

The economic impact of morbid obesity

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The percentage of Americans who are obese doubled from 15% in 1968 to 30% currently. An obesity epidemic is obvious and expected to worsen [1–5]. Lower productivity and higher health care costs resulting from obesity and its comorbidities have led to proposals for governmental intervention [6–10]. Methods for quantifying the costs of obesity costs and the benefits of treatment remain controversial [11–13]. Nonetheless, it is well established that about 10% of health care dollars are devoted to obesity treatment, which is economically justified by the increased absenteeism and decreased productivity associated with this disorder [14–19].

Bariatric surgery gives to the patient increased quality-adjusted life years [20]. A recent review of 18 trials involving 1,891 subjects concluded that surgical management of obesity yielded an average of 30 to 28 kg more weight loss than medical management after 2 years, with marked amelioration of obesity-related diseases such as diabetes, hypertension, and hypertriglyceridemia [21]. Metabolic syndrome, in particular, is cured by surgery in 95.6% of cases [22]. Ultimately, surgical management yields, at 5 years, a mortality rate 42% that of medical management and an 89% reduction in the relative risk of death [23].

That bariatric surgery benefits the health of patients is unquestioned. This review, however, focuses on the benefits of this surgery with respect to the general economy as

well as workers and insurers, exemplifying matters by analyzing the costs of diabetes, one of obesity's comorbidities.

Benefits of surgery to the economy as a whole

A recent study focused on obesity's economic impact on New Mexico's state-wide economy [24]. It was determined that the total labor income impact is nearly \$200 million, representing \$1,660 of output income per household and \$245 of labor income per household. Obesity costs New Mexico more than 7,300 jobs and cuts state and local tax revenues by more than \$48 million. In terms of people, the annual labor income impact totals nearly \$200 million, representing \$1,660 of output income per household and \$245 of labor income per household. In terms of the state economy as a whole, the annual labor income impact totals more than \$1.3 billion.

The current value, capitalized, of output losses alone, using a 5% net discount rate, exceeds \$26 billion. The total current value of benefits from surgery for all obese individuals is roughly \$6.7 billion. The results justify bariatric surgery costs in New Mexico if the current value of total surgical costs to the state does not exceed \$26 billion.

This analysis cannot be extrapolated to other states because of heterogeneity with respect to the impact on specialized regions, such as the Mexico-U.S. border, and on areas with differing population concentrations. Focused studies based on the particularities of the region in question are required for appropriate public health policy decisions. Moreover, when assessments of trends over time are required, time-series econometric analyses that, among other things, evaluate the data for autocorrelation usually are required [25].

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A great value of econometric models is their ability to estimate the effect of a change in an explanatory variable on a response variable, for example, to observe how market demand responds to a change in per capita personal income. The effect of bariatric surgery on the general economy requires further study. Although many studies suggest that bariatric surgical benefits outweigh their costs [13], others have not arrived at the same conclusion [4]. No matter what the conclusions of such analyses are, effective cost-reduction strategies will play a vital role in convincing payers concerning the value of bariatric procedures.

Benefits of surgery to workers and insurers

Some, but not all, studies show that obesity lowers wages [26, 27]. In terms of productivity, recent papers have shown that the cost of obesity among full-time employees is highly concentrated among those eligible for bariatric surgery, which is only one-third of the obese population; that there is increased work loss by the patients who are surgically ineligible; and that in less than 4 years, bariatric surgery yields a net economic gain. Benefits are greater among younger workers and higher-earning individuals [28–30]. Given that bariatric surgery has been shown to increase life expectancy, productivity benefits are likely underestimated.

From the insurer's perspective, the costs of the surgery are balanced against the costs of morbidly obese insured persons. In one study [31], the medical expenses of morbidly obese members were 1.4 to 2.8 times that of other members. The difference for men (\$16,000 vs \$6,000) was greater than for women (\$11,000 vs \$8,000). From this finding, the authors deduced that the costs of surgery would be amortized in less than 3 years. Because the cost of obesity is likely to increase over time [32], a net economic benefit of surgery to the insurance company, if cost reduction is achievable, will occur at shorter and shorter intervals after the surgery.

The economic impact of type 2 diabetes mellitus

Bariatric surgery resolves type 2 diabetes mellitus for most of those afflicted with this problem [33]. Because of the impact on public health funding, expensive studies have been funded to evaluate pathogenesis and therapy [34, 35].

The American Diabetic Society estimate that in 2007, diabetes cost the U.S. economy \$116 billion in excess medical expenditures, \$58 billion in reduced national productivity, \$27 billion for direct care treatment of diabetes, \$58 billion to treat the portion of diabetes-related chronic complications attributed to diabetes, and \$31 billion in

excess general medical costs [36]. Diabetic individuals incur an average of \$11,744 in medical expenses, \$6,649 of which is directed specifically at diabetes treatment. The largest components of medical expenditures attributed to diabetes are hospital inpatient care (50% of the total cost), diabetes medication and supplies (12%), retail prescriptions to treat complications of diabetes (11%), and physician office visits (9%).

Nondiabetic persons incur about 2.3 times less medical expense. Diabetes costs the U.S. labor workforce \$60 billion due to absenteeism, reduced labor productivity, unemployment due to disease-related disability unemployment, and early mortality. Part of the cost is attributable to diabetic comorbidities including insulin resistance, hypertension, coronary artery disease, cancer, arthritis, stroke, and diabetes mellitus [37, 38].

Although diabetes can sometimes be controlled through diet and exercise or by pharmaceutical intervention, bariatric surgery offers a permanent solution, precedent to significant weight loss [39, 40] for reasons that remain the subject of investigation [41–43]. Irrespective of the reason that bariatric surgery works, its economic value can be seen from the preceding analysis of one of obesity's comorbidities.

Conclusions

Obese patients are not in the same position as large financial institutions. They cannot expect trillions of bailout dollars simply because they are too large to fail. Instead, cost-benefit analyses are required if an overburdened health care system is to be persuaded to provide expensive surgery. Costs of obesity, as demonstrated in this report, can be divided into costs to the economy in general and to workers and insurance companies in particular. Costs can and should be assessed with respect to the varied complications of obesity, as shown by the analysis of diabetes. By such means as described, bariatric surgery's savings to the medical system might be demonstrated, most clearly 2–3 years postoperatively [11, 20, 44, 45].

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