Diabetes Prevention

Kevin Miller, DO

Biography

Kevin Miller, DO, earned medical degree from Kirksville College of Osteopathic Medicine in Kirksville, MO, in1996. He moved to the Pacific Northwest after completing a residency at Cuyahoga Falls General Hospital in Ohio. A board-certified family practitioner, he is the co-founder of Diabetes Nation, a nonprofit organization, and Diabetes and Obesity Care in Bend, Oregon where he practices with his wife, Eden Miller, DO.

An experienced clinician and leader, Dr. Miller's involvement has included state-level service as a board member and prior president of Osteopathic Physicians & Surgeons of Oregon, and an Osteopathic Health Policy Fellow. He has published quality improvement research in diabetes working with his team at Diabetes Nation. He is currently chair of Diabetes is Primary at the American Diabetes Association.

Disclosures

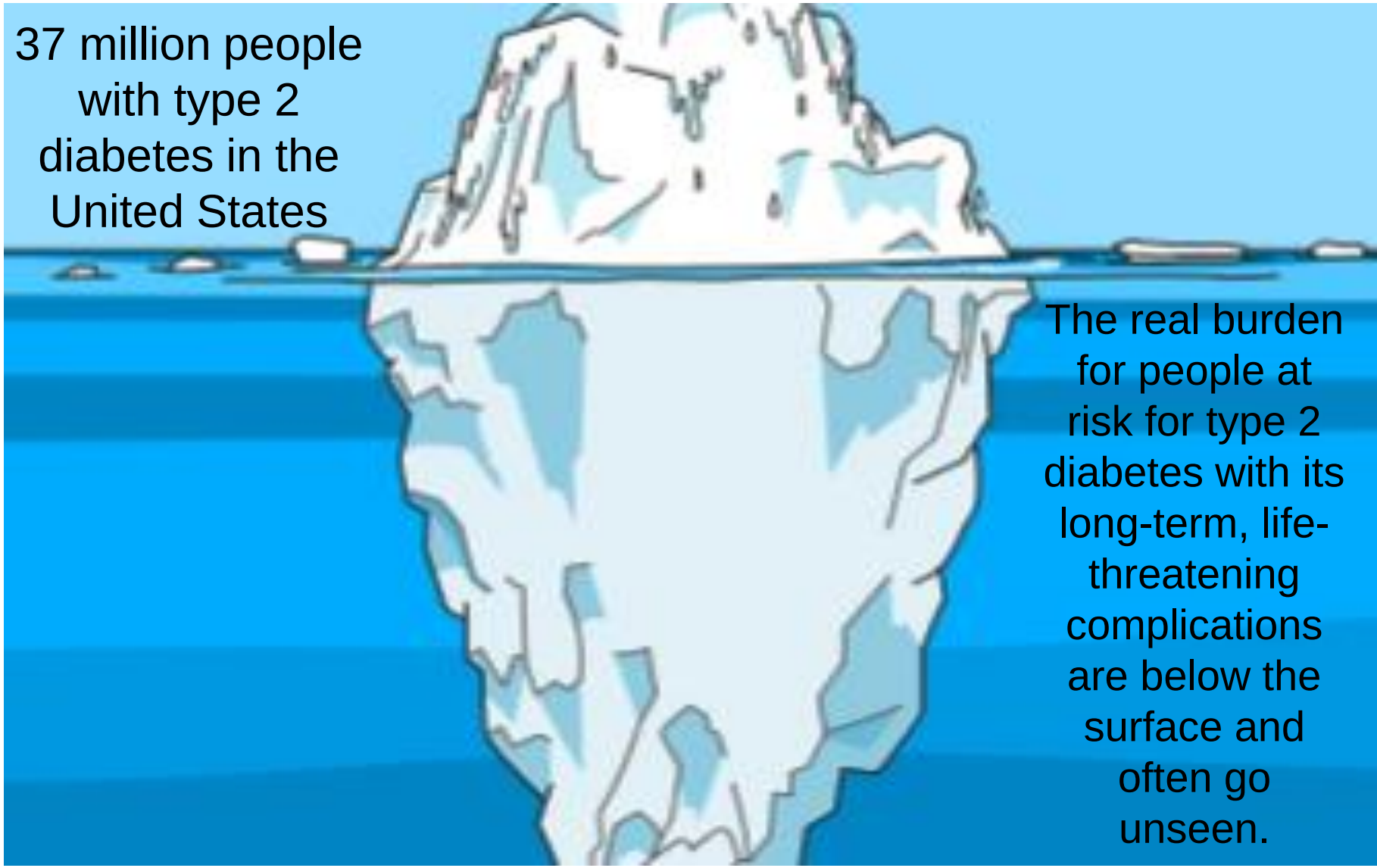
- Selmer Insulin Insights (consultant)
- Abbott (research)
- Lilly (speaker, consultant)

Overview

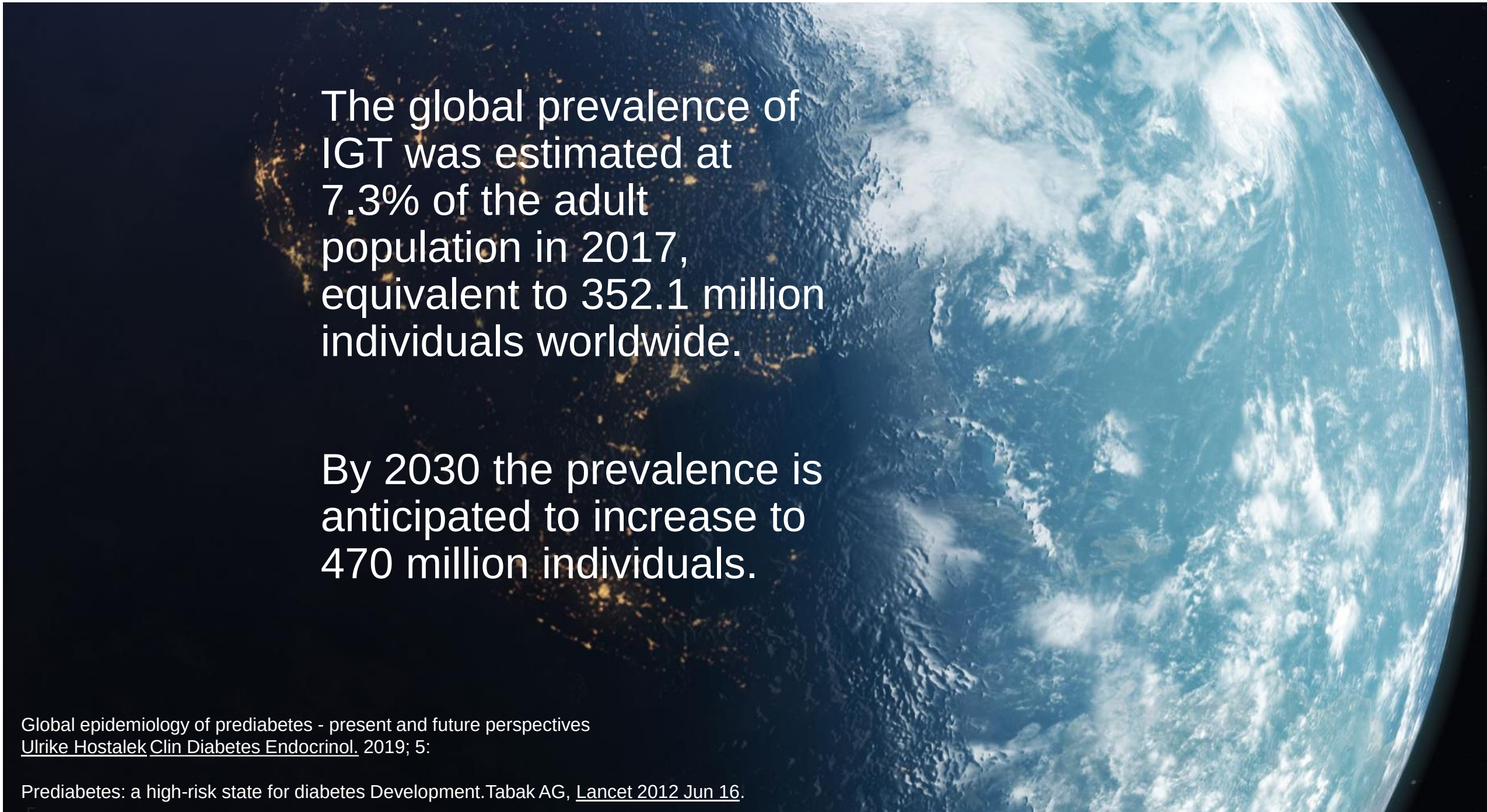
- 1. Discuss the at-risk person for diabetes (T2D).
- 2. Review the current diagnostic criteria.
- 3. Examine the risk factors and discuss screening.
- 4. Consider the increased health risks associated with prediabetes.
- 5. Review the natural history prediabetes toT2D.
- 6. Propose staging to preserve cell function and prevent T2D.
- 7. Begin treatment utilizing new staging.

Prediabetes

96 million people with prediabetes in the United States



Centers for Disease Control and Prevention. Available from https://nationaldppcsc.cdc.gov/s/article/CDC-2022-National-Diabetes-Statistics-Report. Accessed 9 January 2023



Global epidemiology of prediabetes - present and future perspectives
Ulrike Hostalek Clin Diabetes Endocrinol. 2019; 5:

Prediabetes: a high-risk state for diabetes Development.Tabak AG, Lancet 2012 Jun 16.

Update for 2026

CDC January 21, 2026

40.1 million have diabetes
That is 12 % of the population

27.6% are undiagnosed
11 million

<u>Prediabetes</u> 115.2 million

For those 65 and older
52% or 31 million !

ADA Standards Care 2023

Current Definition of Prediabetes

- A1C: 5.7–6.4% (39-47 mmol/mol)
- Fasting blood glucose: 100–125 mg/dL (5.6-6.9 mmol/L)
- Oral glucose tolerance test: 2-hour blood glucose 140–199 mg/dL (7.8-11.0 mmol/L)

2003 ADA definitions for normal to impaired glycemia and diabetes

- **NGT (Normal Glucose)** – FPG < 100 mg/dL, 2-h PG < 140 mg/dL, and no diagnosis of diabetes.
- **IFG (Impaired Fasting Glucose)** – FPG ≥ 100 mg/dL but < 126 mg/dL and no diagnosis of diabetes.
- **IGT (Impaired Glucose Tolerance)** – 2-h PG ≥ 140 mg/dL but < 200 mg/dL and no diagnosis of diabetes.
- **Isolated IFG** – IFG without IGT.
- **Isolated IGT** – IGT without IFG.
- **Prediabetes (IGR)** – IFG and/or IGT.
- **Diabetes** – FPG ≥ 126 mg/dL, 2-h PG ≥ 200 mg/dL, A1c ≥ 6.5%

American Diabetes Standards of Care 2003

Sensitivity and specificity for detecting prediabetes and diabetes by FPG and OGTT stratified by selected factors.

	Prediabetes by FPG (n = 6068)		Prediabetes by OGTT (n = 6068)	
	Sensitivity (%)	Specificity (%)	Sensitivity (%)	Specificity (%)
All cases	53.7	100	81.1	100
Sex				
Men	62.0	100	75.2	100
Women	51.2	100	82.8	100
Age group (yr)				
20–<45	48.4	100	82.3	100
45–<60	54.4	100	79.8	100
≥60	60.9	100	83.6	100
Hypertension				
Yes	54.5	100	81.8	100
No	53.5	100	80.8	100
Family history of diabetes				
Yes	60.2	100	75.8	100
No	47.7	100	80.5	100
BMI (kg/m^2)				
<25	52.0	100	78.8	100
25–<30	53.2	100	81.9	100
≥30	56.7	100	83.6	100

Cut-off point for detecting prediabetes by FPG at 100 mg/dL and by OGTT at 140 mg/dL; cut-off point for detecting diabetes by FPG

This data; stratified by Gender, Age, HTN, Family History and BMI, demonstrates the sensitivity and specificity for the detection of prediabetes using FPG vs OGTT

Gender

Age

Hypertension

Family History

BMI

Detecting Prediabetes and Diabetes: Agreement between Fasting Plasma Glucose and Oral Glucose Tolerance Test in Thai Adults Wichai Aekplakorn, J Diabetes Res. 2015; 2015: 396505

The current diagnostic criteria and ADA's intensive prevention

- A1C: 5.7–6.4% (39-47 mmol/mol)
- Fasting blood glucose: 100–125 mg/dL (5.6-6.9 mmol/L)
- Oral glucose tolerance test: 2-hour blood glucose 140–199 mg/dL (7.8-11.0 mmol/L)

- ADA ***More intensive prevention intervention***
- A1C: 6.0-6.4%
- Fasting blood glucose: 110-125 mg/dl (6.1-6.9 mmol/L)
- Oral glucose tolerance test: 2-hour blood glucose 173-199 mg/dl (9.85-11.05 mmol/L)

STANDARDS OF CARE| DECEMBER 16, 2021
3. Prevention or Delay of Type 2 Diabetes and Associated Comorbidities:

High risk

- American Diabetes Association SOC 2026
- BMI ≥ 35
- Fasting glucose 110-125
- 2 hour post challenge 173-199
- HbA1c ≥6.0
- Those with a history of gestational diabetes

Risk Factors for Prediabetes

- BMI > 25 (Asian > 23) and or Physical inactivity
- First-degree relative with diabetes
- High-risk race/ethnicity (African American, Latino, American Indian, Alaska Native; some Pacific Islanders, Asian American people)
- Gestational diabetes mellitus (GDM) or delivery of a baby weighing ≥ 9 lb.
- HDL cholesterol < 35 mg/dL and/or triglycerides >250 mg/dL
- Hypertension (blood pressure >140/90 mmHg or on therapy)
- A1C ≥ 5.7%, impaired glucose tolerance, or impaired fasting glucose on previous test
- Conditions associated with insulin resistance: severe obesity, acanthosis nigricans, polycystic ovary syndrome. HIV.
- History of cardiovascular disease
- Age > 35 years

El Sayed NA, Aleppo G Aroda VR, et al.; American Diabetes Association. Diabetes Care 2023; 46(Suppl. 1):S19-S40

Online Prediabetes Screening Tool

Are you at risk?

- **Age:** 40–49 years (1 point), 50–59 years (2 points), ≥60 years (3 points)
- **Sex:** male (1 point)
- **GDM:** yes (1 point)
- **Family history of diabetes in mother, father, sister, or brother:** yes (1 point)
- **Hypertension:** yes (1 point)
- **Physically active**: no (1 point)
- **BMI:** Score depending on BMI (overweight 1pt. BMI Class I/II 2 pts. Class III 3 pts.)
- Total score ≥ 5 indicates elevated risk for prediabetes/diabetes

https://diabetes.org/diabetes/risk-test / http://doihaveprediabetes.org / https://www.cdc.gov/diabetes/prevention/pdf/Prediabetes

What if we do **nothing?**

- Today more than 80% of patients who qualify as having prediabetes **do not know.**
- For those with an HbA1c of 6.0-6.5%, 25-50% will progress to the diagnosis of diabetes within 5 years.
- Ligthart et. al. specifies that for patients that are 45 years old with the diagnosis of prediabetes 74% will progress to diabetes in their lifetime.
- In addition to the risk of progressing to Diabetes patients with prediabetes have increased Heart attack
  - Stroke
  - Retinopathy or blindness
  - Neuropathy
  - Kidney failure

A1C Level and Future Risk of Diabetes: A Systematic Review Xuanping Zhang, PHD *Diabetes Care* 2010;33(7):1665–1673 https://doi.org/10.2337/dc09-1939

Prevention or Delay of Type 2 Diabetes and Associated Comorbidities: *Standards of Medical Care in Diabetes—2022* STANDARDS OF CARE| DECEMBER 16 2021

Ligthart.

Prediabetes has serious pathophysiologic changes

- Prediabetes is associated with 6-10% increased risk of all-cause mortality
- Increased risk:
  - Cardiovascular disease
  - Stroke
  - Heart failure
  - Atrial fibrillation
  - Chronic kidney disease
  - Cancer: liver, colorectal, pancreatic, breast, endometrial

Perreault L. Pan Q, Schroeder EB, et al.; Diabetes Prevention Program Research Group. Diabetes Care 2019;42:1809-1815
Schlesinger S, et al.; Prediabetes and risk of mortality, diabetes-related complications and comorbidities: umbrella review of meta-analysis of prospective studies. Diabetologia, 1-11, 2022

Cardiovascular risk in prediabetes

- Systematic review and meta-analysis of 53 prospective cohort studies compared cardiovascular risk in people with normoglycemia versus prediabetes
  - *N* = 1.6 million
  - Prediabetes: based on impaired glucose tolerance or impaired fasting glucose by definition
  - Median follow-up: 9.5 years
- Composite 3-point MACE: relative risk (RR) 1.3 (95% CI 1.10–1.42)
  - CAD: RR 1.20 (95% CI 1.0–1.44)
  - Stroke: RR 1.20 (95% CI1.0–1.45)
  - All-cause CV death: RR 1.32 (95% CI 1.23–1.40)

Huang Y, Cai X, Mai W, Li M, Hu Y. BMJ 2016;355:i5953

Retrospective analysis of 7.8 million hospitalizations from the National Inpatient Sample

Prediabetes and Cardiovascular Disease in adults less than 45 years of age

- Overview**:** young adults **18–44** years of age who are diagnosed with ***prediabetes*** **are more likely to be hospitalized for heart attacks than their peers with normal glycemic levels**
- They have a **1.7 times higher chance of being hospitalized**
- 48.9% were obese compared with 25.7% of those with normoglycemia
- 68.1% had hyperlipidemia compared with 47.3% of those with normoglycemia
- They were more likely to be male and of Black, Hispanic, or Asian/Pacific Islander race/ethnicity

"***Our study should be considered as a foundation for future research to clearly establish heart disease burden in young adults with prediabetes . . . and to take steps to delay the development of type 2 diabetes and associated cardiovascular events."*** **—Dr. Jain**

Desai R, Haque FA, Vasavada A, et al.
Presented at the American Heart Association Quality of Care and Outcomes Research Scientific Sessions, 14 May 2022

Why should we be concerned about the prediabetes state?

- About 10% of people with prediabetes progress to diabetes each year.
- For people with an A1C > 6.0% (42 mmol/L), the rate of conversion to type 2 diabetes is 25–50% over 5 years.
- At diagnosis of type 2 diabetes, 50–70% of pancreatic islet cells are no longer functioning.

Prediabetes: A high-risk state for developing diabetes Adam G. Tabák, MD, PhD Lancet. 2012 Jun 16; 379(9833): 2279–2290. Published online 2012 Jun 9. doi: 10.1016/S0140-6736(12)60283-9

Wajchenberg BL. beta-cell failure in diabetes and preservation by clinical treatment. *Endocr Rev.* 2007;28:187–218. [PubMed] [Google Scholar]

New classification of Prediabetes

Stage 1 Early Prediabetes *(early diabetes stage 1)*

- A1c 5.7-5.9% (39-41mmol/mol)
- Fasting blood glucose: 95-109 mg/dl (5.25-6.05 mmol/L)
- 2 hour post prandial blood glucose140-152 mg/dl (7.8-8.4 mmol/L)
- CGM CV% 20- < 25 (around the mean glucose) *

Stage 2 Late Prediabetes *(early diabetes stage 2)*

- A1C 6.0-6.4% (39-41mmol/mol)
- Fasting glucose 110-125 mg/dl (6.1- 6.95 mmol/L)
- 2 hour post prandial test blood glucose 153-178 (199) mg/dl (8.45 – 9.9 (11.05) 4 mmol/L)
- CGM CV% 26 - < 35 (around the mean glucose) *

CV = $\mathrm{SD} \div \mathit{Mean\ glucose}$

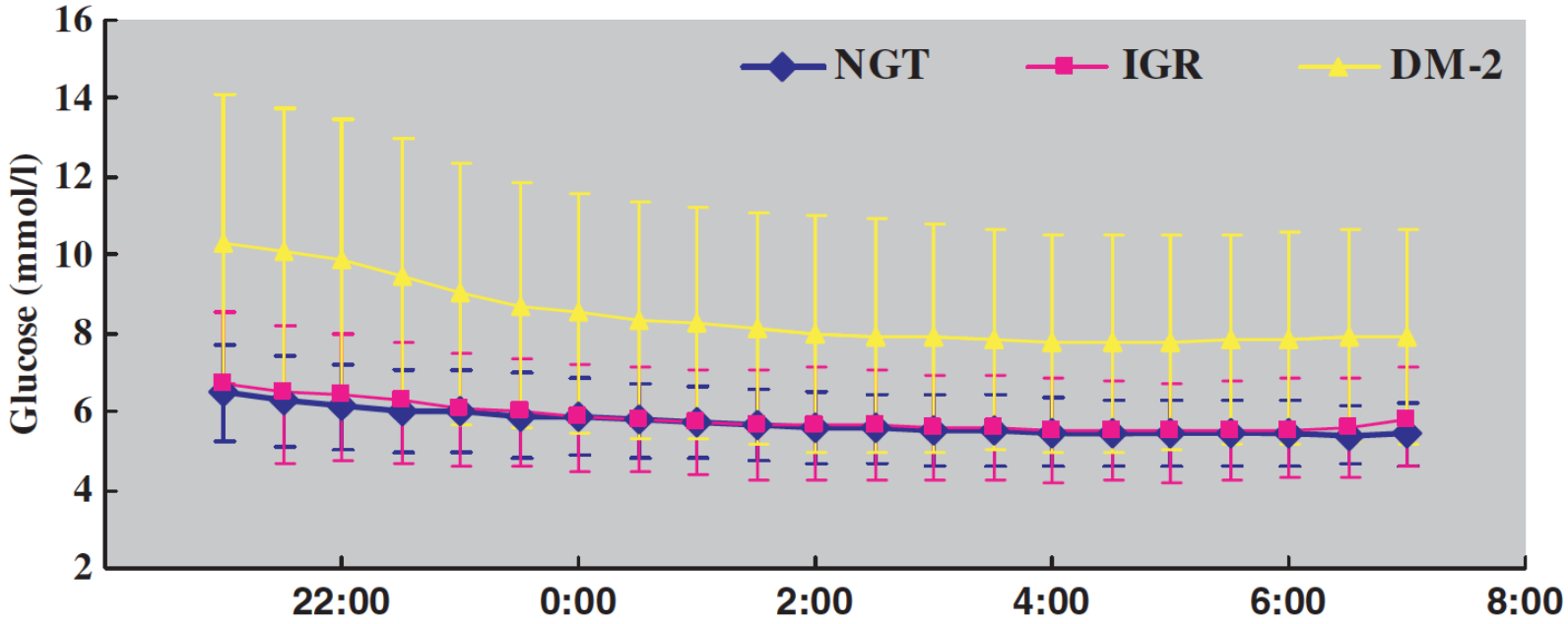
*risk assessment / reduction metric

References to follow

CV% ≥ 20- < 25 around the mean glucose

Stage 1 Early Prediabetes using CGM

- A normal % CV in healthy individuals is below 20.



Glucose variations from 21:00 at night to 7:00 the next morning in

Glucose fluctuations gradually increase from NGT to IGR (IFG with IGT), and IGR to DM-2. Intraday glucose variability occurs at the early stage of abnormal glucose tolerance.

Glucose fluctuations in subjects with normal glucose tolerance, impaired glucose regulation and newly diagnosed type 2 diabetes Mellitus. Chun Wang, Clinical Endocrinology (2012) 76, 810–815 doi: 10.1111

Coefficient of Variability as a risk assessment and risk reduction metric

- %CV is not a stand alone metric for the diagnosis of prediabetes.
  - It is the glucose deviation around the mean glucose
- The wider the deviation (peaks and valleys illuminated by CGM) the more dysregulation of glucose response
- Reveals the glycemic data between the metrics of fasting plasma glucose (FPG) and 2 hour post meal glucose.
- DECODE study in subjects with impaired glucose postprandial hyperglycemia in multivariate analysis was a significant predictor of cardiovascular complications and all cause mortality.
- “In the future, integrated models of parameters of GV with HbA1c, FPG, and PPG may improve the risk prediction.”

Addition of CGM as a risk assessment, risk reduction tool

- Accurate risk assessment tools are needed to determine who is at greatest risk to progression to prediabetes and diabetes.
- HbA1c can be inaccurate in some minorities and some disease states (hemoglobinopathies, chronic kidney disease, anemia, and some medications).
- CGM allows real time glucose monitoring (it is a continuous interstitial plasma glucose tolerance test). CGM allows inter- and intra-day glucose fluctuations that may demonstrate the presence and severity of dysglycemia.
- CGM provides individualized lifestyle data regarding the effects of food (5), exercise (4), illness, stress, and allows for patients to participate in their own health improvement.

Continuous Glucose Monitoring As a Behavior Modification Tool

"The three pillars of diabetes management are diet, medication, and exercise; and all significantly affect glycemic control. What remains to be shown is how CGM can serve as an adjunct to and enhance these interventions."

"Overall, 90% of participants in our survey felt that they had adopted a healthy lifestyle after using CGM, and a high percentage of the participants who used CGM reported food changes such as white rice, cereals, sugared beverages, and increased physical activity, especially postprandially. "

Continuous Glucose Monitoring As a Behavior Modification Tool. Nicole Ehrhardt.

Clin Diabetes. 2020 Apr; 38(2): 126–131.

Identifying Prediabetes in clinical practice

- Screening for Prediabetes for at risk individuals (1)
  - Risk reduction 0% with no intervention
- Fasting glucose (2)
  - FPG missed 46.3% of all prediabetes
  - 42% of subjects developing abnormal FPG do not develop abnormal 2-hour plasma glucose
- A1c (7)
  - Between 5.5 and < 6.0% 5-year incidences 9 to 25%.
  - ≥ 6.0% 5-year risks ranging from 25 to 50% relative risks 20 times higher vs. A1C 5%.
- OGTT (75gram glucose test) (2)
  - 2 times more predictive than FPG prediabetes
  - Feasibility in 96 million people?
- New classification of Prediabetes using CGM and beyond.
  - Risk reduction currently unknown We are working on it!

Can you help your patients prevent diabetes?

Teaching

- Stories
- Examples
- Science
- Data (they are looking on the internet)
- Walking in their shoes

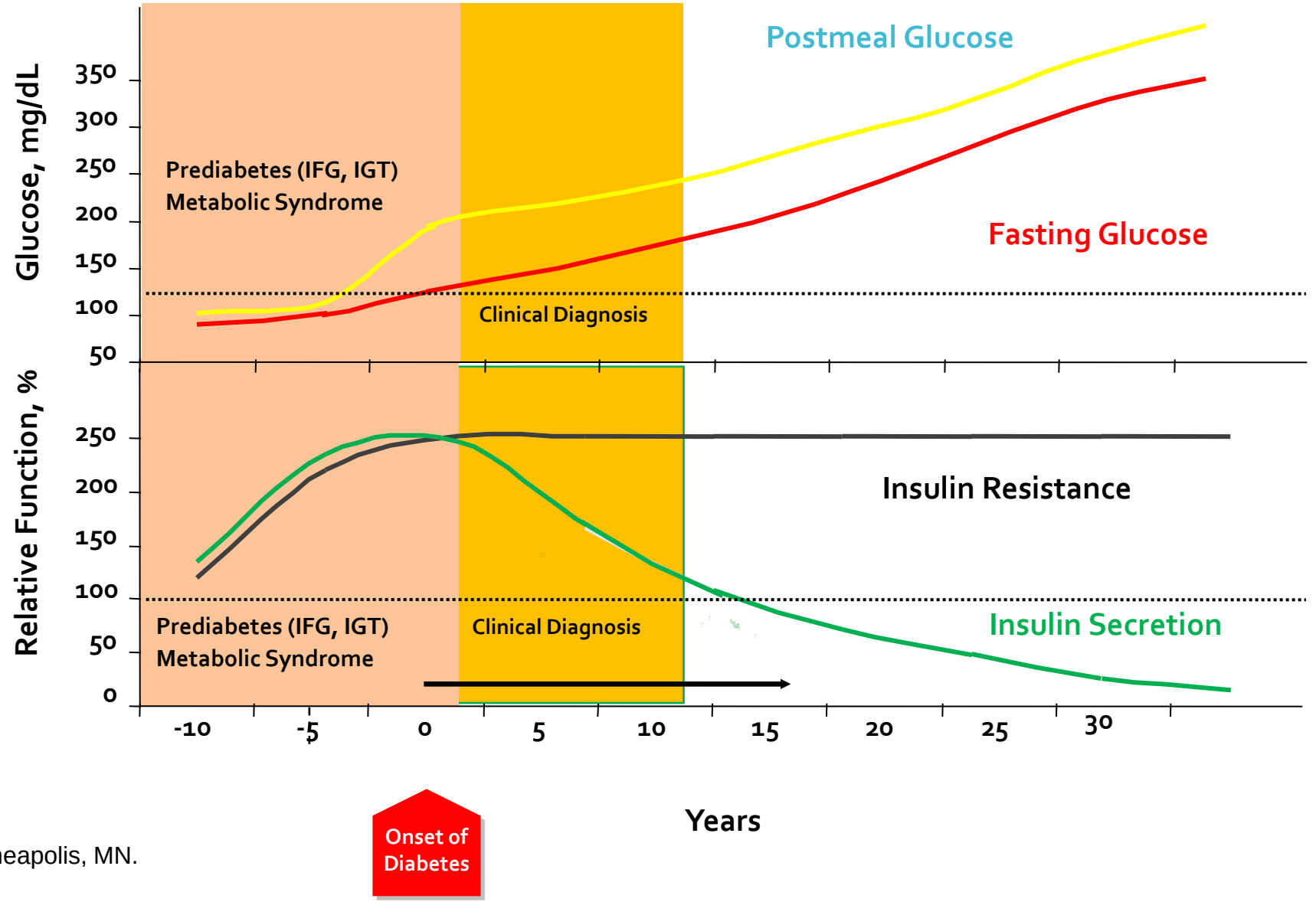
What is happening in the body in the prediabetes sate?

- Triumvirate
- 1987
- 3 core defects
- Liver: insulin resistance and over production in glucose during the sleeping hours leading to high fasting glucose.
- Muscle: insulin resistance
- Beta cell: early increased insulin secretion at first

Natural History of Type 2 Diabetes

IFG-impaired fasting glucose

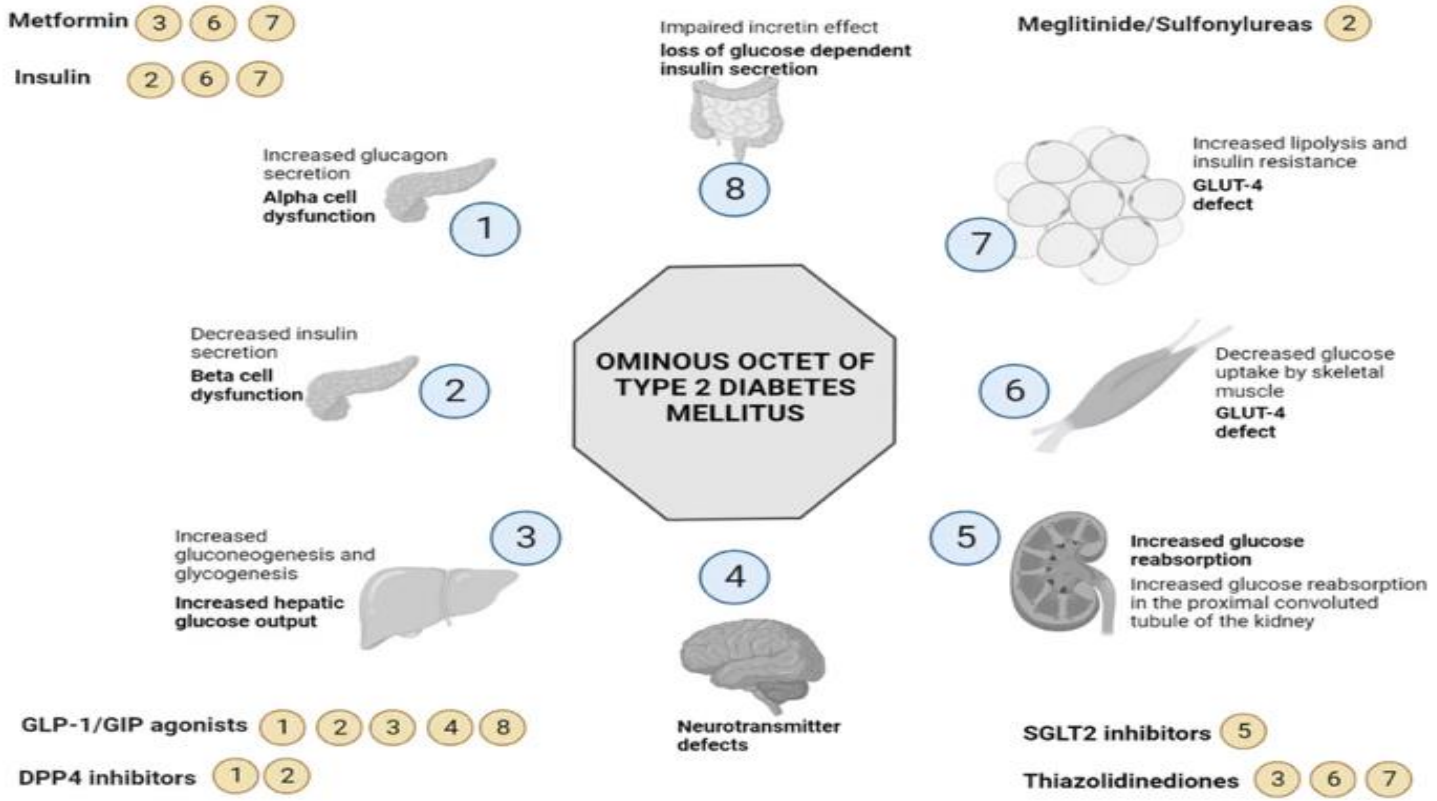
IGT-impaired glucose tolerance



Ominous Octet Ralph DeFronzo, MD

- *Impaired peripheral glucose uptake*
- *Increased glucagon secretion*
- *Increased insulin secretion then decreased insulin secretion*
- *Increased lipolysis*
- *Increased hepatic glucose production*
- *Decreased incretin effect*
- *Increased glucose reabsorption at the kidney*
- *Neurotranmitter dysfunction to the brain*

How do medications address these cellular dysfunction present in pre-diabetes and diabetes?



The Ominous Octet of Diabetes: The ever-evolving pathophysiology of diabetes mellitus. From the triumvirate to the Ominous Octet (and now the Egregious Eleven). The mechanism of action of various medications in diabetes care will be reviewed.

https://myendoconsult.com/learn/the-ominous-octet-of-t2dm-m-o-a/

Micro Macro Vascular

- Micro vascular disease
- Eye, Kidney, Nerve
- Diabetes is still the #1 cause of blindness,
- HTN and diabetes lead to CKD leading to dialysis,
- and 80% of lower leg amputation is a result of diabetes according to the CDC

- Macro vascular disease
- Diabetes doubles the risk of heart disease, CDC 2024

Tools

- What can we offer the prediabetic patient?

The DPP Research Trial

- Lifestyle intervention with a minimum of 7% weight loss
- 150 minutes/week of physical activity
- 16 weeks of lifestyle coaching
- 58% reduction in the development of type 2 diabetes

Centers for Disease Control and Prevention. Available from https://www.cdc.gov/diabetes/prevention/index.html. Accessed 9 January 2023

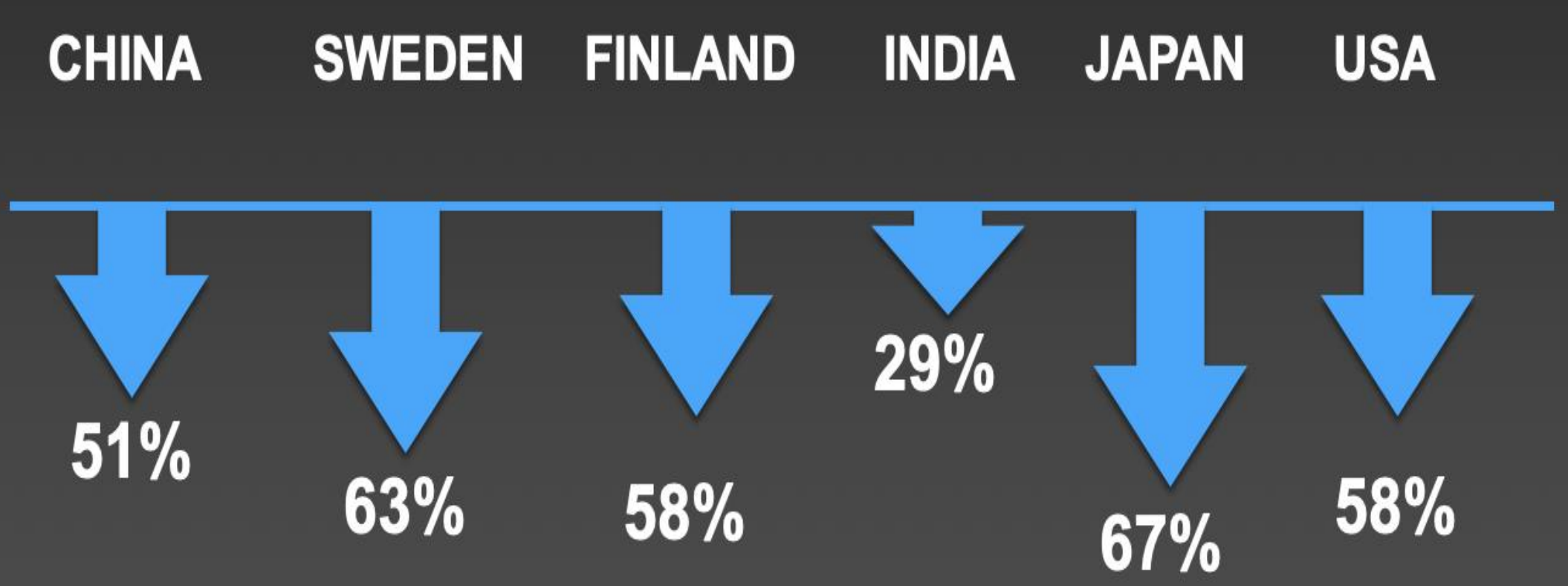
Over 60 had 71% reduction in risk.

Treatment: Lifestyle intervention Diabetes Prevention Program (DPP)

- The intervention involved a lifestyle change program focusing on calorie reduction and increasing physical activity to at least **150 minutes** per week.
- Results from the study showed that this structured lifestyle change program, in which participants achieved **weight loss of 5 to 7 percent of their body weight** (10 to 14 pounds for a person weighing 200 pounds), reduced the risk of developing type 2 diabetes by **58 percent** in adults at high risk for the disease.
- A **10-year follow-up study**, The Diabetes Prevention Program Outcomes Study, showed that participants were still **34% less** likely to develop type 2 diabetes a decade later than individuals who took a placebo. Those who did develop type 2 diabetes delayed the onset of the disease by about 4 years.

Research Behind the National DPP. CDC Dec 27th , 2022

Intensive lifestyle intervention



Graphic Used with Permission Leigh Perreault, MD
Associate Professor of Medicine Endocrinology, Metabolism and Diabetes University of Colorado Anschutz Medical Campus

Pan, Diabetes Care 1997; Erikson, Diabetologia 1991; Tuomilhelto, NEJM 2001; Ramachandran, , Diabetologia 2006; DPP, NEJM 2002

Consideration of Metformin

Metformin for the treatment of prediabetes is an off-label use, but well established.

- For women with a history of gestational diabetes metformin plus lifestyle reduced progression to type 2 diabetes by 50%.
- For patients <60 years of age with a BMI >35 kg/m^2.
- Start with 500–1,000 mg once daily for 1 month; if well tolerated, increase to 1,000 mg twice daily (many prefer to start low and go slow)
- Periodically monitor B12 levels
- When discussing the physiology of prediabetes and diabetes, inform patients that metformin addresses the dysfunctions seen in the Ominous Octet.

Knowler, WC, Barrett-Conner E, Fowler SE, et al.; Diabetes Prevention Program Research Group. N Engl J Med 2002;346:393-403

Medication	
Weight loss	Relative risk reduction Diabetes progression
Orlistat	**37%**
Phentermine/ topiramate	**79%**
Liraglutide	**69-80%**
Semaglutide	**60%**
Anti-hyperglycemic	
Metformin	**31%**
Acarbose	**25%**
Pioglitazone	**72%**
Dapagliflozin	**32%**
Semaglutide	**60%**
Liraglutide	**69-80%**
Tirzepatide	**95%**

Medications associated with weight loss for diabetes prevention

- Orlistat (37.3% reduction) Xendos Trial

  Diabetes Care 2004 Jan;27(1):155-61.doi: 10.2337/diacare.27.1.155.

- Phentermine/topiramate (79% reduction) SEQUEL Trial

  Am J Clin Nutr. 2012 Feb; 95(2): 297–308. Published online 2011 Dec 7.doi: 10.3945/ajcn.111.024927

- Liraglutide (69-80% reduction) Scale Study/ Leader Trial

  N Engl J Med 2016 Jul 28;375(4):311-22.doi:10.1056/NEJMoa1603827. Epub 2016 Jun 13

- Semaglutide (60% 10-year reduction) Step 1and 4 Trial

  JAMA 2021 Apr 13;325(14):1414-1425. doi: 10.1001/jama.2021.3224.

- Tirzepatide (more than 95% of those with prediabetes reverted to normoglycemia in the tirzepatide groups.)

  https://www.nejm.org/doi/full/10.1056/NEJMoa2206038

Diabetes medication risk reduction

Pioglitizone: 72% reduction in the ACT NOW Trial

Act Now trial BMC Endocr Disord 2009 Jul 29;9:17. doi: 10.1186/1472-6823-9-17.

Acarbose: 25% reduction STOP NIDDM Trial

Lancet 2002 Jun 15;359(9323):2072-7.doi: 10.1016/S0140-6736(02)08905-5.

SGLT2 inhibitors:

- **Dapagliflozin** 32% reduction Dapa HF Trial

N Engl J Med. 2019 Nov 21;381(21):1995-2008.doi:10.1056/NEJMoa1911303. Epub 2019 Sep 19.

- Prediabetes trial data lacking for other SGLT2 agents

Weight Reduction is Risk Reduction

- For every 1-kg weight loss in the DPP, there was a 16% reduction in progression to type 2 diabetes.
- Address obesity in prediabetes with medication when lifestyle change is not effective.
- A glucagon-like peptide 1 (GLP-1) receptor agonists can address both elevated glucose and weight; more research is needed to assess cardiovascular morbidity and mortality in prediabetes.
- When discussing the physiology of prediabetes and diabetes, inform patients that a GLP-1 receptor agonist can address dysfunctions such as increased weight and elevated glucose.

Effect of Weight Loss With Lifestyle Intervention on Risk of Diabetes; Richard F. Hamman, MD, DRPH et.al, DiabetesCare. 2006 Sep; 29(9): 2102–2107. doi: 10.2337/dc06-0560

Medications to consider for diabetes prevention.

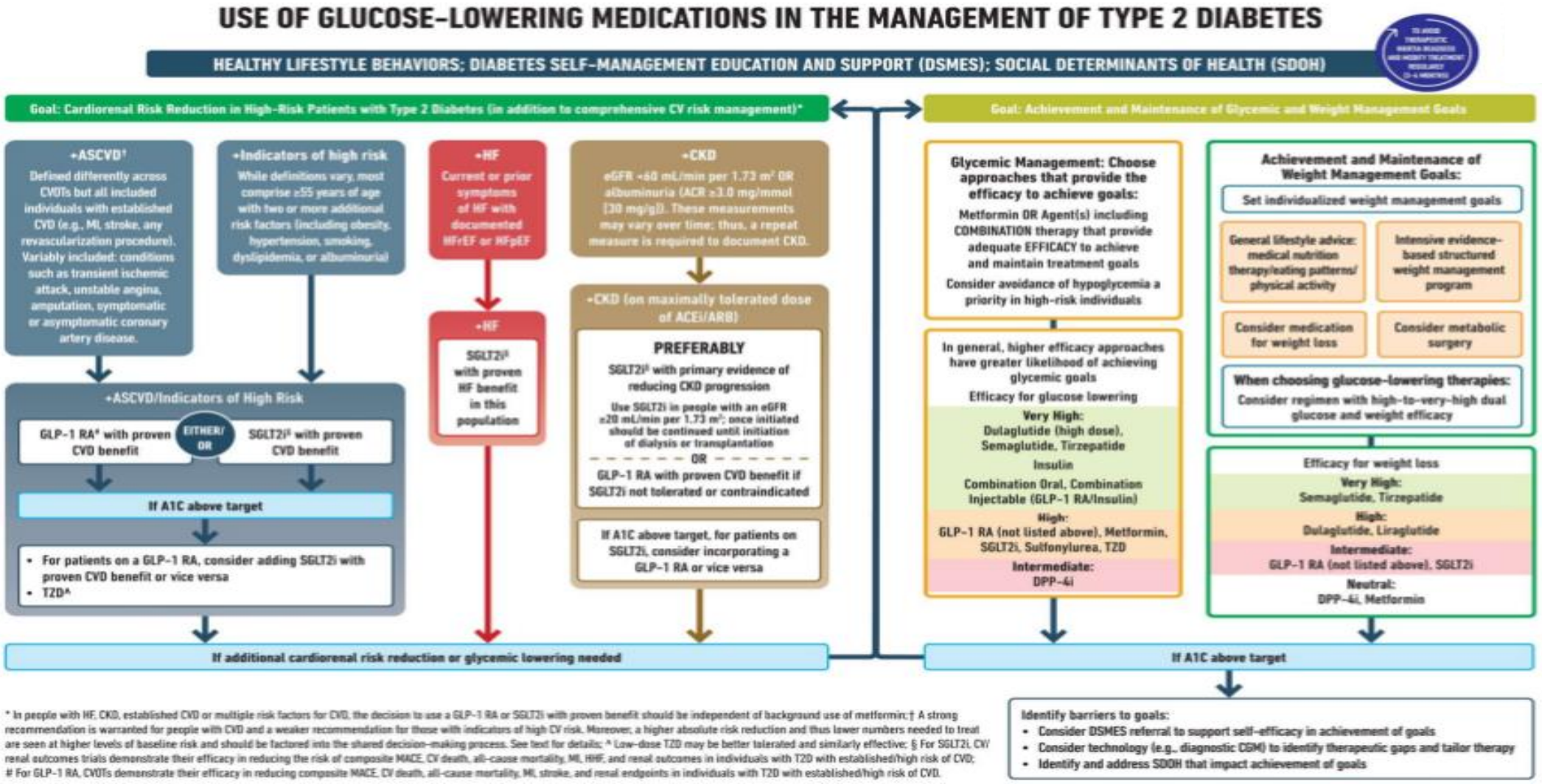
Currently, no medications are indicated by the FDA for the treatment of prediabetes.

However, based on the Diabetes Prevention Program (DPP) results, the ADA recommends lifestyle and **metformin**.

The American Association of Clinical Endocrinologists (AACE) and the International Diabetes Federation (IDF) also recommend **pioglitazone** and **GLP-1 Ra's** (The efficacy of GLP-1 RAs in preventing T2D in people with prediabetes was confirmed in the STEP trial)

Similarly, **tirzepatide** in the SURMOUNT trial delayed or prevented progression to T2D and even promoted reversion to normoglycemia.

Stage 2 Late Prediabetes Intervention



ADA Standards of Care 2023

Bariatric Surgery and risk reduction

- 91% of patients attained normal glycemic status at one year after bariatric surgery. At the three-year follow-up, 87.5% of the patients maintained normoglycemia.
- None of the patients developed T2DM after surgery. 26.9% of patients achieved absolute weight loss at one year after bariatric surgery and maintained this at two and three years post surgery ($p < 0.001$ vs. baseline)
- The procedures commonly used include Roux-en-Y gastric bypass, Laparoscopic adjustable gastric banding, Sleeve gastrectomy, and Duodenal switch with biliopancreatic diversion.
- In the Swedish Obese Subject, bariatric surgery was found to result in sustained weight loss (23.4% at 2 years and 16.1% at 10 years) and a 75% relative risk reduction of diabetes compared to controls

Effectiveness of bariatric surgery in diabetes prevention in high-risk Asian individuals Phong Ching Lee, Singapore Med J. 2018 Sep; 59(9): 472–475.

Swedish Obese Subjects Study Scientific Group Lifestyle, diabetes, and cardiovascular risk factors 10 years after bariatric surgery. Sjöström L N Engl J Med. 2004;**351**:2683–2693**.**

Prediabetes classification, stages, and treatment.

Stage 1 Early Prediabetes (early diabetes stage 1)

- Lifestyle Intervention: healthy diet, exercise
- Weight loss ≥7%
- CGM for risk assessment and risk reduction
- Address other chronic disease, example: obesity

Stage 2 Late Prediabetes (early diabetes stage 2)

- Lifestyle Intervention: healthy diet, exercise
- Weight loss ≥7-10%
- CGM for risk assessment and risk reduction
- Treat glycemic state using the ADA's guidelines for the use of glucose-lowering medications or weight reduction treatments

Opportunity for Impact

A call to action!

Increase	Increase prediabetes screenings by health care providers and community groups.
Implement	Implement a plan that 50% within 5 years of those who meet the criteria of prediabetes will be informed and empowered to understand how they can prevent progression to diabetes.
Improve	Improve diagnoses, risk assessment, risk reduction tools and therapies for prevention.
Develop	Develop new consensus recommendations for the treatment of prediabetes to overcome the therapeutic inertia surrounding this condition.

Core References for Prediabetes New Classification System

1.Screening for Prediabetes and Type 2 Diabetes Mellitus. Neda Laiteerapong, MD, MS JAMA. 2016 February 16; 315(7): 697–698. doi:10.1001/jama.2015.17545

2. Prevalence and phenotype of diabetes and prediabetes using fasting glucose vs HbA1c in a Caribbean population. Nigel Unwin J Glob Health. 2017 Dec;7(2):020407.

3. Detecting Prediabetes and Diabetes: Agreement between Fasting Plasma Glucose and Oral Glucose Tolerance Test in Thai Adults. Wichai Aekplakorn, J Diabetes Res. 2015; 2015: 396505

4.Differences in Glycemic Variability Between Normoglycemic and Prediabetic Subjects Markolf Hanefeld, MD, PhD Journal of Diabetes Science and Technology 2014, Vol. 8(2) 286–290

Core References for Prediabetes New Classification System

5. Self-Monitoring Using Continuous Glucose Monitors with Real-Time Feedback Improves Exercise Adherence in Individuals with Impaired Blood Glucose: A Pilot Study Kaitlyn J Bailey Diabetes Technol Ther. 2016 Mar;18(3):185-93.doi: 10.1089/dia.2015.0285.

6. Continuous Glucose Monitoring As a Behavior Modification Tool. Nicole Ehrhardt Clin Diabetes. 2020 Apr; 38(2): 126–131.

7. A1C Level and Future Risk of Diabetes: A Systematic Review. XUANPING ZHANG, PHD DIABETES CARE, VOLUME 33, NUMBER 7, JULY 2010

8. Glucose fluctuations in subjects with normal glucose tolerance, impaired glucose regulation and newly diagnosed type 2 diabetes Mellitus. Chun Wang, Clinical Endocrinology (2012) 76, 810–815 doi: 10.1111

9. Abnormal Glycemic Profiles by CGMS in Obese First-Degree Relatives of Type 2 Diabetes Mellitus Patients. Sri Venkata Madhu, MD, DM DIABETES TECHNOLOGY & THERAPEUTICS Volume 15, Number 6, 2013