

Diabetes and Cardiovascular Disease

**Satellite Conference and Live Webcast
Wednesday, March 5, 2008
2:00-4:00 p.m. (Central Time)**

**Produced by the Alabama Department of Public Health
Video Communications and Distance Learning Division**

Faculty

***Beverly Stoudemire-Howlett, M.D.
Cardiologist
Montgomery Cardiovascular
Associates &
Montgomery Links Incorporated***

Diabetes

- **21 million Americans have diabetes and 284,000 die from it each year.**
- **65% of the deaths are related to cardiovascular causes.**
- **Type 2 diabetes increases the risk for heart disease 2 to 4 times.**
- **The Diabetes Education Group recommends a HgA1C 7% for Type 2 Diabetes.**

What is Diabetes?

- **Diabetes is a group of diseases characterized by high levels of blood glucose (blood sugar).**
- **Diabetes can lead to serious health problems and premature death.**

Diabetes Complications

- **2 in 3 people with diabetes die of heart disease or stroke.**
- **Diabetes is the #1 cause of adult blindness.**
- **Diabetes is the #1 cause of kidney failure.**
- **Diabetes causes more than 60% of non-traumatic lower-limb amputations each year.**

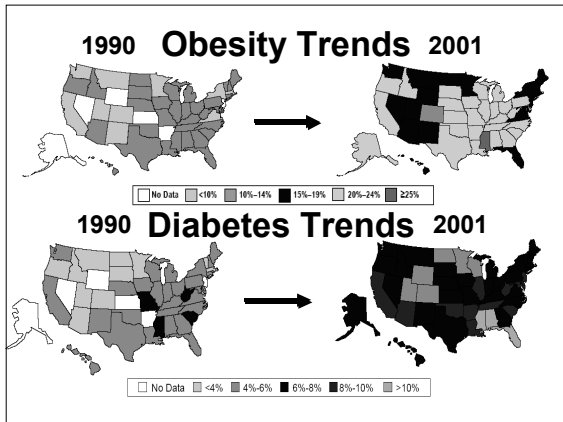
Common Types of Diabetes

Type 1 diabetes

- **5% to 10% of diagnosed cases of diabetes.**

Type 2 diabetes

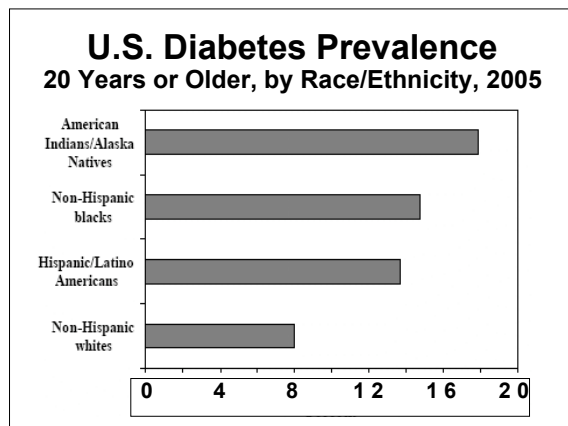
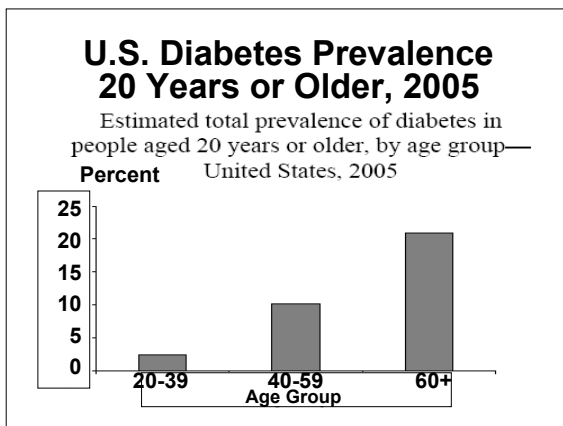
- **90% to 95% diagnosed cases of diabetes.**



U.S. Diabetes Prevalence

All Ages, 2005
 20.8 million people have diabetes.

- **Diagnosed: 14.6 million people**
 - Type 1 diabetes accounts for 5 – 10%
 - Type 2 diabetes accounts for 90 – 95%
- **Undiagnosed: 6.2 million people**



American Indians and Alaska Natives and Diabetes

- 12.8 percent of American Indians and Alaska Natives had diabetes in 2003.
- 2.2 times as likely to have diabetes as non-Hispanic whites.

African Americans and Diabetes

- 13.3 percent of all African Americans have diabetes.
- African Americans are 1.8 times as likely to have diabetes as non-Hispanic whites.

Hispanic/Latino Americans and Diabetes

- 9.5 percent of all Hispanic/Latino Americans have diabetes.
- Mexican Americans are 1.7 times as likely to have diabetes as non-Hispanic whites.

Preventing Diabetes Complications

- Glucose control
- Blood pressure control
- Blood lipid control
- Preventive care practices for eyes, kidneys, feet, teeth and gums
- Aspirin as directed by physician

What is Pre-Diabetes?

- People with pre-diabetes have blood glucose levels higher than normal but not high enough to be diagnosed with diabetes.
- People with pre-diabetes can prevent or delay the onset of type 2 diabetes through lifestyle change and/or medication - though none are approved for diabetes prevention.

Pre-Diabetes

- At least 54 million U.S. adults age 20 and older have pre-diabetes—which raises their risk for type 2 diabetes and cardiovascular disease.

Other Factors for Pre-Diabetes

- Hypertension
- Abnormal lipid levels
- Family history of diabetes
- Race/ethnicity
- History of gestational diabetes
- History of vascular disease
- Signs of insulin resistance
- PCOS
- Previous IGT or IFG
- Inactive lifestyle

Metabolic Syndrome

- Also termed Insulin Resistance - The concurrence of multiple metabolic abnormalities associated with cardiovascular disease.
- 1/3 of US Adults have Metabolic Syndrome.

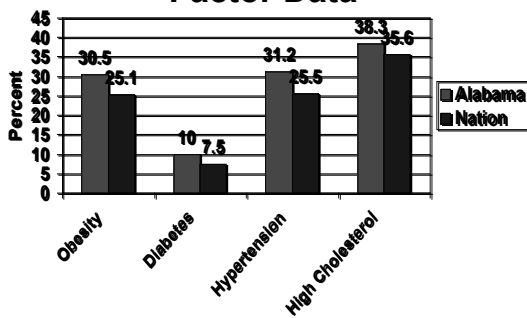
Definition of Metabolic Syndrome

- Hyperglycemia (Glucose intolerance)
- Abdominal Obesity (Central Obesity)
- Hypertriglyceridemia (Dyslipidemia)
- Low High Density Lipoprotein cholesterol
- Hypertension
- Increased Prothrombotic and Antifibrinolytics (Lp(a), Lp-PLA2)

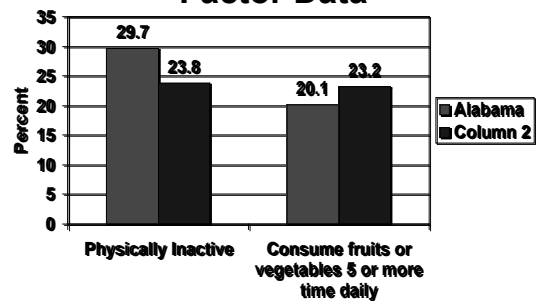
Risk of CV Events

- 3 or more Coronary Risk Factors.
- Evaluation of several large longitudinal studies suggest increased risk of CV events and death in people with MetSyn.
- CV risk conferred by MetSyn is a third higher in women than men.

Alabama vs Nation Adult Risk Factor Data



Alabama vs Nation Adult Risk Factor Data



Treatment

- Target individual risk factors
- Primary prevention trials of aggressive
 - Dietary
 - Lifestyle
 - Pharmacologic interventions

Risk Factors for Diabetes

- Older age
- Overweight (BMI \geq 25)
- Hypertension
- Abnormal lipid levels
- Family history of diabetes
- Race/ethnicity
- History of gestational diabetes

Risk Factors for Diabetes

- History of vascular disease
- Signs of insulin resistance
- PCOS
- Previous IGT or IFG
- Inactive lifestyle

Diabetes Control and Complications Trial (DCCT)

- Compared effects of two diabetes treatment regimens – standard therapy and intensive control – on the complications of diabetes.

DCCT Findings

- Glucose control is key to preventing or delaying complications of diabetes.
- Any sustained lowering of blood glucose helps, even if the person has a history of poor control.

DCCT Findings

Lowering blood glucose reduced risk of:

- Eye disease by 76%
- Kidney disease by 50%
- Nerve disease by 60%

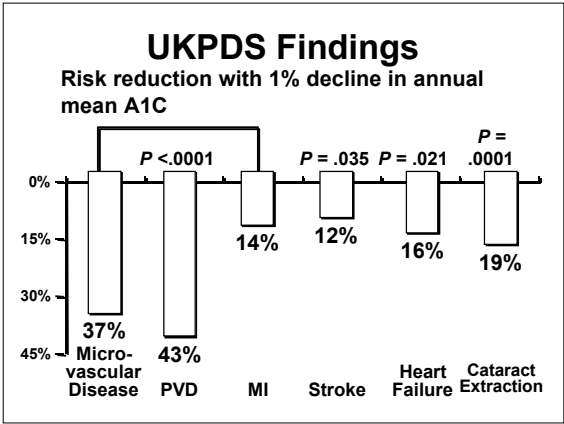
United Kingdom Prospective Diabetes Study (UKPDS)

Clinical Trial

Looked at intensive management of blood glucose levels and long term risk-factors for diabetes complications.

UKPDS Findings

- Mirrored the findings of DCCT in people with type 2 diabetes—better glucose control reduced development of microvascular complications.
- Demonstrated the need for management of high blood pressure and cholesterol as well as blood glucose levels (the ABCs of diabetes).

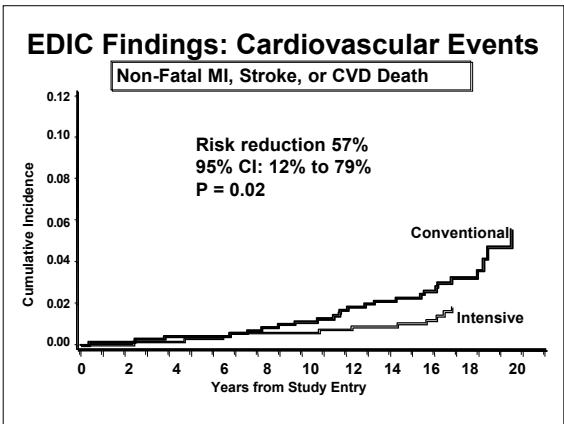
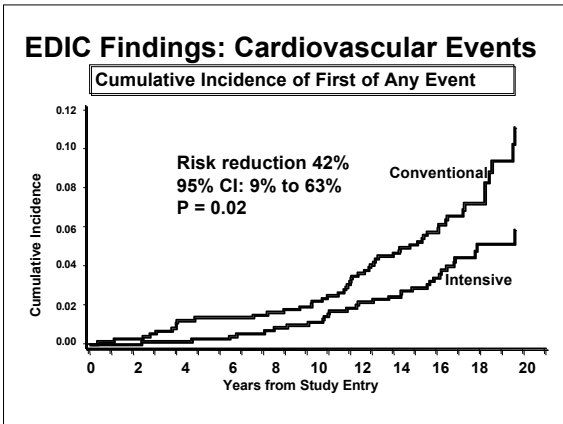


Epidemiology of Diabetes Interventions and Complications Study (EDIC)

- Observational study
- DCCT participants
- Looked at risk factors for long-term complications

EDIC Findings: Intensive Therapy and Diabetes Complications

- Participants continue to benefit from metabolic memory of intense glucose control
- Intensive therapy aimed at achieving near normoglycemia:
 - Reduces CVD events by more than half
 - Should be implemented as early as possible



Diabetes Prevention Program (DPP)

- The DPP was a major clinical trial to determine whether diet and exercise or the oral diabetes drug metformin could prevent or delay the onset of type 2 diabetes.

DPP Participants

Adults at high risk for type 2 diabetes

- Presence of IGT
- Mean age 51 years
- Mean body mass index (BMI) 34
- 68% women
- 45% minority groups:
 - African Americans
 - Hispanic and Latino Americans
 - American Indians
 - Asian Americans and Pacific Islanders

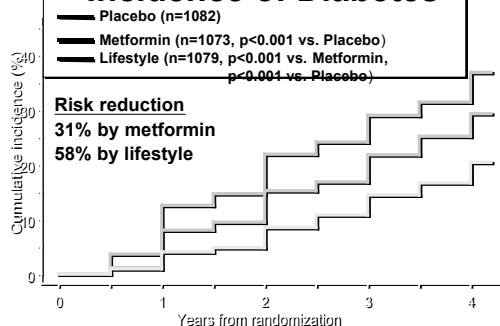
DPP Methods

- Lifestyle intervention
 - 5% to 7% weight reduction
 - Healthy low-calorie, low-fat diet
 - 30 min. of physical activity, 5 days/week
- Metformin
 - Oral diabetes drug
- Placebo

DPP Methods

- DPP Curriculum:
 - Diet
 - Exercise
 - Behavior change modification
- Taught one-on-one by case managers

Incidence of Diabetes



Diabetes Prevention

- Type 2 diabetes prevention is:
 - PROVEN
 - POSSIBLE, and
 - POWERFUL

Testing Recommendations for People at High Risk

- Consider testing plasma glucose if a person is:
 - Age 45 or older and overweight.
 - Younger than 45, overweight, with any additional risk factor.
- Repeat testing at 3-year intervals.
- Obtain FPG or 2-hour plasma glucose post 75-g glucose challenge after overnight 8 to 12 hr fast.

Diagnostic Criteria for Pre-diabetes and Diabetes

	Fasting Plasma Glucose Test (FPG)	2-Hour Oral Glucose Tolerance Test (OGTT)
Normal	Below 100 mg/dl	Below 140 mg/dl
Pre-diabetes	100-125 mg/dl (IFG)	140-199 mg/dl (IGT)
Diabetes	126 mg/dl or above	200 mg/dl or above

ACCORD

- 10,251 Participants.
- 257 in the intensive treatment group died. HgbA1c less than 6.
- 203 in the standard treatment group.
- Trial end June 2009 now the intensive and standard tx groups will be the same.

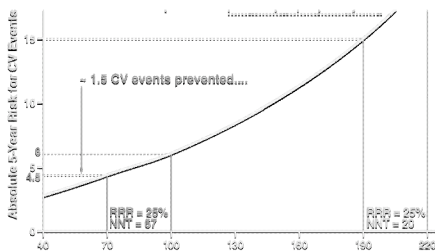
ACCORD

- Intensively reducing blood sugar below guidelines causes harm in high risk type 2 diabetes patients.
- Standard tx arm will continue.
- Seek answer for cause of death in the intense group.

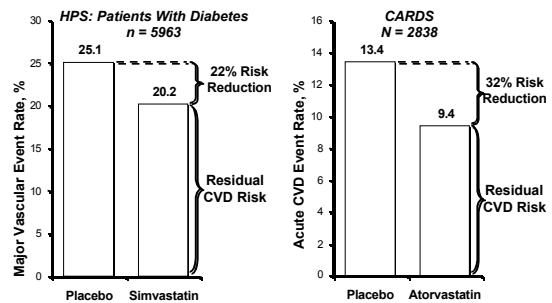
Action to Control Cardiovascular Disease in Diabetes

The standard treatment arm
 Effects of treatments for blood pressure
 Effects of treatments for blood lipids
 The results of ACCORD does not apply to patients with type I Diabetes
 Unclear if applies to recently diagnosed type 2

Diminished Benefit of Lowering LDL-C Substantially Below 100 mg/dL in High-Risk Patients



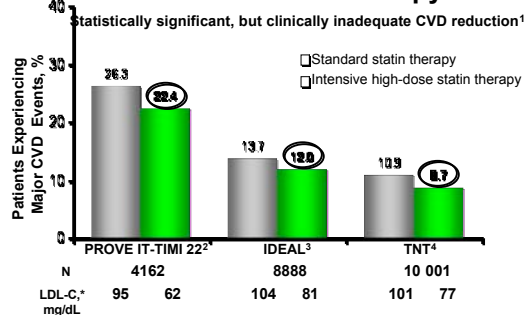
Residual CVD Risk in Diabetic Patients Treated With Statins



Diabetic Patients Have Particularly High Residual CVD Risk After Statin Treatment

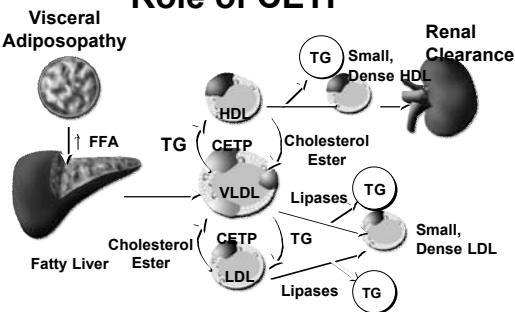
	Event Rate (No Diabetes)		Event Rate (Diabetes)	
	On Statin	On Placebo	On Statin	On Placebo
HPS ^{1*} (CHD patients)	19.8%	25.7%	33.4%	37.8%
CARE ^{2†}	19.4%	24.6%	28.7%	36.8%
LIPID ^{3‡}	11.7%	15.2%	19.2%	22.8%
PROSPER ^{4§}	13.1%	16.0%	23.1%	18.4%
ASCOT-LLA ^{5¶}	4.9%	8.7%	9.6%	11.4%
TNT ^{6_}	7.8%	9.7%	13.8%	17.9%

Residual CVD Risk in Patients Treated With Intensive Statin Therapy

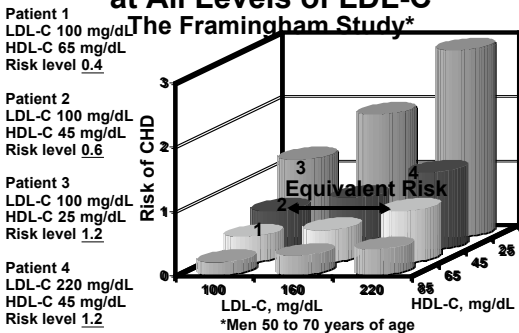


The Role of Elevated Triglycerides and Low HDL-C in Residual CVD Risk

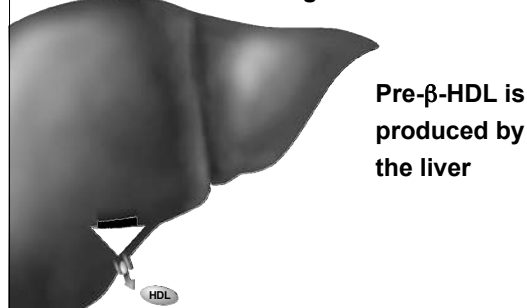
Dyslipidemia and Particle Size: Role of CETP



HDL-C Is a Modifier of Risk at All Levels of LDL-C



HDL and Reverse Cholesterol Transport Benefits in Reducing Atherosclerosis



**ADA/AHA 2007 Scientific Statement:
Primary Prevention of CVD in Patients With
Diabetes**

- Elevated LDL-C is *primary* target of lipid-lowering therapy
 - LDL-C goal <100 mg/dL
- TG-rich lipoproteins, especially VLDL, are often elevated in patients with diabetes, appear to be atherogenic, and represent a *secondary* target of lipid-lowering therapy.

**ADA/AHA 2007 Scientific Statement:
Primary Prevention of CVD in Patients With
Diabetes**

- ^{ADA}• TG goal <150 mg/dL; HDL-C goal >40 mg/dL*
- ^{AHA}• If TG are 200-499 mg/dL, non-HDL-C goal ≤130 mg/dL
- If TG are ≥500 mg/dL, lowering TG is primary target
- Combination therapy of LDL-cholesterol lowering drugs (statins) with fibrates or niacin may be necessary to achieve lipid targets

**American Diabetes Association
Standards of Medical Care in Diabetes:
Dyslipidemia Management**

	First Priority	Second Priority
LDL-C Lowering Goal: <100mg/dL*	•TLC •Statins	•Niacin, ezetimibe, bile acid sequestrants, or fenofibrate
HDL-C Raising Goal: >40 mg/dL†	•TLC	•Niacin‡ or fibrates

**American Diabetes Association
Standards of Medical Care in Diabetes:
Dyslipidemia Management**

	First Priority	Second Priority
TG Lowering Goal: <150 mg/dL	•TLC •Glycemic control	•Fibrates (fenofibrate, gemfibrozil) •Niacin‡ •Statins (if also have high LDL-C)
Combined Hyperlipidma	•Glycemic control + high-dose statin	•Glycemic control + statin + fibrate •Glycemic control + statin + niacin‡

**National Guidelines:
Niacin Therapy**

NCEP ATP III Guidelines¹

- “Among lipid-lowering agents, nicotinic acid appears to be the most effective for favorably modifying all of the lipoprotein abnormalities associated with atherogenic dyslipidemia.”

ADA/AHA 2007 Scientific Statement²

- “The most effective available drug for raising HDL-cholesterol levels is nicotinic acid.”

Summary

- Diabetes is preventable.
- Coronary Artery Disease is preventable.
- Decrease the incidence of cardiovascular events.
- Decrease the incidence of stroke.
- Decrease the incidence of severity of congestive heart failure.



Upcoming Programs

**The Reasons For & Key Elements of
Continuity of Operations Planning
Thursday, March 27, 2008
12:00 - 1:30 p.m. (Central Time)**

**Generation Rx: The Adolescent
"Pharming" Phenomenon
Thursday, April 3, 2008
11:00 - 1:00 p.m. (Central Time)**

**HIV/AIDS Update 2008 for
Home Health Aides & Attendants
Wednesday April 30, 2008
12:00 - 1:30 p.m. (Central Time)**

**For complete list of upcoming programs
visit: www.adph.org/alphtn**