The American Diabetes Association® (ADA) hosts the world’s largest diabetes meeting—Virtually

The ADA’s annual Scientific Sessions attracts attendees from all 50 states and more than 100 countries, all with one goal: sharing research advances to improve the lives of people with and affected by diabetes.

81st Scientific Sessions: By the Numbers

The American Diabetes Association’s annual conference, known as the Scientific Sessions, is always the biggest diabetes event of the year, and 2021 marked the second time this 5-day congress was held completely online because of the lingering COVID-19 pandemic.

Whether in person, virtual, or future hybrid meetings, the Scientific Sessions gives scientists a place to share their latest research findings; it gives physicians an opportunity to understand how to best treat patients; it gives diabetes educators a chance to share information on how to help patients manage diabetes. Today, this extraordinary event, which has long been the world’s largest diabetes meeting, is more accessible than ever.

191 Educational Sessions
900+ presenters
119 Countries
1489 scientific abstracts
1098 ePoster Presentations
11685 Total Attendance
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COVID-19 Pandemic and Diabetes Uncovers Health and Racial Disparities

The disproportionate impact of the global COVID-19 pandemic on people with diabetes was a major theme at the 81st Scientific Sessions. Five symposia highlighted cutting edge science and the latest diabetes developments learned during the initial phases of the pandemic. Additionally, over a hundred oral and poster presentations focused on, or included references to COVID-19.

A retrospective cohort study by Murali and colleagues (Kaiser Permanente) showed BMI was associated with an increased risk of death from COVID-19. This was especially increased with BMI over 40 with 2.7 to 4.2 fold increased risk of mortality. Obesity eclipsed nearly every comorbidity including diabetes. Inactivity was also identified as a risk factor for severe outcomes including death. Their meta-analysis of 54 studies with over 850,000 patients similarly showed a direct relationship between increasing BMI and relative risk of death in COVID-19 patients. The authors suggested this may be related to increased inflammation, prothrombotic state and hormonal rearrangement driven by high BMI and obesity.

Research from the T1D Exchange showed that among people with type 1 diabetes, use of diabetes technology lowered the risk of adverse outcomes with COVID-19 however this was offset by the common barriers of access and affordability issues—as well as racial and ethnic disparities in diabetes technology use. However, Agarwal and colleagues (Albert Einstein College of Medicine), found people of color, Hispanic and Black youth, with type 1 diabetes are less likely to use technology than their white counterparts even when insurance helps cover the cost. Indeed, many of the participants were never offered the technology. They identified multiple barriers among those who were even offered technology including lack of adequate access to learning about the technology, lack of encouragement and uncertainty how to initiate the technology and access help when needed. In their assessment they identified the urgent need for a more equitable system of offering technology, access to visual and hands-on education, peer support and assistance navigating insurance programs.

The COVID-19 pandemic has also had negative psychosocial consequences for people with diabetes. In a study by Westen and colleagues (University of Florida), one in five adults with diabetes reported anxiety or depression at levels moderate to severe during the COVID-19 pandemic. Nearly half of adults (47%) with type 1 diabetes, reported moderate to severe distress compared with only 11 percent of adults with type 2 diabetes. Dr Westen emphasized the need to provide follow-up care aimed at mental health for those pandemic-related psychosocial concerns.

Type 2 diabetes in children dramatically increased during the COVID-19 pandemic. Stay-at-home orders due to the COVID-19 pandemic exacerbated risk factors for type 2 diabetes, including limiting physical activity, increasing screen time and sedentary behaviors, disturbing sleep, and increasing the intake of processed foods, which can all lead to weight gain.

Findings from the two separate retrospective chart reviews, one conducted by Marks and colleagues (Children’s National Hospital, Washington DC) and the other by Hsia and colleagues (Pennington Biomedical Research Center, Baton Rouge LA) revealed a doubling of the rates of hospitalizations for type 2 diabetes among youth. Dr. Hsia reported that children admitted to the hospital in 2020 had more severe diabetes with higher blood glucose, higher A1C and higher indicators of dehydration. Also, more children presented with serious conditions like diabetic ketoacidosis and hyperosmolar hyperglycemic
syndrome. Underscoring the health disparity, 23 out of 25 children were African American and 19 were male.

**Guidelines on diagnosis and management of type 1 diabetes in adults**

The ADA and EASD presented a draft consensus report with key recommendations on the diagnosis and management of type 1 diabetes in adults.

The report lays out that to achieve individualized care, patients should undergo an initial needs assessment. It also addresses behavior considerations such as alcohol and tobacco use, sleep, sick day management, driving, employment, physical activity, and nutrition.

Regarding diagnosis, health care professionals should suspect type 1 diabetes in individuals with new onset diabetes without a family history of type 2 diabetes. The first step is to measure anti-GAD antibodies. A positive test is defined as type 1 diabetes; a negative result is less conclusive. Depending on the population, 5% to 10% of people with type 1 diabetes will test negative for anti-GAD. The consensus report provides additional guidance on delineating a diagnosis of type 1 vs type 2 in these individuals.

A key recommendation is that all people with type 1 diabetes should have access to continuous glucose monitoring (CGM). In addition, the report reviews a variety of insulin regimens, including hybrid closed loop systems and analogue insulins, which are the preferred insulin in type 1 diabetes.

The report also focuses on individual preference and the need to provide education and support for people living with this condition, including referral to a mental health specialist when needed. The report notes that there are four critical times for ongoing diabetes management support and education: at diagnosis, annually or when the patient is not meeting treatment targets, when complicating factors develop, and when transitions in life and care occur.

**Tirzepatide Dramatically Lowers Weight and A1C**

Full results from four SURPASS clinical trials of tirzepatide demonstrated significant A1C and weight reduction and less hypoglycemia among people with type 2 diabetes. This new glucose-lowering therapy is called a "dual agonist" or a "dual GIP and GLP-1 receptor agonist" and is currently in development as a once-weekly injectable to help people manage type 2 diabetes and help provide more stability in terms of weight.

The series of four clinical trials investigated different doses of tirzepatide (5 mg, 10 mg, and 15) in adults with type 2 diabetes. Two of the trials studied the use of tirzepatide in combination with other treatments, and two of the trials compared tirzepatide to other diabetes drugs:

Together, these results are extremely promising for tirzepatide and suggest that it may be a safe and highly effective treatment for both glucose management and weight loss in people with type 2 diabetes.
Diabetes complications and the ‘foot selfie’

Access to care and regular physical examinations are crucial for people with diabetic food complications. Both were a challenge in 2020, especially during the early days of the COVID-19 pandemic. As such, institutions had to rapidly pivot to telemedicine and other communication strategies to stay connected and provide care to patients. Among the innovative adaptations the “diabetes foot selfie” where people snapped and shared photos of their feet so their clinicians could review and help guide decision-making.

In her presentation, Dr. Laura Shin (University of Southern California) said “Comprehensive foot exams are highly recommended and really vital to improve outcomes. So just like in the doctor’s office, we had patients fill these out, or the caregivers fill them out and let us know what patients were at the highest risk,” she said. “A large part of us being able to treat these patients as best we could, especially with using different telemedicine technologies, was the ‘foot selfie.’ If they were flexible or agile enough, they could take the pictures themselves using their cell phones or have a family member or caregiver take the pictures.” She noted that “although this was not a replacement for inpatient visits, I think we were still able to manage to keep a lot of these patients safe, keep them out of the hospital, and keep them moving in the world.”

Major Award Recipients

A journey from the evolution of the gut to the discovery of the incretins

Banting Medalist Professor Jens J. Holst, MD DMSc: In the Beginning was the Gut – And Then Something Happened – A Story About the Incretins

The Banting Medal for Scientific Achievement is the highest scientific award bestowed by the American Diabetes Association. Given in memory of Sir Frederick Banting, a medical scientist, doctor and Nobel laureate who is noted as one of the key investigators responsible for the discovery of insulin, the Banting Medal is awarded annually to honor highly meritorious career achievement in the field of diabetes research.

At the 2021 Scientific Sessions, Professor Jens Holst received the Banting Medal and delivered an accompanying lecture entitled, “In the Beginning was the Gut – And Then Something Happened – A Story About the Incretins.”

Dr Holst started by reminding everyone that “in the beginning was the gut” and then took the audience on a fascinating journey, from the evolution of the gut to the discovery of the incretins, and our growing understanding of their importance.

Dr. Holst noted that although incretins were discovered in the 1930s it wasn’t until the late 1950s, with the ability to measure insulin, that researchers could demonstrate the effect of the gut on stimulating insulin secretion. He went on to note that with the recent availability of specific and potent antagonists to two important incretin hormones, GLP1 (glucagon-like-peptide 1) and GIP (glucose dependent insulinotropic polypeptide) it has become possible to elucidate the importance of incretins as major contributors to glucose tolerance. Indeed, he estimated that gastrointestinal mechanisms, including the incretin effect, may handle up to 80% of ingested glucose.
Underscoring the important role of the incretins in glucose control, Dr. Holst highlighted the newly published results from the SURPASS-2 trial in which more than 50% of participants reached an A1C of below 5.7% with the novel dual GLP-1/GIP receptor agonist, tirzepatide.

Dr. Holst concluded his presentation with the quote ‘Incretins are extremely interesting molecules!’

**Outstanding Scientific Achievement**

**Awardee Kristen J. Nadeau, MD, MS: Managing cardiovascular risk is even more important in youth-onset diabetes**

Dr. Kristen Nadeau, MD, MS presented this year’s Outstanding Scientific Achievement Award lecture at the Scientific Sessions. The award recognizes a scientist who has made significant contributions to an area of diabetes and is under the age of 50. Dr. Nadeau, Professor of Pediatric Endocrinology, University of Colorado, has focused her work on understanding the mechanisms of youth-onset diabetes, obesity and insulin resistance, including sex differences and racial/ethnic disparities, to prevent long-term complications.

“Youth-onset diabetes is more aggressive and more treatment-resistant than in adults,” said Dr. Nadeau in her award lecture. “Youth-onset of type 1 and type 2 diabetes have both unique and overlapping features, and youth onset has unique features from adult-onset. Youth-onset of diabetes leads to earlier complications and earlier increases of cardiovascular disease risk.”

She went on to note that RISE, Today and other trials counter common myths that prevent the reduction of CVD risk in youth-onset diabetes,

The first myth claims complications in youth-onset type 1 diabetes center on beta-cell failure and hypoglycemia, whereas in reality, muscle insulin resistance (IR) is a prominent feature that worsens with obesity and contributes to vascular dysfunction.

The second myth claims IR is always accompanied by features of metabolic syndrome, whereas in reality, metabolic syndrome may not always be present, even in obese youth with type 1 diabetes.

The third myth claims glucose elevation drives cardiovascular dysfunction. Diabetes significantly reduces cardiovascular fitness in youth with type 1 and type 2 diabetes and is tightly correlated with both IR and decreasing vascular function. Dr. Nadeau stressed the importance of addressing health diet and exercise, and interventions that lower insulin dosing in youth with type 1 diabetes.

The fourth myth claims insulin is the only approach for treating youth with type 1 diabetes whereas recent work suggests non-insulin interventions, such as metformin, can provide significant benefits.

The fifth myth claims that youth-onset type 2 diabetes is just an earlier version of adult-onset type 2 diabetes whereas responses differ to antidiabetic agents and females predominate in youth-onset type 2 diabetes but not in adult disease.

The common final myth holds that interventions used in adult-onset type 2 diabetes are too aggressive for youth-onset type 2 diabetes whereas trial data suggest that youth may benefit even more than adults form aggressive interventions.
**Presidents’ Addresses Emphasize Urgent Need to Address Inequities in Diabetes Care**

**ADA President of Medicine & Science Ruth Weinstock, MD, PhD: A Call to Action**

In a stirring call to action, Dr. Ruth Weinstock offered lessons from the past and discussed paths forward to fulfill ADA’s mission to prevent and cure diabetes and to improve the lives of all people affected by diabetes.

Dr. Weinstock argued that the COVID-19 pandemic’s Operation Warp Speed reminds us that widespread rapid change is possible when prioritized and that we should be using the same approach. Looking ahead, she offered a call to action, arguing that members of the diabetes community have a responsibility to: (1) advocate for research funding; (2) personalize care for people with diabetes; (3) address inequities and biases in access to quality of care; (4) spread the word on research advances and correct misinformation; (5) mentor junior researchers and providers; (6) innovate, collaborate, and be open to change; and (7) address barriers experienced by people with diabetes and their caregivers.

**ADA President of Health Care & Education Cynthia Muñoz, PhD, MPH: Pandemic highlights ‘epidemic’ of inequities facing youth with diabetes**

The COVID-19 pandemic revealed the impact of health care disparities on children and youth living with diabetes. “Unfortunately, these inequities are independent of the pandemic—many of us just never noticed them until now,” said Dr. Muñoz in her sobering address. “If you are outraged about the impact on adults, you should be even more outraged that this is happening to our children.”

Dr. Muñoz cited worrying diabetes trends. Incidences of type 2 diabetes have been on the rise since 2004, especially in non-Hispanic Black, Hispanic and Native American populations. Type 1 diabetes has been on the rise among Asian, non-Hispanic Black and Hispanic children. Girls have seen a large increase in type 2 diabetes, and boys have had a more rapid increase in type 1 diabetes incidences.

“The COVID-19 pandemic further exacerbated these trends,” Dr. Muñoz added. “Timely diagnosis and symptom management became more difficult during the pandemic because children stopped going to well visits and there was hesitancy to go to the emergency department. And with schools closed, families also lacked access to school-based health support.”

Meanwhile, shelter-in-place orders and physical distancing guidelines contributed to a decrease in opportunities for physical activity, and, with reduced employment opportunities, families experienced more difficulty buying diabetes supplies and food, she said.

“During the pandemic, education, health care, support, and most all aspects of life became only accessible on the computer,” Dr. Muñoz said. “The pandemic created a digital divide, as many in under-resourced areas had less access to the very technology—telehealth, education, insulin pumps, and continuous glucose monitors—needed to optimally manage their health.”

The pandemic also illuminated inequities and barriers to mental health care and support for children living with diabetes, particularly those in low-income communities, said Dr. Muñoz, noting that children
and youth generally reported lower health-related quality of life during the pandemic and more mental health problems, including higher levels of anxiety.

“To meet the mental health needs of our growing diabetes population, we need to train more mental health professionals who work in outpatient, inpatient, and residential behavioral health treatment centers about the care of people with diabetes,” Dr. Muñoz said.

To that end, the ADA has partnered with the American Psychological Association to create the Mental Health Provider Diabetes Education Program, a training program designed to increase the capacity of mental health professionals equipped to optimally treat diabetes patients. The ADA also created a first-of-its-kind searchable online Mental Health Provider Directory, which currently lists more than 200 mental health providers.

Ongoing ADA programs continue to address other important issues that disproportionately impact people of color and low-income communities, such as insulin affordability, Medicaid expansion, technology access, and expansion of telehealth services for diabetes self-management education and support, she added.

**ADA Programs at the Scientific Sessions**

**Pathway to Stop Diabetes**

In 2013, the ADA launched its most innovative research initiative yet, Pathway to Stop Diabetes. The Pathway program has a simple, bold vision: Bring 100 brilliant scientists to diabetes research. The program identifies and selects individuals who possess transformative capacity among those nominated as the single most promising scientist within their institution. This year, 2021 Virtual Pathway Symposium highlighted the exciting research progress by 2015 awardee Marie-France Hivert, 2016 awardee Phillip White, 2017 awardee Paul Cohen and 2020 awardee Judith Agudo. The symposium was attended by members of the Pathway Mentor Advisory Group, ADA leadership, and philanthropic and corporate Pathway supporters.

**ADA Interest Groups**

The ADA’s 15 Interest Groups, which are open to all ADA Professional Members, held several events aimed at advancing diabetes research in specialized areas. Topics ranged from clinical inertia in the treatment of diabetes, ocular health care by telehealth to exercise post-covid infection.

Additionally, five Interest Group Awards recognizing achievements in behavioral medicine, foot and cardiovascular complications and pregnancy were presented to David G. Marrero, PhD, Edward J. Boyko, MD, MPH, Russell A. DeBose-Boyd, PhD and Denice Feig, MD, MSc, FRCPC, respectively.
Women’s Interprofessional Network of the ADA

The Women’s Interprofessional Network of the American Diabetes Association (WIN ADA) held a mini-symposium on the long-term professional impact of COVID-19 with a panel discussion on the repercussions of the pandemic on women working in the diabetes field. WIN ADA also presented Linda M. Siminerio, RN, PdD, CDCES with the Lois Jovanovic Transformative Woman in Diabetes Award. This award recognizes a woman scientist, clinician, educator, or other female professional who has made a significant impact in the field of diabetes and/or in the lives of people affected by the disease.

Additionally, abstract awards went to Nina Haider, PhD, Carmella Evans-Molina, PhD, MD, Kimber Simmons, MD, MS and Lu Hu, PhD.