as likely, and oftentimes more likely to receive an allowance than their non-obese counterparts. Further study following a cohort of applications through the full application process would be valuable to more fully assess the role of obesity in disability determinations.

The policy implications of the findings are:

- Although we cannot definitively establish a causal connection between growth in obesity prevalence and growth in applications, the findings increase cause for concern that such a connection is important. Because obesity prevalence has risen substantially in recent decades, especially among children, and the effects of obesity on health and functioning are often cumulative, any effect of the growth in obesity on applications and their disposition may well increase in the future.

Synopsis: In “Trends in Obesity Among Social Security Disability Applicants, 2007–2013,” we use data from the Social Security Administration’s Electronic Disability Collect System (EDCS) to examine obesity prevalence among adult applicants to federal disability programs from 2007 through 2013. We compare these trends to those observed for all working-age adults over the same period and provide information about the relationship between applicant obesity and the disability determination process.

Abstract: Using self-reported height and weight data collected when working-age adults apply for federal disability benefits, we produce obesity prevalence statistics for working-age applicants to Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI) from 2007 through 2013. We compare these statistics to those for the U.S. working-age population using nationally representative survey data from the same period, accounting for differences in other characteristics between applicants and the larger population. We find that even after controlling for such differences, disability applicants are more likely to be obese than the general population, and obesity prevalence among applicants has been rising more rapidly than for their peers. We also assess how obesity may play a role in the disability determination process, considering differences in adjudication level, allowances by obesity status, and the body system most affected by impairments. We find that compared with their non-obese peers, obese applicants often must face higher levels of adjudication before receiving a disability allowance.

JEL Classification: H55, J11, J14

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I. INTRODUCTION AND BACKGROUND

Applications to federal disability programs grew in the early 2000s, leveling off for several years before rising substantially during the economic downturn late in the decade. At the peak in 2010, there were slightly fewer than 3 million applications to the Social Security Disability Insurance (SSDI) program and slightly more than 2.5 million applications to receive Supplemental Security Income (SSI) in that year. The increase in applications and receipt of disability benefits over time has been well documented, with a majority of the growth being explained by changes in the size and age-sex composition of the labor force (Liebman 2015). Yet, a large fraction of observed growth in federal disability programs remains unexplained.

One factor that potentially could have contributed to growth in disability applications in recent decades and may play a more important role in the future is the increasing prevalence of obesity in the United States. Since the 1960s, overall obesity prevalence among adults has nearly tripled, with more than one-third of adults obese in 2015 (National Institutes of Health 2012a). The relationship between obesity and disability is bidirectional. On one hand, being obese can cause a range of chronic health conditions, including heart disease, hypertension, stroke, gallbladder issues, sleep apnea, and adult-onset (Type II) diabetes (Centers for Disease Control and Prevention [CDC] 2013, National Institutes of Health 2012b). In addition, it can exacerbate existing musculoskeletal and other health problems, potentially leading to more severe impairments. On the other hand, obesity can occur as a result of disabilities; certain conditions lead to an increased likelihood of obesity, and conditions that limit physical mobility and certain psychotropic medications can lead to weight gain (Shrivastava and Johnston 2010). Adults with a disability are 53 percent more likely to be obese than non-disabled adults (Fox, Witten, and Lullo 2014) and can be more susceptible to increased risk of obesity-related comorbidities and health

problems than other adults (Reichard, Stolzle, and Fox 2011; Reichard and Fox 2013). Earlier work has demonstrated a connection between obesity rates and the prevalence of disability in both younger and older populations but has not determined the magnitude of the effect of obesity on rising disability applications (Sturm, Ringel, and Andreyeva 2004; Lakdawalla, Bhattacharya, and Goldman 2004; Capodaglio et al. 2010). Although not the subject of the literature on obesity, it is also important to note that some disabling conditions, such as Parkinson’s disease and chronic obstructive pulmonary disorder (COPD) or their treatments, might result in weight loss or being underweight.

In addition to a well-documented relationship between obesity and disability, evidence has also shown that increased obesity reduces the likelihood for employment (Morris 2007; Tunceli, Li, and Williams 2006). Thus, obesity may play a significant role in the decision to apply and be found eligible for SSDI and SSI. SSA has long recognized the relationship between obesity and disability; changes in its consideration and the effect on application categorization and awards is explored in Stahl and others (2015). During the period of our study, SSA adjudicators were required to consider the extent to which obesity exacerbated musculoskeletal, cardiovascular, respiratory, or other impairments and led to reduced capacity for work (SSA 2002); obesity alone, no matter how extreme, was not sufficient to warrant a benefit award, however.¹

Despite the high prevalence of obesity among working-age adults and obesity’s potential effect on reduced functional capacity, relatively little is known about rates of obesity among applicants to SSDI and SSI. We seek to fill this knowledge gap using newly available data collected from SSDI and SSI applicants from 2007 through 2013. As described in detail in Section III, SSA collects self-reported height and weight data from disability applicants on Form

3368 as part of its Electronic Disability Collect System (EDCS), which has been used to record the bulk of new disability applications over about the past decade.

Using the data collected from applicants, we are able to construct an obesity prevalence profile of recent disability applicants using Body Mass Index (BMI), a common metric for assessing body fat. We compare applicant obesity prevalence to national and state-level statistics collected in survey data to assess how applicant obesity statistics compare to those for other similar working-age adults, and consider to what extent differences in the characteristics of the two populations contribute to observed differences in obesity prevalence.

In addition to documenting obesity prevalence among initial applicants, we also assess how obesity is associated with the award or denial of disability benefits. SSA removed obesity as a discrete category in its Listing of Impairments in October 1999 and added language to the listings to highlight how it might affect one's functioning in light of other conditions, but intentionally did not provide a set threshold at which obesity should be considered severe enough to be determined an impairment in the review process (Stahl, Schimmel Hyde, and Singh 2015). Consideration of obesity is thus somewhat subjective, or at the very least may add to the effort required for an adjudicator to review applications from obese claimants relative to those from non-obese adults, all else being equal. The disability determination process can be lengthy, and the longer it takes to make a final determination, the greater the cost to SSA and the more an individual's human capital and likelihood of re-entering the labor force fall (Autor et al. 2015). We document the extent to which obesity is correlated with the likelihood of one's application requiring further levels of adjudication before a decision is made, including an analysis of the level of determination and allowance rates based on disabling conditions plausibly associated with obesity.

We begin by describing the use of BMI for measuring obesity status and documenting the relationship between obesity and disability (Section II). We then turn to describing the information that SSA collects from disability applicants to determine obesity and the data we use to compare applicants to the working-age population (Section III). Next, we document differences in obesity status by applicant subgroups and relative to the working-age population (Section IV), document trends in applicant BMI from 2007 through 2013 (Section V), present results related to obesity’s role in the disability determination process (Section VI), and discuss our findings and their implications (Section VII).

II. THE RELATIONSHIP BETWEEN OBESITY AND DISABILITY IN THE WORKING-AGE POPULATION

BMI, used by SSA to categorize applicant obesity since 1999,² is commonly used by clinicians to estimate body fat because it is easily calculated using height and weight. Other options to estimate body fat, such as waist circumference, skin calipers, bioelectric impedance, or water or air displacement methods, are considered imperfect either because they do not take height into account or because they require more invasive or complex measurements (CDC 2013). BMI is based on a formula that divides a person's weight (in kilograms) by the squared value of height (in meters). This measure is then broken into commonly accepted standards (CDC undated, U.S. National Library of Medicine 2012): underweight (BMI of less than 18.5), normal weight (BMI of 18.5 through 24.9), overweight (BMI of 25.0 through 29.9), and obese (BMI of 30.0 and higher). In some cases, BMI is used to categorize obese individuals by the extent of obesity (BMI of 30.0–34.9, 35.0–39.9, and 40.0 and higher).

Despite the advantage of convenience, BMI is known to be an imperfect measure, especially for certain subgroups (CDC 2014; Prentice and Jebb 2001). For example, BMI overstates obesity for athletes, as it does not take muscle mass into account. It also overstates obesity among African Americans as a group relative to Caucasians, given higher muscle mass, on average, among the former group. It understates obesity for an elderly adult relative to a younger adult with the same height and weight, as body fat increases with age. This is similarly true for a comparison of women versus men, as women generally have a higher proportion of body fat at a given weight. In addition, BMI may be less reliable for certain groups with disabilities, including those whose height or weight cannot be accurately measured due to the inability to stand (Fox, Witten, and Lullo 2014).

BMI can be calculated based on data collected in a clinical setting, but is often self-reported through surveys and questionnaires. Evidence shows that, perhaps predictably, individuals on average overstate their height and understate their weight, leading to an underestimate of their actual BMI (Spencer et al. 2002; Kuczmarski, Kuczmarski, and Najjar 2001; McAdams, Van Dam, and Hu 2007). This phenomenon is particularly evident for individuals above the age of 60, for whom significant misclassification of obesity can occur as a result (Kuczmarski, Kuczmarski, and Najjar 2001). Systematic bias is also correlated with educational attainment, occupation, and a preference for rounding weight to the nearest end digit (such as 130 instead of 134) (Niedhammer et al. 2000). Yet, the magnitude of any misreporting effect is likely to be small on average; the mean self-reported BMI was 25.07 compared with 25.52 using clinical measurements. As a result, BMI is considered reliable for measuring obesity for purposes of correlating to increased disease risk (CDC 2013).

There is reason to suspect that intentional misreporting of BMI among individuals seeking disability benefits might be less (or at least no more) prevalent than in survey data. Because applicants might think that their height and weight will be verified by a medical professional or examiner, they may be more likely to report information to the best of their knowledge. To the extent that individuals with disabilities are less aware of their own weight due to limitations that mean they have only inaccurate information about it, they may be incorrect more often than the general population (Fox, Witten, and Lullo 2014), but there is no reason to think that the information they have is biased. Thus, it is possible that differences in bias might contribute to any difference between obesity prevalence among applicants compared to the working-age population, but we have no reason to think that such a contribution will be large relative to other factors affecting a possible difference.

III. DATA DESCRIPTION AND IMPLICATIONS FOR ASSESSING DISABILITY APPLICANT OBESITY

In this section, we describe the SSA administrative data used for the analysis, and why we believe the data reliable for the years in our sample. We then describe the nationally representative survey data we drew upon for purposes of comparing applicant characteristics to those of the working-age population.

A. SSA's Electronic Disability Collect System (EDCS)

SSA launched the EDCS in 2004 to streamline the disability claim process, replacing the traditional paper folder with an “electronic disability folder.” Each time a person files an initial SSDI or SSI application, an electronic folder is generated, then updated as additional information is obtained to support a determination of disability. Within the electronic folder, the Adult Disability Report (Form 3368) contains a large battery of information, including height and weight, demographic characteristics, information on alleged medical conditions, work history, medical providers and treatments, and medication use. Nearly all applications during our observation period (96 percent or more each year) provided information on both height and weight, which we used to determine BMI category using standard thresholds.³

Although SSA started to use the EDCS in 2004, we concluded that we could not rely on pre-2007 data for reasons related to the introduction of the system. SSA had determined that the use of paper folders was hampering its ability to manage workload and began the development process for EDCS, leading to the 2004 launch (Gerry testimony 2006).⁴ By January 2006, all 50 states were using EDCS to some extent, with more than half operating fully in an electronic environment. By April 2006, every SSA field office was taking initial applications through EDCS, 97 percent of applications taken were electronic, and 92 percent of Disability Determination Service (DDS) offices were reviewing cases electronically (Gerry testimony

2006). For this reason, we consider EDCS statistics from 2007 onward to be very accurate for all applicants, whereas trends in the same statistics from 2004 through 2007 likely reflect the gradual ramp-up in adoption of the EDCS. Although in a few instances we display applicant statistics from 2005 and 2006, we flag them and focus on 2007 onward in our comparisons to the national population to ensure that these are accurate estimates of statistics for all applicants.

We used data captured in EDCS for all applications to SSI or SSDI among working-age adults (ages 18 through 65) during our study period. Our analysis excluded technical denials or applications not meeting the financial or work criteria required for program eligibility.⁵ We included one observation for each “disability folder,” meaning that applicants who applied multiple times during this period (possibly within the same year) were included multiple times. If an individual applied to SSDI and SSI at the same time, we categorized the applications as concurrent; applications to SSDI only are labeled “SSDI”; applications to SSI only are labeled “SSI.” Comparing our application counts to those in SSA’s published statistics (available through 2012 at the time of writing), we accounted for about 99 percent of SSI applications during the 2007–2012 period and 97.5 percent of SSDI applications (not shown).⁶

In what follows, we analyze applications in two ways. First, we consider initial applications based on the year in which the application was filed. When we discuss applicants to disability programs, we mean the first time we observe an application in the EDCS, which is at the initial application level. The intent of this analysis is to identify the extent to which obesity may be associated with the decision to apply for benefits. Second, we consider determinations made at each of the adjudication levels, oriented by the year the determination was made. In this case, we consider all applications that reach this level and receive a determination, and consider the allowance rates among those applications. The intent of this exercise is to assess the time elapsed

between the application and decision dates along with ultimate determination, both of which may be different for obese and non-obese applicants.

Our analysis draws upon key individual characteristics collected in Form 3368, focusing on those found to be of clinical significance in the prevalence of obesity or important from an SSA programmatic perspective. Specifically, we consider differences by age, sex, race, and educational attainment. In general, obesity measured by BMI increases with age (at least among the pre-retirement group we are considering), is higher for women than men, higher for African Americans than Caucasians, and higher among those with less education (though this relationship is observed for women only) (CDC 2014). We also consider differences by state of application, as there are strong geographic patterns in obesity, with much higher rates of prevalence in the South, followed by the Midwest, and much lower rates of obesity in the Northeast and states such as California and Colorado (CDC 2014). Our analysis also considers differences in obesity rates based on the primary impairment category coded at the initial application review by SSA (not necessarily as the disability alleged by an applicant). The intent of this analysis is to look for differences in allowance rates and level of adjudication among disabling conditions typically associated with obesity (U.S. Department of Health and Human Services 2003; SSA 2002).

B. Estimates of the obesity prevalence among working-age adults

In many of the results that follow, we compare the BMI distribution of applicants to that observed in the overall working-age population (ages 18–64). To support the comparison as closely as possible, we used national survey data that include self-reported height and weight data, plus basic characteristics. We developed statistics using both the National Health Interview Survey (NHIS) and the Behavioral Risk Factor Surveillance Survey (BRFSS), both collected by the CDC. The surveys produced similar results during our time period of interest for the

working-age population; we present statistics from the BRFSS in what follows because those data allowed us to more readily account for state of residence.⁷ Other characteristics collected in the EDCS are measured comparably in the BRFSS.⁸

IV. OBESITY PREVALENCE AMONG DISABILITY APPLICANTS COMPARED TO THE GENERAL WORKING-AGE POPULATION

In 2013, disability applicants were 12 percentage points more likely to be obese than the overall working-age population (40.2 versus 28.3 percent; Table 1). This finding translates to an obesity prevalence that is 42 percent higher among disability applicants. Applicants were less likely to be normal weight and more likely to be overweight compared to the working-age population generally.⁹ Obesity was most common among those applying for SSDI only (43.8 percent) and lowest among SSI-only applicants (33.7) percent. Because SSDI applicants are older, on average, than SSI applicants, this finding may in part reflect differences in BMI profiles due to age. Yet in all groups, obesity prevalence was more common among applicants than in the overall working-age population.

A. Differences by subgroup

Table 1 also shows that obesity is more common among those seeking disability benefits in virtually all demographic subgroups than among their peers in the general working-age population. One exception is for those with less than a high school education, with obesity being less common among applicants than among those in the working-age population (though within the 95 percent confidence interval of the latter's point estimate).

Comparing differences within each of the categories, we observe that the patterns among applicants are not necessarily the same as in the general population. Female applicants are much more likely to be obese than their male counterparts, whereas that is not true for men and women in the overall working-age population. Obesity prevalence in both the applicant and working-age populations follows an inverted u-shaped pattern with age, with the applicant peak occurring at a younger age group than overall. In less educated groups, differences in rates of obesity between

Table 1. A comparison of the BMI distributions of SSA disability applicants and working-age adults, 2013

	SSA disability applicants				Working-age population		
	Number	Normal weight (%)	Overweight (%)	Obese (%)	Normal weight (%) ¹	Overweight (%) ¹	Obese (%) ¹
Overall	2,408,229	27.6	29.3	40.2	34.6 (34.3, 35.0)	34.6 (34.3, 34.9)	28.8 (38.5, 29.1)
Regression-adjusted ¹		--	--	--	29.6 (29.1, 30.2)	34.9 (34.4, 35.5)	33.6 (33.1, 34.2)
SSDI only	902,938	23.5	30.3	43.8	--	--	--
SSI only	395,603	34.0	28.3	33.7	--	--	--
SSDI and SSI	1,109,688	28.6	28.8	39.7	--	--	--
Sex							
Male	1,222,854	29.0	33.5	35.0	29.2 (28.7, 29.7)	40.7 (40.2, 41.2)	28.8 (38.3, 29.2)
Female	1,185,375	26.1	24.9	45.6	40.4 (39.9, 40.9)	28.1 (27.7, 28.5)	28.8 (28.4, 29.3)
Age							
18 to 25	245,932	41.9	23.7	28.1	54.2 (53.2, 55.2)	25.8 (24.9, 26.6)	15.4 (14.6, 16.1)
26 to 30	162,934	33.8	27.0	35.9	40.6 (39.5, 41.7)	32.7 (31.6, 33.8)	24.1 (23.1, 25.1)
31 to 35	188,595	28.5	28.2	40.9	35.2 (34.1, 36.2)	34.8 (33.7, 35.9)	28.5 (27.5, 29.5)
36 to 40	196,044	24.9	28.1	44.8	32.5 (31.4, 33.5)	36.0 (34.9, 37.1)	30.2 (29.2, 31.3)
41 to 45	249,656	23.5	28.9	45.6	28.9 (27.9, 29.9)	36.6 (35.5, 37.7)	33.3 (32.3, 34.3)
46 to 50	330,248	24.5	29.8	43.5	28.5 (27.6, 29.4)	36.9 (35.9, 37.9)	33.3 (32.3, 34.2)
51 to 55	414,086	25.7	30.8	41.0	28.2 (27.4, 29.0)	37.1 (36.2, 38.1)	33.5 (32.6, 34.4)
56 to 60	399,713	25.5	31.2	40.6	27.3 (26.5, 28.1)	37.6 (36.7, 38.4)	34.1 (33.2, 35.0)
61 to 65	221,021	25.3	32.6	39.5	26.9 (26.1, 27.6)	38.6 (37.7, 39.6)	33.3 (32.4, 34.17)
Education							
Less than high school	65,936	26.5	34.3	36.4	23.6 (21.7, 25.6)	36.6 (34.3, 38.9)	38.5 (36.2, 40.8)
Some high school	580,428	30.0	29.0	37.8	31.3 (30, 32.7)	32.9 (31.5, 34.2)	33.3 (32, 34.6)
High school graduate/GED	1,092,285	26.7	29.1	41.6	32.2	34.3	31.4

TABLE 1A (continued)

	SSA disability applicants				Working-age population		
	Number	Normal weight (%)	Overweight (%)	Obese (%)	Normal weight (%) ¹	Overweight (%) ¹	Obese (%) ¹
Some college	420,819	24.9	28.9	43.8	(31.6, 32.9)	(33.7, 34.9)	(30.8, 32)
College graduate	178,093	27.6	30.6	39.1	33.9	34.0	30.1
Unknown	70,668	38.7	29.4	25.1	(33.3, 34.5)	(33.4, 34.6)	(29.6, 30.7)
Race					41.0	36.0	21.3
Black	585,746	26.0	28.7	43.1	(40.5, 41.6)	(35.5, 36.5)	(20.8, 21.7)
White	1,350,549	27.8	29.1	40.1	33.0	38.3	26.3
Other	471,934	28.9	30.7	37.2	(26.5, 39.4)	(30.1, 46.5)	(19.5, 33.1)
					26.8	34.1	37.6
					(25.9, 27.8)	(33.1, 35.1)	(36.6, 8.5)
					35.0	35.0	28.2
					(34.6, 35.3)	(34.6, 35.3)	(27.8, 28.5)
					40.4	33.2	23.6
					(39.2, 41.6)	(32.1, 34.3)	(22.6, 24.5)

Source: Authors' calculations using SSA's EDCS for disability applicants and BRFSS for the working-age population.

Note: The 2013 BRFSS provided age only in intervals; those intervals are off by one year from the statistics we developed for applicants (e.g., 18–25 was collapsed as 18–24 in BRFSS, 26–30 is 25–29 in BRFSS, 61–65 is 60–64 in BRFSS). We generated similar statistics using the National Health Interview Survey (NHIS) and, with the exception of the youngest age group, this different categorization did not lead to substantively different comparisons between applicants and the working-age population.

¹ 95 percent confidence interval shown in parentheses.

applicants and the full working-age population are not as pronounced as for other subgroups (36.4 versus 38.5 percent among those with less than a high school education, for example). On the other hand, among the most educated groups, differences in obesity prevalence are remarkably large (39.1 versus 21.3 percent among those with at least a college education—84 percent higher among disability applicants in this group).

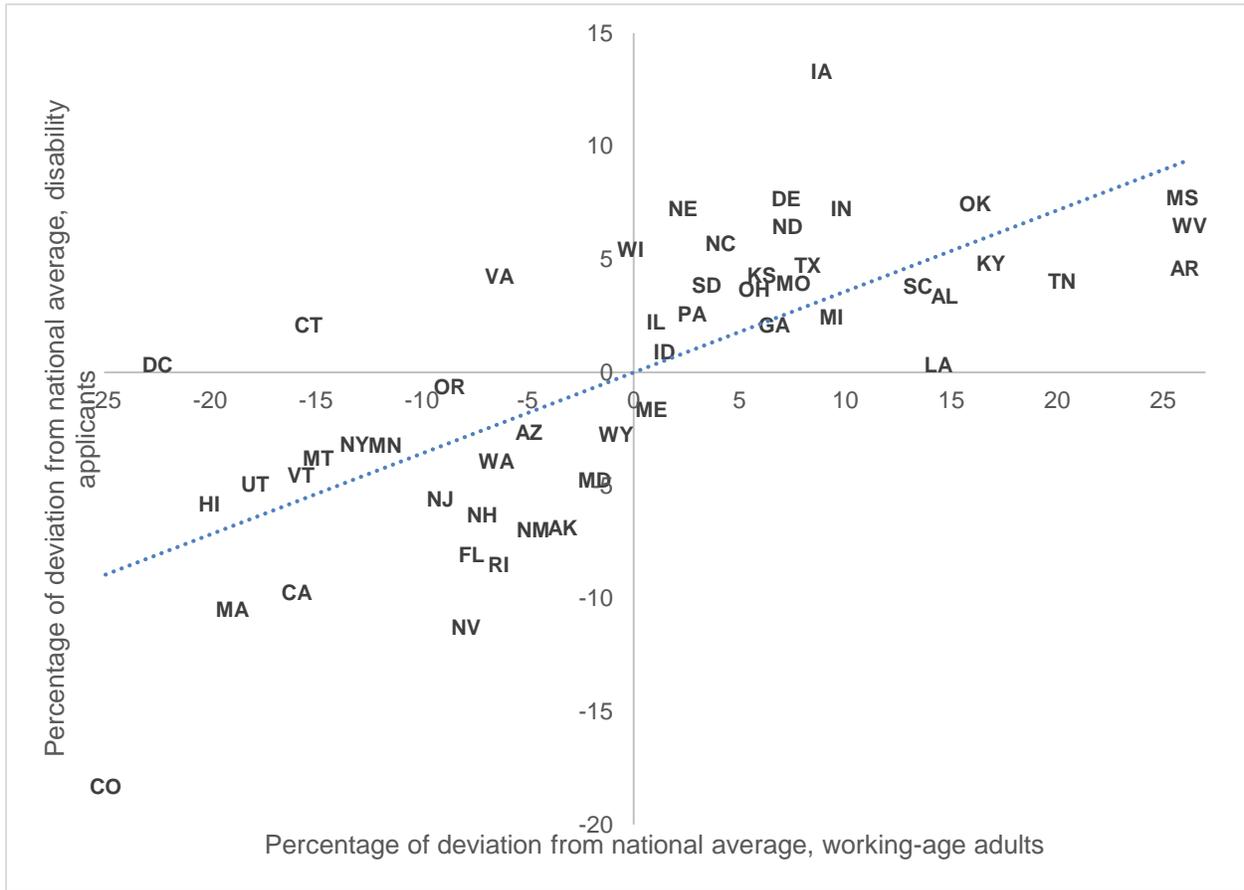
Given these patterns of differences between applicants and the working-age population across characteristics, we sought to understand how much differences in characteristics alone could account for the differences observed overall. To achieve this understanding, we used the BRFSS data to estimate three linear probability models, predicting the likelihood of being (1) normal weight, (2) overweight, and (3) obese. In each model, we controlled for age, sex, race, and education, as shown in Table 1. We then applied the coefficients obtained from these models what the percentages for the population would be if we randomly selected a sample with the same distribution of characteristics as all applicants. As shown in the “regression-adjusted” row in Table 1, adjusting for characteristics does substantially increase the estimated prevalence of obesity in the population for 2013, to 33.6 percent from 28.8 percent, but that value is still well below the 40.2 percent statistic for applicants. In other words, accounting for differences in characteristics explains slightly more than 40 percent of the higher rate of obesity among applicants, but nearly 60 percent of the gap remains. One important confounding factor in the SSA administrative data that we are not able to control for is household income, which is known to be positively correlated with obesity. Disability applicants, especially those receiving SSI, often have very low household incomes; it is possible that accounting for this difference would explain a large part of the remaining obesity gap between the groups.

B. The role of geography in explaining applicants' obesity prevalence

Obesity levels among disability applicants and the general population vary widely across states, with the rates of obesity among applicants in 2013 following patterns similar to those in the overall population. Figure 1 plots state obesity prevalence as a percentage deviation from the national prevalence, with working-age adults on the vertical axis and the applicant population on the horizontal axis. For example, the percentage deviation in obesity prevalence among working-age adults in a state would be 21.5 percent if obesity prevalence in the state is 35 percent. We plot values as percentage deviations from the corresponding national percentage to facilitate comparison of obesity among the two groups. We did not adjust working-age population statistics for differences in population characteristics.

In general, there is a strong correlation between applicant obesity and overall obesity in a state, as highlighted by the states concentrated in the lower left and upper right quadrants. Colorado's working-age and applicant populations, for example, have obesity rates that are the lowest relative to the national average of any state. On the other end of the spectrum is Mississippi, which ranks nearly at the very top on both. Interesting outliers such as Washington, DC likely reflect demographic differences in the applicant pool relative to the general population. For example, applicants (especially to SSDI) may be concentrated in older age groups or among those with less education, groups in which obesity is more prevalent. These differences might also be explained by other factors, such as varying regional attitudes toward obesity or different types of jobs, some of which are more likely to employ obese individuals than others.

Figure 1. Obesity prevalence among disability applicants and the working-age population, by state, 2013



Source: Authors' calculations using the EDCS and BRFSS.

V. TRENDS IN OBESITY AMONG DISABILITY APPLICANTS, 2007–2013

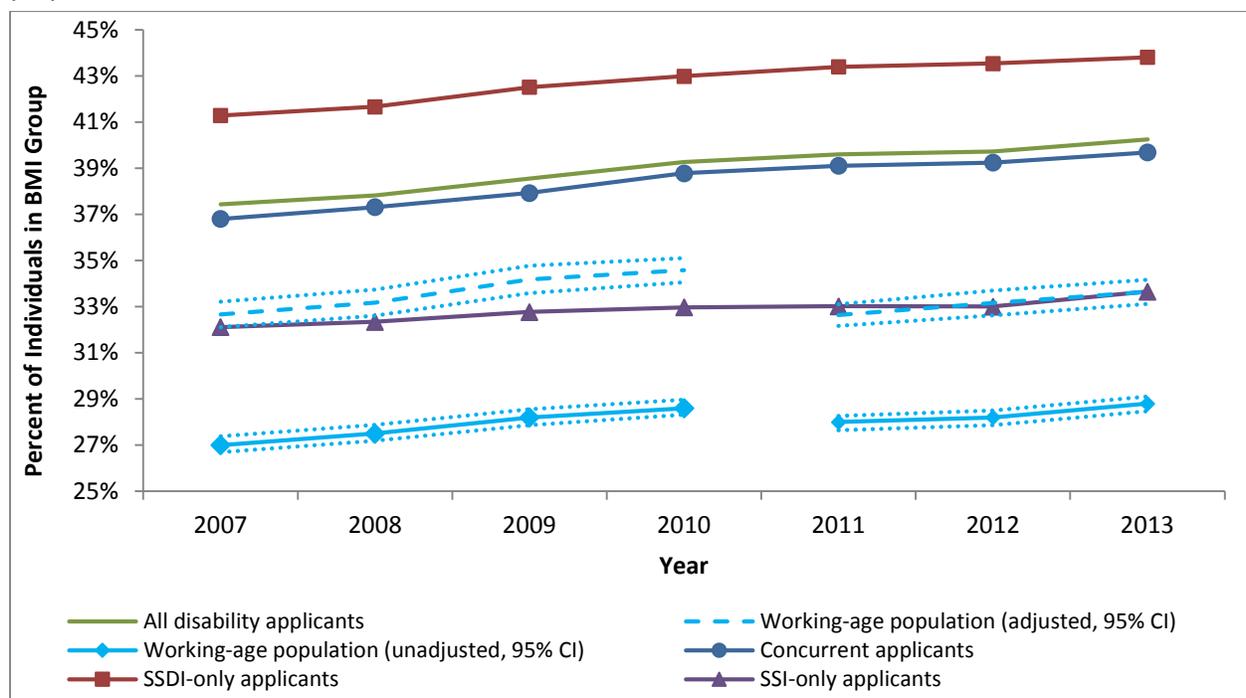
In recent years, the share of disability applicants who are obese has been increasing steadily (Figure 2). From 2007 through 2013, the proportion of applicants who were obese increased 7.5 percent, from 37.4 to 40.2 percent. During this time, applications to federal disability programs grew as well, meaning that the number of applications from obese individuals rose faster than among non-obese individuals. There were no observable large shifts in the share of applicants within obese categories over this period (not shown); among obese applicants, a relatively constant share were in the BMI 30–35, 35–40, and 40 and above categories during this time.

The increase in obesity prevalence among applicants is notable when compared to the working-age population during this period, which experienced a 1.8 percentage point increase. As described previously, a change in the sampling methodology for BRFSS between 2010 and 2011 makes the 2007–2010 and 2011–2013 periods of the working-age population statistics not directly comparable. Yet, a similar analysis with the NHIS showed a slightly higher increase in obesity prevalence of 2.4 percentage points during this period (from 26.8 to 29.2 percent)—still less than that of disability applicants. One possible explanation of the more rapidly increasing prevalence among applicants during this period could be the economic downturn. We found some evidence (not shown) that the state-level unemployment rate was positively correlated with applicant obesity prevalence, which could be consistent with disabled workers faring badly during the recession (Kaye 2010). Although our investigation did not establish a causal linkage, this may be worthy of further study to understand any factors that may influence applicant obesity prevalence in the future.

Growth in obesity was fastest among concurrent applicants, increasing by 7.8 percent (from 36.8 to 39.7 percent), slowest among SSI-only applicants (increasing 4.8 percent, from 32.1 to

33.7 percent), with growth for SSDI-only applicants in between (increasing 6.1 percent, from 41.3 to 43.8 percent).¹⁰ At the same time as applicant obesity prevalence rose, an offsetting decline occurred in the proportion of all applicants who were normal weight, with little change in the share of those who were overweight (not shown). This finding was also true for SSI-only and concurrent applicants; for SSDI-only applicants, the share in the normal and overweight categories both fell during this time.

Figure 2. Trends in obesity among disability applicants and the working-age population, 2007–2013



Source: Authors' calculations using the EDCS and BRFSS.

We used the same adjustment procedure we described for the 2013 comparisons for each year from 2007 through 2013. Accounting for differences in characteristics between applicants and all working-age adults annually during this period reduced the obesity gap substantially in each year, but by more in the early than in the later years (likely explained at least partially by the seam issue between 2010 and 2011, though a similar pattern was seen when using the NHIS). Offsetting the decline in the obesity gap, the adjusted percentage of the working-age population

in the overweight category (not shown) is higher than the corresponding percentage for applicants and slightly higher than the unadjusted percentage in the working-age group. The adjusted percentage of the working-age population in the normal weight category is significantly higher than the percentage for applicants and higher than the unadjusted percentage for the working-age population.

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VI. APPLICANT OBESITY AND THE DISABILITY DETERMINATION PROCESS

Having compared initial disability applicants to the working-age population more generally, we turned to considering applications as they progress through the adjudication process. The intent of this exercise—again descriptive—was to document how obese applicants fare after disability application. We started at the initial review and followed the appeal process through the reconsideration, Administrative Law Judge (ALJ), and Appeals Council (AC) levels. In earlier sections, we considered applications based on the year they were initially filed; here we examine the records by the year the indicated adjudication was made. That is, we did not follow annual cohorts of applicants through the entire adjudication process, which would be problematic for the cohorts in later years because of pending decisions, particularly for applicants later in our period of observation. Higher levels of review may occur several years after the initial application was filed, which necessarily would lead to a lag relative to our earlier analysis—initial applications in 2005 may have received a determination at the initial review in that year but have been delayed for several years, depending on processing delays or backlogs. Future work could consider following a cohort of applicants from initial application through final determination to observe the full effects of obesity.

Table 2 summarizes the number of determinations and allowances in 2007 and 2013¹¹ at each adjudication level, by BMI category. We did not attempt to control for any differences in applicants across these years at the same adjudication level, nor did we account for potential cohort effects within years (that is, cases at the ALJ level in 2013 necessarily received an initial determination sometime earlier). We find that between 2007 and 2013, a growing share of determinations involved obese applicants. Focusing on the within-year pattern shows that (1) a higher share of determinations after the initial level was for obese applicants, and (2) the share of

Table 2. Number of determinations and allowances, by BMI category and adjudication level, 2007 and 2013

Level	Determinations (number, percentage in a BMI category as a share of total applications at specified review level)				Allowances (number, percentage of those in a given BMI category/review level who received an allowance)			
	Underweight	Normal weight	Overweight	Obese	Underweight	Normal weight	Overweight	Obese
Initial								
2007	50,728 3.1%	491,296 29.8%	489,496 29.7%	617,099 37.4%	23,281 45.9%	164,767 33.5%	159,786 32.6%	194,697 31.6%
2013	65,749 2.8%	642,103 27.7%	681,649 29.4%	929,606 40.1%	28,634 43.6%	206,462 32.2%	217,507 31.9%	288,154 31.0%
Reconsideration								
2007	10,191 2.3%	120,781 27.1%	132,920 29.9%	181,250 40.7%	1,505 14.8%	15,146 12.5%	16,782 12.6%	22,255 12.3%
2013	15,082 2.2%	175,493 25.4%	203,193 29.4%	296,842 43.0%	1,981 13.1%	19,638 11.2%	23,556 11.6%	34,255 11.5%
ALJ								
2007	7,528 2.2%	92,536 26.4%	105,324 30.1%	144,543 41.3%	4,943 65.7%	59,440 64.2%	71,145 67.5%	99,779 69.0%
2013	11,269 2.2%	131,109 26.1%	147,535 29.3%	213,022 42.4%	6,312 56.0%	72,631 55.4%	87,293 59.2%	131,653 61.8%
Appeals Council								
2010	1,647 2.1%	21,269 27.4%	22,683 29.3%	31,946 41.2%	-- --	-- --	-- --	-- --
2013	2,902 2.0%	37,058 25.9%	41,661 29.2%	61,265 42.9%	98 3.4%	1,093 2.9%	1,248 3.0%	1,958 3.2%

Source: Authors' calculations using the EDCS. Because our analysis subpopulation includes applications filed from 2007 onward, too few determinations were made at the AC level before 2010 to report findings from those years.

determinations from obese applicants was roughly the same at higher levels of review across years (41 percent in 2007, 43 percent in 2013). Compared to initial allowance rates for obese applicants, allowance rates were significantly higher for those in the underweight category and marginally higher among the normal and overweight groups: 43.6 percent, 31.0 percent, 32.2 percent, and 31.9 percent, respectively, in 2013. The underweight statistic may reflect significant and often terminal medical conditions among those who are underweight. Because initial allowance rates for obese applicants were comparatively low, a relatively large percentage of these applicants may have sought a redetermination after the initial level.

The rows for higher levels of review confirm that obesity prevalence progressively increases with the level of review through the ALJ level. At the reconsideration level, at which allowances for all weight groups were low, the allowance rate for obese applicants was somewhat lower than for others—likely reflecting the same reasons that their initial allowance rate was lower, because both decisions were made by disability examiners at a state DDS. Table 2 also shows that obese applicants at ALJ and AC levels were more likely to receive allowances than other applicants who appeal to those levels. For example, in 2013, ALJs made allowances in 61.8 percent of the claims they reviewed from obese applicants, compared with 55.4 percent from normal weight applicants.

As described more fully in Stahl and others (2015), since 1999, SSA has allowed obesity to be considered in the adjudication process to the extent that its effects, combined with other impairments, lead to significant functional impairments. Before 1999, extreme obesity with the presence of one of five health problems would provide adjudicators with a reason to make an allowance for benefits. During that period, reviewers were not required to otherwise consider obesity in the adjudication process, especially at levels below the “weight 100 percent above

ideal” threshold applied to meet the listing. It is possible that documenting the relationship between obesity and the level of impairment caused by other medical conditions is difficult when based on the medical evidence collected at the DDS level. Applicants who appeal to the ALJ usually have an in-person hearing before a judge and are able to provide information about the severity of their impairment that cannot be gleaned from the evidence available to the DDS. In this context, it may be easier for the judge to verify the effect of comorbid conditions often present among obese individuals (hypertension and diabetes, for example) or the effect of obesity on increasing the severity of a condition. Moreover, the fact that an application was initially denied means that the original medical record did not show that the applicant’s condition met or equaled a medical listing. Hence, it might well be that the impact of obesity on an applicant’s eligibility is through its effect on residual functional capacity and the implications of that capacity—along with age, education, and past work—for the ability to engage in substantial work. The ALJ may have more and potentially updated information about that influence than the information available to the DDS.

Very little variation in allowance rates by weight category appears among the relatively small number of cases that reach the AC level, with all BMI groups having low allowance rates.¹²

Table 2 provides information on the number of determinations made in 2013 and allowance rates among those determinations by selected body system.¹³ We present this information for determinations at the initial level and cases reaching the ALJ level in 2013, by BMI category. We would not expect these applications to be from the same individuals, as more than a year often passes between an initial determination and an ALJ hearing. In addition, we do not expect the body systems to perfectly align between the initial review and ALJ level, as the review process is different at each level. This is particularly evident in the share of applications at the ALJ level

with a missing body system. Despite the difference in body system categorization, interesting patterns emerge. We find the following:

- Among initial applications, obesity prevalence is highest among applicants with endocrine, special/other, cardiovascular, and musculoskeletal impairments. At the ALJ level, obesity is also the most prevalent among these conditions; in each instance, the share of applicants in that body system with obesity is higher at the ALJ level.
- At the initial level, allowances for every body system were higher for underweight applicants relative to those in one of the three higher weight categories.
- At the initial level, there is no strong uniform pattern of allowance rates across the BMI categories from normal through obese within impairment groups, with the exception of a decline in allowance rates for malignant neoplasms and an increase for musculoskeletal conditions.
- In contrast, at the ALJ level, obese applicants have the same or higher allowance rates than normal or overweight applicants in every impairment category, without exception.¹⁴

These findings suggest that, excluding applicants with malignant neoplasms, obese applicants are likely to face higher levels of review before receiving an allowance than their lower-weight counterparts. The way that obesity is considered in the disability determination process supports this interpretation. Since it was delisted as a discrete category in 1999, adjudicators have been required to consider the way in which obesity (defined as BMI > 30) affects functioning, but there is no set point at which it becomes severe and no threshold that automatically results in an allowance, given any specific condition (Stahl, Schimmel Hyde, and Singh 2015). SSA instituted this requirement by adding language to the listings for the Cardiovascular, Respiratory, and Musculoskeletal body systems. It is plausible that the regulations led to (1) obese individuals with musculoskeletal conditions being more likely to receive an initial allowance than their non-obese peers, provided obesity is worsening the applicants' impairments; and (2) higher allowance rates at the ALJ level for obese applicants relative to non-obese peers across all body systems.¹⁵ Of note is that at the initial level, higher allowance rates with rising obesity are observed only for impairments of the musculoskeletal system, not for impairments affecting the

respiratory or cardiovascular systems, as the latter also had text added to their descriptions to remind reviewers to explicitly consider obesity.

Table 3. Share of determinations and allowance rates in 2013, by body system and level of adjudication

	N	Share of determinations in BMI category (row percent)				Allowance rate (percent)			
		Underweight	Normal weight	Overweight	Obese	Underweight	Normal weight	Overweight	Obese
Initial Level	2,319,107	2.8	27.7	29.4	40.1	43.6	32.2	31.9	31.0
Musculoskeletal	774,980	1.6	22.8	30.3	45.4	23.5	22.9	26.9	29.6
Mental disorders	591,068	3.0	32.3	30.0	34.6	33.7	27.7	27.4	25.9
Neurological	180,735	3.5	31.3	30.3	34.8	54.2	42.5	44.1	41.3
Cardiovascular	155,776	1.5	19.9	29.9	48.7	40.3	37.3	36.7	36.3
Malignant neoplasm	124,013	6.3	36.9	29.3	27.5	89.9	82.6	77.4	71.4
Special/other	123,783	2.3	26.3	24.3	47.1	3.6	2.2	2.9	9.6
Respiratory	87,975	5.7	28.2	24.0	42.1	61.2	42.9	38.7	38.3
Endocrine	65,567	1.9	19.3	26.5	52.4	17.0	13.7	15.7	16.1
All other	215,210	4.5	33.1	29.4	33.0	49.5	37.6	38.9	39.4
ALJ Level¹	500,755	2.2	26.1	29.3	42.4	56.3	55.6	59.4	62.1
Musculoskeletal	170,132	1.5	22.4	30.3	45.7	75.3	74.5	77.6	78.0
Mental disorders	92,824	2.6	29.9	29.8	37.7	66.4	66.8	69.2	70.7
Neurological	27,949	2.6	29.5	29.5	38.3	76.3	76.7	78.5	81.0
Cardiovascular	23,811	1.5	18.5	29.3	50.7	80.6	77.8	79.1	80.8
Malignant neoplasm	6,981	3.2	28.8	30.7	37.4	91.4	89.6	90.0	90.1
Special/other	13,525	1.5	17.0	18.5	63.0	64.9	65.1	65.5	65.8
Respiratory	13,260	3.8	26.2	24.3	45.7	75.2	71.6	72.5	73.0
Endocrine	14,564	2.0	18.3	25.4	54.3	76.4	73.0	71.6	73.1
All other	30,966	3.5	31.8	28.8	35.8	77.6	75.7	77.1	79.7
Missing	106,743	2.6	29.7	29.9	37.8	3.2	2.3	2.0	2.1

Source: Authors' calculations using the EDCS.

¹ Note that because of small cell sizes, the number of applications at the ALJ level is slightly lower here than shown in Table 2.

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VII. SUMMARY OF FINDINGS AND IMPLICATIONS FOR POLICY

Based on our analysis, applicants to federal disability programs are more likely to be obese than the general working-age population, both overall and within virtually all major subgroups. Controlling for differences in characteristics between the applicant pool and the general population explains about half of the observed variation, but applicant obesity still remains substantially higher. One likely factor that might explain a portion of the remaining gap is household income, which has been shown to be strongly associated with obesity but is not known for applicants. Notably, along with their higher obesity prevalence, obesity among applicants rose at a faster rate than among the general working-age population in our 2007–2013 study period. Other literature has shown that the growth in obesity prevalence among all adults and children is leveling off (Ogden et al. 2014; Finkelstein et al. 2012).

Many researchers have debated the reasons for the increase in applications for federal disability benefits in recent decades and have noted rises in the share of applicants with mental health impairments or musculoskeletal conditions. Yet, few have made the direct connection to the role of increasing obesity in the population as a driver of the change. Although our results cannot prove that obesity is an important cause, they are certainly consistent with that hypothesis. Like demographic shifts in the working-age population over the last half century, as well as changes in the economy and other factors external to disability programs, trends in obesity prevalence need to be added to the list of factors that deserve consideration by program administrators and policymakers. The strong relationship between obesity and disability, rising obesity rates, and increased childhood obesity rates means that we may see an increased contribution of obesity to growth in the number of applications, allowances, and adjudicative decisions above the initial level. The mechanisms linking obesity to disability are not fully

understood, and the multitude of reasons for obesity make it very difficult to identify a single program, or even a set of programs, that might reverse any effect obesity trends may have on disability program applications. Programs incentivizing weight loss have been found to have only limited success, often involving intense monitoring and financial payments (Jeffery and French 1999). Given this backdrop, it is likely that broad trends in obesity will continue to be reflected in the applicant population, without SSA being able to directly influence patterns among applicants.

Of course, SSA does have control over its consideration of obesity in the disability application review process and has made changes in the past to attempt to better capture the effect of obesity on functioning. The intent of the 1999 policy change was to end allowances on the basis of extreme obesity that did not significantly limit the ability to engage in substantial gainful activity (SGA) but allow for the consideration of obesity in the severity of functional limitations caused by other conditions. In doing so, SSA recognized that no set threshold of BMI automatically limits an applicant's functioning to a level that prevents engagement in substantial work for any given medical condition(s). A potential unintended consequence of that policy change may have been that obese applicants now find it harder to obtain allowances without going through multiple levels of appeal, without necessarily reducing the number of claims eventually allowed. Because no electronic data for applicant height and weight are available before 2004, it is not possible to examine the actual consequences of the policy change.

The difference between the consideration of obesity and that of drug or alcohol addiction (DAA) in disability determinations is notable. Arguably, each involves some level of personal control (not minimizing the potentially causal role that medical conditions may play). In the case of obesity, SSA adjudicators are advised to consider whether it makes a condition worse before

making a determination, whereas with DAA, adjudicators must consider whether a co-occurring medical condition(s) would meet the eligibility criteria for disability benefits in the absence of DAA (SSA 1995). In other words, for DAA, an applicant must be found to meet the eligibility standards for benefits without including DAA; the regulations explicitly indicate that the criteria will be based on what medical conditions would exist if the person quit drugs and alcohol.

If SSA adopted a “material to disability” standard for obesity similar to that for DAA—an allowance would be made only if the obese applicant would still qualify if he or she lost enough weight to no longer be obese—it is quite possible that a meaningful share of applicants would be denied benefits they can receive under the current regulations. This would have negative consequences for applicants with obesity—lower allowance rates and longer waits for final decisions—unless they are induced to lose weight and can return to work, similar to effects found after the change in DAA policy (Moore 2015). It is possible that some obese individuals with low back pain or Type II diabetes that makes them barely unable to engage in SGA could do so if they were no longer obese. Of course, making such an assessment would involve some level of uncertainty and subjectivity on the part of reviewers, and could lengthen the determination process for obese applicants even more. Moreover, any policy that attempted to make such a determination would need to identify whether obesity caused the medical condition or vice versa, and the mechanisms of obesity are not completely understood, with evidence suggesting that genetic predisposition may play an important role (Bouchard 2010). Concerns about the medical safety of substantial weight loss, even in cases where obesity is material to disability, might also be problematic. Also, such a policy might raise serious equity concerns, as individuals living in food deserts, with low incomes, and perhaps even mobility issues in getting

to grocery stores might find it much more challenging than others to lose weight (U.S. Department of Agriculture 2009).

Presumably, adopting a material-to-disability standard for obesity would require an amendment to the Social Security Act; such an amendment was made when the DAA standard was adopted in 1995. The Act's definition of medical eligibility requires SSA to determine if applicants are unable to engage in any SGA because of a medically determinable physical or mental impairment(s) that is expected to last until death or at least 12 months. Like DAA, obesity is a medically determinable condition. Hence, it appears that denying benefits on the basis of a finding that obesity is material to disability would violate the current legal standard for medical eligibility.

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ENDNOTES

¹ SSA changed its policies related to obesity and the determination process in October 1999, as outlined in 64 *Federal Register* 163, August 24, 1999. The effects of that change on disability determinations for obesity are summarized in Stahl and others (2015).

² Until obesity was delisted in 1999, SSA defined obesity as 100 percent above a person's "ideal body weight," given that person's height, which was defined using standard height and weight tables.

³ Though the EDCS was widely used in 2004, a much higher number of applications with information missing in one or both of these fields in 2004 led us to exclude that year from consideration. We ultimately opted not to present findings from 2005 and 2006 due to concerns over the representativeness of the data for a national population, despite more complete information for calculating BMI.

⁴ We use the term EDCS throughout for consistency's sake, but our understanding is that the term "eDib" (electronic disability process) has been used instead of, or interchangeably with, EDCS.

⁵ EDCS records are generated when an application is entered into the system initially, as well as if or when it goes on to further levels of review, including reconsideration, before an Administrative Law Judge (ALJ) and the Appeals Council (AC). For this analysis, we have not linked an individual's application across these various levels. In other words, we know that, by definition, an application we observe at the AC level was necessarily also reviewed (and denied) at the initial, reconsideration, and ALJ levels. However, we did not link the application across levels for the same person to learn the dates of earlier denials or the time the claim was initially filed. Because the adjudication process takes time, it is likely that an initial application from 2005 that was rejected might not appear at the AC level for several years.

⁶ The 99 percent of SSI applications was constant during this period; the share of SSDI applications represented in EDCS was 93.6 percent in 2007 and 93.5 percent in 2008 before increasing steadily and representing more than 99 percent of applications in 2009. For both programs, our EDCS application counts exceeded 100 percent of published statistics in 2011 and 2012 for SSDI and 2012 for SSI. One possible explanation for this difference is our inclusion of repeat applications in the same year, though we did not fully consider this or other reasons.

⁷ One issue of note with the BRFSS obesity prevalence estimates is that the sampling frame for the survey changed in 2011 to include respondents by cell phone and use a new weighting methodology (CDC 2011). As a result, the CDC cautions that obesity prevalence from 2011 and beyond is not directly comparable to the previous years. Existing evidence suggests that the effect on obesity is not systematic (Fussman and Lyon-Callo 2012). We present the trend from

BRFSS during this time for comparison purposes to within-year adjustments to the applicant population, but note that there is a break between 2010 and 2011.

⁸ An important exception is in the measurement of race. Race in the SSA data comes from the Numident file and is missing for approximately 5 percent of applicants in 2013. “Missing” is not a category in the comparable survey data. Moreover, the SSA definition of race changed to include ethnicity in ways that would have affected our analysis subpopulation. For this reason, we used just three race categories—white, black, and other/missing. Even with this broad categorization, differences between the SSA and BRFSS categories likely remain.

⁹ We have omitted the percentage underweight from this table for ease of presentation; underweight adults comprised 2.8 percent of SSA disability applicants in 2013 and 1.8 percent of the working-age population. Because individuals with the most severe health conditions and those nearing death are often underweight, it is not surprising that a higher share of disability applicants is in this category. This is a small share of the total, however, so we do not present this group in what follows.

¹⁰ Because the share of total applications in SSDI-only, SSI-only, and concurrent changed during this period, the average of these three statistics does not produce the comparable number for the total applicant population over the same time.

¹¹ We focused on determinations made in these two years for illustration; the pattern in intermediate years was approximately a linear trend; results can be made available upon request. We used statistics in 2010 for the AC level due to few observations in earlier years; even for 2010, we have omitted allowance data due to very small numbers of cases in each weight group.

¹² For example, in 2013, the data show that only 98 underweight individuals received an allowance of the 2,924 who received a determination in that year.

¹³ We selected these conditions because they were the most prevalent among initial applicants in 2013.

¹⁴ The low allowance rates among applicants with missing body systems is notable. If these determinations had a body system recorded, they would necessarily reduce allowance rates in other body system groups. Yet, that reduction would not be large enough to substantively change the pattern of increasing allowance rates across higher BMI categories.

¹⁵ Because we observed a cross-section of determinations in each year, we are not able to ascertain the overall allowance rate for each applicant cohort. We estimated the overall allowance rate through the ALJ level using cross-sectional statistics and found that applicants with musculoskeletal conditions were the only body system for which allowance rates increased by BMI category. For other body systems, allowance rates either did not show a strong pattern by BMI category, or showed declining allowance rates as obesity increased. Following applicant cohorts until all AC appeals had been determined could shed additional light on these patterns.

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