

Screening and Diagnosis of Diabetes

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Disclosures

- PI/SubPI on many clinical trials at Altru Health System, Grand Forks, ND
- Speakers Bureau Novo Nordisk
- Speakers Bureau Medtronic
- Advisory Board Sanofi
- Advisory Board Novo Nordisk
- American Diabetes Association speaker
- I have type 1 diabetes and use insulin



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Objectives

- Overview of diabetes
- Understand appropriate screening for and diagnosis of diabetes
- Know different types of diabetes
- Incorporate referral for diabetes prevention into practice



Diabetes In America

- 30 million have diabetes
(about 90% are type 2)
- Expect about 1/3 of population to have diabetes by 2050
- Over a million new cases per year
- 86 million have prediabetes
- Racial/ethnic/geographic disparities



Diabetes in North Dakota

- Over 200,000 people in North Dakota have prediabetes, many probably don't know they have it
- About 55,000-65,000 people in North Dakota have diabetes 8-11% of the population
- Direct Medical Costs \$455 million

American Diabetes Association

<http://main.diabetes.org/dorg/PDFs/Advocacy/burden-of-diabetes/north-dakota.pdf>

North Dakota Diabetes Prevention and Control Program

<http://www.diabetesnd.org/>



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Diabetes Mellitus

- Type 1: Usually younger, insulin at diagnosis
- Type 2: Usually older, often oral agents at diagnosis
- Type "1.5" (Latent Autoimmune) mixed features ~10% of type 2
- Gestational: Diabetes of Pregnancy



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Diabetes Risk and Prevention

Risk:

- Type 1- mostly unknown, some familial
- Type 2- obesity, smoking, sedentary lifestyle, familial

Prevention:

- Type 1- none known
- Type 2- lifestyle management



Diabetes Guideline Management

- 2 main sets of guidelines utilized in U.S.
- American Diabetes Association (ADA)
- American Association of Clinical Endocrinology (AACE)
- Lots of overlap, AACE considered
“more intense”



Avoiding Diabetes Complications

- Blood glucose control A1C <7%
- Treat Lipids with appropriately dosed statin based on risk and age
- Treat blood pressure to target <140/<90
- Don't get diabetes
- Appropriate Lifestyle Intervention

For most non-pregnant adults

American Diabetes Association 2017



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Screening For Diabetes



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Risk factors for Prediabetes and T2D

- A1C \geq 5.7% (39 mmol/mol), IGT, or IFG on previous testing
- first-degree relative with diabetes
- high-risk race/ethnicity (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
- women who were diagnosed with GDM
- history of CVD
- hypertension (\geq 140/90 mmHg or on therapy for hypertension)
- HDL cholesterol level $<$ 35 mg/dL (0.90 mmol/L) and/or a triglyceride level $>$ 250 mg/dL (2.82 mmol/L)
- women with polycystic ovary syndrome
- physical inactivity
- other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans).

<https://diabetes.org/diabetes-risk>

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Screening For Diabetes

- A1C or FPG or 75 g oral GTT
- Testing should be considered in all adults who are overweight (BMI \geq 25 kg/m²) and who have one or more additional risk factors for diabetes
- Everyone starting at age 45
- Diabetes Risk Test
- <http://www.diabetesnd.org/diabetes-prevention/>



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Type 2 Diabetes Screening in Children/Adolescents

- Overweight
 - BMI >85th percentile
 - weight for height >85th percentile
 - weight >120% of ideal for height
- Plus similar risk factors for adults



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Diabetes Diagnosis

Category	FPG (mg/dL)	2h 75gOGTT	A1C
Normal	<100	<140	<5.7
Prediabetes	100-125	140-199	5.7-6.4
Diabetes	≥126**	≥200	≥6.5

Or patients with classic hyperglycemic symptoms with plasma glucose ≥200

** On 2 separate occasions

Diabetes Care 41 :Supplement 1, 2014



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Type 1 Diagnosis

- Usually very symptomatic
- Weight loss, polyuria, polydipsia
- May seem flu-like
- Often significant blood glucose elevation
- Blood and urine ketones
- Not necessarily young



Gestational Diabetes (GDM)

- Screen for **type 2 diabetes** first prenatal visit if risk factors
- Not known to have diabetes, screen for GDM at 24 –28 weeks of gestation
- Screen women with GDM for persistent diabetes 6–12 weeks postpartum
 - (A1C not recommended here, as treated in pregnancy)
- Women with a history of GDM lifelong screening for diabetes
 - (up to **7x** higher risk than non-GDM)
- 1 step or 2 step testing



Gestational Diabetes and Type 2 Diabetes Risk

- Gestational Diabetes should be considered a pre-diabetes condition
- Women with gestational diabetes have a 7-fold future risk of type 2 diabetes vs. women with normoglycemic pregnancy
- 35-60% go on to have DM

Lancet, 2009, 373(9677): 1773-9



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Why Is Prediabetes Important?

- Almost 80 million people have prediabetes
- Blood sugars are abnormal, but not high enough to be diagnosed with diabetes
- Lifestyle can **prevent over half** of prediabetes cases converting to type 2 diabetes (and the complications that go with it!)
- 150 minutes of exercise/week, weight loss of 5-7%



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Evidence Supporting Diabetes Prevention

- Finnish Diabetes Prevention Study (DPS)
N Engl J Med 2001; 344:1343-1350
<https://www.nejm.org/doi/full/10.1056/NEJM200105033441801>
- Diabetes Prevention Program (DPP)
N Engl J Med 2002; 346:393-403
<https://www.nejm.org/doi/full/10.1056/NEJMoa012512>



Diabetes Prevention Program

- Community based or health system based, some employers
- Find DPP in your area here:
<http://www.diabetesnd.org/diabetes-prevention/>



Medications for Diabetes Prevention

- Metformin is only indicated medication
- Metformin therapy for prevention of type 2 diabetes should be considered in those with:
 - Prediabetes, especially for those with BMI ≥ 35 kg/m²
 - <60 years of age
 - Women with prior gestational diabetes mellitus

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Case

- 33 y/o female with GDM in 2nd pregnancy (diagnosed with 2 step method), healthy baby boy 10 lbs 2 oz
- BMI 29
- Normoglycemic (blood glucose 90) at 6 week post-partum check
- Now what?



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Case

- GDM is a prediabetes condition
- Needs at least annual followup
- Women diagnosed with GDM should receive lifelong screening for prediabetes and type 2 diabetes

Diabetes Care 2019 Jan; 42(Supplement 1): S1-S2.



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Case

- Lost to followup
- Seen 3 years later for annual exam
- BMI 33
- Fasting blood glucose 118

Now what?



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Case

- This patient has prediabetes
- Should have a discussion and referral to a diabetes prevention program
- Could consider metformin



Summary

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