Changes in Medicare Expenditures Associated with Overweight and Obesity, 1997-2006

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The health effects of excess weight may be changing in ways with significant implications for health care costs. Recent evidence suggests that mortality associated with obesity has declined since the 1970s, with declines concentrated in cardiovascular mortality.[1] At the same time, the association between obesity and disability appears to have increased.[2-4] Health care utilization and medication use may be critically important in preserving the health of obese persons and could contribute simultaneously to an increasing disease burden and to declining mortality among obese persons. The prevalence of measured high blood pressure and high total cholesterol have fallen rapidly in obese adults, primarily due to increases in lipid-lowering and antihypertensive medication.[5] Conditions such as diabetes are much more likely to be diagnosed and aggressively treated in obese persons today than they were in the late 1970s.[6] Gregg and colleagues[5] have noted that "the net result of these phenomena may be a population that is, paradoxically, more obese, diabetic, arthritic, disabled, and medicated, but with lower overall CVD risk."

It is unknown whether these changes in the health of the obese population are reflected in obesity-associated health care costs. Available estimates of changes in the health care costs associated with obesity have used the Medical Expenditure Panel Surveys (MEPS), which substantially underestimates spending. Using MEPS, Thorpe and colleagues found evidence of increased per-capita costs between 1987 and 2001,[7] but Finkelstein and colleagues did not find changes between 1998 and 2006.[8] Existing research has not examined these trends using Medicare claims data. The purpose of this paper is to examine whether trends in Medicare expenditures over time (1997-2006) differ by weight status.

Methods: The Medicare Current Beneficiary Survey (MCBS) is an ongoing nationally representative survey of Medicare beneficiaries conducted by the Centers for Medicare and Medicaid Services. Beneficiaries are selected through a stratified random sampling procedure and surveyed three times a year for up to three years in the Cost and Use Survey, which is linked to Medicare Part A and B claims, including ICD-9 diagnostic codes and payment amounts. This analysis included MCBS respondents surveyed between 1997 and 2006 who met the following inclusion criteria: (1) aged 65 and over; (2) residing in community settings; and (4) covered by both Part A and B at the beginning of the year. MCBS beneficiaries who are institutionalized, have Medicare HMO coverage, or were without both Part A & B benefits were excluded, because MCBS records do not contain complete expenditure data and diagnostic codes for these beneficiaries. The final study sample comprised 30,510 unique individuals who contributed 65,716 person-year observations for the analysis. All analyses used survey weights to provide estimates that are nationally representative of beneficiaries meeting the study inclusion criteria over the study period.

Self-reported height and weight were recoded into three body mass index (BMI) categories (weight in kilograms divided by height in meters squared): normal weight (BMI 18.5 – 24.9); overweight (BMI 25.0-29.9); and obese (BMI 30.0 and over). Because our analysis was focused on the health effects of excess weight relative to normal weight, and prior research has demonstrated that underweight is associated with poorer health, we excluded underweight participants. Outcomes included annual Medicare payments for Part A and B covered services, prescription drug spending, and combined total spending on services and drugs (all converted to constant 2006 dollars using the Consumer Price Index).

Demographic and socioeconomic covariates included age, sex, self-reported race/ethnicity, marital status, education, former recipient of Social Security Disability Insurance (SSDI), census region, metro status, income in relation to the Federal Poverty Level, prescription drug coverage, and a mortality variable indicating whether participants died during the follow-up period. Comorbid conditions were obtained from Medicare claims data.

We predicted spending for each person-year using a generalized linear model (GLM) with a gamma distribution and log link and used robust variance estimators to correct standard errors for repeated observations of the same individual. This specification was selected because the distribution of expenditures is heavily right-skewed and includes small numbers of zero spenders (<10%). This approach has important analytic advantages over more commonly employed log transformations.[9] We estimated three regression models with different controls to examine the association between obesity and Medicare spending, holding other factors constant. Model 1 predicted spending based only on BMI categories, time, and their interaction. Model 2 included demographic and socioeconomic covariates. Finally, Model 3 further controlled for 10 chronic conditions commonly linked to obesity, to determine whether the rising prevalence of chronic conditions accounts for trends in the association between excess weight and spending. Sensitivity analyses tested similar models for different obesity classes. All analyses were conducted in Stata Version 10.

*Results:*Figure 1 provides estimated expenditures by weight status over time. In 1997, Medicare Part A and B expenditures for obese persons were not significantly different from normal weight persons. Mean expenditures increased over time among all weight groups, but appeared to increase faster among obese beneficiaries: by 2006, the average Part A & B expenditures for an obese beneficiary were $8329, compared to $7817 among normal weight beneficiaries.

Table 1 provides marginal effects from regression models predicting expenditures based on weight status, time, and their interaction. Results from Model 1 show that the main effects of overweight and obesity are negative, indicating that overweight and obese patients actually cost less than normal weight patients at baseline. However, the interactions of overweight and obesity with time are positive and significant, showing that every year, costs for the overweight group grew by an average of $159 faster than for the normal weight group, and costs for the obese group grew by an average of $169 faster than the normal weight group ($p<.01$). These effects are still present after controlling for demographic and economic factors (Model 2). However, adjustment for chronic conditions reduces the BMI*time interactions to insignificance.

Discussion: Findings provide important information about changes in the health and health care of obese older persons over time.

Figure 1: Expenditures by weight status and time

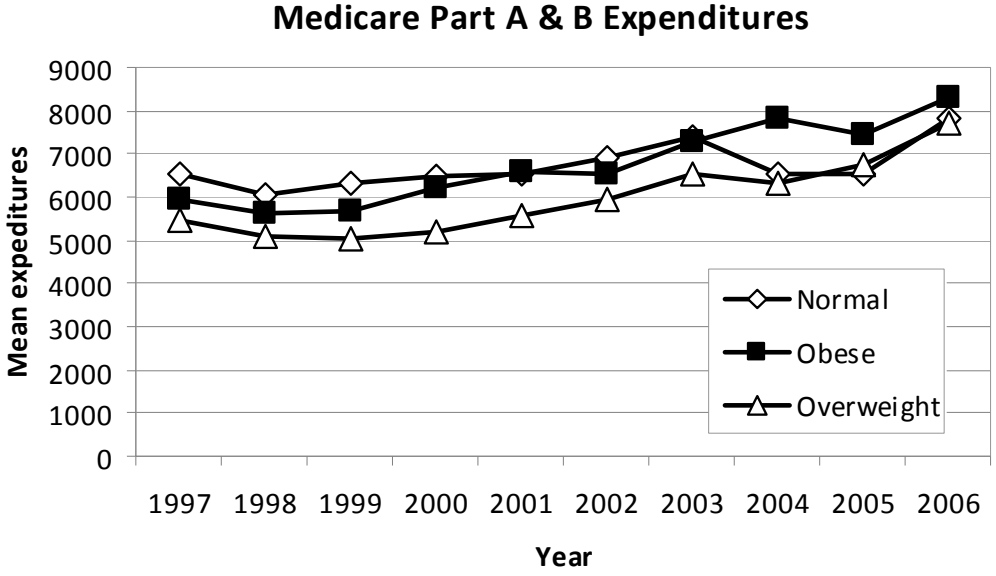

Table 1. Estimated Marginal Effects of Obesity and BMI Time trend on Medicare Part A and B Spending (all values in 2006 constant dollars)			
	Model 1: Unadjusted marginal effects	Model 2: Demographic & economic adjustment	Model 3: Adjustment for chronic conditions
Medicare expenditures			
Overweight	-1,466.04 (297.39)***	-1,117.84 (294.85) ***	-524.43 (146.34) ***
Obese	-732.18 (338.65)*	-504.72 (317.42)	-899.37 (158.69) ***
Time	111.07 (33.41)**	67.03 (33.38) *	47.78 (19.70) *
Overweight*time	158.51 (52.48) **	120.23 (51.25) *	13.78 (29.42)
Obese*time	168.78 (61.84) **	187.66 (59.51) **	39.02 (31.57)

*p<0.05, **p<0.01, ***p<0.001

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