

# Innovations in Diabetes Care

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**Everett Logue, PhD**  
**Family Medicine**  
**Research Center**



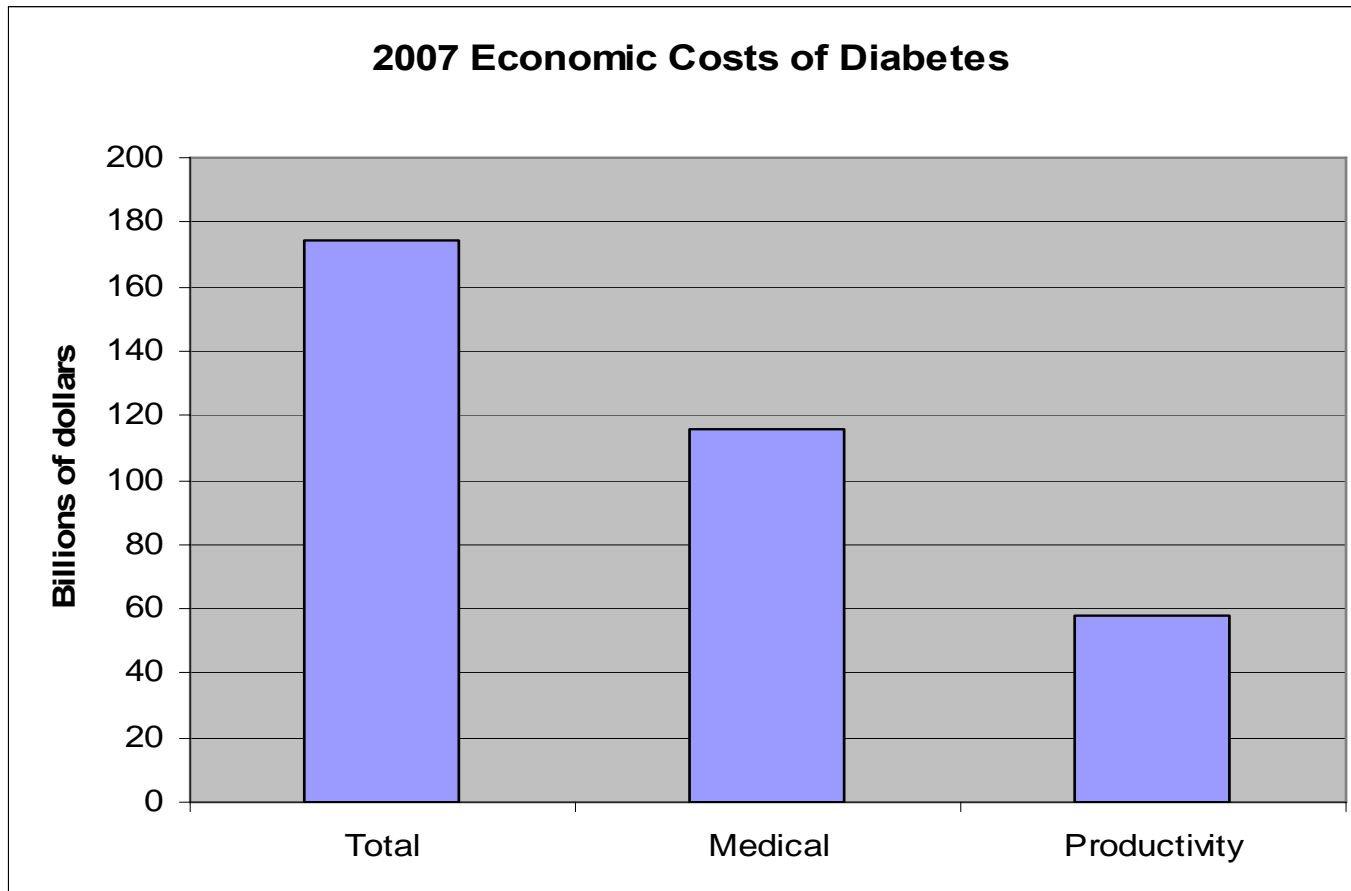
# Diabetes Mellitus (DM) is Serious Business

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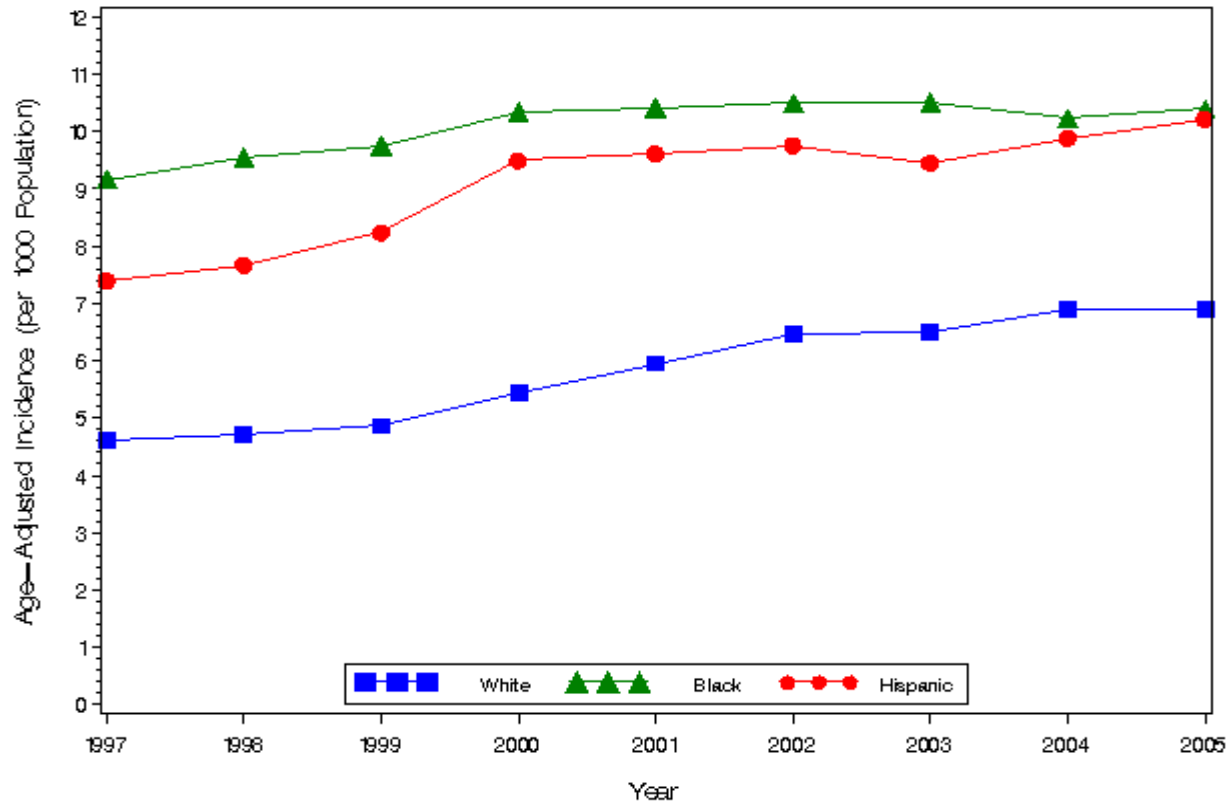


- **Increased morbidity and mortality**
- **Reduced quality of life**
- **Increased health care costs**

# ADA, *Diabetes Care* 31(3): 596-615, 2008



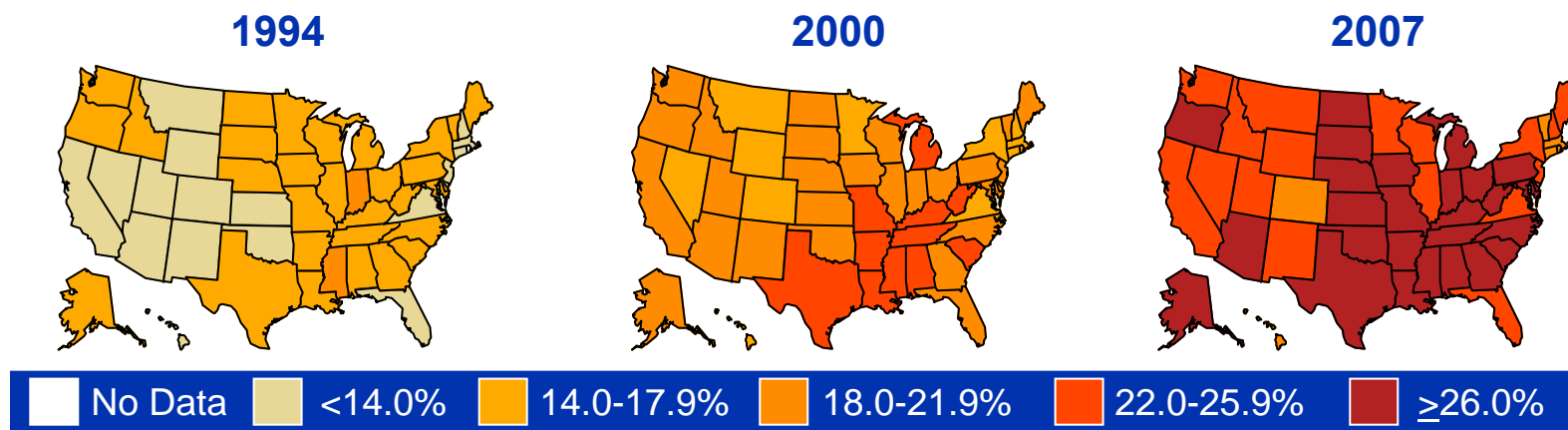
## Age-Adjusted Incidence of Diagnosed Diabetes per 1000 Population Aged 18-79 Years, by Race/Ethnicity, United States, 1997-2005



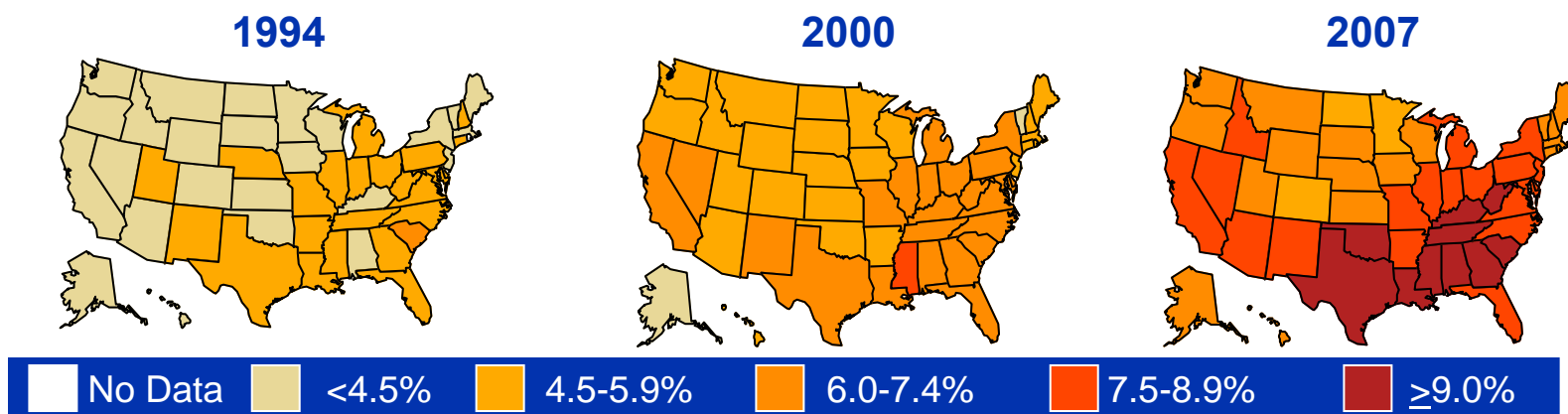
Centers for Disease Control and Prevention

# Age-adjusted Percentage of U.S. Adults Who Were Obese or Who Had Diagnosed Diabetes

## Obesity (BMI $\geq 30$ kg/m<sup>2</sup>)



## Diabetes



CDC's Division of Diabetes Translation. National Diabetes Surveillance System available at <http://www.cdc.gov/diabetes/statistics>



# Diabetes is a Public Health Problem

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- **Affects 7-8% of the population**
- **Many adverse health consequences**
- **Can be partially controlled by wt loss, oral meds or insulin**
- **More prevalent among low SES groups**
- **Etiology: genes X environment**

# What is the problem with diabetes care?

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- **Prevention is difficult**
- **Number of cases increasing**
- **Age at onset is decreasing**
- **Inadequate management of diabetes is common**
  - We know what to do, but not how to do it

# Why Inadequate DM Management?

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- Acute care paradigm
- Fragmented sick care system
- Under investment in primary care
- Inadequate insurance coverage
- Dysfunctional reimbursement
- Under investment in health IT

# Proposed Solutions for Inadequate Management

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- **DM self-management education**
- **DM self-management support**
- **Medical Homes**
- **Chronic Care Model**

# Why Diabetes Self-Management?

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- **Diabetes can be a 365/24/7 problem**
- **Most pts see their PCP a few hours per year**
- **Somebody (not the PCP) has to be in charge**
- **The patient should be in charge**

# Self-Management Education or Support

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- **Education—information transferal & integration**
- **Support---human contact, telephone, email**

# Medical Homes: Ideal Features

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- **Comprehensive**
- **Coordinated**
- **Evidence-based**
- **Patient centered**
- **Information mastery**
- **Primary care based**
- **High quality acute & chronic disease care**

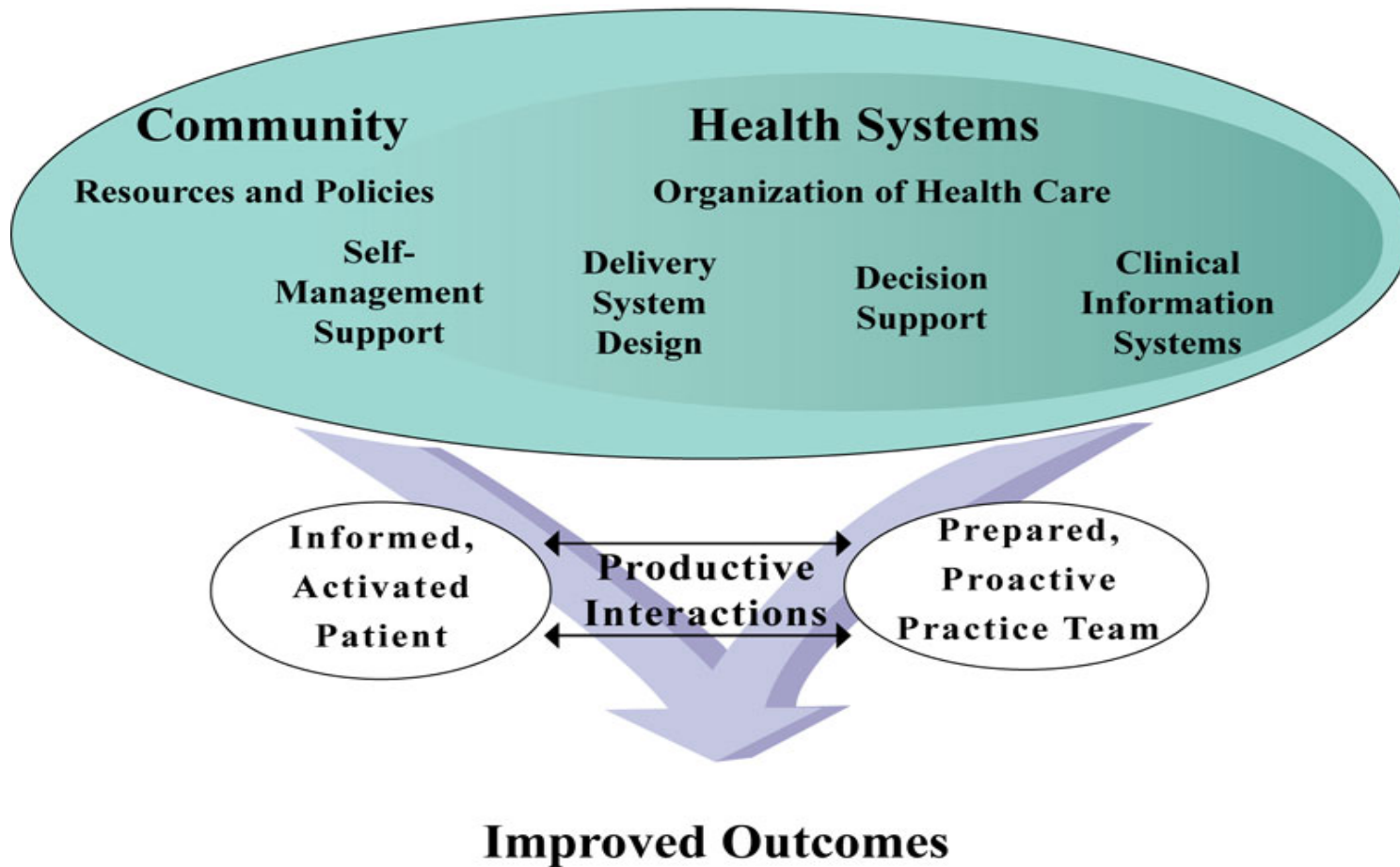
# Chronic Care Model

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- **Health system support & reform**
- **Delivery system redesign**
- **Self-management support**
- **Physician decision support**
- **Greater use of community resources**
- **Health IT**

# Chronic Care Model

## The Chronic Care Model



# Does the CCM work?

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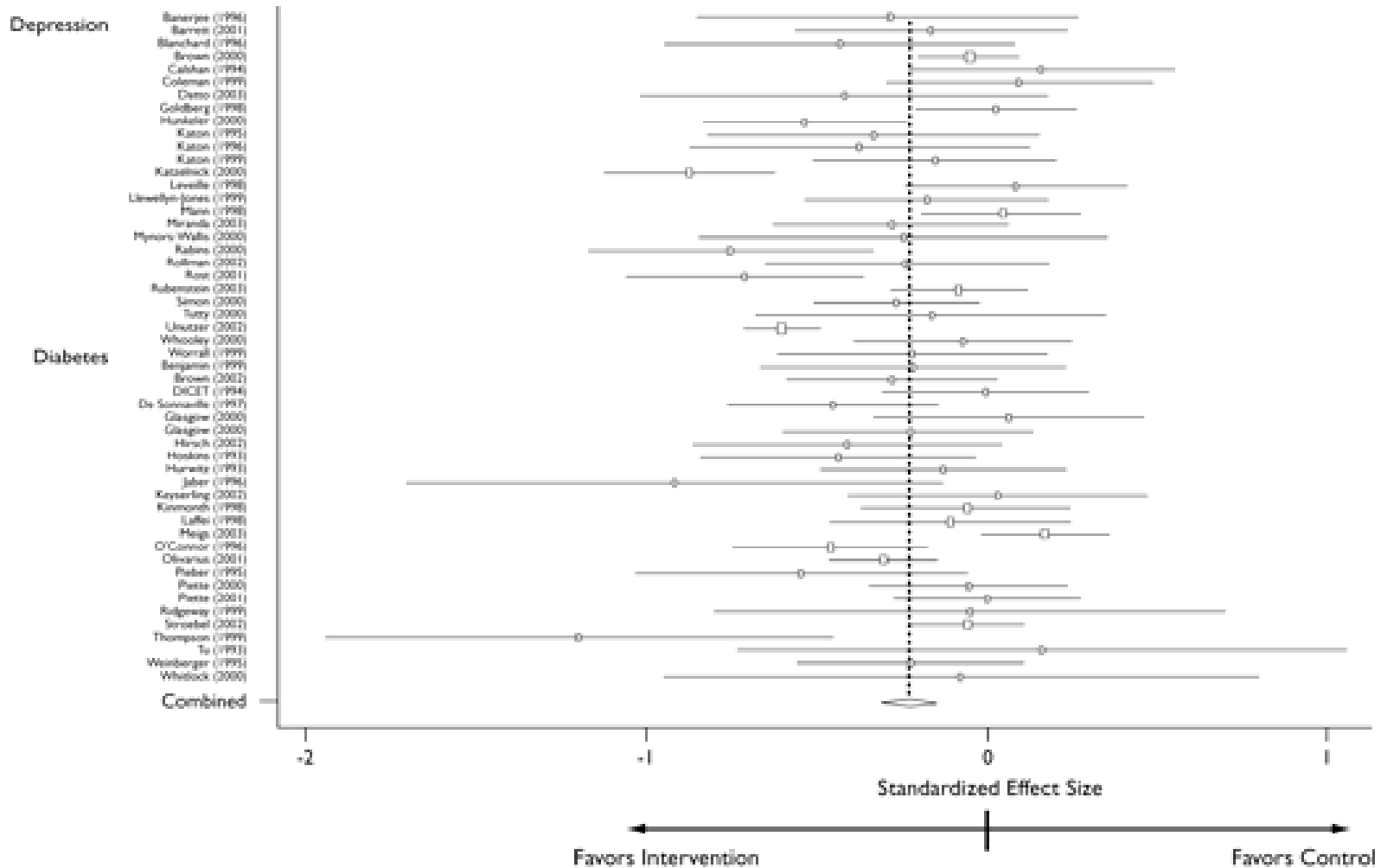
## According to the literature

- Using at least 1 element of the CCM improves outcomes
- Consistently using more than one CCM element improves outcomes more

# CCM Meta Analysis: American J Managed Care, 2005;11:478-488



Figure 2. Forest Plot of Studies Reporting Data on Clinical Outcomes as Continuous Variables



# CCM Regression Analysis: Annals Family Med 2007;5:14-20



Parameter	Estimate	SE	P Value
<u>Hemoglobin A1c value</u>			
Intercept	9.3118	0.5709	<.001
Patient age	-0.0082	0.0041	0.049
Patient race/ethnicity	-0.5990	0.129	<.001
Clinician sex: female	-0.3371	0.1318	0.01
Clinician specialty			
Physician's assistant	-0.6152	0.4299	0.16
Nurse-practitioner	0.8065	0.2556	0.003
General internal medicine	0.1901	0.1263	0.14
Family physician (reference)	0.0000	0	0
<b>Clinician score for use of CCM</b>	<b>-0.3013</b>	<b>0.0879</b>	<b>0.002</b>
<u>Lipid ratio (total CHOL:HDL ratio)</u>			
Intercept	5.8541	0.3414	<.001
Patient age	-0.0148	0.0035	<.001
Patient marital status: married	0.1589	0.0967	0.1
<b>Clinician score for use of CCM</b>	<b>-0.1663</b>	<b>0.069</b>	<b>0.02</b>

# Academic Chronic Care Collaborative

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- **2005-2007 effort to learn how to apply the CCM within physician & allied health training programs**
- **Summa Health System & 23 other sites across the country**
- **Summa focus was applying the CCM to diabetes care**

# Family Medicine Center Diabetes Care 2005-2007

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## Innovations

- **Diabetes planned visits & care teams**
- **Protected time for QI (PDSA cycles)**
- **Better decision support**

## Limited

- **Use of community resources**
- **Health IT**
- **Self-management support**

# Diabetes Planned Visits (DPV)

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## Right information & right pt at the right time

- **Every 3 months**
- **Behind the scene telephone coordination**
- **Pre-visit waiting room questionnaire**
- **Protocol driven, extended 30 minute visit**
  
- **Focus on eliciting pt self-management goals**
- **Verbal support for pt activation & self-management**
- **Lab data should be available at the DPV**
- **Patient report cards with outcome data & goals**

# Four Diabetes Care Teams

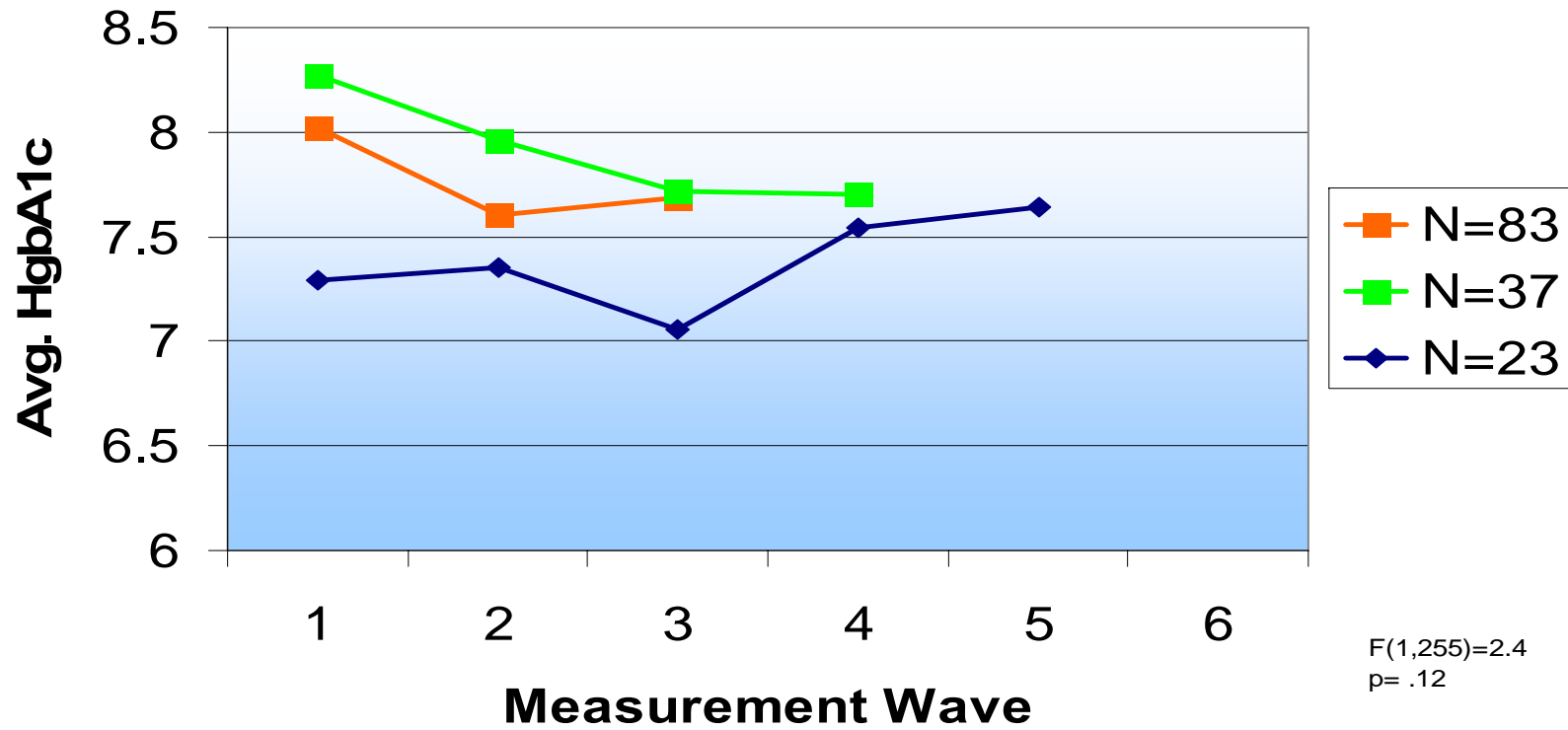
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- **Faculty, residents, staff**
- **Weekly meetings, plan/review PDSA cycles**
- **Separate pt registries for each team**
- **Health outcome monitoring (A1C, LDL-C, BP)**
- **Registry updates by RN's**
- **Promise of team accountability to maintain focus**

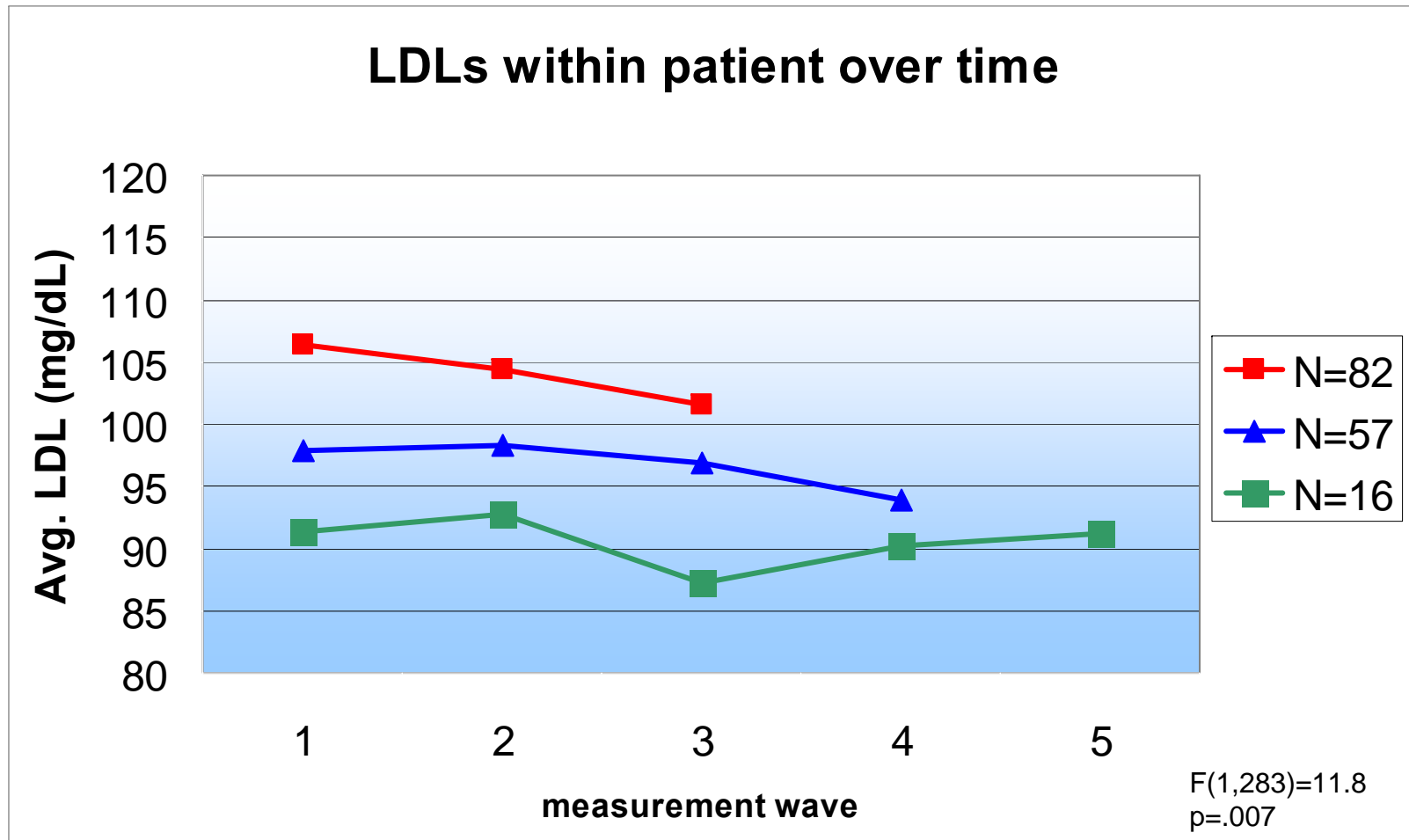
# ACCC A1C Results



### HgbA1c within patient over time



# ACCC LDL-C Results



# Flying while Rebuilding the Airplane

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- **New office & clinical space; staff reorganization**
- **Brand new EMR system with limited reporting**
- **Yearly crop of inexperienced interns**
- **“No shows” at DPV’s**
- **Pts with acute problems that trump DPVs**
- **Everyone feels rushed & ‘change is difficult’**
- **Coordinating PDSA cycles from 4 teams**
- **Clinical inertia**
- **Weak pt self-management support**

# 2008 Nurse Insulin Titration Program

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**Designed to combat clinical inertia**

**Get more pts with high A1Cs to goal**

- **Eligible pts referred to NITP by PCP**
- **Pt knowledge assessment & ed at extended visit**
- **Pt instructed to start insulin or change dose**
- **PCP notified**
- **Close telephone follow-up**

# 2008 Stanford Chronic Disease Self-Management Program

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**System agrees to fund weeklong training session for PCPs and staff**

- **Master trainers in the FMC will train pts to lead 6-week course for other pts**
- **FMC faculty & staff should increase ability to provide self-management support**
- **Evidence suggests that the Stanford program reduces hospitalizations**

# 2008 12-week Weight Management Pilot

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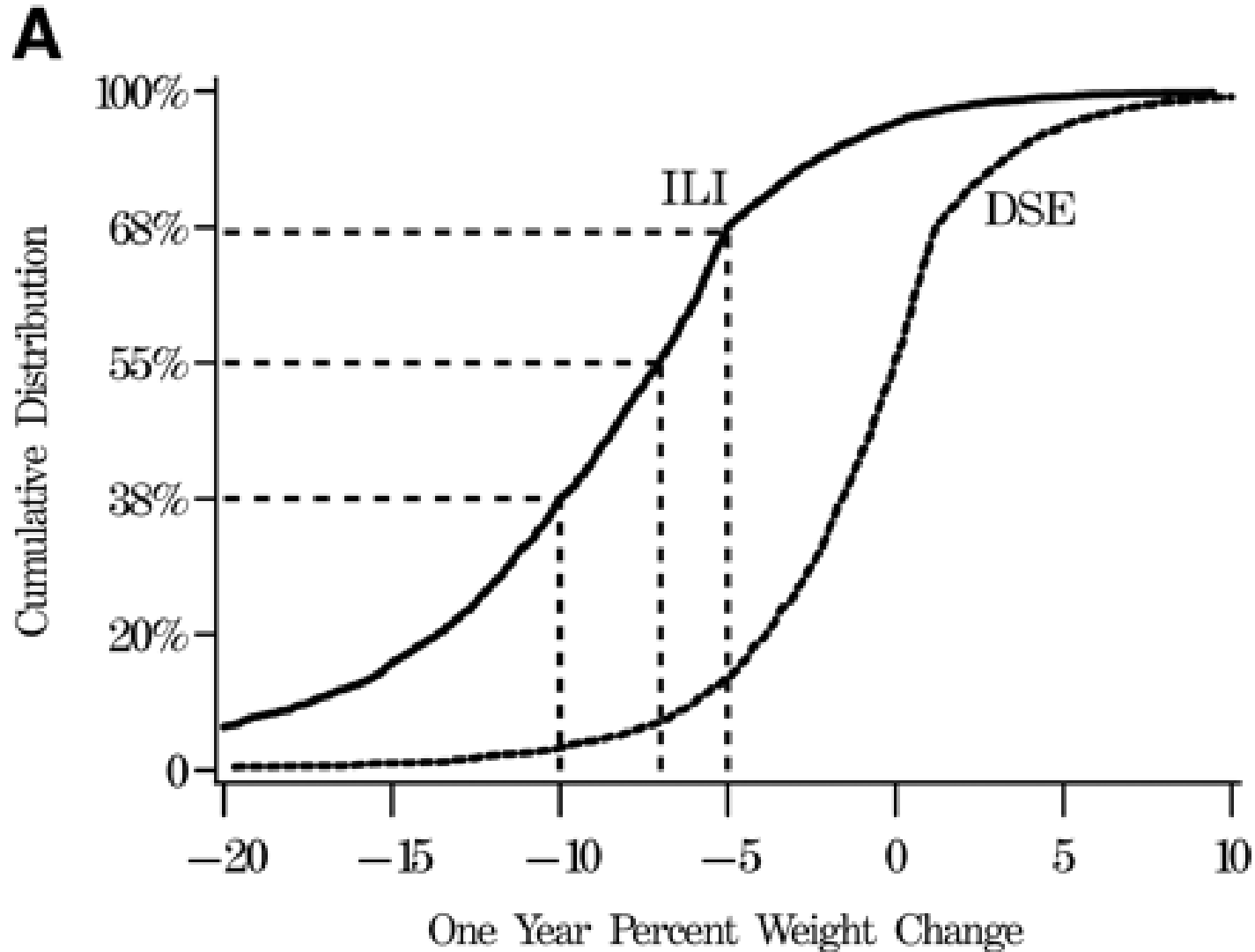
**Pts with DM, high BP, high blood lipids**

- **Weekly weigh-ins support group meetings**
- **Patient-centered toolbox (MRP or standard foods)**
- **Pedometers & walking goals**
- **Early planning for a transition to a linked community program**

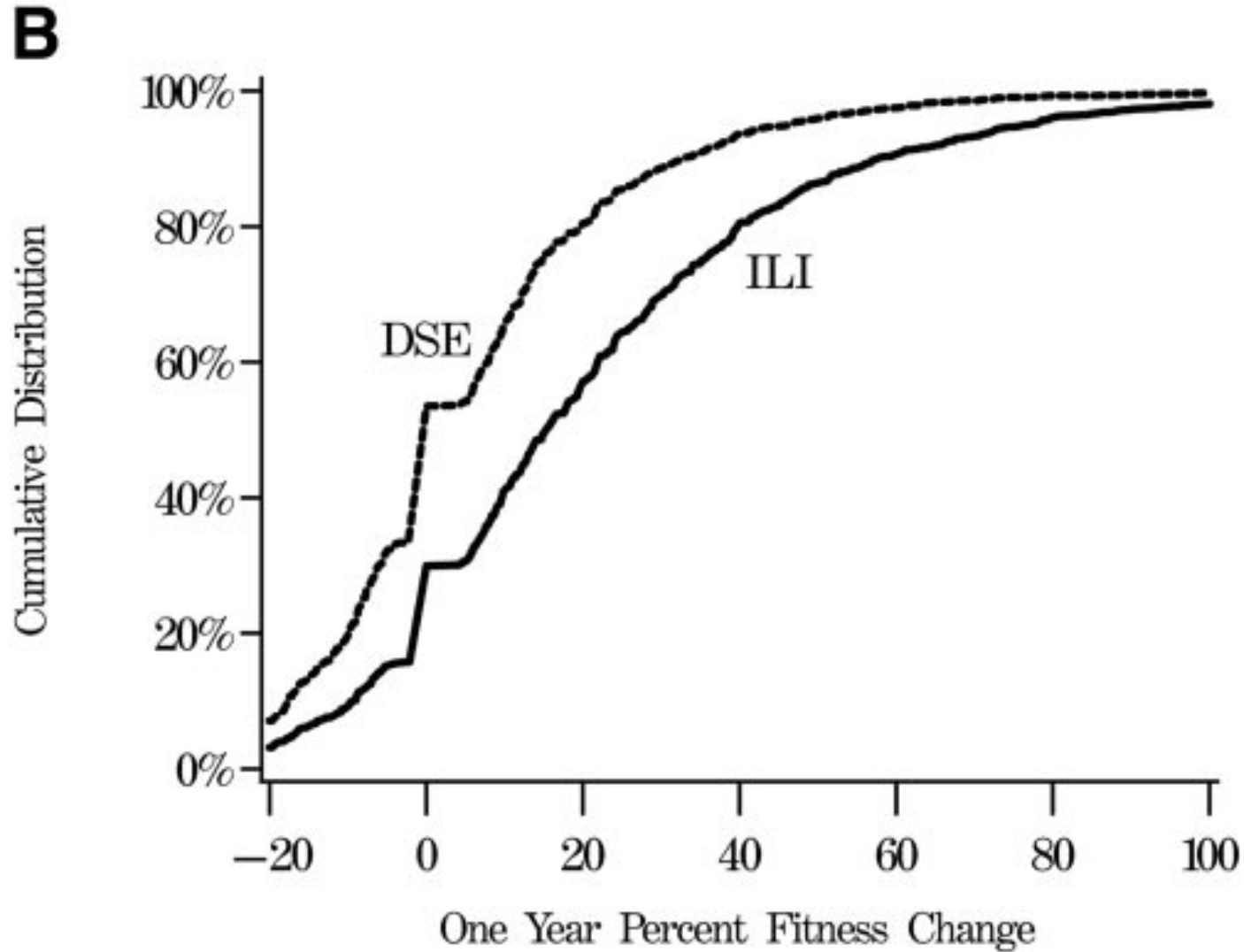
**Evidence-based**

- **NIH Look Ahead trial protocol / DPP**

# Look Ahead Trial Weight Change: Diabetes Care, 2007; 30:1374-83



Look Ahead Trial Fitness Change:  
Diabetes Care, 2007; 30:1374-83



# Diabetes Innovation Summary

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- **Chronic Care Model**
- **Protected time for QA/CQI**
- **Diabetes Planned Visits**
- **Diabetes care teams**
- **Nurse insulin titration program**
- **Stanford chronic disease self-management program**
- **More attention to wt management**

# Mathematics & Science Education Wish List (1)

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## Widespread basic training in

- **Scientific literacy**
- **Protection of human research subjects**
- **Statistical concepts & decision making**
- **Physiology & behavior change**
- **Organizations & social systems**
- **Health disparities**
- **Evaluation of health policy reforms**

# Mathematics & Science Education Wish List (2)

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## **Specialized undergraduate & graduate training**

- **Medical sciences**
- **Healthcare administration & health policy**
- **Public health**
- **Epidemiology**
- **Biostatistics**
- **Health economics**



# Acknowledgements

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**The many contributions of mentors, colleagues, and patients are gratefully acknowledged.**