Learning Objectives

- Identify why discussing cardiometabolic risk (CMR) factors with patients with or at risk for prediabetes and type 2 diabetes can positively impact their health
- Implement screening strategies to promote early detection and prevention
- Discuss with patients how preventing risk factors can positively impact health
- List risk factor treatment options and define goals of treatment
The State of Risk

- 2 out of 3 Americans are overweight or obese
- There are an estimated 86 million Americans with prediabetes
- Nearly 1 in 2 U.S. adults has high cholesterol
- 1 in 3 American adults has high blood pressure
Number and Percentage of U.S. Population with Diagnosed Diabetes 1958–2010

Percentage with Diabetes
Number with Diabetes

Year
Number with Diabetes (Millions)
Percentage with Diabetes

American Diabetes Association
CDC’s Division of Diabetes Translation. National Diabetes Surveillance System.
Heart Disease Facts

- 1 in 6 deaths each year in the U.S. is from heart disease.
- Heart disease is the leading cause of death for men and women.
- 715,000 Americans have a heart attack each year.
  - 525,000 are a first heart attack.
  - 190,000 happen in people who have already had a heart attack.
Cardiometabolic Risk

Overweight/Obesity

Genetics → Insulin Resistance Syndrome → Lipids ↑, BP ↑, Glucose ↑

Age → Insulin Resistance

Insulin Resistance Syndrome

Abnormal Lipid Metabolism
- LDL ↑
- ApoB ↑
- HDL ↓
- Triglycerides ↑

Global Diabetes/CVD Risk

Age, Race, Gender, Family History

Smoking, Physical Inactivity, Unhealthy Eating

Hypertension

Inflammation, Hypercoagulation
Cardiometabolic Risk Factors

Non-Modifiable
- Age
- Race/ethnicity
- Gender
- Family history

Modifiable
- Overweight
- Abnormal lipid metabolism
- Inflammation
- Hypertension
- Smoking
- Physical inactivity
- Unhealthy diet
- Insulin resistance
Diabetes = CVD Risk

More recent studies suggest that this is perhaps only true for those with fairly long-standing diabetes – duration over ten years.

What Are We to Do?

Current approaches for CVD risk management

1) Screen for diabetes and its co-morbidities
2) Manage lipids, blood pressure, glucose, and tobacco in everyone
3) Aspirin therapy for selected individuals
Screening For Diabetes

Testing at least every 3 yrs starting at age 45

<table>
<thead>
<tr>
<th>Test</th>
<th>Prediabetes</th>
<th>Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>FPG</td>
<td>100-125 mg/dL</td>
<td>≥126 mg/dL</td>
</tr>
<tr>
<td>OGTT</td>
<td>140-199 mg/dL</td>
<td>≥200 mg/dL</td>
</tr>
<tr>
<td>A1C</td>
<td>5.7-6.4%</td>
<td>≥6.5%</td>
</tr>
</tbody>
</table>

Younger/More Frequent Testing

If patient is overweight or obese and has 1 or more of the following risk factors (or 2 if not overweight):

- 1st degree relative with diabetes
- Physically inactive
- Certain race/ethnicity
- Elevated blood glucose
- Hypertension
- Low HDL cholesterol and/or high triglyceride level
- History of GDM
- Delivering baby weighing >9 lbs
- Polycystic ovary syndrome (PCOS)

Intervention and Follow-Up

Screen for Diabetes:
- A1C - or -
- FPG – or -
- 2-hour, 75-g OGTT

- A1C ≥ 5.7% IFG or IGT
  - Lifestyle intervention, follow-up @1 year

- A1C ≥ 6.0% IFG and IGT + Other Features
  - Lifestyle intervention and/or metformin, follow-up @6 mo

- Re-evaluate in 3 years if risk factors remain
  - DIABETES

Normal

METFORMIN IS NOT FDA APPROVED FOR PREVENTION

Prediabetes is an important risk factor for future diabetes and cardiovascular disease.

Studies have shown that lifestyle modification can reduce the rate of progression from prediabetes to diabetes.
Diabetes Prevention Program

Cumulative Incidence of Diabetes (%)

Placebo
Metformin
Lifestyle

Lifestyle Modification

- Lose 7% of body weight
- Reduce calories and dietary fat
- Achieve USDA recommendations for dietary fiber and whole grains
- Limit intake of sugar-sweetened beverages

Lifestyle Modification

- Fit physical activity into daily routine
- Aim for at least 150 minutes/week of moderate aerobic exercise
- Start slowly and gradually build intensity
- Wear a pedometer (10,000 steps)
- Encourage patients to take stairs, park further away or walk to another bus stop, etc.
Benefits of Physical Activity

- Increased insulin sensitivity
- Improved lipid levels
- Lower blood pressure
- Weight control
- Improved blood glucose control
- Reduced risk of CVD
- Prevent/delay type 2 diabetes
Statins reduce coronary events

Diabetic Patients

- Placebo: 45
- Simvastatin: 23

55% Risk Reduction

Nondiabetic Patients

- Placebo: 27
- Simvastatin: 19

32% Risk Reduction

Patients With Major Coronary Event (%)

n=202

n=4242

*CHD death or nonfatal MI

Lipid Management

Screening for Adults

- Time of first diagnosis;
- At initial medical evaluation; and/or
- At age 40 years and every 1-2 years thereafter
Intensify lifestyle therapy and optimize glycemic control in patients with:

- Triglycerides $\geq 150$ mg/dL; and/or
- Low HDL cholesterol
  - $<40$ mg/dL for men
  - $<50$ mg/dL for women
# Statin Therapy

<table>
<thead>
<tr>
<th>Age</th>
<th>Risk factors</th>
<th>Recommended statin dose*</th>
<th>Monitoring with lipid panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;40 years</td>
<td>None</td>
<td>None</td>
<td>Annually or as needed to monitor adherence</td>
</tr>
<tr>
<td></td>
<td>CVD risk factor(s)**</td>
<td>Moderate or high</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overt CVD***</td>
<td>High</td>
<td></td>
</tr>
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* With lifestyle therapy  ** LDL ≥100 mg/dL, ↑BP, smoking, overweight, obesity  *** Those with previous CV events or acute coronary syndromes
## Statin Therapy

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<th>Recommended statin dose*</th>
<th>Monitoring with lipid panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-75 years</td>
<td>None</td>
<td>Moderate</td>
<td>As needed to monitor adherence</td>
</tr>
<tr>
<td></td>
<td>CVD risk factor(s)**</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overt CVD***</td>
<td>High</td>
<td></td>
</tr>
</tbody>
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# Statin Therapy

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<th>Risk factors</th>
<th>Recommended statin dose*</th>
<th>Monitoring with lipid panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 75 years</td>
<td>None</td>
<td>Moderate</td>
<td>As needed to monitor adherence</td>
</tr>
<tr>
<td></td>
<td>CVD risk factor(s)***</td>
<td>Moderate to high</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overt CVD***</td>
<td>High</td>
<td></td>
</tr>
</tbody>
</table>

* With lifestyle therapy  ** LDL ≥100 mg/dL, ↑BP, smoking, overweight, obesity  *** Those with previous CV events or acute coronary syndromes
Tight blood pressure control (144/82 mmHg) lead to:

- 32% reduction in diabetes deaths
- 44% reduction in stroke
- 37% reduction in microvascular complications
Hypertension

Goals for people with diabetes and hypertension

- Lower targets (<130 mmHg, <80 mmHG) may be appropriate for certain individuals (younger patients) if it can be achieved without undue treatment burden.

<table>
<thead>
<tr>
<th>Blood Pressure</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic</td>
<td>&lt;140 mmHg</td>
</tr>
<tr>
<td>Diastolic</td>
<td>&lt;90 mmHg</td>
</tr>
</tbody>
</table>

Lifestyle therapy + prompt initiation/timely titration of drugs to achieve goals.

- Include ACE inhibitor or an angiotensin receptor blocker (ARB).
- Multiple-drug therapy (2 or more agents at maximal doses) is generally required.
- Administer 1 or more antihypertensive medications at bedtime.
**UKPDS: “Legacy Effect”**

**After median 8.8 years post-trial follow-up**

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>1997</th>
<th>2007</th>
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</thead>
<tbody>
<tr>
<td>Aggregate Endpoint</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any diabetes related endpoint</td>
<td>RRR:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12%</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td><em>P</em>:</td>
<td>0.029</td>
</tr>
<tr>
<td>Microvascular disease</td>
<td>RRR:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25%</td>
<td>24%</td>
</tr>
<tr>
<td></td>
<td><em>P</em>:</td>
<td>0.009</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>RRR:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16%</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td><em>P</em>:</td>
<td>0.052</td>
</tr>
<tr>
<td>All-cause mortality</td>
<td>RRR:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6%</td>
<td>13%</td>
</tr>
<tr>
<td></td>
<td><em>P</em>:</td>
<td>0.44</td>
</tr>
</tbody>
</table>

RRR = Relative Risk Reduction

*P* = Log Rank

# ACCORD: Exploring lower targets

<table>
<thead>
<tr>
<th>Three randomizations</th>
<th>Three results</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1C target &lt;6% vs 7-8%</td>
<td>More intensive glycemic control</td>
</tr>
<tr>
<td></td>
<td>• microvascular benefit</td>
</tr>
<tr>
<td></td>
<td>• no CVD benefit</td>
</tr>
<tr>
<td></td>
<td>• Increased mortality</td>
</tr>
<tr>
<td>SBP &lt;140 mmHg vs 120-130 mmHg</td>
<td>More intensive BP control</td>
</tr>
<tr>
<td></td>
<td>• no CVD benefit</td>
</tr>
<tr>
<td></td>
<td>• less stroke</td>
</tr>
<tr>
<td>Statin to get LDL to goal plus either fenofibrate or placebo</td>
<td>Fibrate plus statin</td>
</tr>
<tr>
<td></td>
<td>• no CVD benefit</td>
</tr>
<tr>
<td></td>
<td>• microvascular benefit</td>
</tr>
</tbody>
</table>
### Individualized Glycemic Targets

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A1C</strong></td>
<td>&lt;7.0%</td>
</tr>
<tr>
<td>Preprandial plasma</td>
<td>80 - 130 mg /dL</td>
</tr>
<tr>
<td>glucose</td>
<td></td>
</tr>
<tr>
<td>Peak postprandial</td>
<td>&lt; 180 mg /dL</td>
</tr>
<tr>
<td>plasma glucose</td>
<td></td>
</tr>
</tbody>
</table>

More or less stringent goals may be appropriate for individual patients.
Antiplatelet therapy reduces CV events in high-risk patients

**Diabetic Patients**
- Placebo: 22.3%
- Antiplatelet: 18.5%
  - 17% Risk Reduction

**Nondiabetic Patients**
- Placebo: 16.4%
- Antiplatelet: 12.8%
  - 25% Risk Reduction

*P*<0.0001, *n>*100,000

Aspirin Therapy

- Primary prevention strategy in those with increased cardiovascular risk who have at least one additional major risk factor
  - most men aged >50 years
  - most women aged >60 years
- Secondary prevention strategy in those with diabetes with a history of CVD.
- 75–162 mg/day

Is the smoker willing to quit?

If “No” discuss:
- The need to stop
- The risks of continued use
- Support when ready

If yes, assess preference for:
- Minimal counseling
- Brief counseling
- Intensive counseling
Summary

- Routinely assess patients’ CMR
- Recommend multiple prevention and management strategies to achieve goals
  - Lifestyle
  - Other appropriate treatments
- Evaluate patients with CMR for other risk factors
- Discuss risk for diabetes, heart disease and stroke – and – benefits of prevention
Standards of Medical Care

An update of Standards of Medical Care in Diabetes appears annually in the January supplement of the journal *Diabetes Care*

Care.DiabetesJournals.org
Continuing Education

Online self assessments, webcasts and in-person education opportunities:

Professional.Diabetes.org/ce
Patient Education Materials

1) Free, reproducible patient handouts in English and Spanish
   diabetes.org/toolkit

2) Diabetes Risk Test
   diabetes.org/risktest

3) My Health Advisor – 8 and 10 year CMR calculator
   diabetes.org/MHA