

DIABETES IN CONTROL.com Newsletter

The Newsletter for Professionals in Diabetes Care

September 5, 2007 - Issue #380

Top Diabetes Stories:

Another Cause of Type 2 Diabetes Found*

<http://www.diabetesincontrol.com/results.php?storyarticle=5102>

Treating Gestational Diabetes Reduces Childhood Obesity*

<http://www.diabetesincontrol.com/results.php?storyarticle=5100>

Resting Heart Rate Directly Related to Risk of Cardiovascular Disease*

<http://www.diabetesincontrol.com/results.php?storyarticle=5099>

Intensive Diabetes Treatment Can Lower Resting Heart Rate*

<http://www.diabetesincontrol.com/results.php?storyarticle=5098>

Vegetables Protect Against Diabetes*

<http://www.diabetesincontrol.com/results.php?storyarticle=5096>

Primary and Secondary Interventions for Diabetic Retinopathy*

<http://www.diabetesincontrol.com/results.php?storyarticle=5094>

Depression Care Management Can Reduce Mortality in Older Patients With Diabetes*

<http://www.diabetesincontrol.com/results.php?storyarticle=5093>

Obesity Rates Predicted by Property Values and Zip Codes*

<http://www.diabetesincontrol.com/results.php?storyarticle=5088>

From the editor's desk

So often we focus on fixing high glucose levels exactly that we forget about the importance of getting the right amount of glucose to raise low levels. This week **Richard K. Bernstein, M.D., F.A.C.E., F.A.C.N., C.W.S.**, explains how to calculate the right amount of glucose with some of his favorite products.

<http://www.diabetesincontrol.com/results.php?storyarticle=5103>

Last week Medtronic announced that they had gotten approval for the automatic version of its CareLink Network with Conexus Wireless Telemetry in the EU. The network can be programmed to automatically transmit patient and device data on potentially deadly disease progression from an implanted heart device directly to physicians.

Compatible devices include cardiac resynchronization therapy defibrillators for patients with heart failure and implantable cardioverter defibrillators for patients with arrhythmias. The CareLink Network is also the first and only approved system to allow remote monitoring and alerting of fluid buildup in the thoracic cavity (a precursor of heart failure) via a proprietary feature called OptiVol Fluid Status Monitoring. Can Continuous Glucose Monitoring and data transmission be far behind?

We recently had an opportunity to talk with **Dr. Steven Edelman** about his TCOYD (Taking Control of Your Diabetes) program, which travels to different cities to educate patients with diabetes. Diabetes in Control will be helping to get the word out so we can have as many patients as possible attend these great events. See this week's tool for more information.

The Diabetes Cruise: We are putting together a Diabetes CE/CME cruise for medical professionals for next March, 2008. It is a 9 day cruise to the Caribbean with 20 hours of CME/CE that will teach Dr. Richard K. Bernstein's diabetes treatment methods. This is a once in a lifetime opportunity to learn from Dr. Bernstein his methods to normalize blood sugars. You will learn how to normalize blood sugars as if your patients did not have diabetes. For more information on the cruise click here.

<http://www.diabetesincontrol.com/cruise.php>

Next FREE LIVE WEBCAST: September 19, 2007, we will be having another live webcast and teleconference call with Dr. Richard K. Bernstein, who will answer questions from medical professionals and patients and it is free. Just go to www.diabetes911.net and register and ask a question if you like!

September 9, 7PM ET on CNBC

How to overcome diabetes hurdles in the workplace; Luke Branquinho talks about his life as a rodeo champ who also has diabetes; and, dLife's Jim Turner gets personal about sex and diabetes (parental discretion advised). Catch this all-new episode of dLifeTV on: Sundays on CNBC at 7 PM ET, 6 PM CT, and 4 PM PT Check your local listings for details.

We can make a difference!

This week's overview:

- Item #2: Number of Uninsured U.S. Residents Increases to 47M in 2006**
- Item #6: Type 1 and Type 2 Diabetes Linked to Increased Risk of Hip Fracture**
- Item #8: New Age- and Sex-Specific Cholesterol Cutoff Values for Teens**
- Item #11: Diabetes Can Impair Tuberculosis Treatment Response**
- Item #12: Whole Grains Protect Against Diabetes**
- Item #13: Discovery Paves Way for a New Class of Diabetes Drugs**
- Item #14: Brain Link Seen in Type 2 Diabetes**

Check out this weeks **"Test Your Knowledge"** question. This week's question deals with CGMS. <http://www.diabetesincontrol.com/results.php?storyarticle=5104>
Dave Joffe, *Editor-in-Chief*

CE CREDITS

ARE NOW AVAILABLE FOR DM EDUCATE? , COMPREHENSIVE ONLINE DIABETES MANAGEMENT COURSE - DM Educate was created by the University of Pittsburgh, in partnership with Novo Nordisk to provide pharmacy students with the tools to meet the needs of patients with diabetes. Currently 75 colleges and universities throughout the world are registered and using the course. [Learn more here](#)

NEWS FLASH:

Medco Will Buy Diabetes-Care Company for \$1.3 Billion: Medco Health Solutions Inc., the biggest U.S. manager of drug benefits, agreed to a \$1.3 billion purchase of PolyMedica Corp., the largest supplier of glucose-testing supplies for patients with diabetes.

Tools for your Practice:



Taking Control of Your Diabetes- Conferences to Motivate Patient Action

TCOYD's Mission is to educate and motivate people with diabetes and their loved ones, to take a more active role in their condition, in order to live healthier, happier, and more productive lives. TCOYD provides a complete diabetes education program for your patients and their families by providing a full day of seminars, workshops and one-on-one opportunities with leading experts in diabetes care. Check out the cities that TCOYD will be coming to and get your patients to attend.

[TCOYD Calendar of Events](#) If you would like to volunteer for one of these events in your areas send an email to Michele at huie@tcoyd.org
<http://www.tcoyd.org/05/homepage.shtml>

New Product: Infopia brings the Eclipse meter and data transmission system to patients. This device allows the patient to upload their data automatically without going on the internet. Then it can be sent to anyone they choose. We will be reviewing this product for you.



This Week's Items:

1. Another Cause of Type 2 Diabetes Found*
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 2. Number of Uninsured U.S. Residents Increases to 47M in 2006
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 15. Obesity Rates Predicted by Property Values and Zip Codes*
<http://www.diabetesincontrol.com/results.php?storyarticle=5088>
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ITEMS For The Week:

Item 1

Another Cause of Type 2 Diabetes Found

U.S. scientists have discovered a third abnormality that might play a role in the development of obesity-induced type 2 diabetes. The development of type 2 diabetes -- or at least part of it -- may be in your head, researchers said.

<http://www.diabetesincontrol.com/results.php?storyarticle=5102>

In cases of type 2 diabetes, the body's cells fail to appropriately regulate blood glucose levels. Previous research suggested that results from two simultaneous problems: the improper functioning of pancreatic beta cells and the impairment of insulin's actions on target tissues, including the liver, fat and muscles.

In the new study, scientists at Beth Israel Deaconess Medical Center and the Oregon Health & Science University identified a previously unrecognized role for glucose-sensing neurons in the onset of the disease.

"For many years we've known subpopulations of neurons in the brain become 'excited' by glucose," said Dr. Bradford Lowell, a Harvard Medical School professor. "But we haven't understood exactly how or why this is significant.

"With this study, we show these neurons sense increases in glucose and then initiate responses aimed at returning blood-glucose levels to normal. This is the first demonstration that glucose-sensing by neurons plays an important role in responding to rising blood glucose levels."

The idea of neurons as a third-party player in the pathogenesis of diabetes -- in addition to improper functioning of pancreatic beta cells and impairment of insulin activity in tissue -- was revealed by Bradford Lowell, M.D., Ph.D., of Beth Israel Deaconess Medical Center and Harvard, and colleagues. They have identified a population of glucose-sensing neurons in the arcuate nucleus of the hypothalamus whose function is disrupted by obesity, Dr. Lowell and colleagues reported online in *Nature*.

These glucose-excited pro-opiomelanocortin (POMC) neurons, they wrote:

- ?? Play a role in controlling systemic glucose homeostasis.
- ?? Lose their glucose-sensing activity in obese animals fed a high-fat diet.
- ?? Appear to be turned off by the same protein -- uncoupling protein 2 (UCP2) -- that turns off pancreatic beta-cells.

Taken together, the evidence suggests that obesity-induced and UCP2-mediated loss of glucose sensing in the neurons "might have a pathogenic role in the development of type 2 diabetes," Dr. Lowell and colleagues postulated.

"For many years we've known that subpopulations of neurons in the brain become 'excited' by glucose," Dr. Lowell said. "But we haven't understood exactly how or why this is significant.

"With this study, we show that these neurons sense increases in glucose and then initiate responses aimed at returning blood-glucose levels to normal," they said. "This is the first demonstration that glucose-sensing by neurons plays an important role in responding to rising blood glucose levels."

In electrophysiology studies in mice, the researchers first showed that about half of the pro-opiomelanocortin neurons in the arcuate nucleus of the hypothalamus become excited by surges in glucose equivalent to those seen after eating a meal.

The mechanism of excitement was thought to involve the closing of ATP mediated potassium channels, so the researchers created transgenic mice whose pro-opiomelanocortin neurons were 250 times less sensitive to ATP. In these mice, almost none of the pro-opiomelanocortin neurons were excited by glucose, Dr. Lowell and colleagues reported.

In whole-body experiments, the researchers then showed that the transgenic mice -- although of normal weight -- had impaired glucose tolerance, compared to wild-type animals.

Another piece of the puzzle came from experiments on wild-type animals fed a normal chow diet or a high-fat diet to induce obesity for eight weeks, the researchers said. In the chow-fed mice, 46% of pro-opiomelanocortin neurons were excited by glucose, but only 10% of the pro-opiomelanocortin neurons in the obese high-fat diet mice had the same response.

Since UCP2 is expressed in pro-opiomelanocortin neurons, the researchers hypothesized that it might play a similar role there as it does in the pancreas -- turning off glucose sensing.

To test that idea, they used a molecule dubbed genipin that blocks the activity of UCP2. Pancreatic beta-cells incubated with the molecule have their ability to secrete insulin restored.

In wild-type mice fed a normal chow diet, blocking UCP2 with genipin had no effect on the response to increased glucose. But in the same mice fed a high-fat diet -- whose glucose response was impaired -- the molecule completely remedied the defect.

In another test, they created transgenic mice lacking the gene for UCP2. The pro-opiomelanocortin neurons of these mice had a normal glucose response regardless of diet and did not respond differently when treated with genipin, the researchers said.

"An increase in the activity of the mitochondrial uncoupling protein 2 is behind the loss of glucose-sensing ability in the pro-opiomelanocortin neurons," said co-author Laura Parton, Ph.D., also of Beth Israel.

"Increased activity of UCP2 is known to cause loss of glucose-sensing and defective insulin secretion by pancreatic beta cells and this study now shows that a similar phenomenon also occurs in neurons."

The findings "add to our understanding of type 2 diabetes," Dr. Lowell said, "at a critically important time. The discovery that defects in glucose-sensing by the brain may also be contributing to Type 2 diabetes could help lead to new therapeutic strategies for this widespread problem."

Parton LE et al. "Glucose sensing by POMC neurons regulates glucose homeostasis and is impaired in obesity." Nature 2007; doi:10.1038/nature06098

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Item 2

Number of Uninsured U.S. Residents Increases to 47M in 2006

The number of uninsured U.S. residents rose by 5% and is now by 2.2 million in 2006 to 47 million, up from 44.8 million in 2005, the largest increase in four years, even as poverty fell and household incomes rose, according to data released last Tuesday by the Census Bureau.

<http://www.diabetesincontrol.com/results.php?storyarticle=5101>

The percentage of people in the U.S. who received health benefits through an employer declined in 2006 to 59.7 percent, from 60.2 percent in 2005, the census report found.

The survey also found that:

- /// 58.7% of the uninsured worked either full- or part-time during 2006;
- /// Adults ages 18 to 34 comprise the largest portion of the uninsured at 40.4% of those without coverage;
- /// 73.2% of the uninsured were U.S. citizens;
- /// Of the uninsured, 62% live in households with annual incomes less than \$50,000, and of that group, more than half live in households with annual incomes between \$25,000 and \$50,000;
- /// 18.1% of the uninsured lived in households with annual incomes between \$50,000 and \$74,999 (Armstrong, *CQ Today*, 8/29);
- /// 8.5% of the uninsured in 2006 lived in households with annual incomes greater than \$75,000, up from 7.7% in 2005;
- /// 19.3% of children in families with annual incomes below the federal poverty level are uninsured (*USA Today*, 8/29);
- /// 11.7% of children lacked health insurance in 2006, up from 10.9% in 2005. The percentage of children who are uninsured has increased two years in a row after five years of decline (Aizenman/Lee, *Washington Post*, 8/29);
- /// Uninsurance rates differed by race, with 34.1%, or 15.3 million, of Hispanics uninsured in 2006. Uninsurance rates for blacks increased from 19% in 2005 to 20.5% in 2006, up from 32.3% in 2005. The rate for whites was statistically unchanged at 10.8% in 2006, while the rate for Asian-Americans dropped from 17.2% in 2005 to 15.5% in 2006;
- /// An additional 1.3 million full- or part-time workers were uninsured in 2006, compared with 2005;

- ✍ The uninsurance rate for documented immigrants remained statistically unchanged at 16.4%, while the uninsured rate for undocumented immigrants increased from 43.1% to 45% (*USA Today*, 8/29);
- ✍ Texas in 2006 had the highest percentage of uninsured residents at 24.1% and Minnesota had the lowest at 8.5%;
- ✍ The percentage of individuals with government-sponsored health care declined from 27.3% in 2005 to 27% in 2006 (Goodnough, *New York Times*, 8/29); and
- ✍ The number of people with health insurance increased to 249.8 million in 2006, up from 249 million in 2005 (U.S. Census Bureau report highlights, 8/29).

Republicans and Democrats in Washington are struggling for solutions to soaring medical expenses, which have been rising about twice as fast as wages, according to health policy researchers. The number of uninsured has been rising since 2001, while the percentage of U.S. residents without coverage increased in every year except 2004.

Presidential candidates from both parties have offered plans to tackle the growing number of uninsured people. Voters in surveys rank health care as a top domestic concern.

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DID YOU KNOW:

Eli Lilly and Takeda End Agreement to Co-Develop Ruboxistaurin Mesylate: Ruboxistaurin mesylate is used to treat diabetic macular edema and diabetic peripheral neuropathy. The companies said that after looking at the overall results, the trials did not meet the criteria for Phase III studies and therefore they have agreed to terminate the contract.

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Item 3

Treating Gestational Diabetes Reduces Childhood Obesity

Treating gestational diabetes mellitus (GDM) during pregnancy may reduce the child's risk of becoming obese, according to the results of a new study.

<http://www.diabetesincontrol.com/results.php?storyarticle=5100>

"Diabetes in pregnancy is associated with an increased rate of offspring childhood obesity, impaired glucose tolerance, and type 2 diabetes," write Teresa A. Hillier, MD, MS, from the Center for Health Research, Kaiser Permanente Northwest in Portland, Oregon, and colleagues. "We sought to determine whether increasing hyperglycemia in pregnancy, ranging from normal to GDM, is related to childhood obesity in offspring during the typical period of adiposity rebound in a diverse population."

Between 1995 and 2000, universal screening of GDM was performed in 2 regions (Northwest and Hawaii) of a large, diverse health maintenance organization (HMO), with a 50-g glucose challenge test. Criteria from the National Diabetes Data Group were used to diagnose GDM with a 3-hour, 100-g oral glucose tolerance test (OGTT).

At 5 to 7 years later, weight in the offspring (n = 9439) was measured to calculate sex-specific weight-for-age percentiles with use of US norms (1963 - 1994 standard). These were classified based on maternal positive results of glucose challenge test (1 hour = 7.8 mmol/L) and OGTT (1 or = 2 of the 4 time points abnormal: fasting, 1, 2, or 3 hours by Carpenter and Coustan and National Data Diabetes Group criteria).

Across the range of increasing maternal glucose screen values was a positive trend for increasing childhood obesity at 5 to 7 years of age ($P < .0001$; 85th and 95th percentiles). This trend remained after adjusting for potential confounders, such as maternal weight gain, maternal age, parity, ethnicity, and birth weight.

The offspring of mothers with GDM by National Diabetes Data Group criteria that was treated had a lower risk for childhood obesity than did those with lesser degrees of hyperglycemia that was untreated. The pattern was similar for whites vs nonwhites, as well as in children of normal birth weight (= 4000 g).

"Our results in a multiethnic US population suggest that increasing hyperglycemia in pregnancy is associated with an increased risk of childhood obesity," the study authors write. "More research is needed to determine whether treatment of GDM may be a modifiable risk factor for childhood obesity."

"These results suggest that metabolic imprinting of the child for future obesity occurs in women with GDM (not only in those with preexisting diabetes), and, thus, GDM screening might have long-term benefits to offspring," the study authors conclude. "They also suggest that GDM treatment may decrease the risk of childhood obesity and provide an additional reason for screening for GDM in pregnancy."

Diabetes Care. 2007;30:2287-2292.

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Item 4

Resting Heart Rate Directly Related to Risk of Cardiovascular Disease

Higher resting heart rates are associated with an increased risk of cardiovascular disease, and should be introduced into clinical practice according to a new review.

<http://www.diabetesincontrol.com/results.php?storyarticle=5099>

Dr. Kim Fox tells us that, "I hope that as a consequence of the article physicians consider why a healthy person has a high heart rate and search for causes, such as anemia, thyrotoxicosis, etc." "In an otherwise healthy person, I think we are a long way off suggesting pharmacological intervention to improve outcome."

Dr. Fox from Royal Brompton Hospital, London, and colleagues reviewed the data associating resting heart rate and mortality, the possible pathophysiological basis of this association, and the likelihood utility of therapeutic heart rate slowing in improving cardiovascular outcomes for a wide range of patients.

Epidemiological data regarding both the general population and patients with various cardiovascular diseases reveal significant associations between resting heart rate and all-cause and cardiovascular mortality, the authors report.

Lowering of resting heart rate, they note, has proven beneficial in preventing exercise-induced angina and ischemia and reducing mortality in patients with coronary artery disease and with heart failure.

Heart rate appears to have direct effects on the status of the arterial wall, the investigators say, as a result of mechanical pulsatile stress and possibly through proinflammatory actions of such stresses on the vascular endothelium. Heart rate also influences whether ischemic episodes trigger serious arrhythmias.

A relatively high heart rate is likely both causative and indicative of important pathophysiological processes, the researchers note, but exactly what heart rate is optimal remains uncertain.

"From the epidemiologic data presented previously," the investigators write, "it seems desirable to maintain heart rate in the normal rather than in the high range, and specifically, to maintain resting heart rate substantially below the traditionally defined tachycardia threshold of 90 or 100 beats per minute."

"We have designed and are running two very large-scale trials in coronary disease with various degrees of left ventricular impairment," Dr. Fox said. "We are looking at the effect of pure heart rate reduction in these patients who are otherwise well, treated with therapies such as beta blockers, ACE inhibitors/ARBs, statins, and aspirin."

"Clearly, if our studies in coronary disease are proven to show that reducing heart rate improves outcome, then this should be introduced into clinical practice," Dr. Fox concluded.

J Am Coll Cardiol 2007;50:823-830.

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FACT: Number of Uninsured U.S. Residents Increases to 47M in 2006: The number of uninsured U.S. residents rose by 5% and is now by 2.2 million in 2006 to 47 million, up from 44.8 million in 2005, the largest increase in four years, even as poverty fell and household incomes rose, according to data released last Tuesday by the *Census Bureau*. The percentage of people in the U.S. who received health benefits through an employer declined in 2006 to 59.7 percent, from 60.2 percent in 2005, the census report found. **See this weeks Item#2**

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Item 5

Intensive Diabetes Treatment Can Lower Resting Heart Rate

Intensive blood glucose control in type 1 diabetic patients is associated with a lowering of resting heart rate, according to a new report.

<http://www.diabetesincontrol.com/results.php?storyarticle=5098>

Dr. Andrew D. Paterson of the University of Toronto, Canada stated that, "This effect may partially explain why the intensive insulin treatment has been shown to reduce the risk of heart disease in those with type 1 diabetes,"

"Resting heart rate (RHR) is a risk factor for cardiovascular disease in the general population, and case-control studies have reported a higher RHR in individuals with type 1 diabetes," Dr. Paterson and colleagues note.

As part of the Diabetes Control and Complications Trial, 1,441 type 1 diabetic patients had their RHR measured every 2 years, for up to 8 years. In the follow-up study to the DCCT -- the Epidemiology of Diabetes Intervention and Complications (EDIC) study -- RHR was measured annually for 10 years.

An analysis of the DCCT/EDIC RHR data "support and extend the association of diabetes with faster RHR and of higher levels of glycemia with RHR previously demonstrated in cross-sectional studies," the researchers report.

During the DCCT, intensive treatment was associated with lower RHR than conventional treatment, both in adolescents ($p = 0.013$) and adults ($p = 0.0014$). During the EDIC follow up study, the difference in RHR favoring intensive diabetes treatment remained.

Summing up, Dr. Paterson said, "In this study, patients with type 1 diabetes who controlled their blood glucose within the normal range had a lower heart rate than those whose blood glucose control was not as good."

Furthermore, "This effect occurred within 2 years after the start of the intensive insulin treatment ... and persisted for at least 10 years after the end of the treatment," he added.

Diabetes Care Aug. 2007; 30:2107-2112.

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Item 6

Type 1 and Type 2 Diabetes Linked to Increased Risk of Hip Fracture

Men and women with diabetes, either type 1 or type 2, are more likely than the general population to sustain a fractured hip, according to a meta-analysis report

<http://www.diabetesincontrol.com/results.php?storyarticle=5097>

Numerous studies have been published since the early 1980s analyzing the effects of type 1 and type 2 diabetes on fractures, but study findings were inconsistent.

Trials with insufficient statistical power may have contributed to the contradictory results, lead author Dr. Mohsen Janghorbani, currently based at Isfahan University of Medical Sciences in Iran, and associates suggest. They therefore conducted a meta-analysis of published trial results regarding diabetes and low-trauma hip fractures.

The research team reported associations between diabetes and risk of hip fracture as summaries of relative risks (RR). When significant heterogeneity was identified, they conducted a meta-regression analysis to identify trials that contributed the most to heterogeneity, and recalculated associations after excluding those trials.

Adults up to 98 years old participated in the two case-control studies and 14 cohort studies that were identified. Among 836,941 subjects included in the studies, 139,531 fractures occurred.

Twelve studies examined the link between type 2 diabetes and hip fracture incidence, and for these the summary RR was 1.7. After excluding three studies, the association between type 2 diabetes and hip fracture was statistically significant (RR 1.8).

Each of six studies of patients with type 1 diabetes revealed a statistically significant positive association with hip fracture incidence, and the summary RR for all combined was 6.3. After exclusion of one trial contributing to heterogeneity, the association was stronger (RR 8.9).

"Results were consistent between studies of men and women and between studies conducted in the United States and Europe," Dr. Janghorbani and associates report.

They surmise that impaired bone quality may be one culprit responsible for the increased risk of hip fractures among diabetics.

Another possibility, the investigators add, may be "diabetes-related comorbidity, such as diabetic retinopathy, peripheral neuropathy, and cerebral stroke or hypoglycemia, which may increase the risk of falling."

Am J Epidemiol Sept, 1 2007;166:495-505.

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Item 7

Vegetables Protect Against Diabetes

VEGETABLES offer more protection against diabetes than fruit or cereal, new research shows.

<http://www.diabetesincontrol.com/results.php?storyarticle=5096>

A study of more than 2000 people tracked over 10 years found vegetable fiber had the strongest links to reduced risk of type two diabetes.

Adults eating 5g a day of vegetable fiber over the decade had a 24 per cent reduction in the disease, according to research by the University of Sydney.

For people over 70, the benefits were even greater, with a 31 per cent reduction.

The same intake of fruit or cereal fibers only marginally reduced the risk, showing they were not nearly as beneficial. The findings, proved that the type and quality of carbohydrate consumed played an important role in type two diabetes.

Eating carbs that were high in natural fiber and ranked low on the glycemic index (GI) - foods that produced only small fluctuations in blood glucose and insulin levels - might effectively prevent the lifestyle disease, the researchers concluded.

The study leader, dietician Alan Barclay, said vegetables, and legumes in particular, were probably getting the best result because they were an ideal source of intact or "natural" fibers.

"Legumes like beans, lentils, chickpeas are eaten whole with their dietary fibers intact, which means they actually encapsulate the carbohydrate in the food," said Mr Barclay, a PhD student.

"They therefore slow down the rate of digestion and absorption and have good flow-on glycemic effects on blood glucose."

Cereal fiber was not so effective because it was usually added to products, rather than eaten in a natural form. And while fresh fruit fibers were intact, people probably just did not eat enough to benefit, Mr Barclay said.

Diabetes Care, Sept. 2007

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Item 8

New Age- and Sex-Specific Cholesterol Cutoff Values for Teens

Investigators have made the first attempt at developing age- and sex-specific lipoprotein threshold concentrations for adolescents. The major advantage of the new cutoff points is that they reflect the natural fluctuations in cholesterol levels that occur with growth and maturation, say the authors.

<http://www.diabetesincontrol.com/results.php?storyarticle=5095>

"If you look at the currently used thresholds to identify young people with high-risk cholesterol and blood fat levels, they use the same threshold across all ages" senior investigator Ian Janssen, MD, from the Queen's University, Kingston, Ontario, stated. "The problem with that is that you are going to see changes, usually increases, in cholesterol levels across the age range, which reflect, to a large degree, natural changes that occur as people get older...What we did was rather than lumping everybody in together, we developed age-specific and gender-specific cut-off points that should help provide a more accurate diagnosis of these high-risk levels."

The purpose of the study, explained Dr. Janssen, was to establish new criteria that would help clinicians identify adolescents with elevated low-density lipoprotein (LDL) and total cholesterol levels, as well as elevated triglyceride levels and low high-density lipoprotein (HDL) cholesterol levels. He noted that the existing cutoff points for identifying borderline-abnormal and abnormal lipoprotein concentrations are represented by the 75th and 95th percentiles (25th and 5th for HDL cholesterol) of the population distribution. As these apply to all youth aged 2 to 19 years, these percentiles have a limited ability to predict adolescents who will have high-risk lipoprotein levels as adults, Dr. Janssen said.

To create the new classification system, the researchers used total cholesterol, LDL cholesterol, HDL cholesterol, and triglyceride measurements of more than 6000 people aged 12 to 20 years, all of whom participated in the National Health and Nutritional Examination Surveys (NHANES) conducted between 1988 and 2002. Investigators developed age- and gender-specific growth curves, similar to what is currently used to monitor height, weight, and body mass index in children and adolescents. The curves were then linked to the adult National Cholesterol Education Program (NCEP) Adult Treatment Panel III to allow clinicians, by extrapolating from the adolescent lipid levels, to determine future cardiovascular risks as an adult.

Table 1. Age-specific Cutoff Points for Females (mmol/L) *

Age, y	Borderline-High Total Cholesterol	High Total Cholesterol	Borderline-High LDL Cholesterol	High LDL Cholesterol
12	4.77	5.47	2.96	3.52
13	4.71	5.41	2.98	3.55
14	4.68	5.38	3.00	3.57
15	4.72	5.46	3.03	3.61
16	4.82	5.62	3.07	3.68
17	4.94	5.82	3.13	3.77
18	5.07	6.03	3.22	3.90
19	5.16	6.17	3.32	4.06
20	5.18	6.22	3.37	4.14
Age, y	Low HDL Cholesterol	Protective HDL Cholesterol	Borderline-High Triglycerides	High Triglycerides
12	1.03	1.48	1.60	2.03
13	1.04	1.47	1.53	1.93
14	1.04	1.48	1.47	1.82
15	1.03	1.49	1.44	1.79
16	1.03	1.51	1.46	1.83
17	1.03	1.53	1.53	1.94
18	1.03	1.54	1.61	2.09
19	1.03	1.55	1.68	2.22
20	1.04	1.55	1.70	2.26

*To convert total cholesterol, LDL cholesterol, and HDL cholesterol levels to mg/dL, multiply by 38.67. To convert triglyceride levels to mg/dL, multiply by 88.5. Source: *Circulation*. Posted online August 28, 2006.

Table 2. Age-specific Cutoff Points for Males (mmol/L) *

Age, y	Borderline-High Total Cholesterol	High Total Cholesterol	Borderline-High LDL Cholesterol	High LDL Cholesterol
12	5.18	6.03	3.24	3.98
13	4.99	5.83	3.15	3.86
14	4.86	5.70	3.08	3.76
15	4.84	5.70	3.06	3.74
16	4.88	5.77	3.11	3.81
17	4.95	5.88	3.18	3.91
18	5.05	6.02	3.25	4.00
19	5.14	6.16	3.32	4.09
20	5.18	6.22	3.37	4.14
Age, y	Low HDL Cholesterol	Protective HDL Cholesterol	Borderline-High Triglycerides	High Triglycerides
12	1.13	1.70	1.44	1.84
13	1.10	1.64	1.48	1.93
14	1.07	1.59	1.52	2.02
15	1.04	1.55	1.56	2.10
16	1.03	1.53	1.59	2.16
17	1.03	1.53	1.62	2.20
18	1.03	1.54	1.65	2.24
19	1.04	1.55	1.68	2.26
20	1.04	1.55	1.70	2.26

***To convert total cholesterol, LDL cholesterol, and HDL cholesterol levels to mg/dL, multiply by 38.67. To convert triglyceride levels to mg/dL, multiply by 88.5. Source: *Circulation*. Posted online August 28, 2006.**

Dr. Janssen noted that the cutoff points changed over time. For example, LDL cholesterol levels denoting high risk changed from 3.52 mmol/L in 12-year-old girls to 4.14 mmol/L at age 20 years. One advantage of the age- and sex-specific threshold is that adolescents will not be misdiagnosed simply because they are on a different part of the growth curve, say investigators.

"We need to consider measuring cholesterol values in young people, which pediatricians know already," said Dr. Janssen. "But we need to start taking into consideration the person's age when we're trying to define whether or not they're at risk."

Circulation. Published online August 28, 2006.

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FACT: Vegetables Protect Against Diabetes: *VEGETABLES offer more protection against diabetes than fruit or cereal, new research shows.* A study of more than 2000 people tracked over 10 years found vegetable fiber had the strongest links to reduced risk of type 2 diabetes. Adults eating 5g a day of vegetable fiber over the decade had a 24 per cent reduction in the disease. For people over 70, the benefits were even greater, with a 31 per cent reduction. The same intake of fruit or cereal fibers only marginally reduced the risk, showing they were not nearly as beneficial. The findings, proved that the type and quality of carbohydrate consumed played an important role in type two diabetes. **See this weeks Item#7**

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Primary and Secondary Interventions for Diabetic Retinopathy

A systematic review in the August 22/29 issue of the *Journal of the American Medical Association* provides an overview of primary and secondary interventions for diabetic retinopathy (DR).

<http://www.diabetesincontrol.com/results.php?storyarticle=5094>

"Diabetic retinopathy (DR) is the leading cause of blindness in the working-aged population in the United States," write Quresh Mohamed, MD, from the Centre for Eye Research Australia, University of Melbourne, and the Royal Victorian Eye and Ear Hospital in Melbourne, and colleagues. "There are many new interventions for DR, but evidence to support their use is uncertain."

To summarize and review the best available evidence for primary and secondary intervention in the management of DR, including diabetic macular edema (DME), the authors performed a systematic review of all pertinent English-language articles. These were identified with a keyword search of MEDLINE from 1966 through May 2007, EMBASE, the Cochrane Collaboration, the Association for Research in Vision and Ophthalmology database, and the National Institutes of Health Clinical Trials Database, as well as manual searches of reference lists of selected major reviews.

Inclusion criteria for the reviewed studies were all English-language randomized controlled trials with more than 12 months of follow-up and meta-analyses. Delphi consensus criteria were used to identify studies with good methodology.

Of 44 studies meeting the inclusion criteria, 3 were meta-analyses. Based on these studies, the study authors concluded that tight glycemic and blood pressure (BP) controls were associated with lower incidence and slower progression of DR.

In patients with severe nonproliferative and proliferative retinopathy, panretinal laser photocoagulation (PRP) was associated with a 50% decrease in the risk for moderate and severe visual loss. In eyes with macular edema, focal laser photocoagulation was associated with a 50% to 70% decrease in the risk for moderate visual loss.

Early vitrectomy was associated with improvement in visual recovery in patients with proliferative retinopathy and severe vitreous hemorrhage. When conventional treatment has failed, intravitreal corticosteroid injections may be an option for eyes with persistent visual loss.

Available evidence is not sufficient for the efficacy or safety of lipid-lowering therapy, medical interventions, or antivascular endothelial growth factors on the incidence or progression of DR.

"Tight glycemic and blood pressure control remains the cornerstone in the primary prevention of DR," the investigators write. "Pan-retinal and focal retinal laser photocoagulation reduces the risk of visual loss in patients with severe DR and macular edema, respectively. There is currently insufficient evidence to recommend routine use of other treatments."

Specific clinical recommendations for primary and secondary interventions for DR are as follows:

- ?? For glycemic control, any lowering of levels of hemoglobin A1c (HbA_{1c}) is beneficial in reducing the development of new DR or slowing the progression of existing DR. A target of HbA_{1c} level of less than 7% is ideal in patients with DR (level of evidence, A I).
- ?? For BP control, any lowering of systolic and/or diastolic BP is beneficial in reducing the development of new DR or slowing the progression of existing DR. A target systolic BP of less than 130 mm Hg is ideal in patients with DR (level of evidence, A I).
- ?? In terms of lipid-lowering therapy, reducing levels of low-density lipoprotein cholesterol is associated with decreased macrovascular complications of diabetes and may be beneficial in DME (level of evidence, A II).
- ?? For patients with proliferative DR, early PRP is recommended, especially when there are high-risk features (level of evidence, A I).
- ?? Patients with early, less severe proliferative DR, defined as flat, new vessels elsewhere without high-risk features, or those with severe nonproliferative DR may be observed closely. However, treatment is

recommended, especially in patients with type 2 diabetes, if there are any signs of progression or any anticipated difficulty or delay in follow-up (level of evidence, A II).

- ?? In eyes with DME involving the center of the macula and decreasing visual acuity, focal laser photocoagulation is recommended. For DME threatening the center of the macula, focal laser therapy should be considered. However, patients must be warned of the potential risks of therapy, particularly when their vision is 6/6 or better. Ideally, treatment should be guided by fluorescein angiography, because laser therapy is not likely to be helpful when significant macular ischemia is present (level of evidence, A I).
- ?? In patients with type 1 diabetes, severe vitreous hemorrhage, and significant DR, early surgical vitrectomy (within 3 months) is recommended. For eyes with severe proliferative DR refractory to extensive PRP and/or associated with traction involving the macula, vitrectomy should be considered (level of evidence, B, II).
- ?? In selected cases of diffuse severe DME refractory to other treatments, vitrectomy may be helpful, especially when vitreomacular traction is present (level of evidence, B, III).
- ?? Although intravitreal triamcinolone (IVTA) may be helpful in diffuse DME refractory to focal laser therapy, patients must be warned about the high incidence of secondary intraocular pressure increase, cataract, other potential harms, and the possibility that repeat treatment will be needed (level of evidence, B, II).
- ?? There is currently insufficient evidence to recommend the routine use of intravitreal antivascular endothelial growth factor agents (level of evidence, B, II/III) or of protein kinase C inhibitors, growth factor antagonists, and other treatments (level of evidence, C, II/III).
- ?? Aspirin does not reduce the risk of developing DR, and it does not increase the incidence of retinal or vitreous hemorrhage (level of evidence, C, I).

"Although DR remains the leading cause of preventable blindness in working adults, there are primary and secondary interventions proven effective in limiting visual loss," the study authors conclude. "The indications, efficacy, and safety of newer medical and surgical treatments, however, require further evaluation."

JAMA. 2007;298:902-916.

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Item 10

Depression Care Management Can Reduce Mortality in Older Patients With Diabetes

Depression care management may reduce 5-year mortality in older primary care patients with both depression and diabetes, according to the results of a new study,

<http://www.diabetesincontrol.com/results.php?storyarticle=5093>

"Although cohort studies document that depression is associated with increased risk of death among persons with diabetes, no known intervention study has evaluated whether treatment for depression modifies this increased risk of mortality among older primary care patients with diabetes," write Hillary R. Bogner, MD, MSCE, from the University of Pennsylvania in Philadelphia, and colleagues. "We investigated the relationship between diabetes, depression treatment, and all-cause mortality using data from the multi-site, randomized trial, PROSPECT (Prevention of Suicide in Primary Care Elderly: Collaborative Trial), supplemented with a search of the National Death Index."

PROSPECT was a practice-randomized, controlled trial with patient recruitment from May 1999 through August 2001. At 20 primary care practices from New York City, Philadelphia, and Pittsburgh, 584 participants identified from a 2-stage, age-stratified depression screening of randomly sampled patients were classified as depressed and had complete information on diabetes status.

Of the 584 participants, 123 (21.2%) reported a history of diabetes. A depression care manager as well as primary care clinicians implemented algorithm-based care, vital status was determined at 5 years, and median follow-up was 52.0 months.

During follow-up, 110 patients with depression had died. After adjustment for baseline differences in the intervention condition (IC) and usual care (UC) groups, patients in the IC group were less likely to have died

during the 5-year follow-up than were those in the UC group (adjusted hazard ratio [HR], 0.49; 95% confidence interval, 0.24 - 0.98).

"Older depressed primary care patients with diabetes in practices implementing depression care management were less likely to die over the course of a 5-year interval than were depressed patients with diabetes in usual care practices," the study authors write. "We believe these findings support the integration of depression evaluation and treatment with diabetes management in primary care."

Limitations of the study include lack of generalizability to other primary care practices in the United States, diabetes mellitus based on self-report alone (some patients with impaired glucose tolerance but not diabetes may have been included), reduction in mortality in the intervention group possibly due to factors other than the specific effects of a depression management program, possible misclassification of vital status, selection of patients with diabetes from a larger intervention trial, and uncertainty regarding the effect of treatment of depression on outcomes for diabetes and other medical comorbidities.

"These results indicate that a depression care management intervention can significantly reduce all-cause mortality among depressed patients with diabetes," the study authors conclude. "These results should propel the development and dissemination of models of care that better integrate depression management for people with diabetes."

Diabetes Care. Published online August 23, 2007.

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Item 11

Diabetes Can Impair Tuberculosis Treatment Response

Patients with tuberculosis and diabetes do not respond as well to tuberculosis therapy as those who are non-diabetic, Dutch researchers report.

<http://www.diabetesincontrol.com/results.php?storyarticle=5092>

The reason for this is unclear, but screening for and aggressively treating diabetes may improve the outcomes of patients receiving tuberculosis therapy, Dr. Reinout van Crevel, from Radboud University Medical Center in Nijmegen, note in the current issue *Clinical Infectious Diseases*.

The findings stem from a study of 737 Indonesian patients with tuberculosis who were screened for type 2 diabetes, also referred to as adult-onset diabetes, and then followed while receiving tuberculosis therapy.

Overall, 14.8 percent of the subjects had diabetes. Despite initially having more symptoms, the patients with diabetes had tuberculosis that was comparable in severity to that in non-diabetics.

However, after 2 months of treatment, sputum test results were more likely to be positive in diabetic patients -- 18.1 percent vs. 10.0 percent in non-diabetics. At 6 months, the diabetes were still significantly more likely to have positive sputum test results than the non-diabetic patients, at 22.2 percent vs. 9.5 percent, respectively.

In a related editorial, Dr. Blanca I. Restrepo, from the University of Texas Health Science Center in Houston, comments that the findings "highlight the need for further research aimed at understanding how the current global epidemic of type 2 diabetes mellitus is affecting tuberculosis control and prevention."

Clinical Infectious Diseases, August 15, 2007.

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DID YOU KNOW: Whole Grains Protect Against Diabetes: Whole grains may help prevent type 2 diabetes, with consistent results across studies, researchers said. The risk of developing type 2 diabetes dropped 21% with every two additional servings of whole grain per day. Their analysis of two Nurses' Health Study cohorts and four other cohort studies showed a significant benefit to whole grain, particularly its bran component, in five of the studies. "The consumption of whole grains in many populations is very low, an average of one serving per day for U.S. adults and even less in British adults, suggesting that increased consumption has the potential to contribute substantially to reducing risk of type 2 diabetes in these populations," Dr. van Dam and colleagues wrote. See this weeks Item#12

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Item 12

Whole Grains Protect Against Diabetes

Whole grains may help prevent type 2 diabetes, with consistent results across studies, researchers said.
<http://www.diabetesincontrol.com/results.php?storyarticle=5091>

The risk of developing type 2 diabetes dropped 21% with every two additional servings of whole grain per day, reported Rob M. van Dam, Ph.D., of Harvard, and colleagues, in the August issue of the journal *PLoS Medicine*.

Their analysis of two Nurses' Health Study cohorts and four other cohort studies showed a significant benefit to whole grain, particularly its bran component, in five of the studies.

"The consumption of whole grains in many populations is very low, an average of one serving per day for U.S. adults and even less in British adults, suggesting that increased consumption has the potential to contribute substantially to reducing risk of type 2 diabetes in these populations," Dr. van Dam and colleagues wrote.

Most previous studies defined food as whole grain if it consisted of at least 25% whole grain or bran by weight.

But, a new food composition database allowed the researchers to directly calculate grams of whole grains in participants' daily diet and to analyze intake of bran and germ constituents separately.

They analyzed both cohorts of the Nurses' Health Study. The first included food frequency questionnaires completed every two years from 1984 by 73,327 female registered nurses. The second included the same for a group of 88,410 female nurses starting in 1991.

The women self-reported 4,747 cases of incident type 2 diabetes in the first cohort and 1,739 cases in the second.

The researchers found that women with the highest daily whole grain intake (median 31.2 g) in the first cohort had 37% lower relative risk of incident diabetes than women with the lowest intake (median 3.7 g) even after adjustment for potential confounders (RR 0.63, 95% confidence interval 0.57 to 0.69, $P < 0.001$ for trend).

In the second cohort, women with the highest, median 39.9 g daily whole grain intake had 32% lower odds of developing diabetes (RR 0.68, 95% CI 0.57 to 0.81, $P < 0.001$ for trend) than women in the lowest, median 6.2 g daily intake quartile.

After further adjustment for body mass index, higher whole grain consumption remained significantly linked to lower diabetes risk though the association was somewhat attenuated.

In the first cohort, the BMI-adjusted risk was 25% lower for women in the highest intake quartile compared with those in the lowest intake quartile (RR 0.75, 95% CI 0.68 to 0.83, $P < 0.001$ for trend). In the second cohort, it was 14% lower (RR 0.86, 95% CI 0.72 to 1.02, $P = 0.03$ for trend).

Adjusting for magnesium intake did not appear to explain the association either.

But, bran appeared to be the most important constituent of whole grain for reducing diabetes risk with associations similar to those for total whole grain. Germ was not associated with lower diabetes incidence in the second cohort ($P=0.95$ for trend) or in the first cohort after adjustment for bran (RR 1.01, 95% CI 0.90 to 1.14, $P=0.91$ for trend).

The researchers also did a literature search through January 2007 for published cohort studies on the association of whole grain intake with type 2 diabetes incidence.

They found four studies for data extraction: the Iowa Women's Health Study, the Health Professionals Follow-up Study, a Finnish population study, and the Black Women's Health Study.

All but one showed a significant benefit for whole grain. The Black Women's Health Study showed a similar trend (RR 0.65, 95% CI 0.36 to 1.18), though nonsignificant, possibly because of a higher median intake even in the lowest intake group than in other studies, Dr. van Dam and colleagues noted.

Pooled analysis of all six studies showed a 21% lower diabetes risk for each two-serving increase in daily whole grain consumption (RR 0.79, 95% CI 0.72 to 0.87).

"These data provide further support for recommendations to increase consumption of whole grains," they concluded.

In an accompanying editor's summary it was noted that a study showing an association can never prove causation, compared with a comparative trial. "Nevertheless, the research does strongly suggest that a healthy diet that reduces the risk of developing type 2 diabetes should include the consumption of several servings of whole grains daily."

de Munter JSL, et al "Whole Grain, Bran, and Germ Intake and Risk of Type 2 Diabetes: A Prospective Cohort Study and Systematic Review" *PLoS Med* 2007; 4: doi:10.1371/journal.pmed.0040261.

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Item 13

Discovery Paves Way for a New Class of Diabetes Drugs

A multidisciplinary team led by researchers at the University of California, San Diego has determined the structure of a protein found in cells that shows potential as a target for the development of new drugs to treat diabetes.
<http://www.diabetesincontrol.com/results.php?storyarticle=5090>

The study, described the structure of a protein—MitoNEET—that was previously identified as a site where diabetes drugs could operate. The discovery of the protein's three-dimensional structure makes it possible to design small molecules that interact with it and modify its function. The researchers say that MitoNEET has a novel three-dimensional structure that makes it a particularly interesting candidate for the design of innovative compounds that can bind to it.

"This is the first time that a protein like this has ever been found," said Patricia Jennings, a professor in UCSD's department of Chemistry and Biochemistry who led the study along with Mark Paddock, a project scientist in UCSD's Physics department. "It is a brand new structure, a unique beast, which makes it an exciting target for structure-based drug design. "Our work may provide a basis for the design of newer diabetes drugs that have potentially greater specificity and fewer side effects than existing ones," added Paddock.

The team determined that mitoNEET is an iron-sulfur protein. Iron-sulfur proteins have a variety of functions, including electron transfer, which is critical to cell metabolism, and the storage and transport of iron. In its free state, iron is highly toxic to cells and can lead to oxidative stress—the accumulation of reactive compounds that can damage the cell.

MitoNEET's iron-sulfur cluster is loosely bound, a property that may be linked to one of its functions. When mitoNEET binds the type 2 diabetes drug Actos®, the iron-sulfur cluster becomes more stable. This drug was thought to work through an entirely different mechanism involving a different protein. However, the finding by Jerry Colca, presently at Metabolic Solutions Development Company in Kalamazoo, Michigan, that the thiazolidinediones—the class of diabetes drugs of which Actos® is a member—bind to mitoNEET indicated a possible mechanism involving mitoNEET. Colca's finding inspired the UCSD-led study, which suggests that

Actos® and similar drugs may protect cells from the damaging effects of free iron by keeping the iron-sulfur cluster attached to mitoNEET.

From mitoNEET's structure, location and properties, it could also play a role as a sensor of oxidative stress in the cell. Oxidative stress is a problem in many diseases including diabetes. MitoNEET is confined to the mitochondria—structures within cells that convert nutrients into energy—where reactive compounds accumulate as nutrients are metabolized. MitoNEET's structure would allow it to transfer electrons to and from, and therefore detect, these compounds.

"MitoNEET may be an example of an ever increasing group of proteins found to have more than one function. I think we are at the beginning of what is sure to be an interesting and biologically important puzzle." said Paddock.

"It is intriguing to see these different pieces coming together," explained Jennings. "There is growing evidence that mitochondrial dysfunction and compromised oxidative capacity is a problem in diabetes. MitoNEET has iron-sulfur clusters that can transfer electrons, and it binds insulin-sensitizing drugs. Now that we know the structure and physical properties of the protein we can use this knowledge for drug studies and studies of biological function."

The team plans to use the new structural information for designing more sophisticated experiments to test function and structure-based drug design to create drugs that interact better with mitoNEET.

Published September 4 in the journal Proceedings of the National Academy of Sciences,

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FACT: Obesity Rates Predicted by Property Values and Zip Codes: For each additional \$100,000 in the median price of homes, researchers found, obesity rates in a given ZIP code dropped by 2 percent. Neighborhood property values predict local obesity rates better than education or incomes, according to a study published this week. The study, found six-fold disparities in obesity rates across the Seattle metropolitan area. Obesity rates reached 30 percent in the most deprived areas but were only around 5 percent in the most affluent ZIP codes. See this weeks Item#15

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Item 14

Brain Link Seen in Type 2 Diabetes

Glucose Problems in Certain Brain Cells May Be a Red Flag of Type 2 Diabetes Risk

<http://www.diabetesincontrol.com/results.php?storyarticle=5089>

The early warning signs of type 2 diabetes may include subtle changes in some brain cells, a new study shows. The study comes from researchers including Harvard Medical School's Bradford Lowell, MD, PhD.

They studied mice, not people, but the findings may hold important clues about the roots of type 2 diabetes.

In type 2 diabetes, the body doesn't respond properly to insulin, a hormone that controls blood sugar. Type 2 diabetes is the most common type of diabetes in adults.

Lowell's team studied certain brain cells called POMC neurons in mice. Usually, those brain cells are sensitive to glucose (blood sugar).

But when the researchers put the mice on a high-fat diet, the mice became obese -- and their POMC neurons became less sensitive to glucose.

That drop in glucose sensitivity may play a role in the development of type 2 diabetes, Lowell and colleagues write in an online edition of the journal *Nature*.

The study doesn't prove that type 2 diabetes begins in the brain. Type 2 diabetes has been shown to affect just about every part of the body, and it's not clear exactly how or where it starts.

Looking for a take-home message from Lowell's study? It might be to keep an eye on your weight. After all, the mice lost some of their mental glucose sensitivity after they went on a high-fat diet and became obese.

That doesn't mean that all obese people get type 2 diabetes or that everyone with type 2 diabetes is obese.

But since type 2 diabetes makes heart disease, stroke, and many other health problems more likely -- and because type 2 diabetes often goes undiagnosed -- it may be worth discussing with your doctor, especially if you've seen the numbers on your scale notch upwards.

Parton, L. Nature, Aug. 29, 2007; advance online edition.

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Item 15

Obesity Rates Predicted by Property Values and Zip Codes

For each additional \$100,000 in the median price of homes, researchers found, obesity rates in a given ZIP code dropped by 2 percent.

<http://www.diabetesincontrol.com/results.php?storyarticle=5088>

Neighborhood property values predict local obesity rates better than education or incomes, according to a study published this week.

The study, based on analyses of responses to a telephone survey conducted in King County by the local health department and the federal Centers for Disease Control, found six-fold disparities in obesity rates across the Seattle metropolitan area. Obesity rates reached 30 percent in the most deprived areas but were only around 5 percent in the most affluent ZIP codes.

"Obesity is an economic issue," said Dr. Adam Drewnowski, director of the UW Center for Obesity Research and leader of the study. "Knowing more about the geography of obesity will allow us to identify the most vulnerable neighborhoods."

Working with the local health agency, Public Health-Seattle & King County, the researchers aggregated multiple-year data from Washington state's Behavioral Risk Factor Surveillance System (BRFSS) to analyze data for more than 8,000 respondents. The Centers for Disease Control and Prevention use the same data to map rising obesity rates in the United States at the state level. However, unlike most states, Washington codes the BRFSS data by the respondents' ZIP code, which permits more detailed analyses of local obesity rates at a finer geographic scale. Other information about the ZIP code areas was provided by data from the U.S. Census.

Residential property values were used as a proxy measure of ZIP code socioeconomic status. "Incomes are not the same as assets and wealth," said Drewnowski. "The chief financial asset for most Americans is their home."

Area prosperity can also be a good predictor of access to healthy foods, or opportunities for exercise.

The UW study was the first to examine obesity rates by area-based indexes of poverty and wealth across a metropolitan area. Previous studies have found higher obesity rates among racial and ethnic minorities and groups of lower education and incomes. Analyses of the same BRFSS data for King County showed that obesity rates were higher for African-Americans (26 percent) than for whites (16 percent), and were higher for people with annual incomes below \$15,000 (20 percent) than for those with incomes above \$50,000 (15 percent), all consistent with national trends. These disparities were much lower than those dependent on ZIP codes and geographic location. The study concluded that social and economic disparities were more important in predicting obesity than previously thought.

Well-known maps of rising obesity rates in the United States, also based on BRFSS data, showed only small differences among the poorest and the richest states.

"Those maps were used to support that argument that the obesity epidemic did not discriminate," said Drewnowski. "Our research shows that geography, social class, and economic standing all play huge roles in the

obesity problem. Some of the most disadvantaged areas -- those hardest hit by low income, low education, and low property values -- are also the ones most affected by the obesity epidemic."

Published online this week (August 27, 2007) by the journal Social Science and Medicine.

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Quote of the Week!

The Cure for the Diabetes Epidemic: Teach every ninth-grader how to use a glucose meter, and make the devices nearly free for every family. Next: Show every fifth-grader how and why to use a pedometer -- and then give them one. Also: Include simple, glucose-control educational information.

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