Effective Interventions For Stemming The Growing Crisis Of Diabetes And Prediabetes: A National Payer’s Perspective

ABSTRACT Between a fifth and a third of US adults will have diabetes by midcentury, up from one in ten now, according to a government estimate. We project that over the next decade, around 40 million adults could have diabetes and 100 million could be diagnosed with its clinical precursor, prediabetes. Related health care spending could reach $512 billion annually in 2021. Evidence-based interventions can curb diabetes and its clinical complications, but little has been done to implement them on a wide scale. What’s needed, among other measures, are new risk-assessment methods to identify subpopulations that will benefit most; the enrollment of consumers in new care models that support and encourage lifestyle change; partnerships with pharmacists, nurses, and health coaches; and new programs in Medicare and Medicaid that encourage patient engagement and lifestyle change.

Type 2 diabetes, accounting for 90–95 percent of diagnosed diabetestes in the United States,1 is an underlying metabolic problem that is frequently caused by obesity. It impedes insulin’s ability to regulate blood sugar, which in turn causes high blood sugar (hyperglycemia), and it is often accompanied by increases in blood cholesterol and blood pressure.

If untreated, these risk factors can cause blood vessel and nerve damage, leading to blindness, kidney damage, limb amputations, and cardiovascular complications such as stroke and heart attack. Without proper management, diabetic complications increase with both the patient’s age and the passage of time. About a quarter of people with diabetes and the majority of people with its precursor, prediabetes, are unaware that they have either condition, which makes it difficult to address the progression of the disease and its complications.1-3

The Cost Of Diabetes-Related Care

Compared to people without the disease, people with diabetes have more physician visits and longer and more frequent hospital stays, and they use prescription drugs more. To understand the impact that diabetes has on real-world costs, we examined claims data on ten million members of UnitedHealthcare, a commercial health plan.

These data showed that the average total annual cost for an adult plan member with employer coverage and diagnosed diabetes who interacted with the health care system in 2009 was approximately $11,700, compared to $4,400 for an adult with employer coverage not known to have diabetes (Exhibit 1).4 Of particular note, the average yearly total costs for a person with diabetes who developed complications were $20,700—almost three times the average cost of $7,800 for diabetes patients without complications.

These cost differentials also occur in the Medicare population. Seniors with diagnosed diabetes in a large representative sample of United-
Healthcare’s Medicare Advantage members had average costs in 2009 that were 33 percent higher than those for the remainder of the population enrolled in the same plans.\(^5\) Furthermore, seniors with diabetes-related complications incurred almost three times the costs of seniors with diabetes who did not have complications.\(^6\)

### Projecting Future Prevalence And Spending

What are the prospects for the future? If recent trends continue, the Centers for Disease Control and Prevention (CDC) predicts that the prevalence of diabetes will rise from approximately one in ten adults today to between one in five and one in three adults by the middle of this century.\(^7\) Separately, in a recent working paper, we estimated the likely growth in prediabetes and diabetes and associated spending trends in the United States over the next decade.\(^4\) We have updated the main finding by an additional year and with more recent information on prediabetes prevalence.

If current trends persist (see Exhibits 2 and 3), we project that 15.4 percent of American adults (40.3 million) might have diabetes by 2021, compared to 11.8 percent (28 million) in 2011. Also, based on fasting glucose concentrations, roughly 38 percent of the adult population (about 100 million people) might have prediabetes in 2021—up from 29.7 percent in 2011.

Additionally, annual health care spending attributable to prediabetes or diabetes could rise from $206 billion in 2011 to $512 billion by 2021, with a cumulative cost of approximately $3.5 trillion. (These spending figures are for costs of medical care related to prediabetes or diabetes, not total health spending by people with prediabetes or diabetes.) Nearly two-thirds of that cost increase would be likely to fall to Medicare and Medicaid, in part because diabetes prevalence is higher among members of these programs—particularly for those eligible for both programs—than among people with employer-sponsored coverage.

### Evidence-Based Interventions

Given the size of these projected increases in morbidity and spending, what in practice can be done to make a difference? In addition to wider social, economic, and health policies, evidence suggests that a number of programmatic interventions could be effective, as discussed below.

#### INTERVENTIONS TO REDUCE OBESITY

Obesity is a major risk factor for type 2 diabetes. For example, some studies have shown that high-intensity counseling for diet and exercise, combined with behavioral support—and possibly financial incentives—can produce sustained weight loss in obese adults, resulting in improved glucose metabolism, lipid levels, and blood pressure.\(^8-13\)

Early identification of and interventions for...
adults with prediabetes reduce the risk and rate of progression to type 2 diabetes. Between one-third and two-thirds of people with prediabetes are likely to develop type 2 diabetes within six years, compared to fewer than 5 percent of those with normal blood glucose. Well-designed trials, however, have shown that the onset of type 2 diabetes can be prevented or delayed when intensive nutrition, physical activity, and behavioral support interventions or selected medications are offered to adults with prediabetes.

In particular, the Diabetes Prevention Program research study in 2002 showed that intensive lifestyle interventions offered to adults with prediabetes can reduce the incidence of diabetes by 58 percent. Several subsequent studies that have examined structured lifestyle interventions in more real-world settings have achieved weight loss results that are similar to those achieved in the Diabetes Prevention Program but less costly to deliver.

### Evidence Into Practice: Three Innovative Care Models

History shows that just because research identifies promising new ways of preventing or managing diabetes, there is no guarantee that such measures will be adopted, particularly if they require new forms of consumer outreach and support. In a fragmented US health care system that often functions as a "cottage industry," there are relatively few organizations with the resources, capacity, and geographical reach to implement these programs on a large enough scale to make a notable difference in overall population health.

Health plans have the potential to do so, to the extent that they focus on managing the overall health of their populations, not just the use of health care services. Although still early in their rollout periods, three case studies show what that might look like in practice.

### National Public-Private Partnership

Imagine a new medicine that could reduce the risk of diabetes by 58 percent, with results that persisted for a number of years. No doubt the pharmaceutical industry would have quickly mobilized to ensure the widespread adoption of such a medicine around the world. But what if an equally dramatic impact was achievable by a carefully tailored lifestyle intervention? Regret-

### Exhibit 3

<table>
<thead>
<tr>
<th>Source of coverage</th>
<th>All US adults (millions)</th>
<th>Prevalence (millions, 2011 estimate)</th>
<th>2011 (estimated)</th>
<th>Projection</th>
<th>Percent of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private insurance</td>
<td>131</td>
<td>35.4</td>
<td>62</td>
<td>1,084</td>
<td>31</td>
</tr>
<tr>
<td>Medicare (except dual eligibles)</td>
<td>41</td>
<td>16.7</td>
<td>94</td>
<td>1,709</td>
<td>49</td>
</tr>
<tr>
<td>Dual eligibles</td>
<td>7</td>
<td>1.8</td>
<td>24</td>
<td>425</td>
<td>12</td>
</tr>
<tr>
<td>Medicaid (except dual eligibles)</td>
<td>13</td>
<td>2.5</td>
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<td>127</td>
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<td>46</td>
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<td>21</td>
<td>157</td>
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<tr>
<td>Total</td>
<td>238</td>
<td>70.6</td>
<td>206</td>
<td>3,502</td>
<td>100</td>
</tr>
</tbody>
</table>

**Source** UnitedHealth Center for Health Reform and Modernization, 2011. **Note** Numbers might not add to totals because of rounding.
Notably, in the nine years since publication of the landmark Diabetes Prevention Program research study showed precisely that, surprisingly little has been done to implement it on a large scale.

That fact has prompted the CDC, the YMCA of the USA, and UnitedHealth Group to form an alliance to scale up a cost-effective group version of the Diabetes Prevention Program. The program’s sixteen core sessions and follow-up are led by trained lifestyle coaches who help small groups of people learn about behavior changes such as healthier eating and increased physical activity that can reduce the risk of type 2 diabetes. The program is now being offered to employers, other plan sponsors, and insurers in twenty-three states and the District of Columbia. The goal is to expand its reach greatly over the next several years.

**Making Wider Use of Pharmacists** Similarly, UnitedHealth Group has now expanded the concept of the Asheville and Ten-Cities Challenge programs to create the Diabetes Control Program. This intervention gives people with diabetes access to trained pharmacists who provide personalized coaching and counseling to help improve adherence to treatment plans and health goals. Pharmacy partners—including five national pharmacy chains and grocery stores—receive incentive payments based on participants’ results, including weight loss, improvement in blood glucose control and HbA1C levels, and decreases in blood pressure and cholesterol levels. The program is being offered in communities in fourteen states and the District of Columbia and is expected to be rolled out more widely in 2012 and 2013.

**Integrating Patient Incentives and Support** UnitedHealth Group introduced the country’s first Diabetes Health Plan based on so-called value-based insurance design principles. Designed for people with or at risk of diabetes, it aims to improve outcomes through earlier identification, improved self-management, and better care.

Prospective participants are identified by UnitedHealthcare through diverse mechanisms, including an analytics algorithm incorporating claims data, health risk assessments, and biometric testing (for example, blood glucose and cholesterol levels). Focused consumer support then includes a personalized care plan, web-based reminders, an electronic personal health record, and access to physicians identified as high-performing on the basis of national evidence-based care guidelines.

The benefit design includes financial incentives to encourage patients to follow evidence-based steps to help manage diabetes. This includes reduced or eliminated out-of-pocket patient expenses for diabetes-related physician visits; free diabetes self-monitoring training and supplies; and reduced or eliminated out-of-pocket expenses for diabetes-related medicines.

First offered in 2009 as a pilot with three employers, the Diabetes Health Plan has now been adopted by twenty-five employers, accounting for 216,000 at-risk enrollees. Although the program is still being evaluated and refined, measured blood glucose screening rates among employees who have been in the program for at least one year have increased by 17 percent.

UnitedHealth Group has other diabetes-related research and development efforts under way, including testing intensive diet and exercise interventions with groups of obese children and their parents; developing new social networking technologies for people with and at risk of diabetes; using new movement-tracking children’s games to promote physical activity; and working to understand the impact of varying levels of incentives aimed at stimulating behavioral change by patients with or at risk of diabetes. In particular, we seek to understand how these incentives might interact with new physician payment models that promote improved diabetes care.

**Implementation Lessons**

Transferring prediabetes and diabetes intervention models from research conditions to the real world may require a number of adaptations, particularly to ensure their cost-effectiveness. As evidence in the case studies reviewed above shows, these ingredients may include using new statistical and risk-assessment methods to identify the subpopulations that would most benefit from the interventions and working closely with employers and health professionals to facilitate sizable enrollment in new care models and benefit designs.

The ingredients may also include the use of technology and group settings to ensure that...
Diabetes is a prism through which to view changes needed in US health care.

the relevant personalized and peer-to-peer interventions are delivered as efficiently as possible. “Adjunct networks” of health professionals such as pharmacists, nurses, and trained health coaches to support primary care physicians may also be part of the mix. Also needed are rapid implementation; monitoring; iterative adaptation cycles; quickly scaling up what works and dropping what does not; and developing unconventional partnerships that bring together governmental, nonprofit, and private-sector actors in support of common goals.

Given the higher prevalence of prediabetes and diabetes in the Medicare population and among some Medicaid enrollees, there is now an urgent need to consider embedding these evidence-based intervention models into public programs, too. Doing so could include reimbursing interventions modeled on the Diabetes Prevention Program and other research, using trained “extenders” such as the Y lifestyle coaches. And just as private payers are developing value-based insurance designs that encourage patient engagement and lifestyle change, policy makers could consider testing similar models as part of a redesigned fee-for-service Medicare or Medicaid benefit. Enrollees in the new state exchanges could also be offered incentives to stay healthy or to maintain adherence to chronic care treatment programs with help from retail pharmacists.

Conclusion
Diabetes is a prism through which to view broader changes needed in US health care—whether they be strengthened primary care, new models of care coordination, “nudges” to prompt consumers to change their behavior, or the use of actionable information and well-designed payment incentives to stimulate improvements in the quality and appropriateness of care. Diabetes is also a striking case study of how slowly effective approaches for population health improvement diffuse into mainstream application.

Broader policy changes that might improve the social determinants of health would be welcome. But those working in health care also need concerted, broad-based national action to increase screening and diagnosis, improve the uptake of appropriate care, and design effective and evidence-based incentives to stimulate healthy behavior among at-risk populations. We now know enough about what can be done. The question is, Will we act on it?

The authors thank Ann Albright, Centers for Disease Control and Prevention; Ron Ackermann, Northwestern University; and Lew Sandy, UnitedHealth Group, for their insightful comments. Any errors are those of the authors alone.

NOTES
5 UnitedHealthcare 2009 Medicare Advantage member costs. See Note 4.
6 Patients’ adherence to evidence-based self-care also affects costs. Based on pharmacy refill data from the sample of UnitedHealthcare employer-sponsored patients described above, the total annual medical care costs per person with diabetes and complications who did not follow medication guidelines for angiotensin-converting enzyme inhibitors and angiotensin receptor blockers were $24,300, compared to $19,400 for adults with diabetes with complications who were adherent in these medication classes. Moreover, costs for nonadherent patients were also increasing more rapidly (13.8 percent versus 10.6 percent year over year.) Similarly, among UnitedHealthcare Medicare Advan-
tage members who had diabetes, hypertension, and associated complications, the difference in average annual health care costs between those individuals who were and were not adherent to their prescription drug regimen was $6,800 in 2009.


15 Some glucose-lowering and weight loss medications have also been used to treat prediabetes, but the effect of these medications generally disappears partially or completely when patients stop taking them.


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In this month’s Health Affairs, Deneen Vojta and coauthors from UnitedHealth Group present estimates of the toll that diabetes will take in the United States in the next decade. They project that 40 million American adults could have diabetes and that 100 million could be diagnosed with its clinical precursor, prediabetes. They also project that diabetes-related health care spending could reach $512 billion annually in 2021.

The authors recommend various steps, including enrollment of consumers in new diabetes care models and new programs in Medicare and Medicaid that would encourage patient engagement and lifestyle change.

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