DIABETES CENTER OF EXCELLENCE

NEWSLETTER

Section of Endocrinology, Diabetes and Nutrition

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HIGHLIGHTS FROM THE AMERICAN DIABETES ASSOCIATION 70TH SCIENTIFIC SESSIONS

More than 17,000 top scientists, physicians and other health care professionals from around the world attended the American Diabetes Association's 70th Scientific Sessions, June 25-29, in Orlando, FLA. The overall philosophy of the ADA is to present and share cutting-edge research, treatment recommendations and advances toward a cure for diabetes.

Highlights include:

Implications of the NAVIGATOR Trial for Prevention of Diabetes and Cardiovascular Disease in Subjects With impaired Glucose Tolerance

The results of the NAVIGATOR trial came under scrutiny during a symposium examining the implications of the study's results. NAVIGATOR evaluated the effects of the ARB (angiotensin receptor blocker) valsartan, or the insulin secretagogue nateglinide, in addition to lifestyle modifications. These patients were diagnosed with impaired glucose tolerance (IGT) and either cardiovascular disease (CVD) or risk factors for cardiovascular disease. The NAVIGATOR study group concluded that among patients with IGT and CVD or CVD risk factors, the use of valsartan for 5 years, along with lifestyle modification, led to a relative risk reduction of 14% in the incidence of type 2 diabetes but did not reduce the rate of cardiovascular events. The study also found that treatment with nateglinide did not reduce the incidence of diabetes and did not have any impact on the co-primary cardiovascular outcomes.

What was learned from NAVIGATOR? It is believed that lifestyle intervention should remain the primary treatment for IGT and diabetes prevention. With regard to the drug effects, the steering committee concluded that neither drug should be indicated to prevent diabetes in patients with IGT or be recommended for prevention of CVD in people with IGT. Current recommendations from both American and international panels are for lifestyle interventions, statins in general, and blood pressure and antiplatelet therapy for high risk individuals where indicated.

Results of the ACCORD Clinical Trial (Action to Control Cardiovascular Risk in Diabetes)

The ACCORD Trial evaluated three different strategies to reduce cardiovascular risk in three separate trials – an intensive blood glucose control trial, an intensive blood pressure control trial, and a blood lipid control trial. The five-year results from the three ACCORD trials showed that neither an intensive blood glucose lowering strategy, an intensive blood pressure lowering strategy, nor treatment of blood lipids with a fibrate and a statin reduced cardiovascular risk in people with established type 2 diabetes who were at severely high risk for cardiovascular events. The study did show improvement in certain microvascular conditions, such as a reduced rate of progression of diabetic retinopathy and increased visual acuity.

- **Patients in the *ACCORD Intensive Glucose Lowering* arm did see some microvascular improvements such as a reduced incidence of albuminuria in the intensive therapy group, along with fewer cataract extractions.**

- **Patients in the *ACCORD Lipid Trial* found that statin plus fibrate did not help lower cardiovascular risks overall but a subgroup of the study (those with high TG and low HDL) may benefit from this treatment.**

- **Patients in the *ACCORD Intensive Blood Pressure* control arm found no significant reduction in overall CVD events however; they did find a significant 41 percent reduction in stroke. Since the overall rate of stroke was low, researchers were hesitant to recommend a strategy of intensive blood pressure lowering without further study.**

- **The results of the ACCORD Trial did not show that lowering blood glucose, blood pressure, and blood lipids were unimportant. On the contrary, these strategies are very necessary. Rather, it indicated that *very intensive treatment to the targets mandated in the study* might not be as beneficial as previously thought.**

Update on BARI 2D – Treatment of Insulin Resistance

According to the results of a new post-hoc analysis of the BARI 2D (Bypass Angioplasty Revascularization Investigation in Type 2 Diabetes), the TZD drug, rosiglitazone, poses no significant increased risk of death, stroke or myocardial infarction. Treatment of patients with type 2 diabetes and established CAD with rosiglitazone was associated with an increase risk of fractures but no increase in major adverse cardiovascular events, including MI and death, and tended to be about 28% lower among patients taking rosiglitazone. The rate of CHF was higher among patients taking rosiglitazone but this difference was not statistically significant.
Despite the finding of this particular study, the results of some meta-analyses that showed increased cardiovascular mortality and morbidity have caused the FDA to scrutinize this drug very carefully, and further warnings may be added, although the drug has *not* been taken off the market. Pioglitazone, another drug in the same class, has not been shown to present increased cardiovascular risk.

Update on Avandia

On 7/14/10, a panel at the FDA voted to keep Avandia (Rosiglitizone) on the market despite ongoing concern about the safety profile. Although there was a mixed response within the panel, it was decided that the drug should continue to be sold. The product label will now have tougher restrictions and warnings that alert both providers and consumers to the cardiovascular concerns associated with this drug. The safety issues do not appear to be a class effect. Actos (Pioglitizone) has not been found to increase the incidence of heart attack and stroke. Careful patient selection is key when prescribing any of these agents.

Diabetes Diagnosis Based on the A1C

Last year at the ADA Scientific Sessions, an international expert committee recommended the A1C assay for the diagnosis of diabetes. At this year's Scientific Sessions, some experts are maintaining that more traditional glucose tests (fasting plasma glucose or 2 hour oral glucose tolerance test) are just as valid as an A1C test. A symposium on the final day of the meeting re-examined the different diagnostic testing options including A1C assay, fasting plasma glucose, and oral glucose tolerance test.
The biggest challenge is trying to define thresholds based on continuous risk factors, in this case glucose or A1C, for a discrete outcome, either diabetes or a diabetes-related complication. There is a general consensus that A1C is a

practical predictor of diabetes over 5-10 years and a modest but consistent predictor of cardiovascular disease. However, discordance exists between A1C and other glycemic markers and risk factors. These are similar but fundamentally different markers of glucose metabolism so different people will be identified with different tests. Others suggest that glucose tests are just as valid as the A1C assay. However, A1C is clearly more convenient, although cost, access, and the presence of interfering conditions will preclude the use of an A1C test in some settings. There may be different thresholds or cut-offs for the use of A1C for diabetes diagnosis in discrete ethnic groups, such as South and East Asians, and African populations. A1C should not be used for diabetes diagnosis in patients with type 1 diabetes, pregnancy, pediatric patients, patients with anemia, or hemoglobinopathies. The final consensus at the end of the session was A1C alone is not adequate for the diagnosis of diabetes in all circumstances.

The Potential of SSGLT-2 Inhibitors for Diabetes Management

One novel therapy that was discussed was a new class of agents, called SGLT2 inhibitors. These work via the kidney, which plays an important role in glucose homeostasis. The proximal tubule is involved in glucose reabsorption, filtering and reabsorbing about 180 grams of glucose per day. SGLT2 is the sodium coupled glucose cotransporter mainly responsible for this action. A similar transporter, SGLT1, is located in the brush border of the small intestine. By inhibiting SGLT2, more glucose is excreted in the urine, and this glycosuria results in lower serum concentrations of glucose and modest weight loss. There are several compounds currently being tested as potential new agents in type 2 diabetes in this class, including dapagliflozin and canagliflozin. In trials to date there has been a lowering of A1C by about 0.7%. Serious side effects have not yet been identified, but there is some concern over the possible increase in genital infections and urinary tract infections if the medication is used at high doses (not seen at lower doses in early trials). The benefits of this therapy are thought to be the novel mechanism, low likelihood of hypoglycemia, and weight loss.

Advancing the Field--The Role of Inflammation in Depression and Diabetes (Includes Behavioral Medicine and Psychology Interest Group Award and Lectureship for Distinguished Contributions)

The topic of this three-part symposium was the association of obesity, inflammation, depression, and diabetes. The initial speaker reflected on his experience in the field of behavioral therapy for diabetes, and noted the association of diabetes and depression. For example, in the Diabetes Prevention Program (DPP), patients in the placebo or lifestyle modification arm who were being treated for depression with a medication were twice as likely to develop

diabetes during the course of the study, although this was not seen in the metformin arm. The second speaker reviewed the associations between inflammation, diabetes, and obesity. The adipocyte is a complex cell mainly involved in lipid storage and synthesis, although it also releases both anti-inflammatory cytokines (such as adiponectin, IL-IR and IL-10) and pro-inflammatory cytokines (such as MCP-1, IL-6, TNF-alpha and VEGF). Larger adipocytes and adipocytes located in the visceral compartment tend to secrete a greater proportion of proinflammatory cytokines. These cytokines cause local inflammation and recruit macrophages to the site. The macrophages then secrete more proinflammatory cytokines. Rapid growth of adipose cells also contributes to this problem, as it induces local hypoxia in patients who do not compensate with adequate angiogenesis, a proinflammatory state. Finally, these cytokines interfere with insulin secretion and action by stimulation of the JNK pathway, that inhibits and degrades insulin receptor substrate 1 (IRS-1) and GLUT 4 activity. The final speaker reviewed the possible link between inflammation and depression, showing data that in humans and animals treated with IFN-alpha, a proinflammatory medication, suffer symptoms of depression and show central brain changes in cytokines. She also discussed a trial in which cancer patients were randomized to receive behavioral treatment for depression, and those patients were found to have decreased self-reported stress, an improved measure of T cell function and lower cancer recurrence rates. The speaker speculated that depression treatment might improve outcomes in other diseases associated with inflammation such as diabetes. However, further research needs to be done before a definite link can be established.

Cardiovascular Risks of Hypoglycemia

This session reviewed the clinical impact of hypoglycemia in patients with diabetes. Hypoglycemia is the cause of death in 6-10% of patients with type 1 diabetes, and has been reported as a cause of death in patients with type 2 diabetes on sulfonylureas. Studies using continuous glucose monitoring show unrecognized hypoglycemia in 50% of patients with type 1 diabetes. Hypoglycemic and the fear of hypoglycemia are known to be a barrier to achieving the glycemic targets that prevent the chronic complications of diabetes. Patients with type 1 diabetes develop rapid failure of the glucagon response to hypoglycemia, and thus their response to hypoglycemia is entirely mediated by adrenaline. This response may also eventually be lost in some patients, although it may be recoverable over time with hypoglycemic avoidance. Diabetic autonomic neuropathy is associated with a defective neurohormonal response which the increases the risk of severe hypoglycemia. Acute hypoglycemia is associated with QTC prolongation, PVCs, arrhythmias, and increased blood pressure. It is also causes an acute release of TNF-alpha and IL-6, which are associated with endothelial dysfunction. The “U shaped” curve of glucose (where

both elevated and very low glucose levels are associated with adverse outcomes) has been described in a variety of clinical settings. It is recommended that practitioners work to minimize hypoglycemia by individualizing patient glucose targets, using newer insulin analogs and medications with a lower risk of hypoglycemia, and working to restore hypoglycemic awareness in patients by setting the glucose targets in a more moderate mid-100 range temporarily.

HEALTHY Study – Middle School-Based Intervention to Reduce Diabetes Risk

The HEALTHY Study, a 3-year randomized cluster study, was designed to determine if interventions that encourage healthy behaviors lower risk factors for type 2 diabetes in adolescents. The units of randomization were 42 middle schools across the US. In seven cities, six schools were randomized: three to the intervention and three to the control with all students receiving the same health screening.
Students were recruited beginning their 6^{th} grade year in 2006 and followed until the end of their 8^{th} grade year in 2009. The intervention included four components: school nutrition, physical education class activities, behavior change initiatives, and educational and promotional communications activities. Both intervention and control schools showed reductions in the combined prevalence of overweight and obesity (reduced BMI by 4%). Other outcomes such as BMI z-score (result number of the BMI calculation Wt / Ht^2), waist circumference $>90^{th}$ percentile, and insulin, intervention schools had greater reductions than control schools. This study also suggests that overweight and obesity rates may be declining in the US.

Is Diabetes Really a Cardiovascular Disease Equivalent?

Experts debated whether diabetes is an equivalent of cardiovascular disease (CVD). The position that diabetes is an equivalent of CVD goes back to the East-West study in Finland which found that those with diabetes but without prior history of MI were at the same risk over the next 7 years for MI and other severe cardiovascular complications as people without diabetes but with a prior MI. This view has been confirmed by some studies and not by others. It is clear from previous studies of the natural course of diabetes complications that those with just diabetes and not many other risk factors have a 10-year risk of around 20% for cardiovascular events (high risk situation). This risk has been confirmed in a recent meta-analysis based on the ACCORD, ADVANCE, and VADT studies. The meta-analysis indicated CVD risk of 18% in patients with no prior known history of macrovascular disease. Results from the French DIAD Study indicated a risk of >20% for cardiovascular events if extrapolated over 10 years. The NAVIGATOR

prospective study of pre-diabetes, indicated a risk of 26% over 10 years. All of this data indicates that people with type 2 diabetes and without prior history of MI or advanced microvascular disease are at substantially increased risk. Alternatively, the position that diabetes as a cardiovascular risk equivalent implies that patients with diabetes but no coronary heart disease carry as high a risk of developing a major coronary event as do those with established coronary health disease (CHD.) This implies the need to initiate lipid-lowering therapy for the majority of patients in order to achieve a tight LDL cholesterol. Although this is supported by various cost-effective studies, various epidemiological data do not support this concept. To support broad treatment strategy could create a significant burden in relation to limited healthcare resources. Many studies suggest the risk of developing CHD among patients with diabetes is dependent on co-existent risk factors such as the presence of metabolic syndrome and patients' cholesterol levels. As a result, some studies suggest that patients with diabetes but no CHD do not carry as high a risk for major coronary events as do those with established CHD. Conversely, some studies report that the risk of CHD is similar in patients with diabetes and those with established CHD.

Cardiorenal Issues in Diabetes Management

Kidney disease puts patients at higher risk for cardiovascular problems. Research was reviewed to better understand the risk markers and the mechanisms involved that may have implications for early intervention to reduce cardiovascular risk and protect against further decline in kidney function.

- The overall glycemic target in chronic kidney disease is an A1C of 7% or less and does not change because of the kidney disease.

- A major concern as kidney disease becomes advanced is that there is a decrease in gluconeogenesis as well as a decreased metabolism of insulin, leaving patients at higher risk for hypoglycemia.

- Clinically elevated uric acid (hyperuricemia) is associated with conditions like kidney disease but it is not clear if elevations in uric acid actually precede the kidney disease in type 1 diabetes. Research has shown that the measurement of uric acid is happening while renal function is normal and that for every unit increase of uric acid, there was a 50% increase in the risk of early GFR loss. The next step is to determine whether lowering high-normal levels of uric acid reduces the risk of early GFR loss in a clinical trial.

- There is circumstantial evidence of association between high parathyroid hormone and CVD and low vitamin D with diabetes and CVD. It is not certain whether this is a causative relationship so that, for example, low vitamin D increases diabetes risk or CVD risk or whether people who tend to have low vitamin D levels also have poor health status in general and have higher risk of other diseases.

- Elevated levels of urinary albumin excretion are clearly associated with increased cardiovascular risks and increased risks of adverse kidney

outcomes. It has become less clear that measurement of albuminuria or proteinuria can be used as a surrogate for clinical outcomes. While this is a great risk marker, discordance between changes in albuminuria and changes in risk of clinical outcomes has been reported in clinical trials of some treatments. It remains unclear whether or not albuminuria will be a reliable indicator and how it should be used.

Cardiovascular Disease and Diabetes – Nutrition Update

Not all fats are created equal. The current recommendations for all individuals, including those with diabetes, in respect to quantity of fat, is to consume a moderate fat diet, defined as between 30-35% of calories from fat. There is good data to indicate that those with or without diabetes should not consume a low-fat diet as this tends to increase triglyceride levels and decrease HDL. In respect to the quality of fat, there has been a lot of controversy with respect to saturated fat. At one time, the approach to lowering the intake of solid fat – *saturated trans fat* – was to decrease total fat. However, it is important to replace solid fats with liquid vegetable oils, particularly those rich in polyunsaturated fatty acids. When communicating with patients, keep the message simple and help tailor the advice to their particular ethnic, religious or cultural preferences.
A recent study in JAMA about the relationship between blood omega-3 levels and how fast the cells of overweight people age found that the cells of people who had the highest omega-3 levels aged more slowly over a 5-year period compared to the cells of those with low levels of omega-3.

The Implications of Health Care Reform on the Care And Prevention of Diabetes

Health care is not a guarantee unless you are over 65, disabled or very poor. There is a prevalence of both uninsured and underinsured in the US. Privately insured patients receive a much higher level of care in all diabetes measures. Even the insured often do not have access to a usual source of care. The barriers to diabetes care focus on denials based on pre-existing conditions, exorbitant premiums, lifetime and annual caps, insufficient coverage and rescission. Health care reform is focusing on ending discrimination, increasing affordability, increasing preventative services, providing tax credits, lowering out of pocket expenses, and eliminating dropping coverage based on a diagnosis of diabetes. Currently there is a quality gap of limited access to needed care, insufficient delivery system design, and limited coordination between public health and health care. The goal is to expand coverage, set benefit standards, redesign payment and delivery systems, create a national diabetes report card and prevention program, and expand workforce development grants. It is important to look at the long view of diabetes management. Eighty percent of heart disease and type 2 diabetes could be prevented with a change in lifestyle. We need to focus on clinical and community collaboration. Seven billion dollars has been allocated for prevention, wellness, and public health for FY 2010 -2015. One out of five health care dollars

spent is on diabetes – the fastest growing disease in the US. The cost of diabetes care has increased by 32% since 2002. One out of three born in 2000 will develop diabetes if the trends continue. A model of collaborative care, between the patient, physician, and other health care providers and support personnel, offers the best chance for success.

Lost in Translation – Issues in Literacy

Health literacy is an important concept in diabetes management. It is more common in patients with disparities and in patients over 65. Health literacy affects one's ability to: 1) follow directions on a prescription, 2) understand instructions for diagnostic testing or hospital discharge, 3) keep appointments, 4) accurately complete insurance forms, and 5) fully understand and give informed consent. Functional literacy (reading and writing for everyday situations) is different from health literacy (obtaining process and understanding health information to make the right decisions). Formal education is not a predictor of health literacy; 20% of high school graduates have inadequate literacy. Fifty-nine percent of low literacy patients could not calculate a dose of insulin requiring adjustment for carbohydrate intake and glucose levels. Only 32% could read a food label and calculate carbohydrate content. Low numeracy is of particular importance in diabetes as we deal with numbers everyday. The goal in diabetes management for low literacy patients is to provide a holistic approach, designed from the patient's perspective, integrating educational and clinical decision making on a longitudinal basis. The medical home model stresses the importance of ongoing provider relationships with patients utilizing a team approach, along with sharing of clinical information across the continuum. Creating a packet of materials that the patient can understand is essential when dealing with a low literacy audience.

ADA Education Recognition Program Indicators for Measuring DM Outcomes

Trends of ADA Recognition Programs:

- **Primary site programs (a single site) have been decreasing slowly as the trend is moving to join with other sites (multisite) to share costs and staff, to increase volume, and prevent possible closure**
- **ADA has previously required multidisciplinary-run programs. To prevent closure of some programs, ADA now allows single discipline programs that are primarily run by a RN, RD, or PharmD. The quality of single-discipline programs were not found to negatively affect the program.**
- **Patients served are primarily type 2, as expected, but with yearly increases in pre-diabetes patients attending programs**

<u>Behavioral goals, in order of the most highly selected are</u>:

Nutrition ***Risk Reduction***
Monitoring ***Problem Solving***

Activity ***Healthy Coping***
Medications

Other Benchmark goals, in order of the most highly selected are:

A1C ***Weight Change***
Patient Satisfaction** ***Blood Pressure***
Eye Care ***Lipids***
Self - foot exams

****Most often achieved by patients**

Diabetes Prevention and Behavioral Interventions in the Underserved

Prevention programs in primary care that focused on lifestyle modification presented challenges. These programs have been translated into both the community and clinical settings. Six out of ten countries with the highest rate of diabetes are Arab countries. Prevalence is estimated to rise by about eighty percent over the next fifteen years. Economic transformation, progressive urbanization and lifestyle are the primary reasons for this. One study looked at the effects of educational intervention that targeted knowledge and health beliefs on willingness to engage in diabetes prevention activities. This study also assessed feasibility of community based culturally specific interventions.

Sixteen sessions provided by health coaches ran over six months and focused on diet and exercise. Participants were given flexibility in scheduling. The sessions were comprised of diabetes education, behavioral strategies, and motivational interviewing. The main obstacle was increasing attendance and decreasing attrition both of which were better in the group with higher weight loss. Primary care settings offer a good potential for reach, efficacy implementation and maintenance of diabetes prevention programs. The need is for multiple and linked services in the community. A group in Hartford Connecticut looked at the role of the community health worker in Latino diabetes patients. Thirty-two percent reported household food insecurity without hunger and twenty six percent reported insecurity with hunger. Access to specialized care was limited. Greater than fifty percent had never seen a dietitian, podiatrist, or diabetes educator, as they were not referred. Sixty-seven percent had a poor understanding of diabetes. Greater than sixty percent had both hypertension and hyperlipidemia. Forty four percent were without family support. Culturally appropriate community health workers had a positive impact on glucose control. Problem solving skill training (PST) is an established stand-alone intervention for behavior change and is recognized as one of the seven AADE core self-management behaviors. Lower socioeconomic groups in the US suffer excess burden from type 2 diabetes. Precise methods for problem solving and skills training in diabetes education and counseling are needed.

New Technologies for Diabetes

The American Diabetes Association 2010 Scientific Sessions focused on technology updates this year. 2011 will be the year of the small and the sleek. Platform pumps (see below) and glucose sensor-augmented insulin pumps were introduced as devices that will be making insulin delivery more convenient and less intrusive to the patient. The STARS 3 study looked at whether patients with type 1 diabetes did better on multiple daily injections versus insulin pump therapy. This study showed a decrease in A1C to 7.5% (sensor augmented pump) versus 8.1% (multiple daily injections). Adding a continuous glucose monitor (CGM) sensor device further improves outcomes by reducing A1C and frequency of low blood glucose reactions.

Although current studies do not demonstrate reduction of morbidity and mortality, they do show significant decreases in the most serious causes of morbidity and mortality: frequent hypoglycemia and chronic hyperglycemia. Additionally in these studies, the newer device technology was tolerated very well by the very young, adults and older adults. Only teens seemed to have difficulty consistently using the devices to provide improved care.

Major manufacturers of insulin pumps in the U.S. have all concentrated on developing sensor-augmented insulin pumps. Medtronic is currently distributing the REVEL, a small shell shaped device that uses a glucose oxidase sensor for subcutaneous glucose measurement, which is then communicated to the insulin pump. Predictive algorithms allow patients to be warned if glucose is rising or dropping outside of expected patterns. This allows the patient to intervene and prevent low or high blood glucose. In Europe, these algorithms may automatically stop the pump for intervals if glucose is low and restart after glucose stabilization. This feature is not yet available in U.S. Future models may self-adjust basal distribution rate.

Animas and Omnipod pumps are also being paired next year with sensors. They both will use the Johnson and Johnson glucose oxidase Dexcom sensor. The algorithms may be different and features may vary from Medtronic devices.

The next new hot item on the horizon is the platform pump. This device is very small (like a matchbook) with three layers. They do not require tubing to deliver the insulin from the pump to the subcutaneous tissue. The first layer next to the skin is a "platform" with an infusion cannula and adhesive to support the insulin delivery system. A reservoir or syringe is filled with insulin (200 to 400 units in the devices demonstrated). Finally, a small flat control panel directs communication with a hand held controller and delivery of insulin in the pump. A tiny battery is imbedded in the controller layer and is disposed of every 90 days. The platform can be left in place while the remaining parts of the pump can be removed during exercise or to refill the reservoir. The advantage is that the cannula, which delivers the insulin, can be left in place while other housekeeping functions take place with the remainder of the pump. Roche has purchased the rights to

distribute a platform pump, the SOLO, from an Israeli company who has been testing and distributing it in the Middle East for over a year. It has FDA approval and should be available next year. A sleek controller/glucose monitor is similar in look and function to an I-phone, making insulin management inconspicuous.

There is an I-Phone application for those with diabetes. I-Phone allows you to connect a data cable to your glucose meter. Patients can also download to their providers email or PDA for evaluation and treatment recommendations. WaveSense is collaborating with Apple on the development of this application and hopes to have approval for a glucose-testing module that can be used with the I-Phone wirelessly.

With all of this technology, is the artificial pancreas within reach? There are many who say absolutely yes. However, the timing of algorithms, the speed of insulin action, and the lack counter-regulatory effects of the body's hormonal systems cannot match the natural pancreatic function. Researchers are working to improve the speed of absorption of rapid analog insulin to produce a more natural response. The development of predictive algorithms which not only deliver the insulin in a more natural pattern but anticipate the effects of insulin and glucose actions are key to avoidance of hypoglycemia. Finally, simultaneous delivery of amylin and glucagon has been proposed for future insulin pumps. A recent closed loop pump prototype using both insulin and glucagon was reported by investigators at the BU Bioengineering Department. The artificial pancreas may well be within reach, as we hope for the ultimate cure.

Novel Approaches To Patient and Provider Education

This session consisted of several different strategies for delivering diabetes education.

- **The first symposium compared the use of DVD assisted learning vs. traditional group education in prevention and reducing risks factors in those at risk for diabetes. Both groups had improvement in weight loss and glycemic control but the DVD learners had a greater percentage of weight loss at final assessment along with reductions in A1C, total cholesterol, systolic and diastolic blood pressure, waist circumference, and BMI. Further information is available at *www.diabetesprevention.umc.com***

- **The second symposium discussed the development of an interactive web based diabetes self-management program. The program was based on the Pennsylvania State Diabetes Playbook (diabetesplaybook.ning.com) Subjects were computer savvy as they were recruited from Craigslist, Facebook and Penn State web news. All subjects were assessed using a diabetes knowledge test. Results are being evaluated and future studies planned.**

- **The third symposium utilized a church-based diabetes education approach. This was carried out in primarily African-American churches in Georgia and Connecticut. Afro-Americans are twice as likely to have or be at risk for diabetes. Those who have diabetes often have higher A1C, blood pressures,**

lipids, and BMI's. They are also less likely to discuss poor dietary choices with health care providers. Most African-Americans attend church regularly and spirituality is an important part of their life. Church based diabetes management classes and support present a unique way to improve glycemic control.

Point of Care Devices for Glucose and A1C – are they up to the task?

Point of Care (POC) glucose meters generate 6 billion dollars for health care expenses in the US. POC testing also contributes more than 30% of laboratory revenue in the US. Use of POC meters is not without concern as a patient's hematocrit level, reducing substances, user error, and glucose strip condition can influence results. Test strips are influenced by temperature and humidity so the results are strip and technique dependent. Fifteen to 24% of glucose POC results are above the acceptable 20% error rate established by FDA since clinical conditions can influence POC results. A hypotensive patient using a glucose oxidase mediated system may get falsely elevated results. Glucose dehydrogenase systems can falsely elevate or lower hypotensive patient's results. False lows have been reported in both DKA & HHNS patients. Since elderly clients have more difficulty with self-management of blood glucose, a two- week follow up visit after initial teaching is suggested. POC devices should be tested by independent labs agencies. Recommended variations are 95% of values < 10 mg/dl difference and 99% of values should be no higher than a 20 mg/dl variance.

DIABETES CENTER OF EXCELLENCE: PEOPLE IN THE NEWS

Marie McDonnell, MD:

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