

Diabetes and Kidney Disease: A Serious Burden

According to the Centers for Disease Control, diabetes is the leading cause of kidney failure in the United States.¹ The number of people with diabetes and kidney failure has risen rapidly, growing by 61 percent between 2000 and 2010.¹ Treating people with kidney failure, known as end stage renal disease (ESRD), cost the health care system \$42.5 billion in 2009, \$29 billion of which was paid by Medicare²—an average of \$82,000 per person.³ Over 90,000 Americans died from ESRD in 2009.³

Recent Scientific Advancements Show Promise in Reducing Kidney Failure

Improving Glucose Control Reduces Kidney Failure

In recent years, medical research has begun to make significant advancements in understanding how to prevent ESRD in those with diabetes. Research funded by the National Institutes of Health's Special Diabetes Program (SDP) found that 6.5 years of intensive blood glucose control cut in half the onset of impaired kidney function in people with type 1 diabetes (T1D), the first step toward ESRD.⁴ This finding, published in *The New England Journal of Medicine* in 2011, underscores the critical need to improve glucose control in people with diabetes in order to prevent kidney failure.

Fortunately, great progress is being made through the SDP in advancing new ways to improve glucose control. Research by the SDP as well as JDRF has accelerated the development of artificial pancreas systems which will help patients with

diabetes better manage their blood sugar levels and reduce costly and burdensome complications like kidney failure. A renewal of the Special Diabetes Program would enable this promising research and development to continue, so these devices can be available to people with diabetes and help them prevent kidney damage.

Moreover, diabetes prevention and treatment programs for type 2 diabetes being conducted through the Special Diabetes Program for Indians (SDPI) seems to already be helping reduce ESRD rates among American Indians and Alaska Natives, as noted in a report from the Indian Health Service. ESRD rates, which rose rapidly until 1999, fell by 27.7 percent between 1995 and 2006, after the SDPI program was launched in 1998.⁵

Testing Promising Potential Preventive Therapies of Kidney Disease

It should be noted that even in those T1D patients with reported good glycemic control, kidney disease may still occur. Therefore other avenues need to be explored for prevention and treatment of this disease, to reduce the number

who progress to ESRD. One example of such research is being conducted by the Joslin Diabetes Center. The effort is based on published studies from multiple research groups which have found T1D patients with higher levels of uric acid in their blood have more rapid kidney damage, and that there seems to be a strong correlation between the two factors.⁶ A 2012 study found a similar result in patients with type 2 diabetes.⁷ Now the Joslin, funded initially with a pilot grant from JDRF and now with a multi-year grant from the Special Diabetes Program, will conduct a clinical trial to test whether a compound known to lower uric acid⁸ when taken by people with T1D will actually reduce kidney damage. Despite the potential of this therapy to reduce a costly and deadly complication of diabetes, this trial would have been unlikely to move forward without the support of NIH, since the compound is in generic form and no one company would likely have the incentive to conduct such a costly clinical trial. Thus, the Special Diabetes Program is truly filling a gap, and advancing research that could have tremendous benefits for our nation.

Scientific Progress and Opportunities Show Great Potential for Long-Term Medicare Savings

As noted above, continued Special Diabetes Program-funded research to improve glucose control and reduce uric acid could greatly impact the rate of kidney failure in people with diabetes, and the diabetes treatment and prevention programs for Native Americans seem to be already having an impact.

While the level of these potential impacts is not precisely known, it is known that a significant reduction in rates of ESRD would reduce Medicare costs in the long term. Recently, researchers from the University of Chicago and elsewhere utilized a health care economics model to evaluate the savings to Medicare of reductions in ESRD rates⁹, and found:

- A 25 percent reduction in ESRD rates—the level of improvement among American Indians and Alaska Natives with T2D since the beginning of the SDPI program—would save Medicare \$2.6 billion dollars over 25 years for those with T1D and \$53 billion for those with T2D.
- A 50 percent reduction in ESRD rates—the level which *The New England Journal of Medicine* noted can be achieved by 6.5 years of improved glucose control among those with T1D—would save Medicare \$5.9 billion (T1D) and \$120 billion (T2D), respectively.

All told, the Special Diabetes Program has tremendous potential to curb the rapidly rising Medicare costs due to diabetes and kidney disease. We've come too far to stop now.

¹ Centers for Disease Control, National Center for Health Statistics *Health, United States*, 2011, table 51, retrieved from <http://www.cdc.gov/nchs/hus/contents2011.htm#051>

² National Kidney and Urologic Diseases Information Clearinghouse. (2012). *Kidney and Urologic Diseases Statistics for the United States*, retrieved from <http://kidney.niddk.nih.gov/KUDiseases/pubs/kustats/index.aspx#17> and <http://kidney.niddk.nih.gov/KUDiseases/pubs/kustats/index.aspx#12>

³ Data from United States Renal Data System. Retrieved from http://www.usrds.org/2011/view/v2_00b_precis.asp

⁴ The DCCT/EDIC Research Group. (2011). "Intensive Diabetes Therapy and Glomerular Filtration Rate in Type 1 Diabetes." *The New England Journal of Medicine*, 365 2366-2376, retrieved from <http://www.nejm.org/doi/full/10.1056/NEJMoa1111732>

⁵ Indian Health Service, Fact Sheet "Special Diabetes Program for Indians: Community-Directed Successful Interventions and Sustained Achievements" Retrieved from http://www.ihs.gov/newsroom/includes/themes/newihsthem/display_objects/documents/2012_Speeches/PreventingAndTreatingDiabetesAIAN_UCOSpeakerSeries.pdf

⁶ Ficociello, Linda et.al. "High-Normal Serum Uric Acid Increases Risk of Early Progressive Renal Function Loss in Type 1 Diabetes," *Diabetes Care*, Volume 33, Number 6, June 2010, pp 1337-1343. Retrieved from <http://care.diabetesjournals.org/content/33/6/1337.full?sid=58d4e7ec-c999-4ea4-9394-f65ee5663106>

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⁷ Zoppini, Giacomo et.al., "Serum Uric Acid Levels and Incident Chronic Kidney Disease in Patients With Type 2 Diabetes and Preserved Kidney Function" *Diabetes Care* January 1, 2012 35:99-104, retrieved from <http://care.diabetesjournals.org/content/35/1/99.full.pdf+html>

⁸ The compound, known as allopurinol, is now available in generic form and is typically prescribed to prevent gout.

⁹ Winn, Aaron, O'Grady, Michael, and Huang, Elbert, "Potential Medicare Savings of Reduced End State Renal Disease in Patients with Diabetes," September 2012 White Paper.

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