

By Kenneth E. Thorpe and Zhou Yang

Enrolling People With Prediabetes Ages 60–64 In A Proven Weight Loss Program Could Save Medicare \$7 Billion Or More

DOI: 10.1377/hlthaff.2010.0944
HEALTH AFFAIRS 30,
NO. 9 (2011): 1673–1679
©2011 Project HOPE—
The People-to-People Health
Foundation, Inc.

ABSTRACT Rising chronic disease prevalence among Medicare beneficiaries, including new enrollees, is a key driver of health care spending. Randomized trials have shown that lifestyle modification interventions such as those in the Diabetes Prevention Program clinical trial reduce the incidence of chronic disease and that community-based programs applying the same principles can produce net health care savings. We propose expanding a proven, community-based weight loss program nationwide and enrolling overweight and obese prediabetic adults ages 60–64. We estimate that making the program available to a single cohort of eligible people could save Medicare \$1.8–\$2.3 billion over the following ten years. Estimated savings would be even higher (\$3.0–\$3.7 billion) if equally overweight people at risk for cardiovascular disease were also enrolled. We estimate that lifetime Medicare savings could range from approximately \$7 billion to \$15 billion, depending on how broadly program eligibility was defined and actual levels of program participation, for a single “wave” of eligible people. In this context we propose that Medicare expand its new wellness benefit to include reimbursement for this and other qualifying behavior change programs.

Kenneth E. Thorpe (kthorpe@sph.emory.edu) is the Robert W. Woodruff Professor and Chair, Department of Health Policy and Management, Rollins School of Public Health, Emory University, in Atlanta, Georgia.

Zhou Yang is an assistant professor in the Department of Health Policy and Management, Rollins School of Public Health.

The Affordable Care Act of 2010 includes several programmatic changes designed to slow the long-term rise in Medicare spending. However, one key issue not fully addressed in the law is the rising rate of chronic disease and obesity among Medicare beneficiaries, including new enrollees. Among adults age sixty-five and older, obesity (defined as having a body mass index of 30 kg/m² or higher) doubled from 17.5 percent in 1980 to 36.8 percent in 2008 (the most recent data available).^{1,2}

The rising rate of obesity in this and other subpopulations is a substantial contributor to rising health care spending.^{3,4} In any given year, obese adults spend approximately 40 percent more on health care than do adults with normal weight, as a result of higher rates of diabetes and

other chronic illnesses.^{4,5} Lifetime health care spending is also higher for obese adults. Two recent studies have estimated that lifetime Medicare spending is 15–35 percent higher among adults who are obese at age sixty-five compared to adults of normal weight.^{6,7}

To address the rising rate of obesity and associated chronic disease among Medicare beneficiaries, we outline a proposal that would develop an evidence-based weight loss program for at-risk, pre-elderly people nationwide. Program participants would be ages 60–64, overweight (with a body mass index higher than 24) or obese, and at known risk for diabetes or cardiovascular disease, or both. The weight loss program would be based on a community-based intervention that is currently administered in a variety of settings by YMCAs.

Our proposal would use two existing sources of federal funding to create the program and take it to a national scale: the Centers for Disease Control and Prevention's (CDC's) National Diabetes Prevention Program and the Prevention and Public Health Trust Fund, both established by the Affordable Care Act.

Lifestyle Intervention Precedents

Randomized trials throughout the world have demonstrated the ability of well-designed lifestyle interventions to produce weight loss.⁸ Perhaps the most impressive results from lifestyle modification interventions have been achieved as a result of the CDC's multiphase National Diabetes Prevention Program.

The first phase of the program was a nationwide clinical trial—one of six large, randomized trials conducted internationally that have demonstrated the ability of lifestyle modifications to produce sustained weight loss and to prevent or delay the progression of prediabetes to diabetes.⁹ The diabetes prevention clinical trial compared the results of three approaches: an intensive program of lifestyle modification; standard lifestyle recommendations (an annual thirty-minute education session) coupled with use of metformin (a generic drug designed to improve blood sugar levels); and standard lifestyle recommendations coupled with use of a metformin placebo.

All participants were prediabetic overweight or obese adults. The immediate goal of the lifestyle modification approach was to achieve and maintain a weight loss of 7 percent of one's starting body weight.¹⁰ At the core of the intensive lifestyle protocol was a sixteen-lesson curriculum covering diet, exercise, and behavior modification, delivered over twenty-four weeks. This curriculum was taught one-on-one by registered dietitians or trained case managers with master's degrees.

The protocol also included a long-term maintenance program designed to sustain behavioral changes after completion of the curriculum. In addition, participants received about \$100 per year to spend on "toolbox" strategies of their choosing, such as exercise classes, healthy cookbooks, and physical activity videos.

The intensive lifestyle modification proved the most effective of the three approaches. It resulted in a sustained mean weight loss of 7 percent that persisted after 2.8 years of follow-up. At the same time, it reduced the prevalence of diabetes by 58 percent among participants in general (age twenty-five and older) and by 71 percent among participants over age sixty.¹⁰ In other words, for every 100 overweight or obese adults

who completed the intensive lifestyle intervention, nineteen out of the thirty-three expected to develop type 2 diabetes did not do so.

For those nineteen individuals, the social and financial costs of a new diabetes diagnosis—for such necessities as additional tests, diabetes education, glucose meters, test strips, and more intensive management of other cardiovascular risk factors—were avoided. Moreover, for every 100 participants in the intervention, eight avoided the need for blood pressure and cholesterol medications.¹¹

Recently published results of a ten-year follow-up study of the original trial's participants showed that adults participating in the intensive lifestyle intervention continued to maintain about five pounds of weight loss, and those age sixty and older maintained an even higher long-term weight loss of just under eleven pounds.¹²

Other research has shown that enrolling prediabetic overweight adults at age fifty in a proven intervention such as the National Diabetes Prevention Program would reduce the lifetime risk for developing diabetes from 87 percent to 65 percent—a reduction of twenty-two percentage points.¹³ In contrast, delaying the program until age sixty-five would reduce the lifetime risk of diabetes from 87 percent to 83 percent—a more modest four-percentage-point reduction.¹³

In the wake of the original intensive lifestyle intervention's success, the next logical step was to determine whether that rather expensive approach could be translated into a less costly but nevertheless effective program, one that could be offered on a larger scale. The YMCA of the USA began to develop and test a community-based program applying key principles of the intensive lifestyle intervention. The effort started at sites funded by the CDC and expanded in collaboration with UnitedHealth Group.¹⁴

The community-based version had the same main goal (a 7 percent sustained weight loss) and a structured curriculum designed to achieve diet, exercise, and other behavioral changes. A key difference in the YMCA's community-based version was that the original one-on-one, sixteen-session curriculum was delivered instead to groups of ten to twelve people over a shorter period of time (sixteen instead of twenty-four weeks). The original long-term maintenance program was also delivered in groups, by trained YMCA staff. Finally, the intensive intervention's "toolbox" financial incentives were eliminated.

The YMCA's community-based version, still being offered, has been targeting the same population as the original clinical trial: overweight and obese prediabetic adults. A recent randomized trial (the DEPLOY pilot study, covering the

YMCA's community-based program in the Indianapolis area) found that approach produced weight reductions similar to those seen in the intensive lifestyle intervention: a mean 6 percent weight loss after six months (4.2 percentage points higher than in a control group receiving only standard weight loss advice), sustained for more than 12–14 months (the study is still tracking participants and their results).¹⁴

A major advantage of the community-based program was the much lower cost required to administer it: more than \$1,100 less per person per year than the one-on-one, intensive version used in the clinical trial.¹⁵ Thanks to its lower administration cost, the community-based program was found to generate reductions in health care spending within a two-year period from the start of the program.

In this article we present simulation results showing the potential impact that such a weight loss program could have on both ten-year and lifetime Medicare spending, if it were offered nationwide to prediabetic overweight and obese adults ages 60–64. We also present results showing substantial additional savings were it also offered to equally overweight people without prediabetes but at risk of cardiovascular disease. Our proposal, simulation methods, and results are presented below.

Expanding The Community-Based Diabetes Prevention Program

Our proposal would build on the foundation of the YMCA's community-based diabetes prevention program, already in place. As of 2011 the YMCA's program was being delivered by 50 YMCAs at more than 116 sites in 24 states (personal communication from Kathleen Adamson, director of health partnerships and policy, YMCA of the USA, February 2011). Our proposal would take the effort to a national scale. As of 2011 there were 2,686 YMCAs nationwide, and nearly sixty million Americans living within three miles of a facility. Other community-based sponsors—such as state or local health departments or other nonprofit organizations—would also be eligible sponsors.

Based on the experience from their current test sites, the YMCA of the USA and the CDC have estimated that building the capacity to deliver the community-based diabetes prevention program nationally (that is, conducting protocol training, data collection and reporting, and outreach) would cost about \$80 million (personal communication from Jonathan Lever, national director of Activate America, YMCA of the USA, December 2010). We propose that this national effort be funded out of the \$1 billion authorized

in the Prevention and Public Health Trust Fund in federal fiscal year 2012. This estimate assumes that delivery capacity could reach fifteen million at-risk adults. Scaling the diabetes prevention program nationally through the Prevention and Public Health Trust Fund would be allowable under the provisions of the Affordable Care Act; however, there are currently no plans to exercise this option.

Under our proposal, adults ages 60–64, with a body mass index higher than 24 kg/m² and meeting the clinical criteria for prediabetes, would be eligible for full funding (about \$240 per person) for a program lasting sixteen to twenty weeks.¹⁶ Expanding eligibility to overweight people of the same age and weight, but with two cardiovascular risk factors (high blood pressure and high cholesterol) instead of prediabetes, would be considered.

A key aspect of the proposal would be to ensure that the community-based program protocol could produce the same reduction in diabetes incidence (71 percent among adults age sixty and older) seen among participants in the original intensive lifestyle intervention.¹⁰ To accomplish this, the CDC would facilitate the training of program staff (training centers already exist at several universities), establish standards across programs, and assist in marketing the program. Language regarding the CDC's role in the National Diabetes Prevention Program is consistent with our proposal and is outlined in Sec. 10501(g) of the Affordable Care Act.

Study Data And Methods

We estimated savings to Medicare over two time frames (a ten-year period and lifetime) associated with the nationwide adoption of the YMCA prevention program for a single “wave” of pre-elderly people—that is, for all eligible people in the age 60–64 range at a specified point in time. To do so, we used 2009 census data. Following the budgetary conventions of the Congressional Budget Office, we did not adjust all dollar amounts for inflation.

Estimated savings were based on the two possible enrollment scenarios previously described. The first would limit enrollment to people with a body mass index above 24 and who are prediabetic. The second would also enroll people with the same body mass index but also at cardiovascular risk (with high blood pressure or elevated cholesterol) even if not also prediabetic.

We modeled two plausible participation rates: the 70 percent found in the recent DEPLOY trial, and the 55 percent rate typically reported in well-designed workplace wellness programs.^{14,17} We used the lower and more conservative mean

weight loss attributed to the intervention in the DEPLOY trial (4.2 percent, the difference between program participants and controls), as opposed to that seen in the Diabetes Prevention Program intensive lifestyle intervention (7 percent).¹⁴

Our analysis followed the approach developed by Zhou Yang and Allyson Hall, using Medicare Current Beneficiary Survey data. Their model estimates the dynamic relationships among weight, chronic disease, acute medical events, functional status, death, health care use (inpatient, outpatient, nursing home, or outpatient medication), and associated health care costs over time.⁶

A similar set of estimates has been published as part of the RAND Corporation's Future Elderly Model. The RAND model estimates that obese Medicare beneficiaries spend \$37,000 more per capita over their lifetime compared to beneficiaries who maintain normal weight.^{6,18} These estimates are higher than those provided by Yang and Hall, so we used the more conservative model of the two.

We report gross and net savings (unadjusted for inflation) that deduct the cost of scaling the YMCA program nationally and enrollment costs for the program. Additional methodological detail is provided in the online Appendix.¹⁹

Study Results

We start with the estimated savings to Medicare with enrollment limited to prediabetic adults, ages 60–64, with a body mass index of 24 or higher (Exhibit 1). Enrolling 70 percent of this target group in the protocol would cost approximately \$590 million (\$240 times 2.6 million estimated participants), resulting in a net sav-

ings of \$2.3 billion over the next ten years and \$9.3 billion in net lifetime savings. At the lower, 55 percent participation rate, estimated net savings would exceed \$1.8 billion over the next ten years, and \$7.3 billion in net lifetime savings would be expected.

Broadening eligibility criteria to also include overweight and obese individuals with high blood pressure or high cholesterol, even if not prediabetic, would yield an estimated additional \$1.4 billion in net savings for Medicare over the next ten years and an extra \$5.8 billion in net lifetime savings, assuming a 70 percent participation rate. At the lower 55 percent participation rate, the estimated additional net savings to Medicare from expanding the eligibility criteria would be \$1.2 billion over the next decade and \$4.6 billion over participants' lifetimes.

Overall, we estimate that extending eligibility to both at-risk groups would produce net savings to Medicare of \$3.0–\$3.7 billion over the next ten years and \$11.9–\$15.1 billion over participants' lifetimes, depending on the participation rate.

Discussion

Rising rates of obesity and chronic disease are major contributors to increased Medicare spending. The Affordable Care Act includes several provisions that could reduce spending traced to people already enrolled in Medicare but is less aggressive in its attempts to reduce lifetime spending among the newly eligible. However, the health care reform law did expand previous federal-level diabetes prevention work by establishing the National Diabetes Prevention Program, and the CDC has started to fund community-based entities, including YMCAs, to administer that program. The law also grants the

EXHIBIT 1

Estimated Savings To Medicare Associated With A Community-Based Lifestyle Modification/Anti-Obesity Program For People Ages 60–64

Eligible participants	Savings over 10 years (2011–20) ^a		Lifetime savings ^a	
	Gross (\$)	Net (\$)	Gross (\$)	Net (\$)
CORE CRITERIA: OVERWEIGHT AND OBESE ADULTS, PREDIABETIC				
70% participation rate	2.9	2.3	9.9	9.3
55% participation rate	2.3	1.8	7.8	7.3
EXPANDED CRITERIA: OVERWEIGHT AND OBESE ADULTS WITH CARDIOVASCULAR RISK, NOT PREDIABETIC				
70% participation rate	1.8	1.4	6.2	5.8
55% participation rate	1.5	1.2	4.9	4.6
TOTAL				
70% participation rate	4.7	3.7	16.1	15.1
55% participation rate	3.8	3.0	12.7	11.9

SOURCE Authors' analysis. **NOTES** Cardiovascular risk entails high blood pressure or high cholesterol. BMI is body mass index. ^aSavings are in billions of dollars.

We propose that Medicare expand its new wellness benefit to include payment for qualifying behavior change programs.

secretary of health and human services discretion in identifying approaches for improving quality of health care and reducing costs and in scaling and replicating them nationally.

Lifestyle modification programs used in randomized clinical trials, such as the intensive lifestyle intervention used in the Diabetes Prevention Program's original trial, have already demonstrated their ability to lower weight and reduce chronic disease in an adult population—including adults older than age sixty. A growing body of published data continues to show that community-based versions of the program that apply the same principles generate similar health benefits, but at dramatically lower costs.¹⁴

Our results show the potential savings to Medicare if a proven, community-based approach to reducing obesity and related chronic disease were to be made available, nationwide, to high-risk individuals soon to become Medicare beneficiaries. In doing so, they also present a potential business case for the federal government to partner with the private sector in order to encourage broad enrollment in effective weight loss programs. The recent partnership of UnitedHealth Group and YMCA of the USA is an important case in point.²⁰

We estimate that lifetime Medicare savings could range from approximately \$7 billion to \$15 billion, depending on how broadly program eligibility was defined and actual levels of program participation, for a single "wave" of eligible persons. Several additional factors could influence the actual savings ultimately associated with putting our proposal into action.

First, it is uncertain whether the results seen among intensive lifestyle modification recipi-

ents in the original Diabetes Prevention Program trial, and documented among participants in derivative programs at the community level, will be realized in the broader participant population that we currently propose and model. It will be important to continue to measure the effects of the proposed program as the number of community-based applications and the number of individuals reached continue to grow.

Second, to help avoid overestimation of savings, our model used a 4.2 percent weight loss impact—smaller than the 7 percent seen in the original Diabetes Prevention Program clinical trial. Moreover, weight loss in the original trial was greatest among enrollees age sixty and older. These considerations suggest that the program, as currently envisioned, might produce larger effects than we modeled.

Finally, even greater long-term reductions in federal health care spending could be realized by extending the program to additional people, if it proved successful among the initial group of participants. Certainly, it could be routinely offered to people meeting the established participation criteria when they reach age sixty. In addition, expansion of eligibility to younger people (starting at age forty-five or fifty) and to current Medicare beneficiaries (up to age seventy) could be considered.

In this context we propose that Medicare expand its new wellness benefit to include reimbursement for this and other qualifying behavior change programs. The current benefit provides for an annual wellness visit; a personalized care plan; and, if appropriate, a referral. However, without payment for preventive programs, the wellness benefit remains incomplete.

Conclusion

Both previous experience and the current analysis strongly suggest that weight loss programs using evidence-based strategies could prove an effective tool for reducing chronic disease and slowing the growth of Medicare spending, in both the short and long terms. The nationwide scaling up and continued examination of such programs for at-risk people both before and after they reach age sixty-five—which could be accomplished under various provisions of the Affordable Care Act—is a strategy that should be undertaken, particularly in the context of ongoing discussions of reducing the future rate of growth in Medicare spending. ■

The authors thank the Peter G. Peterson Foundation for providing assistance to carry out the research.

NOTES

- 1 Authors' analysis using data from Centers for Disease Control and Prevention. National Health and Nutrition Examination Survey (NHANES 1999–2000) [Internet]. Atlanta (GA): CDC; [cited 2010 Jul 15]. Available from: http://www.cdc.gov/nchs/nhanes/nhanes1999-2000/nhanes99_00.htm
- 2 Authors' analysis using data from Centers for Disease Control and Prevention. National Health and Nutrition Examination Survey (NHANES 2007–2008) [Internet]. Atlanta (GA): CDC; [cited 2010 Jul 15]. Available from: http://www.cdc.gov/nchs/nhanes/nhanes2007-2008/nhanes07_08.htm
- 3 Thorpe KE, Florence CS, Howard DH, Joski P. The impact of obesity on rising medical spending. *Health Aff (Millwood)*. 2004;23:w4-480–6. DOI: 10.1377/hlthaff.w4.480.
- 4 Congressional Budget Office. How does obesity in adults affect spending on health care? [Internet]. Washington (DC): CBO; 2010 Sep 8 [cited 2010 Aug 23]. (Economic and Budget Issue Brief). Available from: http://www.cbo.gov/ftpdocs/118xx/doc11810/09-08-Obesity_brief.pdf
- 5 Finkelstein EA, Trogden JG, Cohen JW, Dietz W. Annual medical spending attributable to obesity: payer and service specific estimates. *Health Aff (Millwood)*. 2009;28(5):w822–31. DOI: 10.1377/hlthaff.28.5.w822.
- 6 Yang Z, Hall AG. The financial burden of overweight and obesity among elderly Americans: the dynamics of weight, longevity, and health care costs. *Health Serv Res*. 2008;43(3):849–68.
- 7 Lakdawalla DN, Goldman DP, Shang B. The health and cost consequences of obesity among the future elderly. *Health Aff (Millwood)* 2005; 24:W5-R30–41. DOI: 10.1377/hlthaff.w5.r30.
- 8 Scheuermann W, Razum O, Wiesmann A, von Frankenberg H, Topf G, Nussel E. Effectiveness of a decentralized, community-related approach to reducing cardiovascular disease risk factor levels in Germany. *Eur Heart J*. 2000;21:1591–7.
- 9 Lindstrom J, Louheranta A, Mannelin M, Rastas M, Salminen V, Eriksson J, et al. The Finnish Diabetes Prevention Study (DPS): life-style intervention and 3-year results on diet and physical activity. *Diabetes Care*. 2003;26(12):3230–6.
- 10 Diabetes Prevention Program Research Group. Reduction in the incidence of type 2 diabetes with life-style intervention or metformin. *N Engl J Med*. 2002;346(6):393–403.
- 11 Ratner R, Goldberg R, Haffner S, Marcovina S, Orchard T, Fowler S, et al. Impact of intensive lifestyle and metformin therapy on cardiovascular disease risk factors in the Diabetes Prevention Program. *Diabetes Care*. 2005;28(4):888–94.
- 12 Diabetes Prevention Program Research Group. 10-year follow-up of diabetes incidence and weight loss in the Diabetes Prevention Program Outcomes Study. *Lancet* 2009; 374(9702):1677–86.
- 13 Ackermann RT, Marrero DG, Hicks KA, Hoerger TJ, Sorenson S, Zhang P, et al. An evaluation of cost sharing to finance a diet and physical activity intervention to prevent diabetes. *Diabetes Care*. 2006;29(6):1237–41.
- 14 Ackermann RT, Finch EA, Brizendine E, Zhou H. Translating the Diabetes Prevention Program into the community: the DEPLOY pilot study. *Am J Prev Med*. 2008; 35(4):357–63.
- 15 Ackermann RT, Marrero DG. Adapting the Diabetes Prevention Program lifestyle intervention for delivery in the community: the YMCA model. *Diabetes Educ*. 2007;33(1):74–8.
- 16 Ackermann RT. Evidence-based diabetes prevention—national policy considerations [Internet]. Presentation at: Alliance for Health Care Reform; Washington (DC); [cited 2011 Jul 15]. Available from: <http://www.allhealth.org/briefingmaterials/Ackermannpresentation--doc-1824.ppt>
- 17 Health Advocate. Guide to workplace wellness: healthy employees, healthy bottom line [Internet]. Plymouth Meeting (PA): Health Advocate Inc.; 2007 [cited 2010 Aug 23]. Available from: <http://www.healthadvocate.com/downloads/whitepapers/WorkplaceWellnessGuide.pdf>
- 18 RAND Roybal Center for Health Policy Simulation. The future elderly model [Internet]. Santa Monica (CA): RAND; 2010 Sep 15 [cited 2011 Aug 8]. Available from: <http://www.rand.org/labor/roybalhp/about/fem.html>
- 19 To access the online Appendix, click on the link in the box to the right of the article online.
- 20 UnitedHealth Group [Internet]. Minnetonka (MN): UnitedHealth Group. Press release, UnitedHealth Group launches innovative alliance providing free access to programs that help prevent and control diabetes and obesity; 2010 Apr 14 [cited 2010 Aug 23]. Available from: <http://www.unitedhealthgroup.com/newsroom/news.aspx?id=199e50a5-557b-4353-b96d-ff060fba10fc>

ABOUT THE AUTHORS: KENNETH E. THORPE & ZHOU YANG



Kenneth E. Thorpe is a professor at the Rollins School of Public Health, Emory University.

In their article in this month's *Health Affairs*, Kenneth Thorpe and Zhou Yang examine how preventing diabetes could result in saving billions of dollars for Medicare. They propose expanding a proven, community-based weight loss program nationwide and enrolling overweight and obese adults ages 60–64 with prediabetes who aren't yet eligible for Medicare but soon will be. "Improving their health profile will result in long-term savings," Thorpe says.

"I have always been interested in modeling the impact of successful weight loss programs on health care spending," says Thorpe, who is the Robert W. Woodruff Professor and Chair of the

Department of Health Policy and Management at the Rollins School of Public Health, Emory University. Coauthor Yang has developed and published a model looking at long-term, lifetime Medicare spending that included weight and chronic disease variables, "so we were a perfect marriage," Thorpe says.

Thorpe is also the executive director of the Emory Institute for Advanced Policy solutions and executive director of the Partnership to Fight Chronic Disease. In that capacity, he works with a coalition of more than 120 organizations—whose members are patients, health care providers, business and labor leaders, and health policy experts—to raise awareness of the impact of chronic disease on the nation's health and economy. He was deputy assistant secretary for health policy in the Department of Health and Human Services from 1993 to 1995. His doctorate in public policy is from the Frederick S. Pardee RAND Graduate School, in Santa Monica, California.



Zhou Yang is an assistant professor at the Rollins School of Public Health.

Yang is an assistant professor in the Department of Health Policy and Management at the Rollins School of Public Health. She is a health economist whose research focus is the economic consequences of obesity and related chronic diseases. She is the principal investigator funded by the Department of Agriculture to evaluate the effect of food assistance on food choices, body weight, and health outcomes among women of low income. Her doctorate in health economics is from the University of North Carolina at Chapel Hill.