Welcomes You To

THE CONVERGENCE OF
TYPE 2 DIABETES &
CARDIOVASCULAR DISEASE
Acknowledgments

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Takeda

Additional support is provided through an educational grant from:

Sanofi Aventis
Presenter Disclosure Information

Alan Zajarias, M.D., F.A.C.C.
The following relationships exist related to this presentation:

Nothing to disclose
Cardiovascular disease and diabetes are closely related and as a result, the ACC is conducting a large initiative over the next two years to increase this awareness and to provide further education to medical professionals.
Learner Objectives

The overall goal of this program is to enhance participants’ competence by providing the most up-to-date information on the correlation of type 2 diabetes and cardiovascular disease.

Upon completion of this program, attendees should be able to —

- Describe the prevalence of CV disease in patients with diabetes
- Identify patients with known diabetes and those at risk for diabetes, who are at significantly increased risk for CV disease based on the most current screening and treatment guidelines
- Apply modifiable and controllable risk factor strategies in the daily management of patients with diabetes and/or CV disease, to achieve evidence-based optimal outcomes
Obesity Trends* Among U.S. Adults:
BRFSS - 1985

(*BMI ≥30, or ~ 30 lbs overweight for 5’4” woman)

(*BMI ≥30, or ~ 30 lbs overweight for 5’4″ woman)
Obesity Trends* Among U.S. Adults: BRFSS - 1997

(*BMI ≥30, or ~ 30 lbs overweight for 5’4” woman)

No Data  <10%  10%-14%  15%-19%  20%-24%  25%-29%  ≥30%
Obesity Trends* Among U.S. Adults:
BRFSS - 2001

(*BMI ≥30, or ~ 30 lbs overweight for 5’4” woman)

Obesity Trends* Among U.S. Adults: BRFSS - 2008

(*BMI ≥30, or ~ 30 lbs overweight for 5’4” woman)
Abdominal Adiposity Is Associated With Increased Risk of Diabetes

P value for trend <0.001

Abdominal Adiposity Is Associated With Increased Risk of CV Events

Diabetes: A Growing Challenge
Prevalence in the United States

Centers for Disease Control and Prevention, Division of Diabetes Translation.
Diagnosed Diabetes in the US: 2008

CDC BRFSS: Self-Reported Diabetes: 8.2% Nationwide

http://apps.nccd.cdc.gov/brfss/list.asp?cat=DB&yr=2008&qkey=1363&state=All
Age-Adjusted Prevalence of Physician-Diagnosed Diabetes in Adults Age 18 and Older by Race/Ethnicity and Sex

Patient Beliefs About Diabetes Risks

ACC/ADA Diabetes Knowledge Survey (n=2008)

- Blindness
- Amputation
- CAD
- MI
- Stroke
- No CV risk

Diabetes and CVD

• Atherosclerotic complications responsible for
  – 80% of mortality among patients with diabetes
  – 75% of cases due to coronary artery disease (CAD)
  – Results in >75% of all hospitalizations for diabetic complications

• 50% of patients with type 2 diabetes have preexisting CAD. (This number may be less now that more younger people are diagnosed with diabetes.)

• 1/3 of patients presenting with myocardial infarction have undiagnosed diabetes mellitus

Lewis GF. Can J Cardiol. 1995;11(suppl C):24C-28C
The Continuum of CV Risk in Type 2 Diabetes

Diabetes Mellitus: A Cardiovascular Disease

United Kingdom Prospective Diabetes Study (n=3867)

Age-Adjusted CVD Death Rates (MRFIT)

CVD=cardiovascular disease
MRFIT=Multiple risk factor intervention trial

Type 2 Diabetes and CHD
7-Year Incidence of Fatal/Nonfatal MI
(East West Study)

CHD=coronary heart disease; MI=myocardial infarction; DM=diabetes mellitus

Cardiovascular Disease (CVD) and Total Mortality: U.S. Men and Women Ages 30-74

(Risk-factor Adjusted Cox Regression) NHANES II Follow-up (n=6255)

- CHD Mortality
- CVD Mortality
- Total Mortality

Relative Risk

- None
- MetS
- Diabetes
- CVD
- CVD+Diabetes

* p<.05, ** p<.01, **** p<.0001 compared to none

Nurses’ Health Study: Elevated Risk of CVD Prior to Clinical Diagnosis of Type 2 Diabetes

Under-Treatment of Cardiovascular Risk Factors Among U.S. Adults with Diabetes

Summary

• Prevalence of obesity is increasing
• The number of patients with diabetes is increasing
• There is increased mortality and morbidity associated with diabetes
  – Primarily attributable to cardiovascular disease
• Patients with diabetes underestimate the risk of the disease
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A1c Target
Aspirin Daily

• A1c Target: Glucose lowering to achieve normal to near normal plasma glucose, as defined by the HbA1c <7%

• Aspirin Daily: Secondary prevention or primary prevention in higher risk patients with diabetes
CAD Event Risk vs. Fasting Glucose (CARE)

CAD=coronary artery disease; CARE=Cholesterol and Recurrent Events trial.

CV Mortality vs. FBG: 22-Year Follow-Up

FBG=fasting blood glucose

Adapted with permission from Bjornholt JV et al. Diabetes Care. 1999;22:45-49.
Type 2 Diabetes: A1C Predicts CHD

CHD Mortality Incidence (% in 3.5 Years)

- Low (<6%)
- Middle (6-7.9%)
- High (>7.9%)

All CHD Events Incidence (% in 3.5 Years)

- Low (<6%)
- Middle (6-7.9%)
- High (>7.9%)

A1C = hemoglobin A1C

*P < 0.01 vs lowest tertile

**P < 0.05 vs lowest tertile

Adapted with permission from Kuusisto J et al. Diabetes. 1994;43:960-967.
Impact of Glycemic Control on Clinical Outcomes

• Proven efficacy for microvascular complications

• Uncertain effects on cardiovascular outcomes
  – Most trials to date not designed nor powered to assess CVD effects
Impact of Glycemic Control on Cardiovascular Outcomes

- UGDP: n=414, Follow-up: 13 yrs, CV death: 62
- Kumamoto: n=110, Follow-up: 8 yrs, MACE: 10
- VACSDM: n=153, Follow-up: MACE 2 yrs, MACE 40
- UKPDS: n=3867, Follow-up: MI 10 yrs, CV death: 595
- UKPDS: n=3867, Follow-up: CVA 10 yrs, CVA: 216
- EDIC*: n=1182, Follow-up: CV death/MI/CVA 17 yrs, 36 endpoints

Endpoints:
- MI (Myocardial Infarction)
- MACE (Mortality, Amputation, Stroke, and Congestive Heart Failure)
- CV death (Cardiovascular death)

Over 10 years, HbA$_{1c}$ was 7.0% (6.2-8.2) in the intensive group (n=2,729) compared with 7.9% (6.9-8.8) in the conventional group (n=1,138).
UKPDS Metformin Sub-Study: CHD Events

Myocardial Infarction

- Incidence Per 1000 Patient Years
- Conventional Diet: n=411, #Events=73
- Insulin SU’s: n=951, #Events=139
- Metformin: n=342, #Events=39
- Reduction: p=0.01, 39%

Coronary Deaths

- Incidence Per 1000 Patient Years
- Conventional Diet: n=411, #Events=36
- Metformin: n=342, #Events=16
- Reduction: p=0.02, 50%

CV Effects of Glucose Control in Recent Large-Scale Trials

Events (n): 358 vs. 301    371 vs. 352    590 vs. 557    264 vs. 235    319 vs. 678    126 vs. 81
RRR   0.9    0.9    0.94    0.88    0.85    0.67
95% CI 0.8-1.02 0.78-1.04 0.84-1.06 0.74-1.05 0.74-0.97 0.51-0.89

Goal of A1c<7% remains reasonable
  - for uncomplicated patients
    • ACC/AHA Class I (A)
  - and for those with macrovascular disease
    • ADA Level B; ACC/AHA Class IIb (A)

Incremental microvascular benefit may be obtained from even lower goals
  • ADA Level B; ACC/AHA Class IIa (C)

Less stringent goals may be appropriate for those with labile glucose control or with advanced micro- or macrovascular disease
  • ADA Level C; ACC/AHA Class IIa (C)
A1c Target
Aspirin Daily

• A1c Target: Glucose lowering to achieve normal to near normal plasma glucose, as defined by the HbA1c <7%

• Aspirin Daily: Secondary prevention or primary prevention in higher risk patients with diabetes
Aspirin Therapy

• Aspirin therapy 75-162 mg for secondary prevention in patients with diabetes with CVD
• Aspirin therapy 75-162 mg for type 1 or type 2 at increased CV risk (10 year risk > 10%)
  – Men > 50 or women > 60 and
    • Family History
    • Hypertension
    • Smoker
    • Dyslipidemia
    • Albuminuria

American Diabetes Association. *Diabetes Care*. 2010:32 (suppl 1) pgS11-S61
Therapeutic Efficacy in Diabetes: ASA

- NEJM 1989; 321: 129
- Diabetes Care 2003; 26: 3264
- BMJ 2008; 337: a1840
- JAMA 2008; 300: 2134
- BMJ 1994; 308: 81
- JAMA 1992; 268: 1292

**Diagram**

- Endpoint (%)
- No ASA
- ASA

- n=
- Endpoint
- # Events
- 533
- 1031
- 1276
- 2539
- 4502
- 3711
- 2368
- 5yr MI
- 4yr MCE
- 7yr MCE
- 1yr MCE
- 7yr MI
- 5yr CVDeath

- 26 vs 11
- 20 vs 22
- 117 vs 116
- 86 vs 68
- 426 vs 403
- 283 vs 241
- 183 vs 133
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*BP ≥130/85 or therapy for hypertension

UKPDS: Effects of Tight vs. Less-Tight Blood Pressure Control

*P=0.0046; †P=0.019; ‡P=0.0092; §P=0.0038; ‡‡P=0.0036; ‡‡‡P=0.013; **P=0.0043

UK Prospective Diabetes Study Group. BMJ. 1998; 317:703-713.
HOT Trial: Effect of BP Control on CV Event Rate

Overall Study Cohorts

Patients with Diabetes

Diastolic Blood Pressure Goal

Major CV Events Per 1000 Patient-Years

≤90 ≤85 ≤80

≤90 ≤85 ≤80

Therapeutic Efficacy in Diabetes: ACE Inhibitors

*Experimental therapy was ACEI plus indapamide

Scientific Statements: Diabetes, CV Disease and Hypertension

• JNC VII Report on Diabetic Hypertension
  – BP goal (<130/80 mm Hg)
    • Commonly requiring combinations of ≥2 drugs
    – ACEIs, CCBs, Thiazide-diuretics, β-blockers, and ARBs shown to reduce CVD/CVA risk
  – ACEIs/ARBs reduce progression of diabetic nephropathy and reduce albuminuria
  – ARBs reduce progression of macroalbuminuria

• Treatment of hypertension
  – Target SBP<130 and DBP<80 mmHg
    • In patients with BP 130-139/80-89 may try three months of diet, weight management and exercise
  – ACEI or ARB for initial drug therapy
    • Especially with micro or macroalbuminuria, given benefit in both type 1 diabetes and type 2 diabetes
  – Multiple drug therapy is generally required to achieve BP control
# Summary of Care: ABC's for Providers

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LDL-C as a Predictor of CAD in Patients with Diabetes

LDL=low-density lipoprotein cholesterol; CAD=coronary artery disease.

Lipid Treatment Goals for Patients with Type 2 Diabetes

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<thead>
<tr>
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<th>ADA 2010¹</th>
<th>ATP III⁴</th>
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</thead>
<tbody>
<tr>
<td>LDL (mg/dL)</td>
<td>&lt;100</td>
<td>&lt;100</td>
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<tr>
<td></td>
<td>&lt;70 highest risk</td>
<td></td>
</tr>
<tr>
<td>TG (mg/dL)</td>
<td>&lt;150</td>
<td>&lt;150</td>
</tr>
<tr>
<td>HDL (mg/dL)</td>
<td>&gt;50</td>
<td>*</td>
</tr>
<tr>
<td>Non HDL (mg/dL)</td>
<td>&lt;130</td>
<td>&lt;130</td>
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</tbody>
</table>

HPS Substudy:
First Major Vascular Event by LDL-C and Prior Diabetes Status

<table>
<thead>
<tr>
<th>LDL-C and diabetes status</th>
<th>Simvastatin (10,269)</th>
<th>Placebo (10,267)</th>
<th>Rate ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;116 mg/dL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With diabetes</td>
<td>191 (15.7%)</td>
<td>252 (20.9%)</td>
<td>Statin better</td>
</tr>
<tr>
<td>No diabetes</td>
<td>407 (18.8%)</td>
<td>504 (22.9%)</td>
<td>Placebo better</td>
</tr>
<tr>
<td>≥116 mg/dL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With diabetes</td>
<td>410 (23.3%)</td>
<td>496 (27.9%)</td>
<td></td>
</tr>
<tr>
<td>No diabetes</td>
<td>1,025 (20.0%)</td>
<td>1,333 (26.2%)</td>
<td></td>
</tr>
<tr>
<td>All patients</td>
<td>2,033 (19.8%)</td>
<td>2,585 (25.2%)</td>
<td>24% reduction (P&lt;0.0001)</td>
</tr>
</tbody>
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CARDS: Primary Endpoint

Relative Risk Reduction 37% (95% CI: 17-52)

P = 0.001

CARDS: Treatment Effect on the Primary Endpoint

<table>
<thead>
<tr>
<th>Event</th>
<th>Placebo*</th>
<th>Atorva*</th>
<th>Hazard Ratio</th>
<th>Risk Reduction (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary endpoint</td>
<td>127 (9.0%)</td>
<td>83 (5.8%)</td>
<td></td>
<td>37% (17-52)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>* p=0.001</td>
</tr>
<tr>
<td>Acute coronary events</td>
<td>77 (5.5%)</td>
<td>51 (3.6%)</td>
<td></td>
<td>36% (9-55)</td>
</tr>
<tr>
<td>Coronary revascularization</td>
<td>34 (2.4%)</td>
<td>24 (1.7%)</td>
<td></td>
<td>31% (-16-59)</td>
</tr>
<tr>
<td>Stroke</td>
<td>39 (2.8%)</td>
<td>21 (1.5%)</td>
<td></td>
<td>48% (11-69)</td>
</tr>
</tbody>
</table>

* N (% randomized)

Favors Atorvastatin
Favors Placebo

<table>
<thead>
<tr>
<th>Major Vascular Events</th>
<th>Treatment (%)</th>
<th>Control (%)</th>
<th>RR (CI)</th>
</tr>
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<tr>
<td>Diabetes with Vascular Disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coronary Heart Disease</td>
<td>755 (29.6%)</td>
<td>898 (34.9%)</td>
<td>0.82 (0.73-0.92)</td>
</tr>
<tr>
<td>Other Vascular Disease</td>
<td>166 (17.6%)</td>
<td>193 (21.9%)</td>
<td>0.80 (0.61-1.03)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>921 (26.3%)</td>
<td>1091 (31.6%)</td>
<td>0.80 (0.74-0.88)</td>
</tr>
<tr>
<td>Diabetes without Vascular Disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>420 (10.0%)</td>
<td>499 (12.1%)</td>
<td>0.75 (0.61-0.92)</td>
</tr>
<tr>
<td>No Hypertension</td>
<td>124 (7.3%)</td>
<td>192 (11.2%)</td>
<td>0.69 (0.55-0.86)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>544 (9.2%)</td>
<td>691 (11.8%)</td>
<td>0.73 (0.66-0.82)</td>
</tr>
<tr>
<td>All Diabetes</td>
<td>1465 (15.6%)</td>
<td>1782 (19.2%)</td>
<td>0.79 (0.74-0.84)</td>
</tr>
<tr>
<td>No Diabetes with Vascular Disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coronary Heart Disease</td>
<td>3589 (19.4%)</td>
<td>4587 (24.8%)</td>
<td>0.79 (0.75-0.83)</td>
</tr>
<tr>
<td>Other Vascular Disease</td>
<td>342 (12.2%)</td>
<td>438 (15.4%)</td>
<td>0.81 (0.70-0.94)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>3931 (18.5%)</td>
<td>5025 (23.5%)</td>
<td>0.79 (0.76-0.82)</td>
</tr>
<tr>
<td>No Diabetes or Vascular Disease</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hypertension</td>
<td>598 (7.9%)</td>
<td>704 (9.3%)</td>
<td>0.80 (0.68-0.93)</td>
</tr>
<tr>
<td>No Hypertension</td>
<td>360 (5.3%)</td>
<td>483 (7.1%)</td>
<td>0.74 (0.62-0.89)</td>
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<tr>
<td>Subtotal</td>
<td>958 (6.7%)</td>
<td>1187 (8.3%)</td>
<td>0.78 (0.71-0.85)</td>
</tr>
<tr>
<td>All without Diabetes</td>
<td>4889 (13.7%)</td>
<td>6212 (17.4%)</td>
<td>0.79 (0.76-0.81)</td>
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RR (99% CI) = Risk Ratio (99% Confidence Interval)
RR (95% CI) = Risk Ratio (95% Confidence Interval)
Reducing CVD Risk with Statin Therapy in Patients with Diabetes

- Number needed to treat to prevent 1 major CVD event
  - From meta-analysis
    - Without vascular disease 39
    - With vascular disease 19

Kearney PM Lancet;2008:371:227-239
ADA 2010 Guidelines

- Statin therapy should be added to lifestyle therapy, regardless of baseline lipid levels, for diabetic patients:
  - With overt CAD
  - Without CVD >40 and have ≥ 1 CVD risk factor

American Diabetes Association. *Diabetes Care.* 2010;33 (suppl 1) pgS12-S61
Non-HDL: Secondary Target

- Non-HDL = TC – HDL
- Non-HDL: secondary target of therapy when serum triglycerides are ≥200 mg/dL (esp. 200-499 mg/dL)
- Non-HDL goal: LDL goal + 30 mg/dL
Specific Dyslipidemias: Low HDL Cholesterol

Management of Low HDL

- LDL is primary target of therapy
- Weight reduction and increased physical activity (if the metabolic syndrome is present)
- Non-HDL is secondary target of therapy (if triglycerides ≥200 mg/dL)
- Consider nicotinic acid or fibrates (for patients with CHD or CHD risk equivalents)
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Effectiveness of Smoking Cessation Interventions for CVD Admissions

- Smoking cessation intervention
  - MI = “teachable moment”
  - JCAHO/CMS core measure for MI care
- Meta-analysis of 18 RCTs in CVD, by intensity of intervention
- Only extended support programs significantly improved abstinence

Summary OR
95% CI
Control 1.14 0.9-1.4
Treatment 1.07 0.7-1.6
1.81 1.5-2.2

The 5 “A’s” for Effective Smoking Intervention

1. **ASK** about smoking
2. **ADVISE** to quit
3. **ASSESS** willingness to make a quit attempt
4. **ASSIST** if ready - offer therapy and consultation for quit plan and if not, then offer help when ready
5. **ARRANGE** follow up visits
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CHD Mortality Rates (by Degree of Glucose Tolerance)

*Indicates patients known to have diabetes prior to the study.
CHD=coronary heart disease; NGT=normal glucose tolerance; IGT=impaired glucose tolerance

Most Cardiovascular Patients Have Abnormal Glucose Metabolism

GAMI
n = 164

EHS
n = 1920

CHS
n = 2263

- 35% Normoglycemia
- 31% Prediabetes
- 34% Type 2 Diabetes
- 37% 45% 27% 36%

GAMI = Glucose Tolerance in Patients with Acute Myocardial Infarction Study
EHS = Euro Heart Survey
CHS = China Heart Survey

# Diagnostic Criteria for Metabolic Syndrome: Modified NCEP ATP III

≥3 Components Required for Diagnosis

<table>
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<th>Components</th>
<th>Defining Level</th>
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<td>Increased waist circumference</td>
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<tr>
<td>Men</td>
<td>≥ 40 in</td>
</tr>
<tr>
<td>Women</td>
<td>≥ 35 in</td>
</tr>
<tr>
<td>Elevated triglycerides</td>
<td>≥150 mg/dL (or Medical Rx)</td>
</tr>
<tr>
<td>Reduced HDL-C</td>
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</tr>
<tr>
<td>Men</td>
<td>&lt;40 mg/dL</td>
</tr>
<tr>
<td>Women</td>
<td>&lt;50 mg/dL (or Medical Rx)</td>
</tr>
<tr>
<td>Elevated blood pressure</td>
<td>≥130 / ≥85 mm Hg (or Medical Rx)</td>
</tr>
<tr>
<td>Elevated fasting glucose</td>
<td>≥100 mg/dL (or Medical Rx)</td>
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IDF Criteria: Abdominal Obesity and Waist Circumference Thresholds

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<td>Europid</td>
<td>≥ 94 cm (37.0 in)</td>
<td>≥ 80 cm (31.5 in)</td>
</tr>
<tr>
<td>South Asian</td>
<td>≥ 90 cm (35.4 in)</td>
<td>≥ 80 cm (31.5 in)</td>
</tr>
<tr>
<td>Chinese</td>
<td>≥ 90 cm (35.4 in)</td>
<td>≥ 80 cm (31.5 in)</td>
</tr>
<tr>
<td>Japanese</td>
<td>≥ 85 cm (33.5 in)</td>
<td>≥ 90 cm (35.4 in)</td>
</tr>
</tbody>
</table>

- AHA/NHLBI criteria: ≥ 102 cm (40 in) in men, ≥ 88 cm (35 in) in women
- Some US adults of non-Asian origin with marginal increases should benefit from lifestyle changes. Lower cutpoints (≥ 90 cm in men and ≥ 80 cm in women) for Asian Americans

10-Year CVD Risk Estimates Associated with Metabolic Syndrome

Projected 10-Year Prevalence (%)

<table>
<thead>
<tr>
<th></th>
<th>Botnia</th>
<th>TARFS</th>
<th>Kuopio</th>
<th>WHS</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>4483</td>
<td>2398</td>
<td>1209 men</td>
<td>14,719 women</td>
</tr>
<tr>
<td>Mean Age</td>
<td>54</td>
<td>49</td>
<td>52</td>
<td>54</td>
</tr>
<tr>
<td>F/U</td>
<td>6.9 yrs</td>
<td>3 yrs</td>
<td>13.7</td>
<td>8 yrs</td>
</tr>
<tr>
<td>1° Endpoint</td>
<td>CV Death</td>
<td>CHD events</td>
<td>Mortality</td>
<td>MACE</td>
</tr>
<tr>
<td>DM Included</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

Management Opportunity: Prevent Diabetes

Placebo (n=1082)

Metformin (n=1073, p<0.001 vs. Placebo)

Lifestyle (n=1079, p<0.001 vs. Metformin, p<0.001 vs. Placebo)

Risk reduction
31% by metformin
58% by lifestyle

Years from Randomization
Cumulative Prevalence (%)

NEJM 346:393-403, 2002
Finnish Diabetes Prevention Study: Reduction in Risk for Diabetes*

*P<0.001; 4-year results

Benefit of Comprehensive, Intensive Management: STENO 2 Study

- Treatment Goals:
  - Intensive TLC
  - HgbA1c <6.5%
  - Cholesterol <175
  - Triglycerides <150
  - BP <130/80

Primary End Point=CV events (%)

Gaede, P. et al, NEJM 2003;348:390-393
# Summary of Care: ABC's for Providers

<table>
<thead>
<tr>
<th>A</th>
<th>A1c Target Aspirin Daily</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Blood Pressure Control</td>
</tr>
<tr>
<td>C</td>
<td>Cholesterol Management Cigarette Smoking Cessation</td>
</tr>
<tr>
<td>D</td>
<td>Diabetes and Pre-Diabetes Management</td>
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<tr>
<td>E</td>
<td>Exercise</td>
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<td>F</td>
<td>Food Choices</td>
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</table>
Physical Inactivity: A Call to Arms

10,000 Steps Daily

30 minutes most days
Take an Exercise History and Encourage Increased Physical Activity

• Brisk walking is an ideal physical activity for those without orthopedic issues
• Walking uses the patient’s increased body weight to increase energy expenditure
• Pedometers provide daily feedback - 10,000 Steps Per Day
RCT Trial Assessment of Pedometer Interventions

N=277; 8 Trials
Pedometer increased steps by 2500/day

Bravata, DM et al. JAMA 2007; 298:2296-2304
Lifestyle Activity as an Alternative to "Working Out"

National Weight Control Registry

- Successful Losers: >10% Body weight for 1 year
- 3000 Registrants, 80% Women
- Average Loss = 30 kg; Time = 5.5 yrs
- How?
  - Low Fat Diet
  - Self-monitoring
  - Physical Activity
- 81% Reported More Physical Activity

<table>
<thead>
<tr>
<th>Mode of exercise</th>
<th>Frequency</th>
<th>Intensity</th>
<th>Duration</th>
<th>Class and level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardio-respiratory (large muscle)</td>
<td>3-7 d/week</td>
<td>Moderate intensity OR</td>
<td>150 min/week</td>
<td>1 (A)</td>
</tr>
<tr>
<td>Cardio-respiratory (large muscle)</td>
<td>3 d/week</td>
<td>Vigorous Intensity</td>
<td>90 min/week</td>
<td>1 (A)</td>
</tr>
<tr>
<td>Resistance</td>
<td>3 d/week</td>
<td>2-4 sets of 8-10 reps</td>
<td></td>
<td>1 (A)</td>
</tr>
</tbody>
</table>

Marwick TH. Circulation 2009;119:3244-62
## Summary of Care: ABC's for Providers

<p>| | |</p>
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Effect of Moderate Weight Loss On Cardiometabolic Risk Factors

Percent changes are initial visit to final visit.

ADA Nutritional Guidelines

- Patients with pre-diabetes should receive individualized Medical Nutrition Therapy (MNT)
- Weight loss recommended for all overweight or obese individuals who have or are at risk for diabetes
- Physical activity and behavior modification effective for weight loss and maintenance
- Fiber 14 g/1000 kcal intake
- Saturated fat 7% with minimal trans fat
Effect of Mediterranean-Style Diet in the Metabolic Syndrome

- 180 pts with metabolic syndrome randomized to Mediterranean-style vs. prudent diet for 2 years
- Those in intervention group lost more weight (-4kg) than those in the control group (+0.6kg) (p<0.01), and significant reductions in CRP and IL-6

Esposito K et al. JAMA 2004; 292(12): 1440-6.
Patient Education

- Educational Objectives
  - Ensure patients realize the link between metabolic syndrome and risk of heart disease
  - Reinforce the patient’s role and control in disease management
    - Focus on significant impact even modest exercise and weight loss will have
  - Verify patients understand how to implement healthy changes to diet and physical activity level
Smarter Patients.  Better Care.

Help Your Patients Fight Cardiovascular Disease With CardioSmart™. CardioSmart™ encourages patients to better understand, manage and impact the outcome of their cardiovascular health.

New features include:
CardioSmart™ News
Condition Centers
Blood Pressure Tracking Tool

Visit www.cardiosmart.org today.