



DIABETES IS PRIMARY

TIMELY NEWS FOR THE MULTIDISCIPLINARY CARE TEAM

from the American Diabetes Association

By Max Bingham, PhD

FROM THE JOURNALS.....

Fasting Glucose Misses Prediabetes; Make A1C Standard for Prediabetes

Individuals with normal fasting glucose (FG) levels but elevated A1C have an increased risk of developing diabetes, according to Shiffman et al. (*Diabetes Care*, doi.org/cqrs), who suggest that A1C and FG levels should be used to identify individuals at risk. Their study of just over 20,000 individuals participating in an employee wellness program used regression modeling to test for an association between baseline A1C and incident diabetes over a 4-year follow-up. They found that 513 individuals with normal FG at baseline developed diabetes during the follow-up period. Individuals with an A1C >5.9% but <6.5% were eight times more likely to develop diabetes than those with a normal A1C level (<5.7%); those with an A1C >5.7% but <5.9% were three times more likely to develop diabetes.

Among individuals with normal FG levels, the authors write, A1C can be used to identify those at highest risk of progression to diabetes for targeted prevention efforts.

Diabetes Screening Criteria Miss Up to Half of Prediabetes and Diabetes Cases

Diabetes screening recommendations from the U.S. Preventive Services Task Force that are based on age and weight alone may miss up to half of U.S. adults with prediabetes or diabetes, according to O'Brien et al. (*Journal of General Internal Medicine*, doi.org/cqrt). Their study, involving 3,643 individuals with no diabetes diagnosis, suggests that expanding the criteria to include key risk factors such as gestational diabetes, family history of diabetes, and non-white ethnicity would result in more cases being identified and might result in reduced ethnic/racial disparities in diagnosis. However, the authors note, it is unclear whether insurers would cover diabetes screening if individuals only meet the expanded criteria.

"This could be a particular problem for people of low socioeconomic status who are at high risk of developing diabetes and may be unable to pay for a screening test," lead author Matthew O'Brien said in a statement (bit.ly/2sP8dfy).

Screening Lowers Health Care Costs

A recent study suggests that screening results in earlier detection and earlier treatment, as well as significant reductions in health care costs. The study, by Sortsø et al. (*Diabetologia*, doi.org/gdqv3k), evaluated a population-based cardiovascular and diabetes screening program that took place in Denmark between 2001 and 2006. More than 150,000 individuals from selected general practices were sent a diabetes risk score questionnaire, and those with moderate to high risk were invited to visit their family doctor for a diabetes test and other risk assessments. More than 27,000 individuals received a screening, resulting in 1,533 diabetes diagnoses during the screening. About 1.7 million other individuals were identified as matched controls who had not undergone screening. All individuals were then followed until the end of 2012, when the authors searched national registers for health care usage and costs.

During the follow-up period, 13,992 individuals in the screening group and 125,083 in the control group were diagnosed with diabetes. Individuals who received a clinical diagnosis did so ~2 years later than those identified through screening. Health care costs were significantly reduced in the screening group, with an average annual reduction of €889 (\$1,048) per individual. Over 5 years, the screening program was associated with a savings of €2,688 (\$3,170) per person, which the authors estimate saved the Danish health care system €37.6 million (\$4.4 million). In a statement (bit.ly/2JHhz3E), lead author Camilla Sortsø said, "While trials of population-based screening for type 2 diabetes have not demonstrated beneficial effects at the population level, we have previously shown that there are benefits for those found to have diabetes. This study contributes to our previous research by showing that early detection and treatment among individuals at high risk of type 2 diabetes has the potential to reduce costs."

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TREATMENTS + THERAPIES



“Fat But Fit” Again in the Spotlight

More doubts have emerged about the concept of metabolically healthy obesity (“fat but fit”), with two studies suggesting that the condition is associated with increased risks for cardiovascular disease (CVD) and metabolic syndrome. In both cases, the researchers suggest that tackling obesity should be a primary concern and that physical exercise and lifestyle improvements should be a key focus even with so-called “healthy obesity.”

Eckel et al. (*Lancet Diabetes and Endocrinology*, doi.org/gdk2g8) report that the CVD risk for women with obesity but considered to be metabolically healthy (i.e., without diabetes, hypertension, or hypercholesterolemia) was ~40% greater than for healthy women with normal weight. Moreover, there were escalating risks in women considered metabolically unhealthy across BMI ranges. The authors also report that the majority of metabolically healthy women eventually convert to an unhealthy phenotype; 84% of those with obesity converted compared to 68% of those with a normal weight. Those who maintained metabolically healthy obesity still had an increased CVD risk in comparison to healthy women with normal weight. Risk was particularly acute for women with initial metabolic health but incident diabetes and hypertension. The analysis is based on the Nurses’ Health Study and involved ~90,000 women followed for more than three decades.

Meanwhile a longitudinal cohort study by Mongraw-Chaffin et al. (*Journal of the American*

College of Cardiology, doi.org/gdhvx7) involving ~6,800 people suggests that metabolically healthy obesity is neither a stable nor a reliable indicator of future CVD risk. Despite having a risk that was similar to that of normal-weight individuals, almost half of individuals with unstable metabolically healthy obesity at baseline (i.e., transitioned to unhealthy during ~12 years of follow-up) went on to develop metabolic syndrome, and this increased their odds for CVD (odds ratio 1.60, 95% CI 1.14–2.25) compared to individuals with stable metabolically healthy obesity or normal healthy weight. The duration of metabolic syndrome was also associated with CVD risk and overall mediated ~62% of the relationship between obesity and CVD, which the authors say reinforces the premise that obesity is an originating cause of cardiometabolic risk. They suggest that constant vigilance is needed to avoid metabolically healthy obesity transitioning to metabolic syndrome and that even metabolically healthy obesity should trigger efforts to reduce weight and improve lifestyle.

Community Health Worker–Led Interventions Can Improve A1C

Diabetes self-management education programs led by community health workers (CHWs) can result in sustained A1C improvements up to 18 months after baseline, according to Spencer et al. (*Diabetes Care*, doi.org/cqr7), who suggest that the approach is scalable and particularly appropriate for low-resource settings. Their study focused on 222 Latino adults in Detroit with type 2 diabetes and poor glyce-mic control who were randomized to either a 6-month program led by CHWs or enhanced usual care. Those enrolled in the program were subsequently randomized to either another 12 months of the program, this time led by peer leaders or 12 months of CHW support via telephone. At 6 months, the CHW-led program resulted in an A1C reduction of just under 0.5% (from a baseline of 7.7–8.2% across the different groups) compared to usual care, as well as a reduction in distress levels. Meanwhile, at 12 and 18 months, participants who received leadership from CHWs and peer leaders maintained their A1C reductions. The authors also reported a variety of other improvements from the intervention.



CONFERENCE SPOTLIGHT

Is Free Food the Solution to Diabetes?

According to reports from the 2018 World Health Care Congress, an initiative to give food-insecure people with diabetes free, nutritious food (and training) could yield improvements in glycemic control and reductions in medication usage, cholesterol levels, and blood pressure. The concept is being tested at Geisinger Health System of Pennsylvania, which, like other health systems, provides extensive medical care and lifestyle assistance to people with diabetes. According to reports (bit.ly/2HPxdJg), Geisinger officials were dissatisfied with their patients' diabetes outcomes and their institution's related costs. Looking for possible social determinants of outcomes, they zeroed in on diet and lifestyle factors and found that food insecurity was a persistent problem for many of their patients.

The group embedded two food insecurity questions into the medical records of their patients with type 2 diabetes. Those who answered "yes" to either question were referred to Geisinger's "Fresh Food Farmacy" (bit.ly/2C6qrjB), which provides patients with enough healthy free food for two daily meals, 5 days per week,



Terry Doran/Mittera

for their entire household for as long as needed. Almost all of the food is provided by food banks and other supporters. Patients must undergo training in preparing healthy meals to participate, and their initial welcome visit includes meeting a care team, including health managers, a pharmacist, a dietitian, and other specialists.

So far, the program has shown consistent reductions in A1C by as much as two percentage points, as well as improved quality of life and reductions in other risk markers such as high cholesterol and blood pressure.

There are also substantial cost reductions. The cost of feeding a family of four is reportedly \$1,200 per year, but each percentage-point reduction in A1C can result in \$12,000 or more in other savings.

Although the results of this program have not yet been published in a peer-reviewed journal, Geisinger's staff have described their approach in the *Harvard Business Review* (bit.ly/2gJq9pe) and a Catalyst blog post for the *New England Journal of Medicine* (bit.ly/2HLkqqp). According to a report on MedPage Today (bit.ly/2JMm7ZQ), they are planning a controlled trial later this year.



MARKETPLACE

Dual-Hormone Closed-Loop System Reduced Hypoglycemia

A dual-hormone closed-loop system with exercise detection and additional glucagon dosing can reduce hypoglycemia in physically active adults with type 1 diabetes, according to Castle et al. (*Diabetes Care*, doi.org/cqrv). The system outperformed an equivalent exercise detection–enabled single-hormone system and also a predictive low-glucose suspend system. However, compared to current care in which participants adjust insulin levels manually, there was no significant difference in terms of percentage of time in hypoglycemia. The authors enrolled 20 participants with type 1 diabetes who then underwent four study arms, each lasting 4 days, during which they used the dual-hormone system, single-hormone system, predictive low-glucose suspend system, and current care in randomized order. Each arm included three aerobic exercise sessions. Mean percentage of time with hypoglycemia was significantly lower with the dual-hormone system during exercise (3.4%) than with the single-hormone (8.3%) or predictive low-glucose suspend (7.6%) systems; manual adjustment of insulin before exercise resulted in 4.3% time with hypoglycemia, which was not significantly different from the dual-hormone system. Throughout the study, the percentage of time in hypoglycemia was lowest with the dual-hormone system. The percentage of time in the target range was highest with the single-hormone approach (74.3%) but not significantly different from that of the dual-hormone approach (72.0%).

“The addition of glucagon delivery to a closed-loop system with automated exercise detection reduces hypoglycemia in physically active adults with type 1 diabetes,” the authors conclude.

Most Diabetes Apps Lack Evidence

A review from the Agency for Healthcare Research and Quality (AHRQ) of apps for diabetes self-management says that few have been proven clinically effective. The authors identified only 11 apps that had been formally evaluated. To put this in the context of the wider app ecosystem, they cite a report that suggests there were 318,000 mobile health applications available worldwide in 2017. Of disease-specific apps, diabetes accounted for 16%, second only to mental health.

The authors report that common app features include methods to track blood glucose, A1C, medications, physical activity, and weight. For the studies, typical duration of assessment was 2–12 months. For type 1 diabetes, just two apps resulted in clinically significant improvements in A1C. A third app resulted in A1C reductions that were statistically but not clinically significant. For type 2 diabetes, three apps had A1C reductions that were clinically and statistically significant.

For other outcomes, two apps reportedly reduced hypoglycemia episodes in people with type 1 diabetes, but for outcomes such as quality of life, blood pressure, weight, or BMI in either type of diabetes, no app could help. In terms of study quality, no app was scored more than moderate, and of the apps the authors tested for usability, three were rated “acceptable,” two received a “marginal” rating, and three got “not acceptable.” Some apps that had been evaluated in studies reportedly were not available in either the Apple or Google app stores.

In an accompanying statement (bit.ly/2r4fkjT), AHRQ Director Gopal Khanna said, “Although consumers have access to dozens of apps for diabetes management, only a handful of these technologies have been evaluated. AHRQ’s report helps identify an important area where more research will help us understand how these apps can improve the health of people with diabetes. Because diabetes patients rely on these apps to manage their health, and so many apps have not yet been studied, there is a compelling need for improvement.”

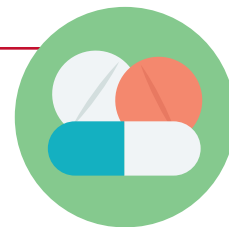
The report, available at bit.ly/2LLBcZ3, was simultaneously published in the *Journal of General Internal Medicine* (doi.org/cqr4).

Artificial Intelligence–Based Device for Diabetic Retinopathy Screening Approved

The U.S. Food and Drug Administration (FDA) recently approved a device that uses artificial intelligence (AI) to detect diabetic retinopathy. The IDx-DR (IDx, Coralville, IA) software uses an AI algorithm to analyze images taken with a retinal camera called the Topcon NW4000 (bit.ly/2NmVUDR). Doctors can upload digital images of a patient’s retinas to a Cloud server on which IDx-DR is installed. The software returns one of two results: either a message that “more than mild diabetic retinopathy” has been detected with suggested referral to an eye specialist or a message that the image is “negative for more than mild diabetic retinopathy” with suggested rescreening in 1 year. In a clinical study of images from 900 patients with diabetes, the IDx-DR correctly identified those with and without more than mild diabetic retinopathy 87.4 and 89.5% of the time, respectively.

“Early detection of retinopathy is an important part of managing care for the millions of people with diabetes, yet many patients with diabetes are not adequately screened for diabetic retinopathy since about 50 percent of them do not see their eye doctor on a yearly basis,” Malvina Eydelman, MD, director of the Division of Ophthalmic and Ear, Nose and Throat Devices at the FDA’s Center for Devices and Radiological Health, said in a statement (bit.ly/2v55lyQ). “Today’s decision permits the marketing of a novel artificial intelligence technology that can be used in a primary care doctor’s office.”

ADA NEWS



INSULIN AFFORDABILITY: ADA WORKING GROUP REPORTS RECOMMENDATIONS

An American Diabetes Association (ADA) working group charged with investigating insulin affordability in the United States recently reported its conclusions and recommendations (Cefalu et al., *Diabetes Care*, doi.org/cqr6). List prices (those set by manufacturers) of insulin have increased by ~10–20% per year for the past decade at a time when inflation has been ~2% and spending on prescription drugs has only increased by ~3% per year.

STAND UP FOR AFFORDABLE INSULIN



 **American Diabetes Association.**

Based on public information sources and meetings/interviews with key stakeholders, the working group describes a complex insulin supply chain, including opaque pricing mechanisms and a myriad of different health insurance policies, which have contributed to steeply rising insulin prices. In particular, the working group notes that there may be numerous incentives to increase prices within a system that it says cannot be beneficial to the health of patients with diabetes.

Detailing the many complexities in the pricing system, the group points out that, although list prices appeared to triple between 2002 and 2012, the net price (reflecting what the manufacturer receives) is much less. The group singles out a system of rebates as a major issue when accounting for the apparent difference between list and net prices. The article also notes that a lack of transparency has made it difficult to understand where the money flows; rebates often do not make it to the point of sale for patients.

The working group highlights a number of other issues and then offers conclusions and recommendations regarding insulin affordability and access and expresses concern about the complexity and opaqueness of the system that ultimately appears to be driving prices higher and higher.

“The working group was convened to provide high-level direction in the implementation of insulin access and affordability initiatives,” said working group chair William T. Cefalu, MD, ADA’s Chief Scientific, Medical & Mission Officer. “After discussions with over 20 stakeholders in the insulin supply chain, we remain concerned with the complexity of the system. It was the consensus of the working group that the incentives throughout the insulin supply chain that facilitate high list prices need to be addressed.”

To learn more about ADA’s continuing education opportunities, including Diabetes Is Primary events in your community, please visit professional.diabetes.org/ce.