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Xiaohui Zhuo, Ping Zhang, Edward W. Gregg, Lawrence Barker, Thomas J. Hoerger,
Tony Pearson-Clarke and Ann Albright
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By Xiaohui Zhuo, Ping Zhang, Edward W. Gregg, Lawrence Barker, Thomas J. Hoerger, Tony Pearson-Clarke, and Ann Albright

A Nationwide Community-Based Lifestyle Program Could Delay Or Prevent Type 2 Diabetes Cases And Save $5.7 Billion In 25 Years

Xiaohui Zhuo (iip6@cdc.gov) is a health economist at the Centers for Disease Control and Prevention (CDC), in Atlanta, Georgia.

Ping Zhang is a senior health economist at the CDC.

Edward W. Gregg is the acting director of the Division of Heart Disease and Stroke Prevention, CDC.

Lawrence Barker is a senior scientist at the CDC.

Thomas J. Hoerger is a senior fellow and director of the RTI-UNC Center of Excellence in Health Promotion Economics, in Research Triangle Park, North Carolina.

Tony Pearson-Clarke is a health writer and editor at the CDC.

Ann Albright is director of the Division of Diabetes Translation, CDC.

ABSTRACT The increasing health and economic burden of diabetes has made preventing the disease a public health priority. But investing in such chronic disease prevention programs requires a long-term horizon because many years may be required for the downstream savings to fully offset the up-front intervention cost. Using a simulation model, we projected the costs and benefits of a nationwide community-based lifestyle intervention program for preventing type 2 diabetes. Accounting for all costs to the US health care system, our results indicate that the program would break even in fourteen years. Within twenty-five years, the program would prevent or delay about 885,000 cases of type 2 diabetes in the United States and produce savings of $5.7 billion nationwide. If restricted to people ages 65–84, the program would save $2.4 billion. Thus, implementing such a program nationwide would be an efficient use of health care resources, although it might be necessary for all health insurers to participate to share prevention costs. Our results also indicate that although a prevention program would lead to cost savings in both younger and older people, it would achieve greater health and economic gains if it were directed at people under age sixty-five.

Nearly twenty-six million Americans currently live with diabetes, and an additional seventy-nine million are at high risk of developing the disease.[1] Diabetes is costly, accounting for one-tenth of US health care expenditures in 2007.[2] Additionally, America's aging population and obesity epidemic are contributing to an increase in the number of people with diabetes.[1] The number of people in the United States with diabetes is projected to nearly double by 2034, to forty-four million, with health care spending attributable to diabetes nearly tripling, to $336 billion.[3]

To prevent human suffering and reduce health care costs, policy makers have called for additional efforts to prevent type 2 diabetes. The National Diabetes Prevention Program[4] is establishing a network of evidence-based lifestyle intervention programs for people who are at high risk of developing type 2 diabetes—that is, those who have prediabetes or a history of gestational diabetes. The program is based on the Diabetes Prevention Program clinical trial[5] led by the National Institutes of Health and on subsequent studies conducted in community settings.[6,7] The program is being delivered at the community level through partnerships with community-based organizations, health care organizations, and private insurers.

There is little disagreement that such national-level action would benefit public health. However, there is concern about the cost to the nation of wide implementation of prevention programs,

particularly at a time of growing health care spending. Programs to prevent noncommunicable diseases are often perceived to be expensive because they require screening a large number of people; the rate of compliance with treatment protocols is sometimes low; and savings in medical expenditures may be long delayed, whereas program costs are immediate. However, assessments of the costs and benefits of such programs should be based on long-term results in addition to immediate outcomes. In this study we projected the potential long-term costs and health benefits of implementing a community-based diabetes prevention program nationwide.

Study Design

We examined a hypothetical prevention strategy consisting of screening to identify the target population for an evidence-based lifestyle intervention program, followed by the program. Using a simulation model, we projected the costs and health outcomes of such a strategy, compared with current screening practices and with providing no intervention.

TARGET POPULATION In our hypothetical intervention scenario, shown in the online Appendix,[8] we screened eligible adults ages 18–84 and selected people at high risk of developing type 2 diabetes for lifestyle interventions. We excluded people younger than eighteen because of the low risk of developing type 2 diabetes in that age group. We also excluded people age eighty-five and older because of a lack of evidence that they would benefit from lifestyle interventions.

We assumed different methods of screening for prediabetes for different age groups. We assumed that all people ages 65–84 would be contacted by letter and invited to undergo a laboratory test for fasting plasma glucose or hemoglobin A1c. We assumed that people ages 18–64 would be screened during regular office visits to their primary care provider. People who do not make such visits would not be screened. Data suggest that 45 percent of US adults ages 18–44 and 50 percent of those ages 45–64 visit a primary care physician's office at least once a year.[9,10] They would be asked to take the pencil-and-paper diabetes risk test of the Centers for Disease Control and Prevention (CDC)[11] during that annual visit if their body mass index were at least 25 kg/m^2—a score that would make them either overweight or obese. The CDC diabetes risk test has been validated for both diabetes and prediabetes.[12]

Based on data from the National Health and Nutrition Examination Survey for 2004–08,[13] we estimated that 52 percent of the younger group would screen positive for prediabetes on the pencil-and-paper test. Those people would be asked to take a diagnostic blood test to determine whether or not they actually had prediabetes. Our simulation assumed that screening would be conducted one time among those who were eligible in 2011 and those who would become eligible over the next twenty-five years.

We estimated that 54 percent of the older group would screen positive for prediabetes on their blood test.[13] They and the younger people identified with prediabetes would be referred to a community-based lifestyle intervention program (described below). Based on a review by Tjarda Scheltens and coauthors,[14] we assumed that 50 percent of those ages 18–64 who were identified as having prediabetes and referred for interventions would participate in the program. Participation in lifestyle interventions has been shown to be higher among the elderly than among other age groups.[15–17] Therefore, we assumed a 60 percent participation rate for people ages 65–84 who were identified as having prediabetes and referred for interventions. We varied these assumptions in the sensitivity analyses. Other parameters and sources of data appear in Exhibit 1.

COMMUNITY-BASED PROGRAM Our hypothetical lifestyle program was based on a study known as Promoting a Lifestyle of Activity and Nutrition for Working to Alter the Risk of Diabetes, described by Ronald Ackermann and colleagues.[6,7] This community-based program was designed to translate the elements of the Diabetes Prevention Program lifestyle intervention from a clinical trial to a community setting at a lower cost. The program described by Ackermann and colleagues consists of sixteen intensive core sessions offered at regular intervals over five months to help participants lose weight and adopt various health-promoting behaviors, followed by six monthly postcore sessions to help participants sustain those behaviors and the weight loss.

Training materials for both the core and postcore sessions, based on the Diabetes Prevention Program curriculum, stressed the goals of reducing body weight by 5–7 percent during the first six months and maintaining this weight loss during the second six months. We assumed that participants would be offered eight maintenance sessions during the second year of the program and one or two counseling sessions annually after the first two years. All sessions would be conducted in a group setting by trained lifestyle coaches—not by medical personnel—for the first two years and by any health care provider thereafter.

EXHIBIT 1

Model Parameters In The Hypothetical Screening Strategy And Type 2 Diabetes Prevention Program

Parameter	Base-case strategy (%)	Sensitivity analysis (%)
ANNUAL PRIMARY CARE DOCTOR OFFICE VISIT		
Ages 18–44	45.10[a]	30.00–50.00
Ages 45–64	50.61[a]	30.00–50.00
Diabetes screening rate in usual care	10.00[b]	5.00–20.00
DIAGNOSTIC TEST UPTAKE		
Among those screening positive (ages 18–64 years)	50.00[c]	40.00–60.00
Among those receiving letter (ages 65–84)	25.00[c]	10.00–50.00
LIFESTYLE INTERVENTION UPTAKE		
Ages 18–64	50.00[d]	37.50–62.50
Ages 65–84	60.00[e]	50.00–70.00
Lifestyle intervention completion	50.00[f]	40.00–60.00
Diabetes incidence in people with prediabetes, per person-year	5.03[g]	4.23–6.78
PENCIL-AND-PAPER TEST[h]		
Sensitivity	70.47	Not varied
Specificity	56.06	Not varied

SOURCES References cited. [a]Notes 9 and 10 in text. [b]Note 33 in text. [c]Authors' assumption. [d]Note 14 in text. [e]Notes 14–16 in text. [f]Notes 19–21 in text. [g]Note 28 in text. [h]Note 12 in text.

Ackermann and colleagues estimated the cost of the program they described as about $300 per person during the first year, including supplies, personnel time, and program administration,[7] and we used this estimate for our analysis (Exhibit 2). Because the authors did not estimate

EXHIBIT 2

Costs And Effectiveness Of The Hypothetical Type 2 Diabetes Prevention Program

Cost/effectiveness	Base-case strategy	Sensitivity analysis
COST OF SCREENING FOR PREDIABETES ($ PER TEST/VISIT)		
Pencil-and-paper test[a]	0.10[b]	0.20
Additional time in doctor office visit	53.20[c]	106.40
HbA1c or fasting glucose–based diagnostic test	11.70[d]	23.40
COST OF GROUP-BASED LIFESTYLE INTERVENTION ($)		
Year 1 (intensive sessions)	300.00[e]	600.00
Year 2 (maintenance sessions)	150.00[f]	300.00
Year 3 and beyond (brief sessions)	50.00[f]	100.00
REDUCTION IN DIABETES RISK WITH INTERVENTION (%)		
Ages 18–64		
Year 1 (intensive sessions)	40[g]	30–50
Year 2 (maintenance sessions)	40[g]	10–50
Year 3 and beyond (brief sessions)	10[g]	0–20
Ages 65–84		
Year 1 (intensive sessions)	50[g]	40–70
Year 2 (maintenance sessions)	50[g]	20–70
Year 3 and beyond (brief sessions)	15[g]	0–20

SOURCES References cited. **NOTES** To be conservative, for cost variables we tested only the scenario in which the costs of screening and the lifestyle intervention program doubled. We did not test the scenario in which the costs of screening and the lifestyle intervention program were lower than the base-case levels. A discount rate of 3 percent was applied to the base-case strategy; a rate of 0–5 percent was applied to the sensitivity analysis. [a]Note 11 in text. [b]Authors' assumption. [c]Centers for Medicare and Medicaid Services Medicare Physician Fee Schedule: overview [Internet]. Baltimore (MD): CMS; [cited 2011 Dec 16]. Available from: http://www.cms.hhs.gov/PFSLookup/. [d]Centers for Medicare and Medicaid Services. Fee schedule [home page on the Internet]. Baltimore (MD): CMS; [cited 2011 Dec 16]. Available from: http://www.cms.gov/ClinicalLabFeeSched/02_clinlab.asp#TopOfPage. [e]Note 7 in text. [f]Note 18 in text. [g]Assumption explained in text.

costs beyond the first year, we used data from a similar group-based intervention[18] to estimate that the program would cost about $150 per person during the second year of the intervention and $50 per person per year thereafter.

Ackermann and colleagues estimated that such a lifestyle intervention would result in an average reduction in body weight of four kilograms among participants during the first year and found that the loss would be sustainable after the first year.[6] These results are similar to those of other lifestyle intervention programs to prevent type 2 diabetes.[19–21] Richard Hamman and colleagues examined the relationship between weight loss and the risk of developing type 2 diabetes.[22] Based on that relationship, we estimated that a weight loss of four kilograms would be associated with about a 50 percent reduction in diabetes incidence in the first year of intervention. Details of the calculation appear in the online Appendix.[8]

However, the Diabetes Prevention Program follow-up data and other lifestyle intervention studies indicated that participants may, over time, regain lost body weight, and the intervention would thus be less effective over a longer period of time.[17,23] Consequently, we took a conservative approach and assumed that our intervention strategy would lead to a 40 percent relative reduction in risk for diabetes during the first two years of participation and a reduction of 10 percent in each of the following years for participants ages 18–64 (Exhibit 2).

Results from both the Diabetes Prevention Program[5] and the Diabetes Prevention Program Outcomes Study[17] suggest that lifestyle interventions are more effective in reducing diabetes incidence among elderly participants than among younger ones. We therefore assumed that the program would lead to a 50 percent relative reduction in risk for diabetes during the first two years and a 15 percent reduction thereafter for participants ages 65–84 (Exhibit 2). In the sensitivity analysis, we varied both the cost and effectiveness of the program.

Study Data And Methods

To estimate the twenty-five-year health and economic consequences of implementing such a diabetes prevention program, we used a type 2 diabetes simulation model developed by the CDC and RTI International.[24] The model has been validated against the results of many major clinical trials and cohort studies and found to accurately predict the development and progression of diabetes and its complications.[25] The model has been used for economic evaluation of both lifestyle interventions and medication therapy to prevent type 2 diabetes among people at high risk,[26] as well as for interventions designed to manage risk factors for diabetes-related complications among people with type 2 diabetes.[24]

Our simulation cohorts consisted of subsets of two age groups. The older group—ages 65–84—consisted of a representative sample of the US population in this age range in 2011 and those who would reach this age range over the next twenty-five years. The younger group—ages 18–64—consisted of a representative sample of overweight or obese adults within this age range in 2011 and those who would reach this age range over the next twenty-five years.

To ensure that the population characteristics of the simulation cohorts were representative of US adults overall, we created the cohorts using data from the 2004–08 National Health and Nutrition Examination Surveys.[13] These characteristics included demographic factors (age, sex, and race or ethnicity), common chronic health conditions (such as high blood pressure and history of heart disease), and smoking behaviors. The size of each simulation cohort was based on the US Census Bureau's most recent estimate of the current and projected US population.[27]

Our model tracked clinical events and health spending associated with the disease progression of people in the simulated cohorts from prediabetes through diabetes, diabetic complications, and death. The progression from prediabetes to diabetes was based on data from the Atherosclerosis Risk in Communities Study.[28] The development of diabetic complications in the model was based on data from the United Kingdom Prospective Diabetes Study.[29]

Diabetes treatment was based on an algorithm recommended by the American Diabetes Association and the European Association for the Study of Diabetes.[30] Medical costs associated with disease progression were derived from the results of a study by Michael Brandle and colleagues,[31] the Diabetes Prevention Program study,[18,26] and the Medical Expenditure Panel Survey.[32] Details of the cost calculations appear in the online Appendix.[8]

We ran the simulation using the intervention scenario with "no intervention" as the control. In the no-intervention scenario, we assumed that 10 percent of the people in the cohorts would have received a diabetes screening test during a regular doctor's office visit.[33] We estimated the program's health benefits as the difference between the health outcomes of the intervention and control cohorts in the two scenarios, using the number of cases of type 2 diabetes prevented or delayed, the number of life-years gained, and the number of quality-adjusted life-years gained.

The net cost of the program was calculated by

adding the costs of screening, diagnosis, and delivering the lifestyle intervention, and by subtracting from that total the costs saved by treating fewer cases of diabetes and diabetic complications.

We took a health care system perspective and thus considered only the intervention cost and the direct medical costs associated with diabetes and its complications. We did not include direct nonmedical costs such as the costs of a participant's travel and time spent on the program, or the indirect costs such as loss of productivity resulting from type 2 diabetes.

All costs were expressed in 2011 dollars. Both costs and quality-adjusted life-years were discounted at 3 percent per year in the base case and at 0–5 percent in the sensitivity analyses. All aggregated health outcome measures were rounded and specified in thousands of outcomes. Aggregate cost estimates were rounded and specified in billions of dollars with one decimal place.

POSSIBLE ALTERNATIVE INTERVENTION STRATEGIES In addition to the base-case intervention strategy, we examined three alternative intervention strategies. In the first of these, all eligible people would be screened based on a blood test. In the second, the program would be offered for two years only, with no postintervention effect assumed. In the third, the program would be continuously offered at the same intensity as in the first year, and the cost and effectiveness of the intervention would be assumed to continue at the same level as in the first year.

LIMITATIONS Our study had four notable limitations. First, we did not consider other health benefits of a lifestyle intervention program, such as reduction in the risk of hypertension and hyperlipidemia. We also excluded the indirect economic impact of diabetes prevention. Studies have shown that indirect costs, such as productivity loss, account for a sizable proportion of the total economic cost of diabetes.[2] Had we accounted for these additional benefits, our cost-savings projections would have been even higher, and the break-even point would have arrived sooner.

Second, the long-term effectiveness of the group-based intervention program in a real-world setting remains to be evaluated. The effectiveness of the program would probably depend on participants' long-term adherence to lifestyle modifications. Therefore, to avoid overestimating the benefits of the program, we used very conservative estimates of long-term effectiveness and undertook many sensitivity analyses.

Third, our results are subject to the limitations of the data currently available and to our assumptions. Our data on the cost and effectiveness of the lifestyle intervention were based on translational programs in communities. The parameters related to our screening and diagnosis strategy were derived from published literature and multiple data sources, including the National Health and Nutrition Examination Survey[13] and the Atherosclerosis Risk in Communities Study.[28]

Because of a lack of data, we had to assume participation rates for the test to diagnose prediabetes. If the rates were lower than we assumed, the magnitude of the health benefits and cost savings would be smaller than what we projected. We performed a large number of sensitivity analyses to test potential biases, and those analyses showed that our results were robust in the variations of our model inputs. Nonetheless, the results from modeling studies can be useful only if they are understood in light of the data input and underlying assumptions.

Finally, in the study we presented only one of many possible intervention scenarios. The actual implementation of the screening and community-based lifestyle prevention program may be different from the one we described here. For example, for the group ages 18–64, health plans may use existing medical records instead of the paper-and-pencil screening test to identify members at high risk. Also, screening may be conducted repeatedly instead of once, and additional education or economic incentives may be needed to encourage health care providers to adopt the paper-and-pencil screening test.

We could not evaluate all possible scenarios. However, the results from our sensitivity analyses shed some light on how the potential health benefits and savings would change under different scenarios.

Study Results

Exhibit 3 summarizes the projected health and economic impacts of the program under the base-case intervention scenario. Nearly 100 million Americans ages 18–84 would be screened over the next twenty-five years. About twenty-three million of them would be found to have prediabetes, and thirteen million of those would be expected to enroll in the lifestyle intervention program. Over the twenty-five-year simulation period, we projected that the program would prevent or delay 885,000 new cases of type 2 diabetes and result in a gain of 952,000 life-years and 669,000 quality-adjusted life-years.

We also projected that the program would cost $24.1 billion for screening, diagnosis, and lifestyle interventions. However, it would result in $29.8 billion in downstream savings from treatment costs for people who might have developed

diabetes and diabetes-related complications without the intervention. This would lead to a net savings of $5.7 billion over twenty-five years.

On a per capita basis, for people ages 65–84 in the intervention cohort, we estimated that the program would extend their expected life with full health by an average of about three weeks and save an average of $330 per person over the twenty-five-year simulation period. For those ages 18–64 in the intervention cohort, the program would extend expected life with full health by an average of nearly one month and save an average of $640 per participant over twenty-five years (data not shown).

Exhibit 4 shows the projected cumulative net cost of the program by year over the simulation period. For people ages 65–84, the program would have a net cost in the first year of $1.2 billion ($300 million for screening and diagnostic tests, and $900 million for delivering lifestyle modification programs, with little savings from diabetes treatment cost). The net cost would continue to increase until year 3, after which it would start to decline. It would reach the break-even point in year 13. From then on, the program would start to reduce costs. The yearly projected cost savings would steadily increase to $2.4 bil-

lion in year 25. The pattern of projected costs for people ages 18–64 was similar.

Sensitivity Analyses
As shown in Appendix Exhibit A7,[8] our projections were sensitive to changes in both cost and

Benefits And Costs Of The Prevention Program After 25 Years, By Age Group

Benefit/cost	Age group		
	18–64	65–84	Total
People receiving screening, millions	69.4	29.4	98.8
Identified cases of prediabetes, millions	10.3	12.5	22.7
People participating in lifestyle intervention, millions	5.1	7.5	12.6
Type 2 diabetes cases prevented or delayed, thousands	289	596	885
Life-years gained, thousands	400	551	952
Quality-adjusted life-years gained, thousands	321	347	669
Cost of screening ($ billions)	0.8	1.0	1.8
Cost of lifestyle intervention ($ billions)	9.1	13.1	22.3
Costs saved from averted diabetes and complications ($ billions)	13.2	16.6	29.8
Overall cost saving ($ billions)	3.3	2.4	5.7

SOURCE Authors' analysis.

Costs Of The Prevention Program Over The Next 25 Years, By Age Group
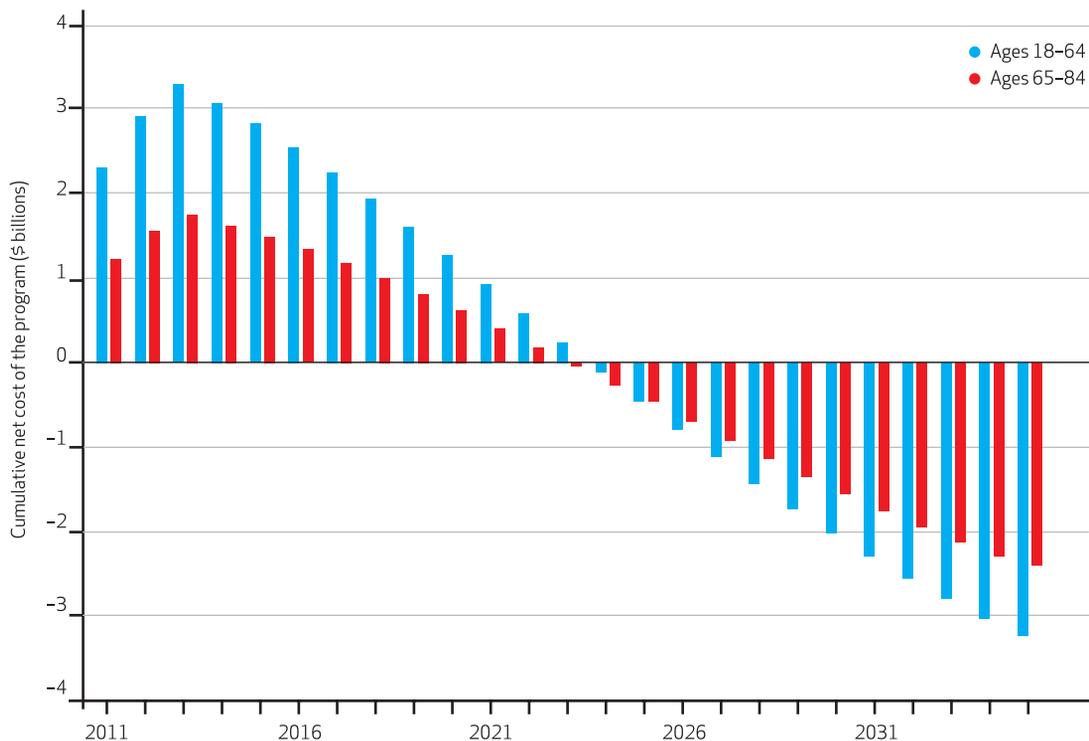
SOURCE Authors' analysis. **NOTE** The projected net costs were calculated by adding the costs of screening, diagnosis, and intervention and subtracting from that total the reduction in treatment costs for diabetes and diabetic complications.

effectiveness estimates in the lifestyle intervention program. For example, in the younger age group, reducing the effectiveness of the lifestyle intervention to a 30 percent reduction in diabetes risk in the first two years and 0 percent in subsequent years from 40 percent and 10 percent, respectively (Exhibit 2), would reduce the health gain by 110,000 quality-adjusted life-years and make the program nearly cost-neutral over twenty-five years.

In contrast, increasing the relative risk reduction associated with the program from 40 percent to 50 percent in the first two years, and from 10 percent to 20 percent in subsequent years, would increase the health gain by 180,000 quality-adjusted life-years and the cost savings by $6.8 billion in the younger age group over twenty-five years.

If we assumed that the intervention was effective only in the first year, the gain in quality-adjusted life-years for both groups would decrease by 448,000. In addition, the cost savings would be reduced by more than half over twenty-five years, to $2.3 billion.

Regarding variations in the cost, doubling the cost of the intervention for all years would lead to a net cost of $3 billion. Doubling the cost of the intervention for the first two years only would reduce the net savings to $400 million over twenty-five years. If the program were to be offered only to people ages 65–84, the intervention would at least break even over twenty-five years if the average cost of the intervention in the first two years were lower than $450 per person per year. The break-even threshold would be $550 per person per year if the program were offered only to those ages 18–64.

Increasing the percentage of eligible people who began the program or who completed it would lead to increases in health gains and medical cost savings. For example, increasing the completion rate by 20 percent would increase the quality-adjusted life-years gained by 163,000 and increase net cost savings by about $2 billion. Our projected health and cost benefits would increase similarly if we assumed that more people complied with recommendations to have a diagnostic test for prediabetes, despite the increase in testing costs.

All of the three additional intervention scenarios we tested led to a cost savings. Moreover, the program would result in greater health benefits and cost savings if it was offered continuously over time.

Discussion

Our findings suggest that the program, incurring net costs of screening and the commu-

A diabetes prevention program represents an efficient use of health care resources.

nity-based lifestyle intervention program as modeled, would break even in fourteen years (Exhibit 4). Over twenty-five years, it would prevent about 885,000 cases of diabetes and save $5.7 billion nationwide (Exhibit 3). If the program were restricted to people ages 65–84, it would take one year less for the program to break even. In that case, the program would result in 596,000 fewer cases of diabetes and reduce health care expenditures by a net $2.4 billion over twenty-five years. Thus, such a diabetes prevention program represents an efficient use of health care resources and appears to be an appealing public health intervention. However, several programmatic challenges remain.

BUDGETING FOR THE LONG TERM First, investing in chronic disease prevention programs requires adopting a longer-term budgetary horizon because many years may be required for the downstream cost savings to fully offset the up-front intervention cost. For people ages 65–84, our study suggests that the net savings of the screening and the community-based lifestyle intervention program would begin fourteen years after the initial implementation. Within five-year and ten-year windows, the program would result in increases of $1.5 billion and $640 million, respectively, in net costs (Exhibit 4). If it were limited to people ages 18–64, the program would require about the same amount of time to recoup costs as under our base-case simulation scenario.

CHALLENGES IN REACHING THE YOUNGER GROUP Second, there would be additional challenges in implementing the program for people in the younger group. In 2010, 64 percent of people ages 18–64 were covered by private health insurance.[32] However, a single private insurer might not have enough incentive to bear the entire costs of screening and the lifestyle intervention program for its beneficiaries, because they might switch insurers before the full benefits of prevention were realized. Therefore, in the context of the current US reimbursement system, it might be necessary for all health insurers to participate and share prevention costs if implementation were to be successful.

People with prediabetes and their employers

might be willing to share the costs of screening and the intervention program with insurers. Employers could gain financially through greater worker productivity and reductions in insurance costs and absenteeism.[34,35] Studies suggest that employers would be willing to pay up to $36 per employee per year to prevent those with prediabetes from developing diabetes.[36] They also suggest that people with prediabetes would be willing to pay up to $1,510 to participate in a three-year lifestyle intervention.[37]

For certain segments of the at-risk population, however, the requirement to contribute substantially to the cost of the program would be an insurmountable barrier. It would also probably widen wealth-related health disparities.

RESOURCES REQUIRED FOR IMPLEMENTATION Third, the initial implementation of the program would require a large amount of financial resources. Budgetary constraints on the public and private sectors are likely to limit the number of people who could be screened and to whom the lifestyle intervention could be delivered. Consequently, the magnitude of the public health benefits and cost savings actually realized might be smaller than estimated here.

However, our projection provides a useful analytical framework through which we can assess the potential impact of a prevention program with a fixed budget. For example, if only $5 billion were available for the program and it were targeted at people ages 65–84 for ten years, we project that about nine million people could be screened and that three million would participate in the lifestyle intervention. As a result, 317,000 cases of type 2 diabetes would be prevented or delayed (details of the calculation are provided in the online Appendix).[8]

GREATER BENEFITS IN THE YOUNGER GROUP Our results also indicate that such a diabetes prevention program would achieve greater health and economic gains if it were directed at younger people. People under sixty-five would benefit more than the older group because they have a longer life expectancy, thus providing a longer period of time to recover the screening and intervention costs. Policies offering incentives for private insurers to provide reimbursement for the intervention or for public health programs to deliver lifestyle interventions to people under sixty-five could create greater access to interventions for this population.

POTENTIAL FACTORS CONTRIBUTING TO THE COST SAVINGS Our finding of cost savings associated with such a diabetes prevention program is generally consistent with previous economic evaluations of lifestyle interventions for diabetes prevention in the United States[38] and other countries.[39,40] The magnitude of our estimated savings, however, is smaller.

For example, Kenneth Thorpe and Zhou Yang projected that enrolling people ages 60–64 with prediabetes in a lifestyle intervention program would save Medicare $7–$15 billion over the lives of those enrolled.[41] Stephen Colagiuri and Agnes Walker estimated that implementing a lifestyle intervention in Australia similar to that in the Diabetes Prevention Program would reap net savings in ten years.[39] A recent study by Angelica Castro-Ríos and colleagues suggested that screening and prevention for diabetes in Mexico would save $84–$323 per dollar invested.[40]

The potential savings from diabetes prevention programs based on lifestyle modification are largely attributable to three factors. First, without intervention, most people with prediabetes will eventually develop type 2 diabetes.[17] Second, such programs are effective in preventing or delaying the progression from prediabetes to type 2 diabetes in participants. And third, lifetime treatment costs for diabetes and diabetes-related complications are relatively high because diabetes is not curable, treatment is expensive, and people with diabetes tend to live longer than do people with other chronic diseases such as cancer or heart disease.

Results of our sensitivity analysis indicate that the program's net cost impact depends largely on the cost of the lifestyle interventions. For example, under our base-case assumptions, the cost of providing the intervention to people ages 65–84 must be less than $450 per person per year in the first two years for the program to be cost-neutral over twenty-five years.

There are a number of reasons to believe that the cost of the intervention is not likely to exceed this figure. Ackermann and colleagues used trained lay people to deliver the lifestyle intervention in a group setting and showed the program cost to be about $300 per person in the first year.[6] That study was conducted in only one community and on a very limited scale. Implementing the intervention on a larger scale could reduce the cost as a result of economies of scale.

Conclusion

The rising burden of type 2 diabetes in the United States has made its prevention a priority for public health agencies, health care professionals, private insurers, and community organizations. In this study, we found that implementing a nationwide screening and community-based lifestyle intervention for preventing type 2 diabetes would not only improve health but would also reduce health care costs over the long term. Thus, implementing such a community-based lifestyle intervention program nationwide would be an efficient use of health care resources. ∎

NOTES

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8 To access the Appendix, click on the Appendix link in the box to the right of the article online.

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ABOUT THE AUTHORS: XIAOHUI ZHUO, PING ZHANG, EDWARD W. GREGG, LAWRENCE BARKER, THOMAS J. HOERGER, TONY PEARSON-CLARKE & ANN ALBRIGHT

Xiaohui Zhuo is a health economist at the Centers for Disease Control and Prevention (CDC).

In this month's *Health Affairs*, Xiaohui Zhuo and coauthors report on results of a simulation model projecting the costs and benefits of a nationwide community-based lifestyle intervention program for preventing type 2 diabetes. Accounting for all costs to the US health care system, they conclude that the program would break even in fourteen years and that within twenty-five years it would prevent or delay about 885,000 cases of type 2 diabetes in the United States and produce savings of $5.7 billion nationwide.

Zhuo is a health economist at the Centers for Disease Control and Prevention (CDC) and winner of the American Diabetes Association's 2010 Young Investigator Travel Grant Award. He earned master's and doctoral degrees in policy analysis from the RAND Graduate School. He also has a master's degree in education economics from Peking University.

Ping Zhang is a senior health economist at the CDC.

Ping Zhang is a senior health economist and the leader of the economics team in the CDC's Division of Diabetes Translation, National Center for Chronic Disease Prevention and Health Promotion. He was awarded a doctorate in agricultural and applied economics from Texas Tech University and a master's degree in economics from North Carolina State University.

Edward W. Gregg is the acting director of the Division of Heart Disease and Stroke Prevention, CDC.

Edward Gregg is the acting director of the CDC's Division of Heart Disease and Stroke Prevention. His work includes oversight of the National Diabetes Surveillance System and the integration of surveillance, epidemiology, health services, and economic studies at the CDC to better guide health policy for chronic diseases. Gregg holds a doctorate in chronic disease epidemiology from the University of Pittsburgh.

Lawrence Barker is a senior scientist at the CDC.

Lawrence Barker is a senior scientist in the CDC's Division of Diabetes Translation. He served as the associate director for sciences for the division. The winner of the CDC's 2010 Statistical Science Award in applied statistics, Barker holds master's and doctoral degrees in statistics from Florida State University.

Thomas Hoerger is a senior fellow and director of the RTI-UNC Center of Excellence in Health Promotion Economics. He specializes in health economics, public health, hospital and physician behavior, health care reform, and cost-effectiveness analysis. He received master's and doctoral degrees in economics from Northwestern University.

Tony Pearson-Clarke is a health writer-editor with the CDC's Division of Diabetes Translation, on contract from Amer Technology, a high-tech consulting firm. He has a master's degree in technical and professional communication from Southern Polytechnic State University.

Ann Albright is the director of the CDC's Division of Diabetes Translation, providing leadership and direction to the science and programs of the nation's public health diabetes program. She holds a doctorate in physical education from the Ohio State University and a master's degree in physical education from California State University, Sacramento.

Thomas J. Hoerger is director of the RTI-UNC Center of Excellence in Health Promotion Economics.

Ann Albright is director of the Division of Diabetes Translation, CDC.