

## **Cardiovascular Risk Reduction in Diabetes**

**Satellite Conference and Live Webcast  
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**Produced by the Alabama Department of Public Health  
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## **Faculty**

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## **Presentation Overview**

- **Agency for Healthcare Research and Quality's Effective Health Care Program's Research in Diabetes**
- **Other AHRQ resources in diabetes**

## **Presentation Overview**

- **Managing the patient with type 2 diabetes**
  - **Achieving optimal glycemic control**
  - **Management of hypertension**
  - **Management of Dyslipidemia**
- **Management of other conditions**

## **AHRQ Mission**

- **To improve the quality, safety, efficiency, and effectiveness of health care for all Americans**

## **Effective Health Care Program**

- A. Evidence synthesis (EPC program)**
  - **Systematically reviewing, synthesizing, comparing existing evidence on treatment effectiveness**
  - **Identifying relevant knowledge gaps**

### Effective Health Care Program

#### B. Evidence generation (DEcIDE, CERTs)

- Development of new scientific knowledge to address knowledge gaps
- Accelerate practical studies

### Effective Health Care Program

#### C. Evidence communication / translation (Eisenberg Center)

- Translate evidence into improvements
- Communication of scientific information in plain language to policymakers, patients, and providers

### The Effective Health Care Challenge

- What is effective health care?

The Right Care

For The Right Person

At The Right Time

Stakeholder Input  
Public and Expert Input  
Systematic Review or New Review  
Transparency and Credibility

### Effective Health Care Program

- To improve the quality, effectiveness, and efficiency of health care delivered through Medicare, Medicaid, and S-CHIP programs
  - Focus is on what is known now:
    - Ensuring programs benefit from past investments in research and what research gaps are critical to fill

### Effective Health Care Program

- Focus is on Patient Centered Health Outcomes

### Priority Conditions for the Effective Health Care Program

- Arthritis and non-traumatic joint disorders
- Cancer
- Cardiovascular disease, including stroke and hypertension
- Dementia, including Alzheimer Disease

### **Priority Conditions for the Effective Health Care Program**

- Depression and other mental health disorders
- Developmental delays, attention-deficit hyperactivity disorder and autism
- Diabetes Mellitus
- Functional limitations and disability

### **Priority Conditions for the Effective Health Care Program**

- Infectious diseases including HIV / AIDS
- Obesity
- Peptic ulcer disease and dyspepsia
- Pregnancy including pre-term birth
- Pulmonary disease / Asthma
- Substance abuse

### **Diabetes Multi-Center Research Consortium**

- Funded from FY 2008 – FY 2012 by DEcIDE Program to support innovative new research that was:
  - Responsive to stakeholders
  - Protocol driven
  - Based on established principles of good research practice

### **Diabetes Multi-Center Research Consortium**

- Includes analyses of both existing data as well as new data collection
- Products / manuscripts available at:
  - <http://www.ahrq.gov/cpi/portfolios/comparative-effectiveness/index.html>

### **Health Care Quality and Disparities Reports**

- AHRQ National Healthcare Quality and Disparities Reports – Annual tracking of 13 diabetes measures at the national level

### **Health Care Quality and Disparities Reports**

- State Snapshots
  - State level disparities in diabetes and costs of diabetes

### Health Care Quality and Disparities Reports

- **Diabetes Resource Guide and Workbook**
  - Data on diabetes to help states assess the quality of their care and develop quality improvement strategies

### Health Care Quality and Disparities Reports

- **Diabetes Cost Calculator**
  - A tool by NBCH for assessing the impact of implementing value based benefit designed for diabetes-related pharmaceuticals

### Other Collaborative Activities

- **CDC's Diabetes Primary Prevention Initiative 4**
  - Case study for CDC's Diabetes Primary Prevention Initiative
  - Assessment involved collaboration with several project sites

### Other Collaborative Activities

- **Practice-Based Research Networks**
- **ACTION** – integrated delivery system network
- **AHRQ / CMS report “Women with Diabetes”**

### Other Collaborative Activities

- **NIH and CDC**
- **DMICC**
- **NDEP**
  - Guiding Principles

### Other Collaborative Activities

- **CDC**
  - Challenges in Translating Science to Policy in Preventing Diabetes

### **Evidence-based Guidelines**

- **National Guidelines Clearinghouse includes 51 guidelines related to management and treatment of type 2 diabetes, developed by 28 public- and private-sector developer organizations**

### **Evidence-based Guidelines**

- **National Quality Measures Clearinghouse has 57 related measures, developed by a total of 9 public- and private-sector organizations**
- **Of the 28 guideline and nine measure development organizations, only two develop both guidelines and measures**

### **How to Access Products**

- **AHRQ website**
  - [www.effectivehealthcare.ahrq.gov](http://www.effectivehealthcare.ahrq.gov)
    - **Abstract**
    - **Workplan**
    - **Full reports and / or manuscripts**

### **How to Access Products**

- **AHRQ Publications: 800 – 358 – 9295**
  - **Requests for free, printed summary guides**

### **Fast Facts on Diabetes Mellitus**

- **Diabetes affects 25.8 million people of all ages**
- **8.3% of the U.S. population = 18.8 million people**
- **Diabetes is a major cause of heart disease and stroke**
- **Type 2 Diabetes Mellitus accounts for 90-95% of cases**

–Source: NIH/NIDDK

### **Evidence for Diabetes as a Risk Factor for CVD**

- **2004 meta-analysis of observational studies of the association between glycosylated hemoglobin and cardiovascular disease in diabetic persons**

## Evidence for Diabetes as a Risk Factor for CVD

- Findings
  - Observational studies are consistent with limited clinical trial data and suggests that chronic hyperglycemia is associated with an increased risk for cardiovascular disease in persons with diabetes

–Source: Meta-analysis: glycosylated hemoglobin and cardiovascular disease in diabetes mellitus. *Ann Intern Med* 2004; 141: 421-431

## Evidence for Diabetes as a Risk Factor for CVD

- Meta-analysis of individual records of diabetes, fasting blood glucose concentration, and other risk factors in people without initial vascular disease from studies in the Emerging Risk Factors Collaboration that included 698,782 patients from 102 prospective studies

## Evidence for Diabetes as a Risk Factor for CVD

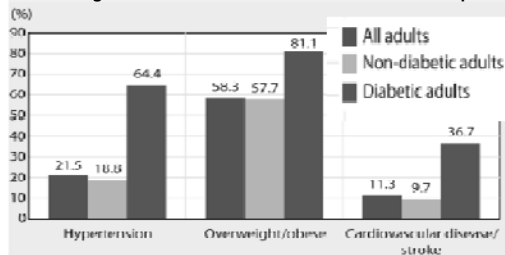
- Findings
  - Diabetes increases the risk of:
    - Coronary heart disease – HR=2.0
    - Coronary death – HR=2.31
    - Non-fatal MI – HR=1.82

## Evidence for Diabetes as a Risk Factor for CVD

- Part of the increase may be due to the frequency of associated CVD risk factors such as hypertension and dyslipidemia

–Source: *Lancet* 2010;375:2215-22 Diabetes mellitus, fasting blood glucose concentration, and risk of vascular disease: a collaborative meta-analysis of 102 prospective studies

Chronic Diseases Among Diabetics, Nondiabetics, and All Adult US Population, 2003  
Add a Diagnosis of CVD to Diabetes and Watch Costs Explode



Source: Sui, A. Diabetes Management, Tests and Treatments Among the 18 and Over U.S. Civilian Noninstitutionalized Population in 2003. Statistical Brief #100, December 2005. Agency for Healthcare Research and Quality, Rockville, Md. <<http://www.ehponline.org/papers/s11051stat105.pdf>>

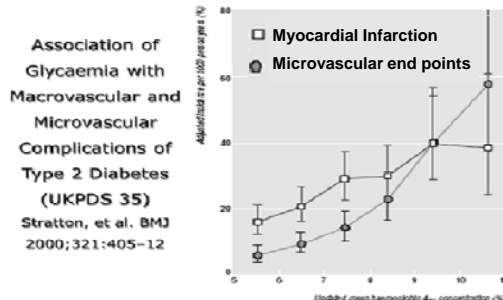
## What Can Be Done to Reduce the Risk of Developing CVD in Patients with Type 2 Diabetes Mellitus?

- Achieve optimal glycemic control
- Manage other CVD risk factors
  - Hypertension
  - Dyslipidemia
  - Smoking

**What Can Be Done to Reduce the Risk of Developing CVD in Patients with Type 2 Diabetes Mellitus?**

- Manage other conditions
  - Obesity
  - Hypercoagulability
- \* Treatments and goals should be individualized

**Evidence for Glycemic Control and CVD Risk Reduction in Patients with Type 2 Diabetes**



**RCTs - Glycemic Control and Vascular Disease in Patients with Type 2 Diabetes**

- UKPDS (1998)
  - United Kingdom Prospective Diabetes Study
- ACCORD (2008)
  - Action to Control Cardiovascular Risk in Diabetes

**RCTs - Glycemic Control and Vascular Disease in Patients with Type 2 Diabetes**

- ADVANCE (2008)
  - Action in Diabetes and Vascular Disease
- VADT (2009)
  - Veterans Affairs Diabetes Trial

**Summary of Initial RCT Results Comparing Intense Control vs Standard Control in Patients with Type 2 Diabetes**

STUDY	CVD	Mortality	Microvascular Disease
UKPDS	↔	↔	↓
ACCORD	↔	↑*	↓
ADVANCE	↔	↔	↓
VADT	↔	↔	↔

\* Intensive therapy HgbA1c = 6.4% vs. Standard therapy = 7.5%

**Therapies for Glycemic Control**

- Individualize therapy depending on HgbA1c
- Lifestyle modification
- Metformin as initial therapy
  - Or insulin if glucoses are high

### Therapies for Glycemic Control

- Add second oral agent, GLP-1 agonist (or insulin)
- Add Insulin
- New and emerging drugs?

-Based on 2013 American Diabetes Association (ADA) Guidelines

### Glycemic Treatment Goals

- ADA <7%
  - More or less stringent glycemic goals may be appropriate for individual patients

### Glycemic Treatment Goals

- Individualize goals based on diabetes duration, age/life expectancy, co-morbid conditions, known CVD or advanced microvascular complications, hypoglycemia unawareness, and individual patient considerations

### Glycemic Treatment Goals

- AACE < 6.5% (if can be done safely)
  - Glucose targets should be individualized and take into account residual life expectancy, duration of disease, presence or absence of microvascular and macrovascular complications, CVD risk factors, co-morbid conditions and risk for severe hypoglycemia

### Glycemic Treatment Goals

- Glucose targets should also be formulated in the context of the patient's psychological, social, and economic status

-Source: most recent ADA and AACE guidelines

### Evidence for Treating Hypertension and CVD Risk Reduction in Patients with Type 2 Diabetes

- ACCORD BP-arm trial did not show any additional benefit on cardiovascular event reduction at a mean systolic BP < 120 mm Hg



### **Evidence for Treating Hypertension and CVD Risk Reduction in Patients with Type 2 Diabetes**

- International Verapamil-Trandolapril study (INVEST) also failed to show additional CVD risk reduction among patients who achieved a BP <130/80 mm Hg

### **Evidence for Treating Hypertension and CVD Risk Reduction in Patients with Type 2 Diabetes**

- A number of other clinical trials also demonstrate that when systolic pressures fall to less than 130 mmHg there is no reduction in CVD events

### **Hypertension Therapies Treatment Goals in Patients with Type 2 Diabetes**

- Begin with an ACE or ARB due to renal benefits
  - Additional therapies may include diuretics, beta-blockers
- Need for more than three drugs may necessitate further evaluation or consultation

### **Hypertension Therapies Treatment Goals in Patients with Type 2 Diabetes**

- Treatment goal for BP to reduce CVD risk is not well-established
- BP goal of 130-135 / 80-85 mm Hg may be reasonable given the evidence on reducing CKD and stroke

### **Diabetes and Dyslipidemia**

- Patients with Type 2 Diabetes often have multiple lipid abnormalities including:
  - Increased triglycerides >150 mg/dl
  - Decreased high-density lipoprotein (HDL) cholesterol
    - < 40 mg/dl in men
    - <50 mg/dl in women

### **Diabetes and Dyslipidemia**

- Increased low-density lipoprotein (LDL)

### Evidence for Treatment of Dyslipidemia and CVD Risk Reduction in Patients with Type 2 Diabetes

- Collaborative Atorvastatin Diabetes Study (CARDS)
  - Findings at 4 years: 37% relative risk reduction for atorvastatin 10 mg in the primary endpoints
    - Acute coronary heart disease death

### Evidence for Treatment of Dyslipidemia and CVD Risk Reduction in Patients with Type 2 Diabetes

- Fatal or non-fatal myocardial infarction
- Unstable angina requiring hospital admission
- Resuscitated cardiac arrest
- Coronary revascularization procedures

### Evidence for Treatment of Dyslipidemia and CVD Risk Reduction in Patients with Type 2 Diabetes

- Among the secondary endpoints
  - Total mortality was reduced by 27% (p=0.05)
  - Acute coronary events by 36%

### Treatment of Dyslipidemia

- Statin (e.g. 2nd generation potent statins)
  - Lower LDL by 50% or more
  - Raise HDL 3-10%
  - Reduce TGs up to 28%

### Treatment of Dyslipidemia

- Lifestyle changes
  - Weight loss, exercise, limit alcohol
- Fibric acids
  - For lifestyle and statin resistant hypertriglyceridemia

### Goals of Lipid Management in Patients with Type 2 Diabetes without CAD

	NCEP	ADA	AACE
LDL-C	<100 mg/dl	<100mg/l *statin if >40 yrs and other CVD risk factors	< 70 mg/dl highest risk <100 mg/dl High risk
HDL	<40 mg/dl men <50 mg/dl women		
TG	<150 mg/dl		<150 mg/dl

### Summary of Tests and Target Goals for Patients with Type 2 Diabetes

TESTS	GOAL	FREQUENCY
HgbA1c	Individualized** ≤6.5% - < 7%	Twice a year
Blood Pressure	130-135/80-85	Four times a year
LDL Cholesterol	<70 mg/dl - <100 mg/dl	Once to twice a year
Body Mass Index	≤25	Every visit

### Other Therapies

- Aspirin therapy
- Smoking cessation (if indicated)
- Weight loss
  - Dietary consultation
    - ADA diet
    - Plant-based diet
  - Bariatric Surgery
  - Gastric Banding

### Resources

- NDEP Resources for Diabetes and Heart [www.yourdiabetesinfo.org](http://www.yourdiabetesinfo.org)
- Resources from the National Diabetes Information Clearinghouse (NDIC) <http://diabetes.niddk.nih.gov/>
- NHLBI

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