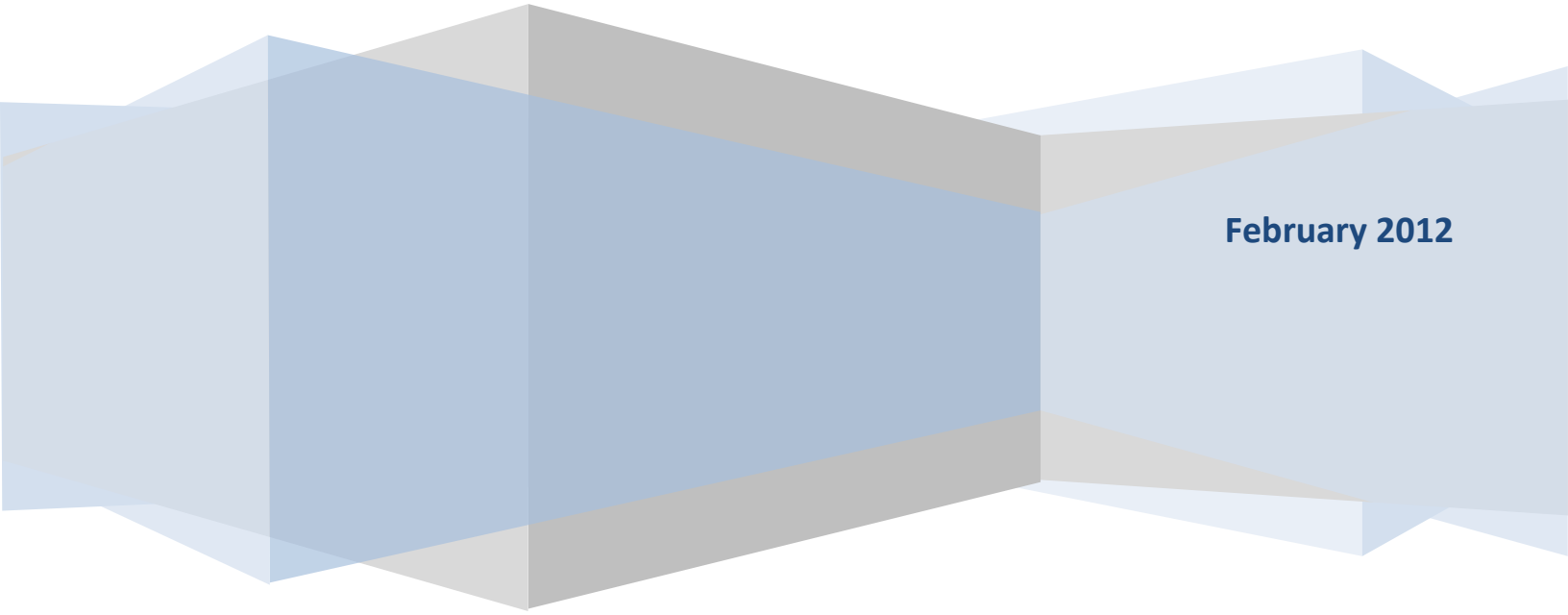
CAMPAIGN TO END OBESITY

Assessing the Economics of Obesity and Obesity Interventions

MICHAEL J. O'GRADY, PhD, AND JAMES C. CAPRETTA, MA



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About the Authors

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He is a veteran health policy expert with 24 years working in Congress and the Department of Health and Human Services (HHS). From 2003 to 2005, Dr. O'Grady was the Assistant Secretary for Planning and Evaluation at HHS, where he directed both the policy development and policy research across the full array of issues confronting the Department. Prior to ASPE, Dr. O'Grady served as the senior health economist on the majority staff of the Joint Economic Committee of the U.S. Congress. Previously, he held senior staff positions at the Senate Finance Committee, the Bipartisan Commission for the Future of Medicare, the Medicare Payment Advisory Commission and the Congressional Research Service at the Library of Congress. He received a Ph.D. in political science at the University of Rochester.

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Since leaving government service, Mr. Capretta has become a frequent public commentator on health care and fiscal policy matters. He serves as a Fellow at the Ethics and Public Policy Center and a Principal at Civic Enterprises, LLC, where he is a policy and research consultant. Mr. Capretta received an MA from Duke University in public policy studies.

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Executive Summary

Rising obesity rates in the United States are not only a serious public health challenge but a critical economic issue as well. Over the past half century, the percentage of Americans who are obese or extremely obese has been on a pronounced upward trajectory. In 1961 about 14.3 percent of the public was obese or extremely obese; by 2008 more than 40 percent fell into these categories.[1]

The goal of this paper is to answer a number of questions, including:

1. What is the latest and best evidence on the size and nature of the obesity epidemic?
2. What is the latest and best evidence on the health care spending associated with obesity?
3. What are the best projections of the future size of the overweight and obese population?
4. What are the best projections of future health care costs associated with being overweight or obese?
5. Is there a reasonable array of interventions to fight obesity that have been proved clinically effective, as well as cost effective or cost-saving?
6. Can the current modeling done by both the Congress and the Administration be enhanced using the latest and best scholarly research to improve projections for policymakers?

To answer these questions, an examination of the peer-reviewed literature was conducted. We limited ourselves to scientific journals, and mainly to those in medicine and economics. We did this not only to ensure scientific rigor but also because those are the types of studies considered by the medical and economic experts who advise policymakers, e.g., the U.S. Preventive Services Task Force (USPSTF) and the Congressional Budget Office (CBO).

It has been thoroughly documented that obesity is associated with the development of debilitating and costly chronic conditions, including diabetes, heart disease and hypertension. Consequently, as the population has become more obese, added cost burdens have been placed on the health care system, including the major taxpayer-financed insurance programs, Medicare and Medicaid. Our comprehensive review of the literature on this subject suggests that the more we look into the costs of obesity, the more daunting they appear.

More encouraging, we find that various interventions have already been designed and tested and that several have shown promising results in peer-reviewed evaluations. We focused on rigorous studies of different interventions, their clinical effectiveness, and their cost implications. Some interventions are better documented and studied than others. Many have been covered in the

[1] Ogden, Cynthia L. and Margaret D. Carroll. "Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, Trends 1960–1962 Through 2007–2008," by, Division of Health and Nutrition Examination Surveys, National Center for Health Statistics, CDC, HHS. June 2010. http://www.cdc.gov/NCHS/data/hestat/obesity_adult_07_08/obesity_adult_07_08.pdf

media and trade journals, but that "gray literature" was, for the most part, not considered in this review.

The full benefit of these interventions, however, is not likely to be reflected in the conventional measurements provided to federal policymakers. During recent health care reform efforts, for example, a vibrant debate occurred over the true costs and savings associated with prevention initiatives, for both the government and the broader health system. Proponents of such initiatives, however, could not provide enough acceptable evidence to win the day.

The most important audience for that debate is the budget estimators at the Congressional Budget Office (CBO). In theory, CBO acknowledges that prevention efforts actually might improve health and lower costs by reducing use of expensive medical care. In practice, however, large impediments keep us from moving forward, particularly a mismatch between the timing of costs and benefits.

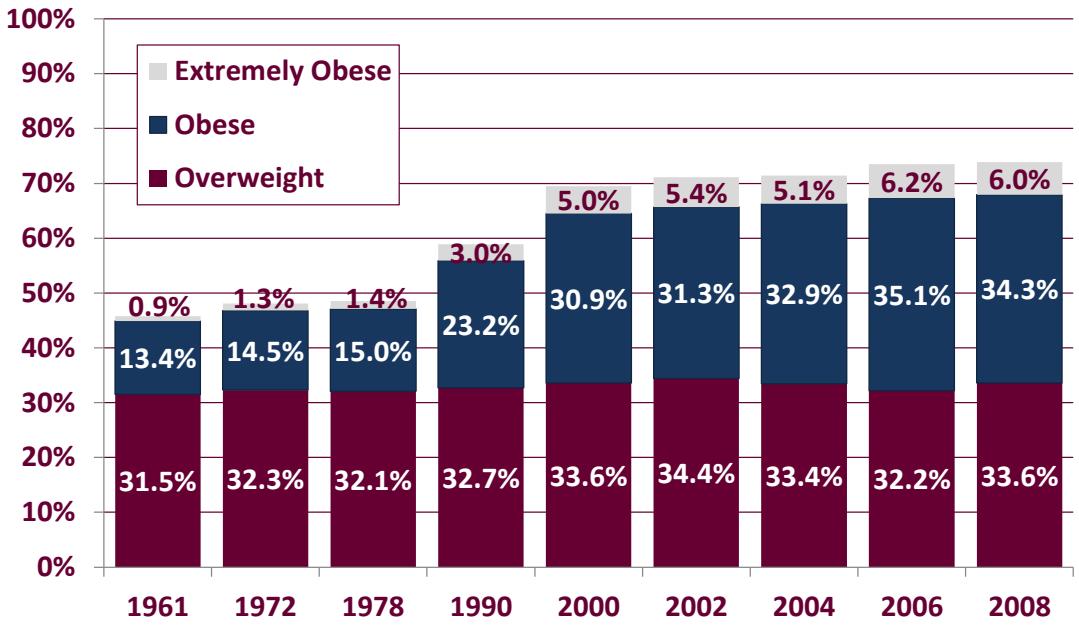
As this paper examines the costs of obesity – present and future – and reviews the array of programs currently available to prevent and treat obesity, it also seeks to bridge the gap between those programs and how policymakers measure the benefit of policies to address chronic diseases like obesity. More specifically, we describe how CBO cost estimates, which generally cover a ten-year budget window and no farther, do not factor in many of the costly complications associated with obesity that take longer than ten years to manifest themselves. An obesity intervention that reduces complications in later years can thus appear less effective than it really is. The cost of providing the intervention are fully counted, but the offsetting savings from avoiding complications like diabetes and heart disease are only partially included in the estimate.

While the CBO ten-year budget window may be appropriate for many federal programs, in cases where the trajectory of a disease plays out over longer periods, we argue that the only way to give policymakers an accurate analysis of their policy options is to go beyond the traditional ten-year window. We therefore recommend that, in certain cases, CBO produce cost estimates for legislation covering a 25-year period instead of just ten years. It is also necessary to build more rigorous modeling capability, taking into account the scientific literature on natural disease progression to forecast more accurately the effect of interventions on improving health status and the spending to care for those complications. This enhancement would allow changes in the participants' health status and out-year spending to be measured as accurately as good modeling will allow, and we believe it would improve the policymaking process for obesity interventions and other public health measures as well.

The Rise in U.S. Obesity

There is no doubt that the percentage of Americans who are obese or extremely obese has been climbing for several decades. The National Center for Health Statistics at the Centers for Disease Control and Prevention (CDC) has provided policymakers and the public with rigorous evidence of this. Exhibit 1 presents some of this data.

Exhibit 1 –
The Rise in Obesity in the U.S. 1961-2008
(ages 20 and older)



Source: http://www.cdc.gov/NCHS/data/hestat/obesity_adult_07_08/obesity_adult_07_08.pdf

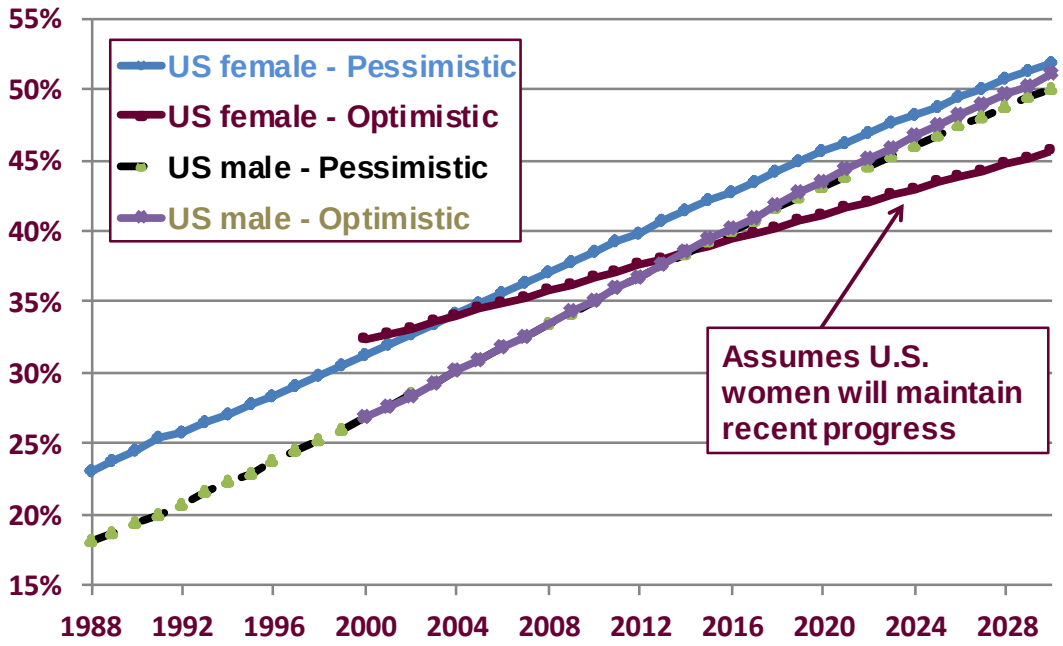
The most disturbing aspect of this evidence is that extreme obesity has grown from just under 1 percent of the population to 6 percent – six times what it was 50 years ago. The obese, but not extremely obese, population grew more than two-and-a-half times over the period, from 13.4 percent to 34.3 percent of the population.[2] The portion of Americans who are overweight held relatively constant at about one-third of the population, but it is clear that this really is not the same population from the earlier era. People who would have been normal weight in the 1960's are now overweight; people who would have been overweight are now obese, and people who would have been obese are now extremely obese.

[2] Obesity is a clinical term used to refer to an individual with a body mass index (BMI) of 30 or more. Extreme obesity refers to individuals with a BMI greater than 40. Body Mass Index (BMI) is a number calculated from a person's weight and height. BMI provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems.

Future Trends in U.S. Obesity

Nor is there much doubt that the nation is heading toward a further rise in obesity. Exhibit 2 displays U.S. projections through 2030, developed as part of recent research funded by the CDC and the Robert Wood Johnson Foundation.[3]

Exhibit 2 – Projections of Obesity Under Optimistic and Pessimistic Scenarios



Source: Y. Claire Wang, Klim McPherson, Tim Marsh, Steven L Gortmaker, Martin Brown. "Health and economic burden of the projected obesity trends in the USA and the UK," *Lancet*, 2011; 378: 815–25.

The research team applied two scenarios to their projections. First, a more pessimistic scenario projected to 2030 the same trend U.S. males and females have shown since the late 1980's. Second, a more optimistic scenario incorporated progress made since 2000 in slowing the increase in obesity. It assumed that the slower trend since 2000 was a better predictor of future obesity rates. This slower trend is significantly different only for U.S. women. The rate of obesity increase has not eased substantially for U.S. men in recent years.

Under either scenario, obesity rates for both men and women continue to rise. Under the more optimistic scenario, 45.6 percent of women are projected to be obese by 2030, less than the 51.9

[3] Y. Claire Wang, Klim McPherson, Tim Marsh, Steven L Gortmaker, Martin Brown. "Health and economic burden of the projected obesity trends in the USA and the UK," *Lancet*, 2011; 378: 815–25. Only the study's U.S. results are shown here, not those for the United Kingdom.

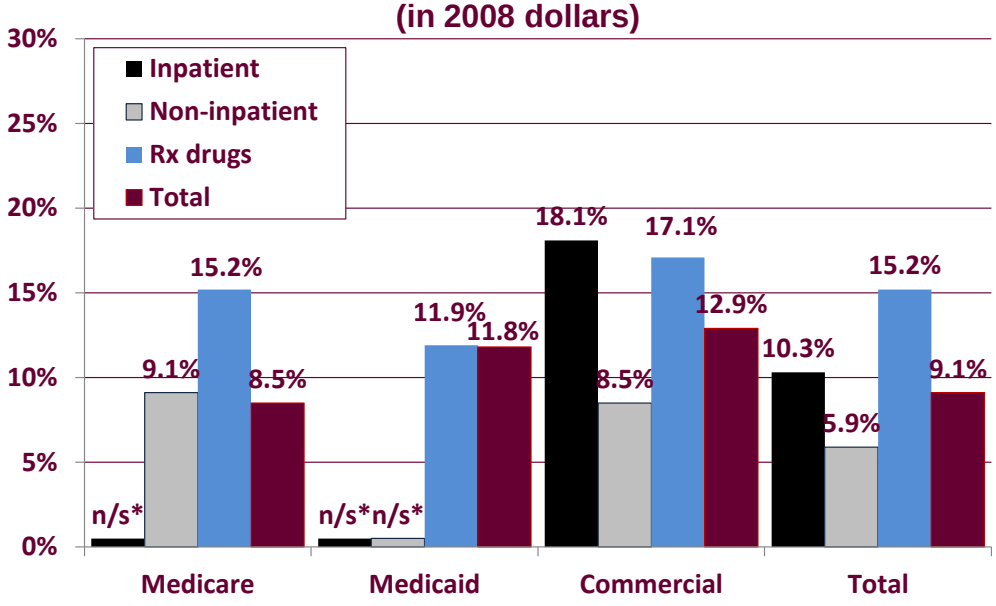
percent of women who are forecast to be obese under the more pessimistic scenario. While it obviously would be better if U.S. women were able to maintain the progress they have made since 2000, both estimates still amount to a serious public health concern.[4] As noted, the estimates for U.S. men do not differ in any meaningful way between the two scenarios. Under the optimistic scenario men have a 50.1 percent obesity rate by 2030, while under the pessimistic scenario they have a 51.1 percent obesity rate.[5]

The Price of Obesity

It is also clear that obesity is having a major impact on U.S. health spending. The most recent and most cited estimates of the costs of obesity come from a 2009 study by CDC and the Agency for Healthcare Research and Quality (AHRQ).[6] The main finding of the study, "Annual Medical Spending Attributable to Obesity: Payer and Service Specific Estimates," was that "estimates show that the annual medical burden of obesity has risen to almost 10 percent of all medical spending and could amount to $147 billion a year in 2008."[7] Exhibit 3 and 4 display some of the study's more pertinent findings. Exhibit 3 shows the percentage increases in health care spending associated with obesity. Exhibit 4 displays the actual dollar amount of increased spending associated with obesity.

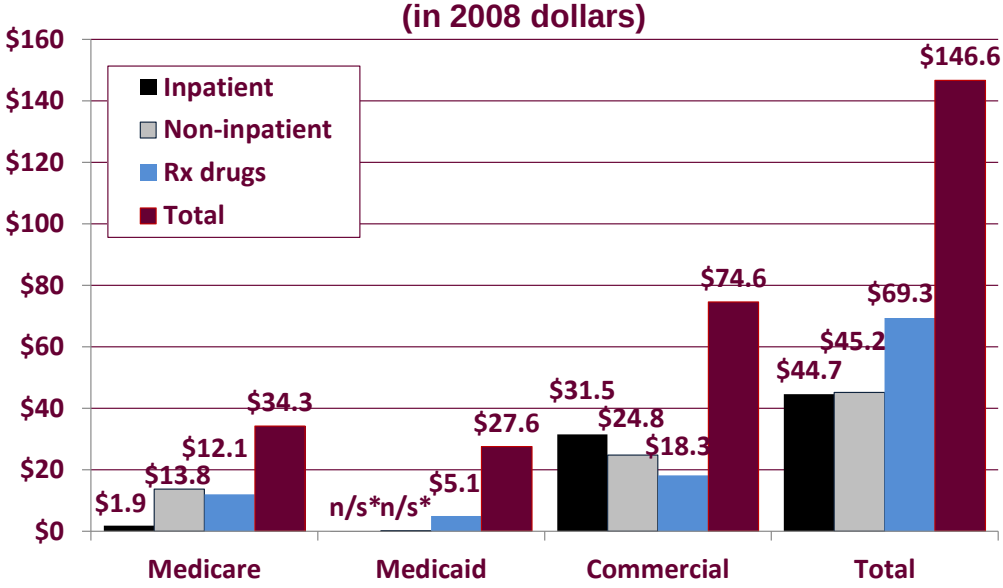
[4] Given the uncertainties of projecting so far into the future, it could of course be argued that the difference between the two estimates is, at any rate, not statistically significant.
[5] Recent studies conducted by the Centers for Disease Control and Prevention indicate that obesity rates, in certain populations, have leveled off since 2000.
[6] Both CDC and AHRQ are agencies within the U.S. Department of Health and Human Services (HHS).
[7] Eric A. Finkelstein, Justin G. Trogdon, Joel W. Cohen, and William Dietz, "Annual Medical Spending Attributable to Obesity: Payer and Service Specific Estimates." *Health Affairs*, 28, no.5 (2009):w822-w831.

Exhibit 3 –
Increased Spending Associated with Being Obese:
Percentage Increase by Payer and Service
(in 2008 dollars)



n/s = No statistically significant difference attributable to obesity.
Source: Eric A. Finkelstein, Justin G. Trogdon, Joel W. Cohen, and William Dietz, "Annual Medical Spending Attributable to Obesity: Payer and Service Specific Estimates." *Health Affairs*

Exhibit 4 –
Increased Spending Associated with Being Obese:
Dollar Increase by Payer and Service
(in 2008 dollars)



n/s = No statistically significant difference in spending attributable to obesity.
Source: Eric A. Finkelstein, Justin G. Trogdon, Joel W. Cohen, and William Dietz, "Annual Medical Spending Attributable to Obesity: Payer and Service Specific Estimates." *He*

Here is a look at the three insurance payers and the obesity-linked impacts on key expenditures.

A. MEDICARE. When they analyzed Medicare spending patterns, the research team did not find a significant effect on Medicare inpatient spending.[8] However, as Exhibit 3 shows, they found that non-inpatient care was 9.1 percent higher than it would have been without the rise in obesity. They also found obesity associated with a 15.2 percent spending increase for pharmaceuticals**.** Overall, obesity was found to have pushed up Medicare spending by 8.5 percent.

When they analyzed actual dollars spent, the researchers identified an additional $1.9 billion in Medicare inpatient spending associated with obesity – a small sum compared to the $13.8 billion in non-inpatient care, and the $12.1 billion in increased pharmaceutical outlays, that they found to be linked to obesity. The overall effect was that obesity was associated with $34.3 billion in higher Medicare spending.

B. MEDICAID. Medicaid showed similar patterns, with a few important exceptions. The researchers did not find statistically significant spending difference for either inpatient or non-inpatient services. They did, however, find that Medicaid drug outlays were significantly affected – up 11.9 percent. Obesity also was associated with an 11.8 percent increase in total Medicaid expenditures.

Medicaid spending sums in Exhibit 4 showed similar patterns to those found in Figure 3. The research team did not find statistically significant spending differences in Medicaid for either inpatient or non-inpatient services. They did, however, find that Medicaid drug expenditures were significantly higher due to obesity – up $5.1 billion. Overall, obesity was associated with $27.6 billion in higher Medicaid spending. [9]

C. COMMERCIAL INSURANCE. Exhibit 3 shows that obesity has an even greater impact on costs in the commercial health insurance sector. Inpatient spending was 18.1 percent higher for commercial insurers due to the rise in U.S. obesity. Non-inpatient care was 8.5 percent higher, and pharmaceutical spending was 17.1 percent higher. The overall effect was a 12.9 percent spending increase associated with obesity. The report did not provide a hypothesis for why commercial health insurance outlays for obesity care were so much higher than those for public insurance programs.

[8] This result highlights an important point about direct versus indirect effects of obesity. These researchers did not find a direct effect on hospital spending associated with obesity. At the same time we know that inpatient spending for Medicare beneficiaries with diabetes averaged $6,756, compared to inpatient spending for people without diabetes that averaged $2,787. Given that we know that obesity is a primary contributor to the development of diabetes the implied indirect effect is substantial. (Source: Medicare 5% Sample LDS SAF Claims and Enrollment Data, Average Spending Per Enrollee – 2008).

[9] The substantial difference between the estimated effects on pharmaceutical spending versus total spending, i.e., five times larger, would imply that the non-significant results for inpatient and non-inpatient spending may have been caused by small sample size.

Commercial insurance inpatient spending was $31.5 billion higher due to higher obesity rates, according to the study. Non-inpatient costs were up $24.8 billion and pharmaceutical spending increased by $18.3 billion. The overall effect was $74.6 billion in higher spending by commercial health insurers because of obesity.

D. TOTAL SPENDING. Across all payers, higher levels of obesity in the U.S. population were associated with increases of:

- 10.3 percent, or $44.7 billion, for inpatient services.
- 5.9 percent, or $45.2 billion, for non-inpatient services.
- 15.2 percent, or $69.3 billion, for pharmaceutical services.
- 9.1 percent, or $146.6 billion, across all services.

Importantly, the research team also concluded that "our estimates reveal that the 37 percent increase in obesity prevalence, and not per capita cost increases, was the main driver of the increase in obesity-attributable costs between 1998 and 2006."[10] In other words, these higher costs cannot mainly be ascribed simply to the broader trend of rising health costs but to the burden on the health system linked to patients suffering from more ailments due to their obesity.[11]

ARE EXPENDITURES ACTUALLY EVEN HIGHER? Other research suggests that actual spending related to overweight and obesity could be much higher. A report from the Society of Actuaries (SOA) looked at both the United States and Canada and included mortality and disability costs as well as medical costs. The SOA report concluded:

> In summary, the total economic cost of overweight and obesity in the United States and Canada caused by medical costs, excess mortality and disability is approximately $300 billion per year. The portion of this total due to overweight is approximately $80 billion, and approximately $220 billion is due to obesity. The portion of the total in the United States is approximately 90 percent of the total for the United States and Canada."[12]

[10] Eric A. Finkelstein, Justin G. Trogdon, Joel W. Cohen, and William Dietz, "Annual Medical Spending Attributable to Obesity: Payer and Service Specific Estimates." *Health Affairs*, 28, no.5 (2009):w822-w831.

[11] The same research team has developed a newer version of their model, which should be released soon. Whether their estimates will increase, decrease or remain roughly the same should be known before too long.

[12] Behan, D. and Cox, S. "Obesity and its Relation to Mortality and Morbidity Costs." © 2010 Society of Actuaries page 59..

The estimates are higher for a number of reasons. They include both the US and Canada, but perhaps more importantly they include indirect spending associated with obesity, i.e., productivity losses due to excess mortality, disability and workers totally unable to work.[13]

Another study, by Cawley and Meyerhoefer, has solved what is called the causality problem, applying more sophisticated modeling techniques than those used in the past. Researchers long have been stymied by the causality problem. Does obesity cause other medical problems, or do other medical problems cause obesity? Was obesity the cause or the effect? If victims of car accidents are immobilized for months, they could certain become obese, but we wouldn't say that obesity caused the spending related to the car accident. Most estimates measure how obesity and other conditions and spending are associated, but cannot say whether obesity caused the other medical condition or the other medical condition caused the obesity.

Cawley and Meyerhoefer separated the obese into two subpopulations: 1) people for whom obesity was the effect, not the cause and 2) people for whom obesity was the cause, not the effect. In the subpopulation where obesity was the cause, they found the following increases in estimated per-person costs:

- Prescription drug spending was 249 percent higher.
- Outpatient spending was 226 percent higher.
- Inpatient spending was 846 percent higher.[14]

Cawley and Meyerhoefer didn't attempt calculations beyond the per-person estimates (e.g., nationwide, Medicare or Medicaid), so further work is necessary.

Obesity Spending in the Future: CBO Scenarios

Hopefully Finkelstein, et al, are correct and spending per obese patient is not growing any faster than other health care expenses. However, the number and percentage of obese patients is nonetheless growing. To shed some light on this trend, CBO developed a series of scenarios of the future size of the obese population and associated health spending for their medical needs. While CBO was careful to stress that the scenarios were strictly hypothetical, they nonetheless shed light on the economic implications of a growing obese population.

CBO's three scenarios were specified as follow:

> **Scenario 1: Distribution by Body Weight Remains Unchanged from 2007.** Under this scenario, individuals within each demographic category – grouped by age, sex, and race – do not become heavier over time, but body weight continues

[13] Ibid.
[14] Cawley, J. and C. Meyerhoefer," The Medical Care Costs of Obesity: An Instrumental Variables Approach." *Journal of Health Economics,* forthcoming, Table 4.

to rise slightly because of population aging and other shifts among demographic categories. Under those assumptions, the share of obese adults would remain at about 28 percent in 2020, and spending per adult would rise from $4,550 in 2007 to $7,500 in 2020 (see Table 3) – largely as a result of the underlying trends in health care that are projected to increase spending for all adults regardless of weight (all dollar figures are in 2009 dollars).

Scenario 2: Distribution by Body Weight Changes at the Average Annual Rates for the 2001–2007 Period. This scenario assumes that recent trends in adults' body weight continue. By 2020, the share of obese adults would reach 37 percent. Projected spending per capita would be $7,760 – about 3 percent higher than in the first scenario.

Scenario 3: Distribution by Body Weight Returns to the 1987 Distribution by 2027. This scenario represents a reversal of the sharp rise in the percentage of the adult population with above-normal weight that has occurred since 1987. That steep decline would result in 20 percent of adults being obese in 2020. Projected spending per capita would be $7,230 – that is, 4 percent lower than in Scenario 1 and about 7 percent lower than in Scenario 2. Even though obesity rates in this scenario would be lower in 2020 than in 2007, health care expenditures per capita would be higher, reflecting a continuing increase in underlying health care spending and in the gap in outlays between normal-weight and obese adults.[15]

Exhibit 5 displays the results from the CBO simulations. CBO projected both the size of the obese population and how larger and smaller obese populations would change average per-person health care spending. Average per-person expenditures are expected to grow over the period for a myriad of reasons not associated with the obesity rate of the underlying population, but the CBO estimates show the contribution to cost trends that obesity can make. The CBO simulations projected both the obesity rates and spending per capita from 2007 to 2020.

Despite accusations of institutional pessimism, all three CBO scenarios are moderately to extremely optimistic about future U.S. obesity rates. Scenario 1 assumes that obesity rates will hold at their 2007 level for the rest of the period. Scenario 2 assumes they will grow at slower rates than long-term trends would indicate. Scenario 3 assumes that obesity rates will fall back to 1987 levels. In effect, the most pessimistic CBO scenario, Scenario 2, is almost identical to the optimistic scenario displayed in Exhibit 2.

Even under these somewhat optimistic assumptions, these simulations highlight important aspects of obesity's contribution to future medical spending.

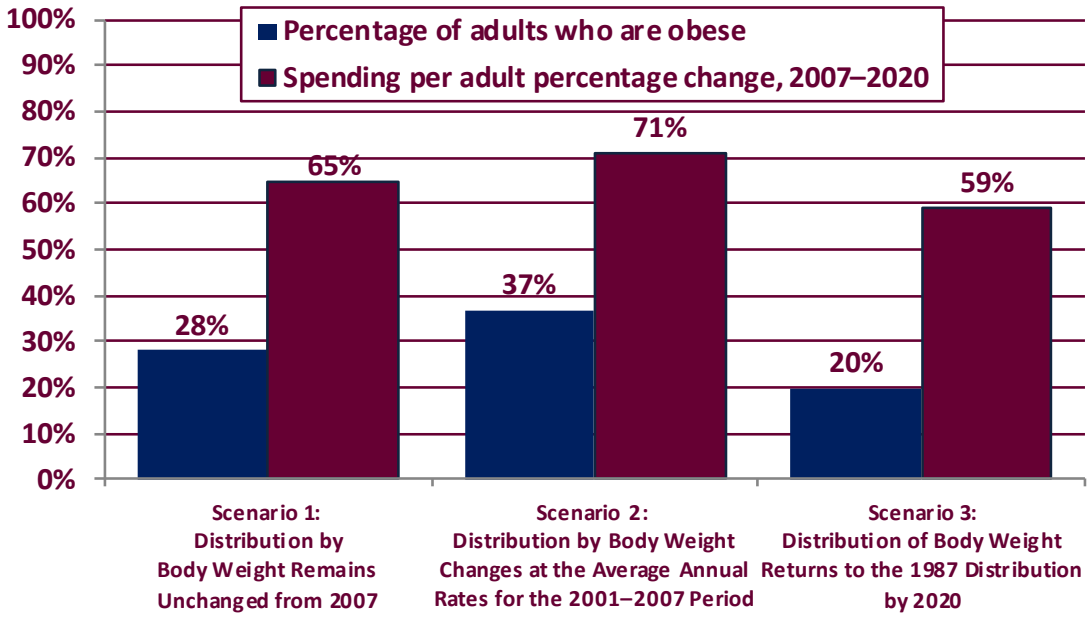
[15] Duchovny, N. and Baker, C., "How Does Obesity in Adults Affect Spending on Health Care?" Economic and Budget Issue Brief, Congressional Budget Office, September 8, 2010 - page 9.

Scenario 1, the moderately optimistic scenario, shows the effect of freezing obesity rates at their 2007 level. The population remains at 28 percent obese through 2020. Per-person medical spending grows by 65 percent, or an average of 3.9 percent a year.

Scenario 2, the least optimistic scenario, shows the effect of obesity continuing to grow, but at the more recent slower rates (especially for American women – see Exhibit 2). The obese population grows from 28 to 37 percent of the U.S. population. Per-person medical spending grows by 71 percent, or an average of 4.2 percent a year.

Scenario 3, the most optimistic scenario, assumes obesity rates will fall to their 1987 level of 20 percent of the U.S. population. Per-person medical spending grows by 59 percent, or an average of 3.6 percent a year.

Exhibit 5 –
CBO Projected Prevalence of Obesity and Health Care Spending per Adult in 2020 Under Alternative Scenarios



Source: Duchovny, N. and Baker, C., "How Does Obesity in Adults Affect Spending on Health Care?." Economic and Budget Issue Brief, Congressional Budget Office, September 8, 2010.

While the differences here may not seem large, it is important to consider the policy context. In much of the discussion of health care financing and the long-term financial viability of programs like Medicare, the underlying problem is that spending growth is outstripping revenue growth. Our ability to pay for health care, whether it's our own health insurance premiums or the nation's funding of programs like Medicare, relies on our expenses growing at an affordable rate compared to the growth of our income. Gross Domestic Product (GDP) is a commonly used

proxy for both growth in personal income and government revenues. Health care programs that grow at the same rate as GDP, or not much faster, are generally considered financially viable. Programs that outstrip GDP by more than a percentage point, especially when it occurs year after year, are considered financially vulnerable in the long term.

CBO's most recent projections of GDP average 2.9 percent annually for the years 2011 through 2020.[16] Using the GDP+1 percent as a rough standard for financial viability, Scenario 1 and Scenario 3 both meet the rule of thumb, but Scenario 2 does not. The policy "take away" is that controlling obesity has a large enough effect on cost trends that it can make the difference between a health care program being financially viable or financially vulnerable in the long term. This is a particularly vital piece of information for large entitlement programs such as Medicare, Medicaid and the new generation of exchanged-based health insurance subsidies.

Obesity Interventions

So what would it take to achieve the reductions CBO simulated? What tools have been tried? How effective are they in reducing obesity and in maintaining those reductions over time? And what do they cost?

To answer these questions, a review of the peer-reviewed literature was conducted. We focused on rigorous studies of different interventions, their clinical effectiveness, and their cost implications. Some interventions are better documented and studied than others. Many have been covered in the media and trade journals, but that "gray literature" was, for the most part, not considered in this review. We limited ourselves to scientific journals, and mainly to those in medicine and economics. We did this not only to ensure scientific rigor but also because those are the types of studies considered by the medical and economic experts who advise policymakers, e.g., the U.S. Preventive Services Task Force (USPSTF) and the CBO.

Given that our intent was to identify possible interventions that meet both clinical and cost goals, we constrained our analysis in two ways:

1) We did not look at studies that had clinical outcome data, but no cost data. We included studies that used a range of methods to examine cost, e.g., cost effectiveness analysis and return on investment analysis. However, the "price of admission" was rigorous cost data and a sophisticated analysis to show the effect on costs.
2) We focused on studies where cost was within the range generally accepted by policymakers. Those generally accepted limited are discussed below. However, we did not include interventions that were so expensive that they were unrealistic as a practical policy option.

[16] Congressional Budget Office. "The Budget and Economic Outlook: An Update," August 2011, page 33.

We used two categories for analyzing interventions: clinical and economic. Clinical considerations focus on the effectiveness of interventions over current treatments, or clinical effectiveness. Economic considerations weigh the cost of interventions and any offsetting savings related to the improved clinical outcomes. Such cost effectiveness, however, is different from cost saving. Few clinical interventions, after all, save money. A heart bypass, for example, is not expected to save money. It is performed for its clinical benefits. However, there is a tradeoff between incremental improvements in clinical effectiveness and the cost of the intervention.

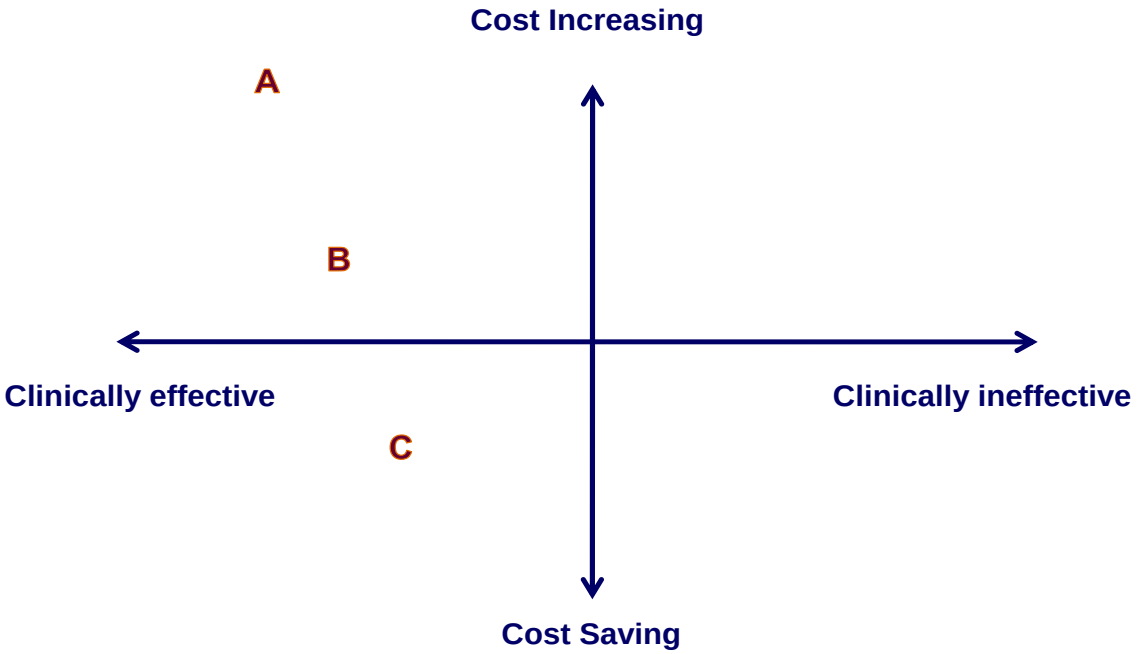
Exhibit 6 demonstrates this tradeoff between medical and economic considerations. Clinical effectiveness is a necessary condition before cost is ever considered. If a treatment doesn't work, there is no need to calculate its costs. The top half of Exhibit 6 shows the ranking of interventions if only clinical effectiveness is considered. The lower half shows how decision-making is more complicated when cost is taken into account. Is the incremental increase in clinical effectiveness worth the increased cost of the intervention? One way of measuring this balance between clinical benefit and cost is through quality adjusted life years (QALY). The calculation of the QALY measures the amount of clinical benefit achieved for the dollars spent. In this way it provides within a single data point the tradeoff between clinical improvement and cost.

In the U.S. commercial insurance market, a cost-effective intervention is one that provides the equivalent of an additional quality year of life at a cost of under $100,000. Other countries use other thresholds. For instance, the National Health Service in the United Kingdom has a threshold that is about half of the standard U.S. amount.

Exhibit 6 - Interactions Between Medicine and Economics

(clinical considerations)

(clinical and economic considerations)



As we consider each of the individual interventions, it is important to keep some caveats in mind:

- First, these studies looked at a range of health risks, not just obesity. It is difficult, therefore, to isolate whether progress was made explicitly against the health risks associated with being overweight or obese.

- Second, all peer-reviewed research reflects a bias toward publication of successful interventions. Editors are much more interested in publishing articles about what works than about what doesn't work.

- Third, there is always a question of "scalability." Can successful results found in one place or with one employer be expected to be successful elsewhere or everywhere? For example, most workplace interventions are sponsored by large employers with the capacity to implement them. Generalization across all employers is therefore far from certain.

- Fourth, as discussion turns to how these studies might be used in policy decisions, we have to consider the standards used by official scorekeepers to assess programs. This is why we have limited our analysis to the peer-reviewed literature. The official scorekeepers take into consideration these caveats. This means that interventions that show they can be effective across multiple sites and populations are more persuasive. It also means that proposals that more closely match the parameters of the successful interventions will raise fewer concerns about scalability.

A number of interventions have been attempted and then evaluated for cost effectiveness and/or return on investment. The next illustration, Exhibit 7, displays some of the interventions that also had rigorous cost-effectiveness or return-on-investment evaluations of both the clinical outcomes and costs of the intervention. The interventions and evaluations are organized by the following approaches to combating obesity:

- School-Based Intervention
- Community-Based Intervention
- Pharmaceutical Intervention
- Surgical Intervention
- Workplace Intervention

Exhibit 7 – Cost Per Quality-Adjusted Life-Year (QALY) Saved Of Interventions to Prevent or Reduce Obesity

Intervention	Description	Estimated cost per QALY saved	Reference
School-Based Intervention			
Coordinated Approach to Child Health (CATCH)	Comprehensive intervention in elementary schools	$900	Brown et al. (2007)[11]
Planet Health	Comprehensive intervention in middle schools	$4,305 for females; not effective for males	Wang et al. (2003)[13]
Community-Based Intervention			
Wheeling Walks	Communitywide campaign using paid media to encourage walking among sedentary adults	$14,286	Reger-Nash (2004)[16]
Stanford Five-City Project	An integrated, community-wide health education intervention for improving physical activity.	$68,557	Young (1996)[18]
Walking to meet health guidelines	Training session involving walking maps and handouts on strategies and support maintaining a walking program.	$27,373	Lombard (1995)[20]
Environmental change	Exposure to a more active lifestyle (bike paths, fitness center, cycling, running).	$28,548	Linenger (1991)[22]
Behavioral therapy; personal trainers and incentives	Use of personal trainers, behavior-therapy, financial incentives, and calls to increase physical activity	$29,759	Jeffery (1998)[24]
Diabetes Prevention Program (DPP)	Intensive program for adults at-risk of type 2 diabetes. Exercise, diet and behavior modification.	$46,914	Knowler (2002)[26]
Pharmaceutical Intervention			
Xenical (orlistat)	Anti-obesity drug that inhibits absorption of, and promotes excretion of, dietary fat.	$8,327	Maetzel et al (2003)[29]

Exhibit 7 - Cost Per Quality-Adjusted Life-Year (QALY) Saved Of Interventions to Prevent or Reduce Obesity – (CONTINUED)

SURGICAL INTERVENTION			
Gastric bypass (older)	Limits food intake by reducing the effective size of the stomach and bypassing part of the small intestine.	$5,000–$16,100 for women, $10,000–$35,600 for men	Craig and Tseng (2002)[33]
Gastric bypass (newer)	Limits food intake by reducing the effective size of the stomach and bypassing part of the small intestine ORD – obesity-related disease.	BMI – 40-50, ORD $1,853 No ORD $3,770 BMI – 50+, ORD cost saving No ORD $1,904	Chang, et al. (2011)[34]
WORKPLACE INTERVENTION			
Workplace Wellness Programs (more recent)	Variety of interventions reviewed in a meta-analysis of evaluations done on employer-sponsored wellness plans; typical interventions include baseline health indicators, educational materials, and individual and group exercise.	$3.27 drop in medical expenses for every $1 spent on wellness programs	Baicker, Cutler, and Song (2010)[38]
Workplace Wellness Programs (less recent)	Emphasis on weight control and reduction of chronic disease risk factors.	26 percent reduction in medical costs from employer wellness initiatives	Chapman (2005)[39]

Following are descriptions and discussions of each of the intervention described in Exhibit 7:

a. School-Based Interventions

THE CATCH PROGRAM - CATCH (Coordinated Approach to Child Health) builds an alliance of parents, teachers, child nutrition personnel, school staff, and community partners to teach children and their families how to be healthy for a lifetime. The four CATCH components – Go for Health Classroom Curriculum, CATCH Physical Education, Eat Smart School Nutrition Guide, and family Home Team activities – *reinforce* positive healthy behaviors throughout a child's day and make it clear that good health and learning go hand in hand.[17] CATCH was created as a research project in the late 1980's and early 1990's by teams from four universities (University of California at San Diego, University of Minnesota, Tulane University and University of Texas Health Science Center at Houston). The purpose was to develop an elementary school-based program to reduce the risk factors related to cardiovascular disease. The project was funded by the National Heart, Lung, and Blood Institute of the National Institute of Health (NIH) The CATCH study involved more than 5,000 ethnically diverse third graders from 96 elementary schools in Minneapolis, San Diego, Austin and New Orleans.[18]

CATCH is the most cost effective of the programs analyzed here. The ratio of quality-adjusted life-years gained to cost was $900.[19] Keep in mind that the typical threshold used in the United Sates is $100,000. While not cost-saving, this program is quite cost-effective.

PLANET HEALTH - Planet Health, developed at the Harvard School of Public Health, provides an interdisciplinary curriculum focused on improving the health and well-being of students in the sixth through eighth grades while building and reinforcing skills in language arts, math, science, social studies and physical education. Planet Health aims to increase activity, improve dietary quality, and decrease inactivity through classroom and physical education activities.[20]

Planet Health has shown mixed results. It was clearly cost effectively for girls but not for boys. For girls, the ratio of quality adjusted life years gained to cost was $4,305,[21] or well below the U.S. and U.K. thresholds.

b. Community-Based Intervention

i. **Community-Wide Efforts.** A variety of community-based interventions have shown some success, starting with programs that focus on community-wide programs. These

[17] http://www.sph.uth.tmc.edu/catch/about.htm.
[18] http://www.sph.uth.tmc.edu/catch/about_History.htm
[19] Brown HS, III, Pérez A, Li YP, Hoelscher DM, Kelder SH, Rivera R., "The cost-effectiveness of a school based overweight program." Int J Behav Nutr Phys Act. 2007;4:47.
[20] http://www.hsph.harvard.edu/research/prc/projects/planet/
[21] Wang LY, Yang Q, Lowry R, Wechsler H. "Economic analysis of a schoolbased obesity prevention program." Obesity Res. 2003;11:1313–24.

typically are highly visible and broad-based, with multiple-intervention approaches to increase physical activity. The focus is on combating sedentary behavior and reducing cardiovascular disease risks.

WHEELING WALKS - Wheeling Walks is a community-based program in Wheeling, West Virginia, aimed at promoting walking among sedentary adults 50–65 years old. The program's campaign activities include paid newspaper, TV and radio advertising, weekly press conferences and news coverage, worksite programs, websites and other public health education programs implemented by physicians, health professionals, and ministers. An initial 12-week component mobilizes community members to assist with subsequent campaign planning and implementation. Wheeling Walks' intensive 8-week campaign is followed by two booster campaigns.[22,23]

Wheeling Walks was evaluated in 2008 and found to meet accepted cost-effectiveness guidelines. The Wheeling Walks evaluators estimated that the ratio of cost to QALYs gained was $14,286.[24]

THE STANFORD FIVE-CITY PROJECT - The Stanford Five-City Project was a 6-year, integrated, community-wide health education intervention for improving physical activity. It included print materials, radio, TV, seminars, community walking events, and worksite- and school-based programs. Begun in 1979, it targeted all residents ages 12-74 in the cities of Monterey and Salinas California. Information was disseminated regarding the benefits of physical activity, and promotional efforts encouraged such activity. The physical activity intervention, as well as the other components of the health education program, covered multiple targets through multiple channels and settings. The first two years of the intervention focused on creating awareness and knowledge of the need to exercise regularly, the benefits of regular physical activity, and ways of carrying out a safe and effective physical activity program.[25]

The project was evaluated and found to meet accepted cost effectiveness guidelines as well, although it was more costly than some other interventions examined. The Stanford Five-City Project evaluators estimated that the ratio of cost to QALYs gained was $68,557.[26]

[22] http://rtips.cancer.gov/rtips/programDetails.do?programId=234167#Program.
[23] Reger-Nash, B, et al., "Wheeling Walks Evaluation of a Media-Based Community Intervention," *Family and Community Health*, 2004, Vol. 28, No. 1, pp. 64–78.
[24] Roux L, Tengs TO, Yore MM, Yanagawa TL, Van den Bos J, Rutt C, et al. "Are public health efforts to promote physical activity cost-effective? - A cost-effectiveness analysis of the Guide to Community Preventive Services recommendations for increasing physical activity." *Am J Prev Med.* 2008;35 (6):578–88.
[25] Young DR, Haskell WL, Taylor CB, Fortmann SP. "Effect of community health education on physical activity knowledge, attitudes, and behavior. The Stanford Five-City Project." *Am J Epidemiol* 1996;144:264 –74.
[26] Roux, op. cit.

WALKING TO MEET HEALTH GUIDELINES - Walking to Meet Health Guidelines is an intervention involving training sessions, walking maps and handouts on strategies and support for maintaining a walking program. The effects of frequency of prompting (phone calls once a week versus once every 3 weeks) and structure of prompting (high versus low structure) were assessed. The walking program was designed to meet the American College of Sports Medicine's cardiovascular exercise goals, including walking at least 20 minutes a day at least 3 times a week. The results suggested frequent phone prompting was an inexpensive way to increase exercise. [27] The Walking to Meet Health Guidelines intervention had an estimated ratio of cost to QALYs gained of $27,373, in the middle range of cost effective interventions.[28]

ii. **ENVIRONMENTAL CHANGE -** Another community-based intervention focused on providing exposure to an environment that emphasizes and supports a more active lifestyle (bike paths, extended fitness facility hours, accessible fitness center, cycling clubs, marked running courses and organized athletic events). [29] This intervention had an estimated ratio of cost to QALYs gained of $28,548, which is also in the middle range of cost effective interventions. [30]

iii. **BEHAVIORAL THERAPY –** An additional research effort sought to compare the relative effectiveness of behavioral therapy, supervised exercise, personal trainers and financial incentives on exercise and weight loss. Participants were from two urban communities (Pittsburgh, Pennsylvania, and Minneapolis–St. Paul, Minnesota). Individuals were between 31 and 70 kg overweight, 25 to 55 years old, free of serious diseases and able to walk for exercise. Study participants were randomly assigned to one of five treatment groups and were followed for 18 months. Both personal trainers and financial incentives enhanced attendance at the supervised walks, and the combination of the two produced the best adherence. Increased walk attendance did not result in higher overall energy expenditure, however, and long-term weight loss was also not improved. Post hoc analyses suggest that the level of exercise needed for successful long-term weight loss is much higher than that usually recommended in behavioral treatment programs.[31]

[27] Lombard DN, Lombard TN, Winett RA. "Walking to meet health guidelines: the effect of prompting frequency and prompt structure." *Health Psychol* 1995;14(2) 164 –170.
[28] Roux, op. cit.
[29] Linenger JM, Chesson CV 2nd, Nice DS. "Physical fitness gains following simple environmental change." *Am J Prev Med* 1991;7:298 –310.
[30] Roux, op. cit..
[31] Jeffery RW, Wing RR, Thorson C, Burton LR. "Use of personal trainers and financial incentives to increase exercise in a behavioral weight-loss program." *J Consult Clin Psychol* 1998;66: 777– 783.

This intervention was also in the middle range of cost-effective interventions, with an estimated ratio of cost to QALYs gained of $29,759.[32] Its inability to delivery long-term clinical effectiveness limits its applicability.

iv. **DIABETES PREVENTION PROGRAM -** The Diabetes Prevention Program (DPP) provided an intensive lifestyle-modification intervention for adults at high risk of developing type 2 diabetes. The program consisted of physical exercise tests, written information, individual counseling sessions, a 16-lesson curriculum covering diet, exercise, and behavior modification, individual and group exercise sessions, and in-person visits and phone calls to participants.[33]

This intervention had an estimated ratio of cost to QALYs gained of $46,914, making it one of the more expensive interventions, though still within acceptable standards.[34] Work is continuing on taking the DPP design and making it more affordable while not losing the gains in clinical effectiveness of the original DPP. One study, funded by the CDC explored ways the cost sharing could be modified to increase the likelihood that private payers, e.g., employers and public payers, e.g., Medicare could be realize a better return on the investment.[35] In addition, the YMCA is spearheading this work with a grant from NIH. While early results are promising, we were unable to find a peer-reviewed study that attempted to estimate the cost effectiveness of the YMCA version of the intervention. [36]

c. Pharmaceutical Intervention

ORLISTAT - Among pharmaceutical treatments, the use of Orlistat is perhaps most common. Orlistat (prescription and nonprescription) is used with an individualized low-calorie, low-fat diet and exercise program to help people lose weight. Prescription Orlistat (with a brand name of Xenical and manufactured by Roche) is used in overweight people who may also have high blood pressure, diabetes, high cholesterol, or heart disease. (Non-prescription Orlistat has a brand name of Alli and is produced by GlaxoSmithKline). Orlistat is also used after weight loss to help people keep from regaining that weight. Orlistat is in a class of medications called lipase inhibitors. It works by preventing some fat in foods eaten from being absorbed in the intestines.

A number of studies, including one conducted by the United Kingdom's National Institute for Clinical Excellence (NICE), have analyzed the cost effectiveness of Orlistat in both the United

[32] Roux, op. cit.
[33] Knowler WC, Barrett-Connor E, Fowler SE, et al. "Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin." *N Engl J Med* 2002;346:393– 403.
[34] Roux, op. cit.
[35] Ackermann, R., Marrero, D. et al. "An Evaluation of Cost Sharing to Finance a Diet and Physical Activity Intervention to Prevent Diabetes," Diabetes Care 29:1237–1241, 2006.
[36] Ackermann, R., Finch, E,, Brizendine, E., Zhou, H., and Marrero, D., "Translating the Diabetes Prevention Program into the Community: The DEPLOY Pilot Study," *Amer. Journal of Preventive Medicine*, 2008;35(4), 357.

States and Europe. These studies produced varied results, depending on which country was being assessed and the use of diet modifications and exercise programs in conjunction with the medication. Overall, the studies showed Orlistat to be cost-effective. The ratio of cost to QALY gained ranged from a low of $8,327[37] to a high of $37,795,[38] well within the accepted parameters of cost-effectiveness.

d. Surgical Intervention

In recent years various forms of bariatric surgery have been shown to be both clinically and cost effective for the treatment of obesity and obesity-related diseases (ORD) such as diabetes. Earlier studies indicated promising results. Craig and Tseng estimated in 2002 a cost per QALY of $5,000–$16,100 for women and $10,000–$35,600 for men, depending on the patient's age at surgery and BMI before surgery. [39]

The latest work in this area has shown even better results. For patients whose BMI was between 40 and 50, Chang, Stoll and Colditz estimate cost per QALY was $1,853 for patients who already had obesity-related diseases and $3,770 for those without obesity-related diseases.[40]

For the very obese, i.e. those with BMI's above 50, as well as obesity-related diseases, weight loss surgery was essentially cost-saving because it is more effective and less costly than non-surgical interventions. However, Chang et al. did not give an estimate of how much costs could be reduced. For the cohort with BMIs above 50 but no obesity-related diseases, the researchers estimated a cost-to-QALY ratio of $1,904.[41]

Bariatric surgery researchers have also done a number of analyses to look at bariatric surgery as a return-on-investment (RoI). Two leading studies – Crémieux, et al. (2008) and Klein et al. (2011) – come to similar conclusions. Crémieux, et al. found that "mean bariatric surgery investment ranged from approximately $17,000 to $26,000. After controlling for observable patient characteristics, we estimated all costs to have been recouped within two years for laparoscopic surgery patients and within four years for open surgery patients."[42]

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[37] Maetzel A, Ruof J, Covington M, Wolf A. "Economic evaluation of orlistat in overweight and obese patients with type 2 diabetes mellitus." *Pharmacoeconomics*. 2003;21: 501–12.

[38] Foxcroft, D.R., "Orlistat for the treatment of obesity: cost utility model." *Obesity Reviews*, (2005) 6, 323–328. Other studies with intermediate results include: Hertzman P, "The cost effectiveness of orlistat in a 1-year weight-management programme for treating overweight and obese patients in Sweden: a treatment responder approach." *Pharmacoeconomics*. 2005;23(10):1007-20; J Ruof, A, et al., "Orlistat in responding obese type 2 diabetic patients: meta-analysis findings and cost-effectiveness as rationales for reimbursement in Sweden and Switzerland." *International Journal of Obesity* (2005) 29, 517–523.

[39] Craig BM, Tseng DS. "Cost-effectiveness of gastric bypass for severe obesity." *Am J Med* 2002;113:491– 8.

[40] Chang, S-H, Stoll, C, Colditz, G, "Cost-effectiveness of bariatric surgery: Should it be universally available?," *Maturitas* 69 (2011) 230– 238

[41] Ibid.

[42] Crémieux, P-Y; Buchwald, H; Shikora, S; Ghosh, A; Yang, H.; and Buessing, M. "A Study on the Economic Impact of Bariatric Surgery, " *Am J Manag Care. 2008;14(9):589-596.*

Klein et al. focused on patients who had Type 2 diabetes and BMI's above 35. They found:

> Surgery costs were fully recovered after 26 months for laparoscopic surgery. At month six, 28% of surgery patients had a diabetes diagnosis, compared to 74% of control patients ($P < 0.001$). Among preindex insulin users, insulin use dropped to 43% by month three for surgery patients, vs. 84% for controls ($P < 0.001$). By month one, medication and supply costs were significantly lower for surgery patients ($P < 0.001$). The therapeutic benefits of bariatric surgery on diabetes translate into considerable economic benefits. These data suggest that surgical therapy is clinically more effective and ultimately less expensive than standard therapy for diabetes patients with BMI ≥35 kg/m2.[43]

Although a somewhat different method of modeling cost effectiveness, the RoI studies have produced findings consistent with those using the standard QALY measures.

e. Workplace Intervention

In the United States, employers are the primary source of health insurance for the working-age population and their families. While this is somewhat an accident of history, it has made employers much more sensitive to general health trends and much more active in pursuing initiatives that might influence those trends and improve worker health.

As obesity has increased in recent years, many employers have become alarmed, not only because obesity will increase expenditures for the health plans they sponsor but also because obese workers are less productive, suffer from more absenteeism, and generally don't reach their full potential as employees.

To combat the trend, employers have experimented with health promotion programs, many with a focus on weight control. Employers have developed so many programs that an individual listing and description would be unwieldy. Fortunately a 2010 study by Baicker, Cutler, and Song, published in *Health Affairs*, took a comprehensive look at other evaluations of workplace wellness efforts[44] and were encouraged to find that these initiatives were producing real results.

> Our critical review of the existing evidence suggests that employer-based wellness initiatives may not only improve health, but may also result in substantial savings over even short run horizons. Encouraging (or even subsidizing) such programs also seem to have broad political appeal, perhaps in

[43] Klein, S, Ghosh A, Cremieux P-Y, Eapen S, and McGavock, T. "Economic Impact of the Clinical Benefits of Bariatric Surgery in Diabetes Patients With BMI ≥35 kg/m2," *Obesity* (2011) 19, 581–587. doi: 10.1038/oby.2010.199

[44] Baicker K, Cutler D, and Song Z, "Workplace Wellness Programs Can Generate Savings." *Health Affairs* 2010; 29(2).

> part because they operate with less direct government oversight and fewer government dollars and in part because they hold the promise of slowing health care cost growth without the specter of rationing care.[45]

Evaluations of workplace interventions are much more likely to use the return-on-investment (RoI) methodology, rather than the cost-effectiveness methodology, i.e., QALY's, used in evaluating most other forms of obesity intervention. The target audience for these analyses is predominantly the business community, which is more familiar with RoI.

Overall, the authors suggest that the studies looking at workplace wellness programs found them to be good investments. On average, the studies found that such programs reduced medical costs by $3.27 and absenteeism by $2.73 for every dollar spent on wellness efforts.

The most common employer-sponsored interventions started with a baseline assessment of worker health risks, using self-reported data from the worker as well as measures of blood pressure, cholesterol, and BMI. Employers then offered a combination of interventions to help workers reduce their risks, using self-help educational materials, on-site gymnasiums, group health activities, and individual counseling. In the sample used in the study, roughly 40 percent of companies offered the self-help materials, 40 percent individual counseling, and 35 percent group activities.

In addition, some employers (about 30 percent in the study sample) used incentives to encourage workers to reduce health risks. The incentives typically took the form of bonus payments for successful intervention against a health risk and reimbursement for program participation.

It must be noted that obesity and weight loss were a clear and explicit focus of many of these programs (60 percent had obesity reduction as a primary objective). But there were several other common goals, including smoking cessation, stress management, back care, nutrition, alcohol consumption, blood pressure management, and broad-based preventative care. A good example of this Discovery Health's, Vitality health promotion program developed for employers in South Africa. The goal was to increase physical activity to improve health and reduce medical spending. The program was effective at reaching its stated goals, but it was not evaluated on its effect on obesity.[46] The program has since been used in the United States by Humana with obesity reduction added as a goal, but peer-reviewed evaluations have not yet been produced.[47]

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[45] Ibid.

[46] Deepak Patel, Lambert, E., et al. "The Association Between Medical Costs and Participation in the Vitality Health Promotion Program Among 948,974 Members of a South African Health Insurance Company," *American Journal of Health Promotion*, January/February 2010, Vol. 24, No. 3, page 199.
Deepak Patel, Lambert, E., et al. "Participation in Fitness-Related Activities of an Incentive-Based Health Promotion Program and Hospital Costs: A Retrospective Longitudinal Study," *American Journal of Health Promotion*, May/June 2011, Vol. 25, No. 5, page 341.

[47] http://www.humana.com/vitality

An earlier study by Chapman (2005) found even larger savings from such workplace programs ($5.81 for every dollar spent).[48] This may be due to slightly different criteria for which evaluations were included in the so-called "meta" analyses. Chapman's threshold may have allowed in more evaluations than the Baicker et al. approach.

An Overview of Health Policy Decision-Making and the Scoring Process

Efforts to reduce the prevalence of obesity in the United States, and thus also chronic health conditions and health care costs, raise the question of how health policy gets made in the federal budget process and especially in the Congress.

It is no secret that the federal government is running large budget deficits and that these are likely to widen further in the years ahead as the baby boom generation begins to retire. Not surprisingly, then, policies projected to improve the budget outlook are more likely to gain favor than those that make matters worse. Indeed, congressional budget rules have been written to try to favor policies that reduce budget pressures or, at least, do not make matters worse.

Over the years, many health policy advocates have sought to make the case that prevention of costly chronic conditions should be a win-win situation. With some new focus on prevention efforts, they have argued, it would seem that both the public's health would improve and medium- and long-term federal costs would moderate as Medicare and Medicaid outlays for chronic conditions declined.

But health policy scorekeeping is not that simple.

The official scorekeeper in the legislative process – the CBO – has a long history of professional integrity and of relying on peer-reviewed academic literature to base its judgments. CBO has written numerous analyses and issued cost estimates for health-related legislation that tend to be skeptical about the prospect of new prevention spending reducing spending sufficiently over the long run to bring the legislation's net costs down to the point of actually saving money.

It's not that such a prevention effort is theoretically impossible. It can in fact happen; it's just that CBO hasn't found the basis in the academic literature to project that it will happen very often. There are a number of reasons for this.

First, it is often difficult to translate a study of a relatively small intervention into a cost estimate for nationwide implementation. There is, of course, the previously noted problem of scale: It simply may not be possible to take something on a local level and assume it can be replicated with consistency in every community.

[48] Chapman L. "Meta-evaluation of Worksite Health Promotion Economic Return Studies: 2005 Update." *American Journal of Health Promotion*: July/August 2005.

Second, the nature of evaluations tends to be short-term, showing results in a limited window. However, the effects of interventions may atrophy with time, so it is hard to assign long-term savings without additional proof.

Third, in the past a number of initiatives that were supposed to reduce spending never did so. For example, the introduction of Medicare payments for non-physician providers – e.g., nurse practitioners and physician's assistants – was supposed to pay for themselves through reductions in physician spending. Such savings, however, never materialized because physician spending never declined enough to offset the added costs of the new provider groups. This phenomenon, often referred to as provider-induced demand, is outside the control of programs, except in rare cases like those involving traditional HMOs. While this is primarily a problem for a medical intervention with multiple providers, it is important for the designers trying to take an intervention "to scale" structure the payment or reimbursement system in such a way that they control the stream of spending and savings.

Fourth, some efforts are economically inefficient in their targeting. Targeting accuracy is a key determinant of whether a particular intervention is cost-saving, cost-effective or not cost-effective. For example, screening millions of patients to find a few thousand cases may be the best way to ensure that all cases are found, but it almost always results in the intervention being much more expensive than an alternative that better targets the subpopulation where there's a high probability of finding cases and the intervention is more likely to succeed. In some areas targeting is a long-established technique. For example, when it comes to surgery some patients are better candidates than others. In other areas with a more traditional public health focus, interventions tend to be broadly targeted, with limited exclusion criteria.

Fifth, and perhaps most importantly, is the issue of the timing of interventions and their potential health benefits.

Under current law, the official budget adopted by Congress need only cover the coming fiscal year and the following four fiscal years, for a total budget window of five years. Over time, Congress has moved toward a longer time horizon of ten years (though, Congress has frequently passed budgets which covered only five years). To many policymakers, and to the CBO, a decade seems plenty far into the future, given the uncertainty surrounding economic and other technical assumptions about taxes and spending programs that far into the future.

Nonetheless, for health policy, a ten-year budget window can be a hindrance to effective policymaking because of the unusual nature of health issues. The natural history of many chronic diseases, like type II diabetes and hepatitis C, is such that the symptoms often do not manifest themselves for many years, and sometimes decades, after the patient has first developed them. Therefore, interventions to prevent costly complications of many chronic illnesses do not result in enough short-term improvements in health status to generate short-term reductions in health care costs. This mismatch in timing is magnified by the ten-year scoring convention.

With many prevention interventions, all of the expenditures can often be seen in a ten-year window, while none, or virtually none, of the benefits occur until after a decade has passed.

An additional complicating factor is that there are multiple payers for health services in today's system of health coverage in the United States. In general, the working age population is enrolled in employer plans, individually-purchased coverage, or the Medicaid and SCHIP programs. The elderly are enrolled in Medicare. Efforts to prevent health complications can sometimes mean that the benefits of prevention flow to a different set of payers than those who paid for the prevention program. This could be the case with obesity prevention efforts that are focuses on encouraging younger Americans to lose weight before they become elderly and on Medicare. For these younger Americans, their primary contact with the health system is likely to be through their employer-sponsored health plans, while the benefits of fewer obese patients might be concentrated mainly in federal Medicare spending. If the burden of financing prevention were somehow imposed on employers, the federal government might be able to be a net winner in a budgetary sense. However, the mismatch between who pays and who saves could easily complicate the advancement of the policy from a political perspective.

Finally, there also is an issue of modeling capability that holds back prevention programs. Currently, most cost estimates in health care are built around use of various categories of providers' services, including inpatient hospital days, physician services, drugs, lab tests and the like. There is no effort to calibrate the use of services to a model of the underlying health condition of the population being treated. To effectively assess a prevention program, more information would be needed in the modeling process about the changing health status of the population and the connection of that changing status to its use of services.

Improving Policymaking with Better Estimates and Longer Time Horizons

To improve federal policymaking in the area of obesity prevention, we need a concerted effort to address two shortcomings in the current estimating process:

1. Budget windows that are too short to capture the important trends.

2. Models that are not comprehensive or sophisticated enough to capture the full potential of promising interventions.

In previous and related work, we assessed the state of type II diabetes prevention from the perspective of federal cost-estimating.[49] Our findings in that effort are directly relevant to efforts to prevent chronic illnesses stemming from obesity.

As a starting point, strong consideration should be given to adjusting the budget process under special circumstances to reflect the importance of a long time horizon for certain health prevention efforts. For instance, the congressional budget process could be amended to move from a ten-year to a 25-year horizon when dealing with matters of public health prevention like obesity. That would allow Congress to weigh the inevitable short-term spending increases associated with more intensive prevention efforts against the potential for offsetting spending reductions over the longer term. Even if the longer-term savings do not turn the entire effort into a "cost reducer," capturing those out-year savings – i.e., years 11 to 25 – may show that the public investment necessary to achieve better health outcomes will be less expensive than anticipated under current ten-year estimates.

However, to make the case that obesity prevention can have longer-run cost offsets that reduce the present value of the public investment, we need a reliable model for longer-term cost estimating based on credible, peer-reviewed inputs as well as a realistic programmatic model for implementation.

At present, CBO and the administration do modeling of various sorts, but they tend not to build longer-run projection models focused on the influence of health status on spending. One reason for this is the view that the data upon which such models must be built are not yet reliable enough to make the effort worthwhile.

That may be changing, however, in the context of some of the most important cost consequences of obesity. For instance, in previous work, we built a longer-term model for the costs of type II diabetes, with a 25-year simulation using well-documented NIH and CDC data on the natural progression of the disease and the resulting health cost consequences. This type of model could be the foundation for looking at obesity as well, as so much of the obesity problem is bound up with diabetes, and vice versa.

Professional cost estimators maintain a healthy skepticism regarding calls to alter the federal budget process, and rightfully so. In particular, the current congressional process is intended to support fiscal discipline in an environment that is inherently inclined to move in the opposite direction. It is easier for elected leaders to agree to more spending and lower revenue than to vote to restrain spending and impose tax increases.

[49] "Using Clinical Information to Project Federal Health Care Spending How Congress could use diabetes spending projection model to help inform budget decisions." Elbert S. Huang, Anirban Basu, Michael J. O'Grady, and James C. Capretta. Health Affairs Web Exclusive, September 1, 2009.

Nonetheless, in the area of health care policy, it is clear that examining the implications of policies beyond ten years would, under certain circumstances, generate additional insights into current trends and how those trends might be affected by policy.

We therefore recommend that, in certain cases, CBO produce cost estimates for legislation covering a 25-year period instead of just ten years. While this would not be necessary for the vast majority of cost estimates produced by the agency, it would greatly add to the information base when Congress is considering health legislation with implications for the treatment of a small number of costly chronic illnesses, including those closely associated with obesity.

To build consensus support for implementation of such an approach, Congress should appoint a joint task force, with members from both parties, to work with CBO on enumerating the circumstances under which such longer-term estimates would be needed from the cost estimating agencies. These criteria should be based on ensuring such estimates are produced only when legislation would have a significant impact on the treatment or prevention of a costly and prevalent chronic illness and for which a credible epidemiological model is readily available.

To allow these longer-term estimates to be useful in the budget process, Congress could consider modifying its budget rules. Currently, Senate rules contain a procedural hurdle against legislation that would increase the federal budget deficit by more than $5 million in any of the four decade increments beyond the normal ten-year budget horizon. This provision could provide a model for using CBO estimates to enforce budgetary issues over longer periods in the context of chronic diseases.

For instance, CBO could be asked to provide longer time horizon estimates whenever it was clear that the legislation under review could have a potentially large impact on disease burden and budgetary costs beyond the normal ten-year budget window. This special budget process could also be limited to those cases in which credible, long-term epidemiological modeling is available and thus could form the basis for a credible longer term estimate.

One of the challenges associated with capturing savings from prevention efforts flows from Medicare's current design. The program generally pays at least a portion of the bill for whatever health services enrollees' use, with no questions asked. Consequently, in the past, efforts to reduce spending in a part of the program (such as inpatient hospital care) by increasing use of less expensive services in another part of the program (such as home health) have not been successful because there was no easy way to ensure that reduced pressure for hospitalization could be realized and captured by the program. In the end, hospital use continued at its traditional rate, and home health care use increased rapidly as well.

This dilemma may well be raised and discussed in the context of preventing and treating the conditions associated with obesity. Some budgetary experts might observe that in light of Medicare's current design, it would be difficult to ensure that improved health outcomes would

translate into reduced use of services, given the tendency for demand to fill up whatever supply exists. One potential way to address this dilemma is to give participants a stronger financial incentive to capture potential savings from treatment improvement.

Summary and Conclusions

In this white paper we have attempted to detail the underlying economic dynamics of obesity in America. To do so we have documented:

1. The latest and best evidence on the size and nature of the obesity epidemic.
2. The latest and best evidence on the health care outlays associated with obesity.
3. What the latest research projects for the future size of the overweight and obese population.
4. What the latest research projects for future health care costs associated with being overweight or obese.
5. A range of interventions to fight obesity and estimates of their cost-effective or cost-savings.
6. How the latest and best research on obesity intervention can be used in policymaking with a few improvements in the current modeling done by both the Congress and the Administration.

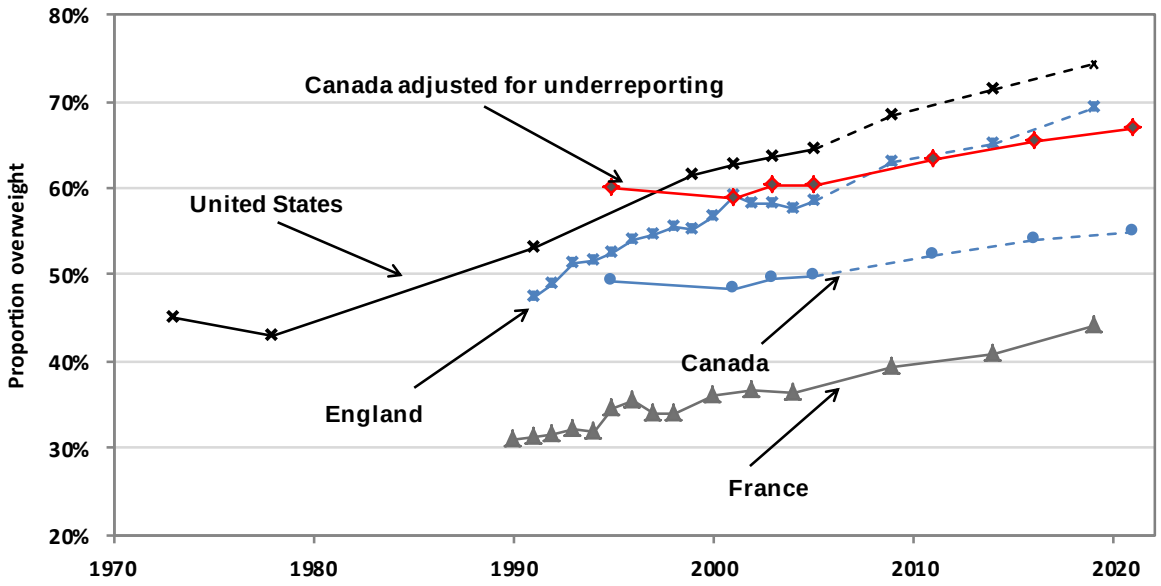
Our research has convinced us that the problem is severe, for both the health of the American people and the financial viability of our health care system. The best research points to the problem only getting worse in both clinical and financial terms. A number of interventions have been successfully implemented, and many are cost-effective, though some are more so than others.

The implications of this analysis are two-fold: One, with a more open-minded and flexible approach, the official budget and spending scorekeepers in both the legislative and executive branch could significantly improve the estimates and information they provide policymakers. Two, the designers and evaluators of obesity interventions also need to be attentive the kinds of research that actually will be useful in developing their initiatives. If the key goal is to design effective interventions, rigorous empirical evidence is essential. If the evaluations of these interventions are to be useful to policymakers, they must be evaluated using modeling and measures acceptable to the policy community. If some modest adjustments are made, there could be both an estimating process that is more open to the kinds of prevention efforts focused on obesity and more research backing up the policies that actually will work. Thus, the potential for well-informed policymaking to combat America's obesity epidemic effectively and efficiently is well within reach.

Appendix A: International Comparisons of Obesity

The obesity and overweight problem is more severe in the United States than in other countries. The Organization for Economic Cooperation and Development (OECD) collects health data from its 34 member countries, which tend to be the most developed nations. Exhibit 8 shows the OECD data for four countries: The United States, England,[50] Canada and France. The OECD both collects historical data and makes projections for the next ten years.

Exhibit 8 – Percentage Overweight in the US, England, Canada and France



Source: http://www.oecd.org/document/57/0,3746,en_2649_33929_46038969_1_1_1_1,00.html. Canadian undercount - http://www.parl.gc.ca/Content/LOP/ResearchPublications/prb0511-.

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The United States has the dubious honor of leading in the percentage of overweight citizens, followed closely by England. Before too much is made of the large gap between the United States and England compared to Canada and France, it is important to note that the United States and England have a neutral third-party record a subject's weight, while Canada, France and almost all the other countries allow people to self-report their weight on a survey questionnaire. Canada did collect weight data through a neutral third-party at one point, which thus allows a comparison of the two approaches. Self-reporting led to under-reporting of weight by an average of 21.2

[50] The particular data collection used is for England not the UK as a whole.

percent.[51] The line labeled "Canada adjusted for under reporting" indicates the Canadian trend with a 21.2 percent adjustment, which narrows the gap considerably with the United States and England. There is no reason to assume that Canadians are any more or less likely to under-report their weight than the citizens of other countries. Even with an adjustment for under-reporting, Americans still have the highest percentage of overweight people among developed countries.

The OECD data has raised the question of trends in overweight and obesity. The OECD is projecting continued growth in the overweight population in numerous countries in coming years. Nonetheless, the United States is still leading other countries with citizens who are overweight in the OECD projection, with 74 percent of the U.S. population expected to be overweight by 2019.

A study recently release by the National Academy of Sciences adds additional nuance to this discussion by examine the interaction with other risk factors, such as smoking and its effect on life expectancy.

> Obesity has a greater effect on years of life lost for men than for women and for whites than for blacks, and its effects are similar for smokers and nonsmokers, with smoking adding greatly to the mortality risk for all groups. Thus, while an 18-year-old white male who is of normal weight and does not smoke can expect to live to 81, the life expectancy of an 18-year-old white male who smokes and is Class 3 obese *(BMI 40 and above)* is only 60 years—a decrease in life expectancy of 21 years, approximately 10 years of which can be attributed to obesity.[52]

The issue is clearly complicated and any policy intervention needs to be carefully designed and implemented to maximize the value of the effort.

[51] Starky, Sheena, "The Obesity Epidemic in Canada". Economics Division. Parliamentary Information and Research Service. Library of Parliament. http://www.parl.gc.ca/Content/LOP/ResearchPublications/prb0511-e.htm#measurementtxt.

[52] Crimmins, E., Preston, S. and Cohen, B. Editors; "Explaining divergent levels of longevity in high-income countries." Copyright 2011 by the National Academy of Sciences. Page 50.