Using an EMR to Improve Quality of Care in a National Network

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Medical Quality Improvement Consortium (MQIC)

- Consortium of Centricity EMR users interested in pooling clinical data
- Use data to:
  - Improve patient care
  - Strengthen clinical reporting
  - Use clinical data for research
- Represents over 5 million patients, over 5000 physicians/clinicians
- Over 35 states, including Arizona, Delaware, D.C., Florida, Georgia, Hawaii, Idaho, Iowa, Kentucky, Maine, Massachusetts, Minnesota, New Hampshire, New York, North Carolina, North Dakota, Oklahoma, Oregon, Pennsylvania, Rhode Island, Tennessee, Texas, Virginia, Washington

MQIC: 5,100+ Providers by Specialty

Family Medicine	818
Internal Medicine	1088
Pediatrics	432
Obstetrics & Gynecology	152
Geriatrics	43
Primary Care Physicians	**2,533**

Focus on Primary Care → 63%

Growing Specialties Over Time

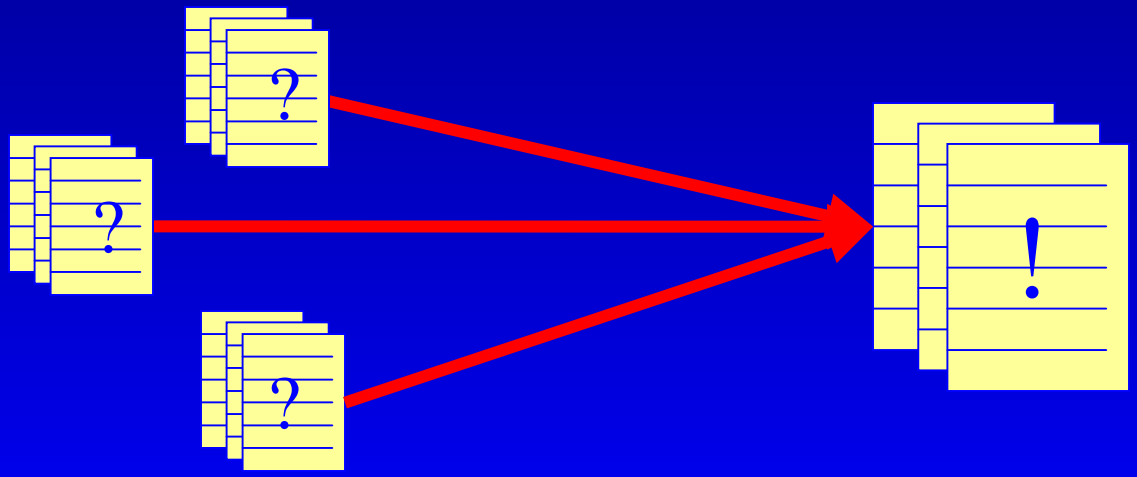
Last updated 5 June 2005

Cardiology	227
Surgery	153
Infectious Disease	58
Pulmonology	96
Hematology/Oncology	85
Neurology	77
Orthopedics	56
Other Specialties	712
Total Specialty Physicians	**1,464**

Residents	415
Allied Health Professionals	694

Clinical Data Services technical process

- Aggregated, Cleaned, Standardized
  - Combine de-identified data from different locations
  - Clean numeric data such as lab results
  - Normalize conceptually equivalent items



Load and stage data to make it useful

Retrospective Outcomes Studies

Quality of Outpatient Diabetes Care: A National EMR Consortium Study

James M. Gill, MD. MPH
Andrew Foy
Yu Ling

Gill JM, Foy, AJ, Ling L. Quality of Outpatient Care for Diabetes Mellitus in a National Electronic Health Record Network. American Journal of Medical Quality. 2006;21:13-17

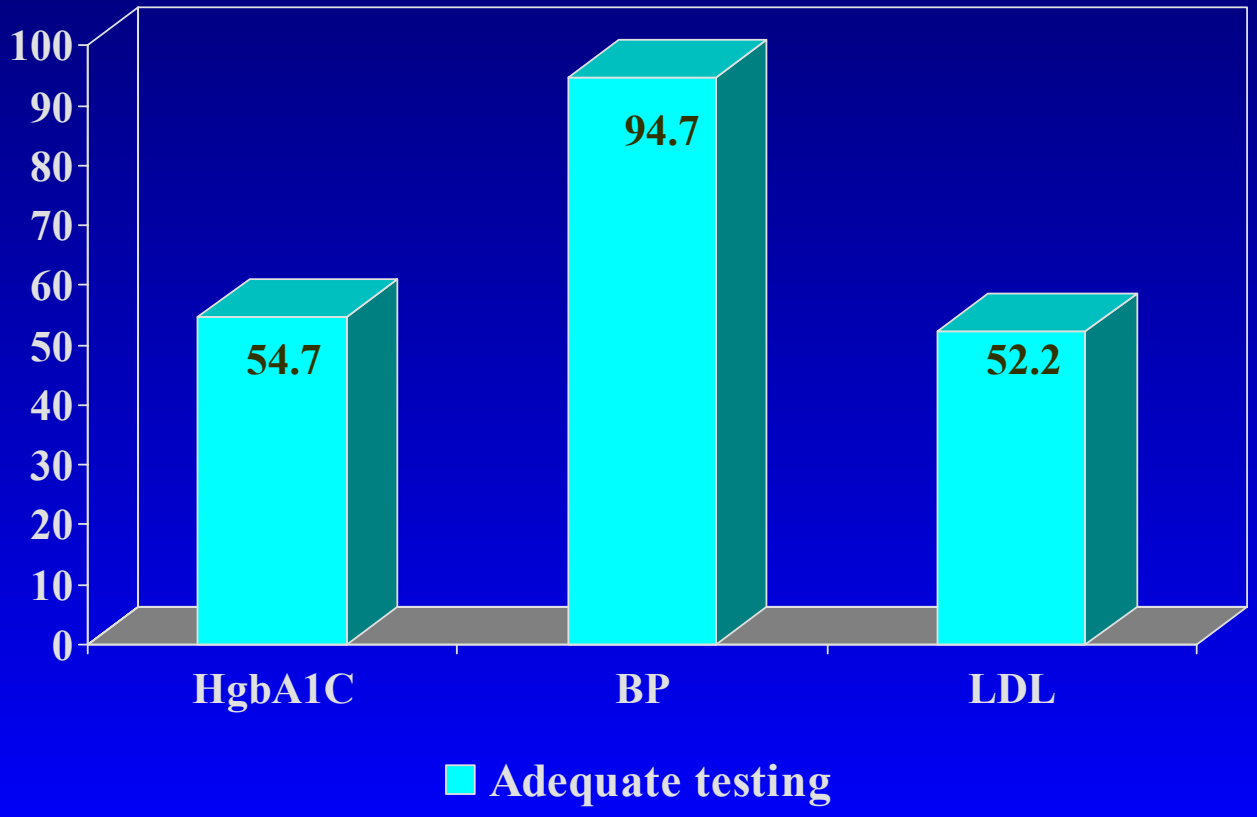
METHODS

- Study Design:
  - Retrospective cohort, using EMR data
- Study Period:
  - 1/1/2002 – 6/30/2003
- Population: N=10,500
  - 30 to 70 years old
  - Diagnosis of diabetes (250.xx) before study period and still active at end of study period
  - Office visit during 2002

METHODS

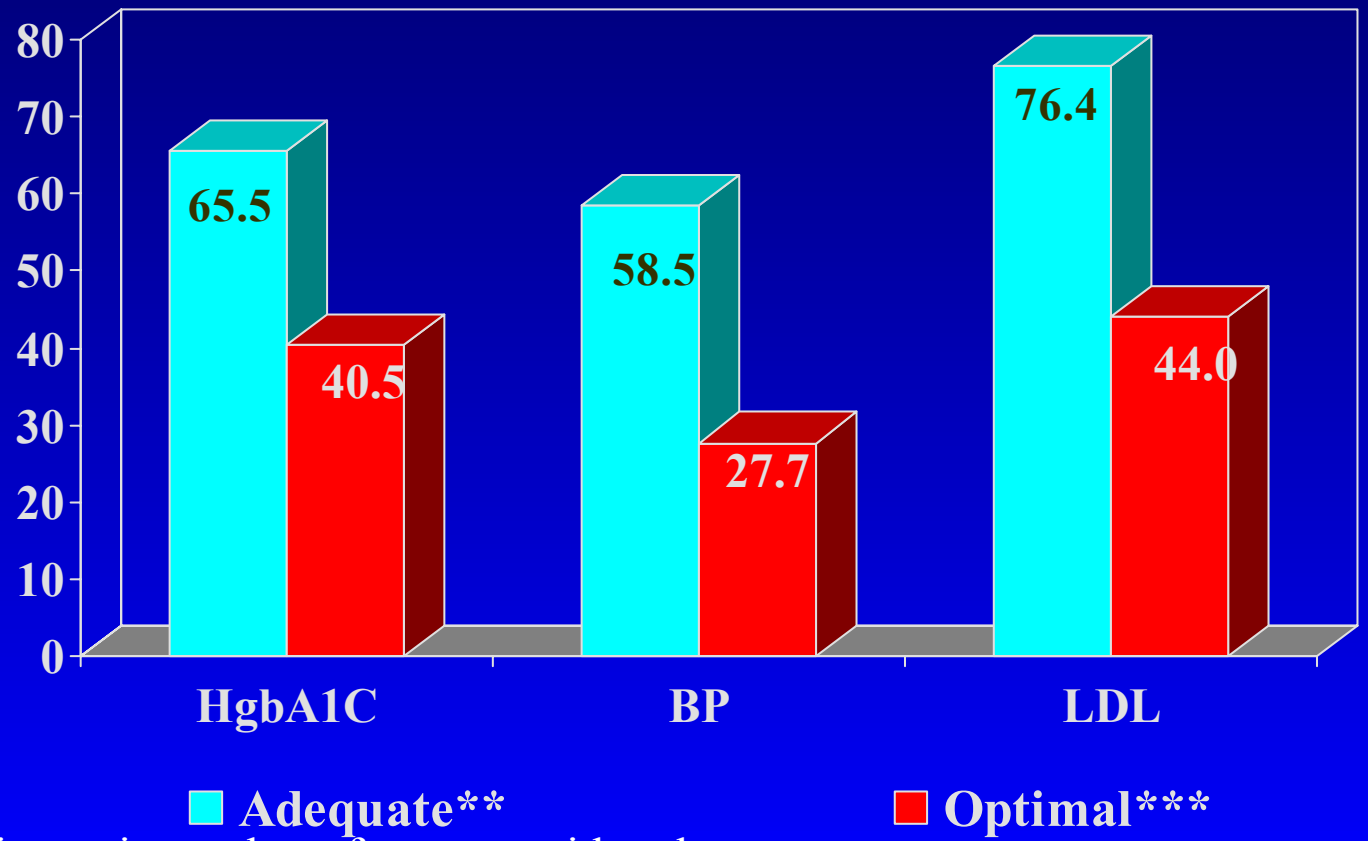
- Outcome Variables
  - Adequate testing
    - 2 HgbA1c, 1 LDL, 1 BP during 1st year
  - Attainment of Goal (based on last value in 1st yr)
    - Optimal: A1c < 7, BP < 130/80, LDL < 100
    - Adequate: A1c < 8, BP < 140/90, LDL < 130
  - On medication if not adequate control
- Analysis
  - Descriptive: calculated percentages and CI's

Percent of Patient Population with Adequate Testing



*Adequate testing is at least two Hgb tests, one systolic and diastolic BP, and one LDL test

Percent of Patient Population by Level of Control

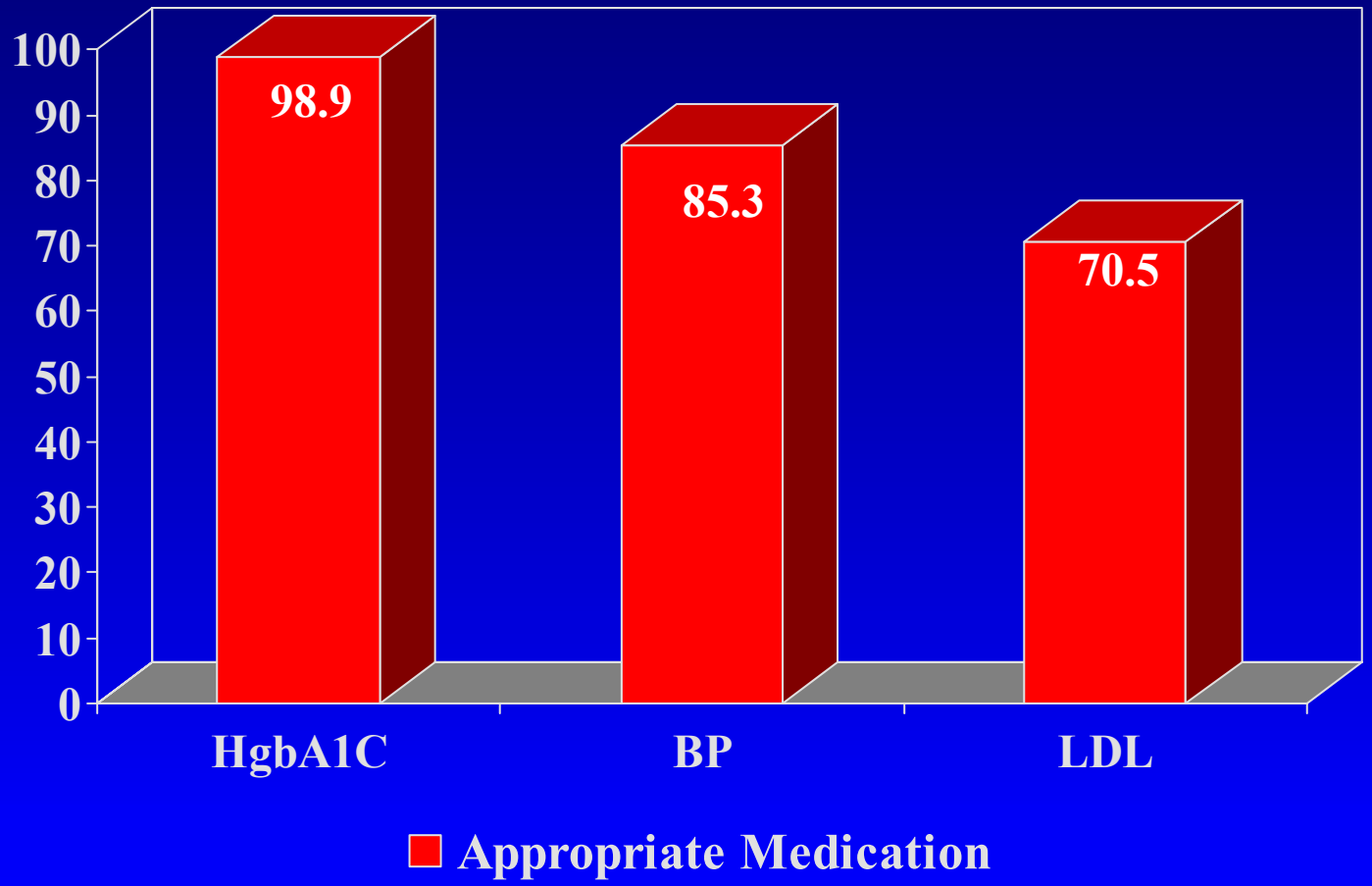


*Denominator is number of persons with at least one test

**Adequate control = HgbA1c<8.0, BP <140/90, LDL,130

***Optimal control = HgbA1c<7.0, BP<130/80, LDL,100

Percent of Patient Population with Appropriate Medications



Denominator is number of persons not adequately controlled

Medications for Hyperlipidemia N=916

	# Patients	% out of Patients on Medication
Statins	866	94.5%
Atorvastatin	610	70.4%*
Simvastatin	251	29.0%*
Pravastatin	131	15.1%*
Fluvastatin	96	11.1%*
Lovastatin	35	4.0%*
Fibrates	123	13.4%
Bile Acid Sequestrants	35	3.8%
Nicotinic Acid	48	5.2%

*Does not add up to 100% since patients may be on more than one medication

Medications for Hypertension
N=3544

	# Patients	% out of Patients on Medication
ACE Inhibitors	2885	81.4%
Diuretics	1494	42.2%
Calcium Channel Blockers	1412	39.8%
Beta Blockers	1414	39.9%
ARBs	440	12.4%
Centrally Acting Agents	305	8.6%
Vasodilators	44	1.2%

*Does not add up to 100% since patients may be on more than one medication.

Medications for Hyperglycemia
N=2905

	# Patients	% out of Patients on Medication
Metformin	1997	68.7%
Sulfonylureas	1908	65.7%
Insulin	1608	55.4%
TZD's	1221	42.0%
Other	184	6.3%

*Does not add up to 100% since patients may be on more than one medication.

Prescribing Patterns for New Antihypertensives before and after ALLHAT in a National EMR Database

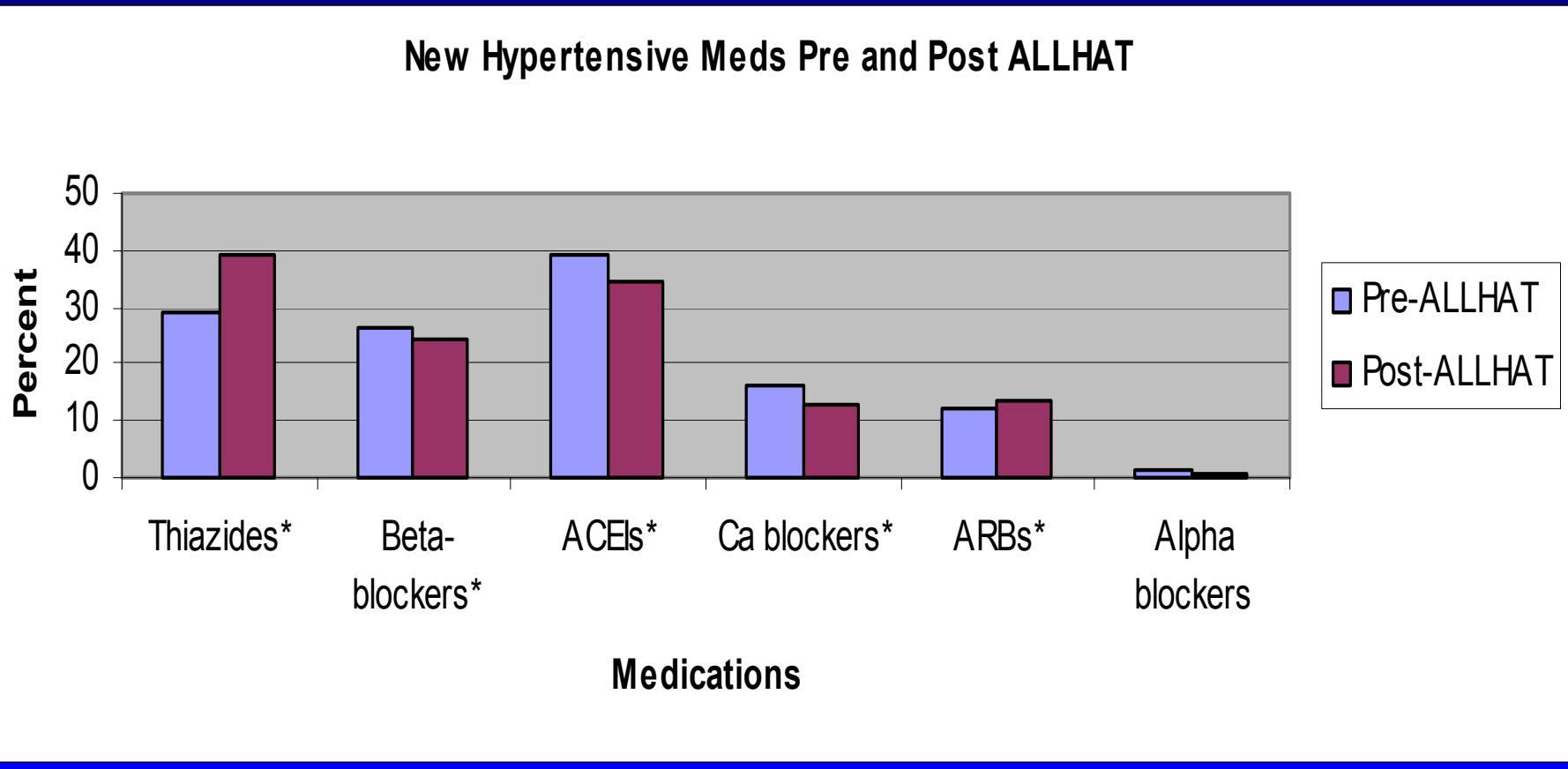
Marty Player, MD
Medical University of South Carolina

James M. Gill, MD, MPH
Heather Bittner-Fagan, MD
Arch G. Mainous, Ph.D.

METHODS

- Study Design:
  - Retrospective cohort, using EMR data
- Population:
  - 20 to 80 years old
  - New diagnosis of hypertension in year before or after ALLHAT publication (December, 2002)
  - New prescription for antihypertensive on or after diagnosis date
  - N = 5950 (before),7706 (after)
- Outcomes:
  - Category of antihypertensive prescribed
- Analysis:
  - Logistic regression, controlling for age/gender

Main Results



Results

Medication type	Pre-ALLHAT	Post-ALLHAT	OR (95% CI)
	Percent	**Percent**	
Thiazide diuretics	29.38	39.06	1.53 (1.43-1.65)
Beta-blockers	26.17	24.37	0.91 (0.84-0.98)
ACE inhibitors	39.33	34.26	0.81 (0.76-0.87)
Calcium channel blocker	15.88	13.03	0.80 (0.72-0.88)
Angiotensin receptor blocker	11.95	13.65	1.17 (1.06-1.30)
Alpha blockers	1.33	0.95	0.74 (0.54-1.03)

Prospective Interventional Studies

- Previous studies have shown EMR's to improve quality of care for prevention
- Few studies have examined impact of EMR's on quality for chronic diseases
- Large opportunity to reduce treatment gap by using EMR's to bring guidelines to the point of care.

Using Electronic Medical Records (EMR) Based Disease Management Tools to Improve Management of Hyperlipidemia in Primary Care

James M. Gill, MD, MPH
Michael Lieberman, MD

Background

- Large body of evidence that reducing lipid levels reduces CV morbidity/mortality
  - Especially persons with known CVD
- Guidelines – NCEP ATP III
  - Screening/Monitoring
    - Age 20+, lipid panel every 5 years
    - Annually if high risk
  - Lipid Goals: Based on LDL
    - High Risk: LDL < 100 mg/dl.
    - Moderate Risk: LDL < 130 mg/dl
    - Low Risk: LDL < 160 mg/dl

Treatment Gap

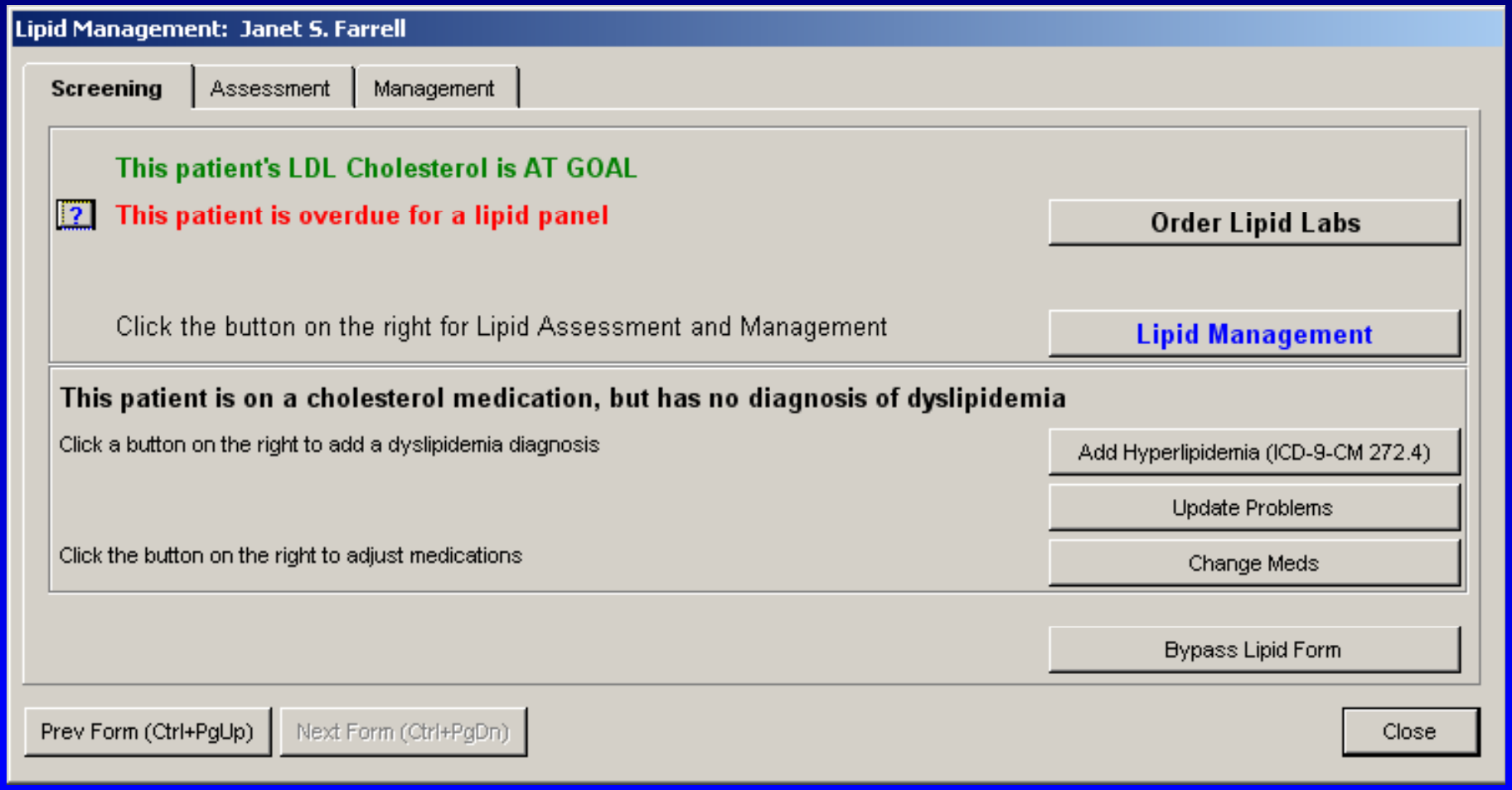
- Studies show suboptimal levels of lipid control in outpatient settings
  - 40-60% not up to date on screening/monitoring
  - 50-80% not at goal
  - No better (often worse) for highest risk pts
- EMR has been shown to improve quality
  - Makes guidelines available at point of care

Purpose

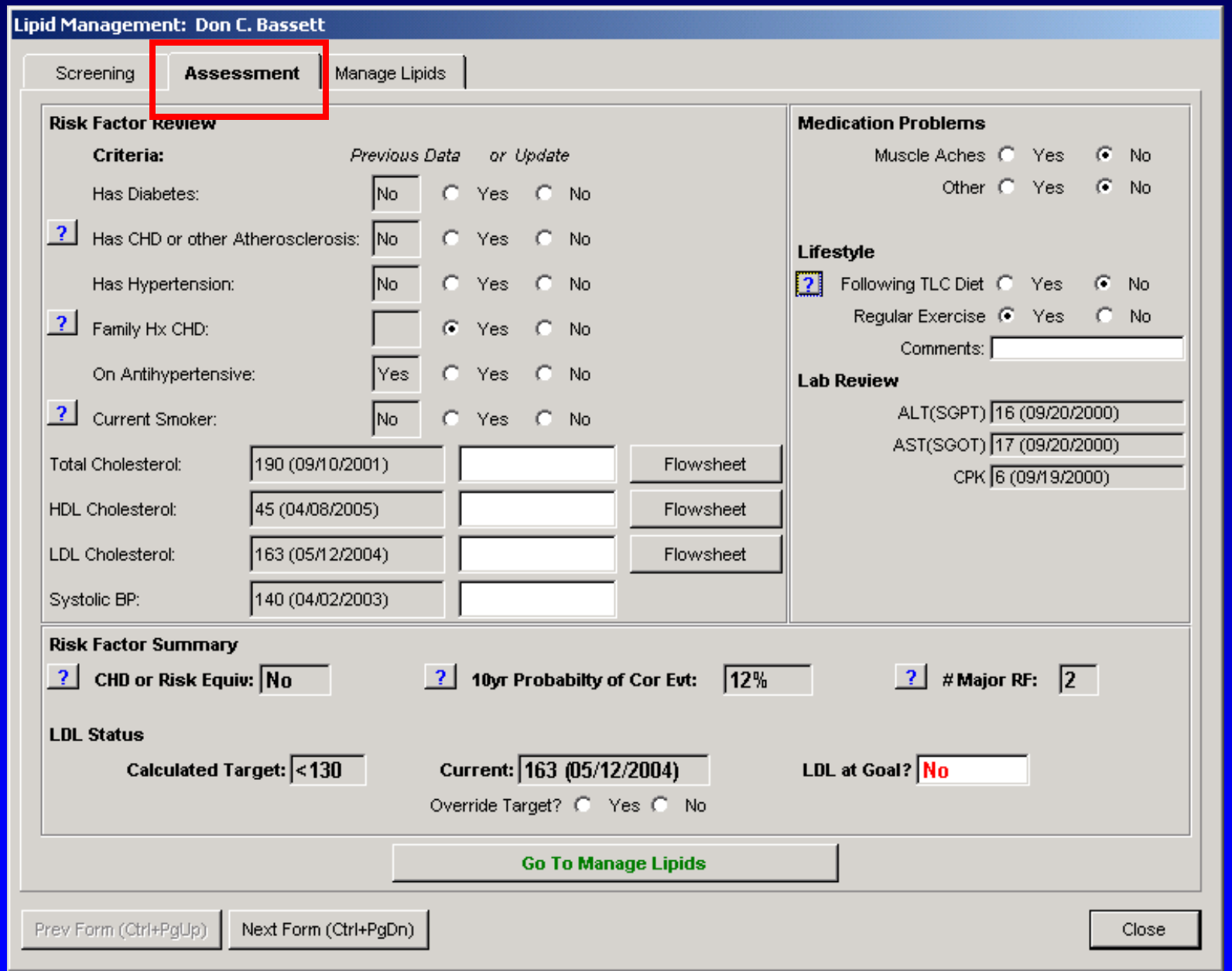
To examine the impact of an EMR-based disease-management intervention for hyperlipidemia in outpatient practices.

- Three Components:
  - An electronic decision support tool embedded into the EMR
  - Patient and physician education materials accessed through the EMR form
  - Reporting tools to identify patients in the practice who may benefit from more intensive therapy

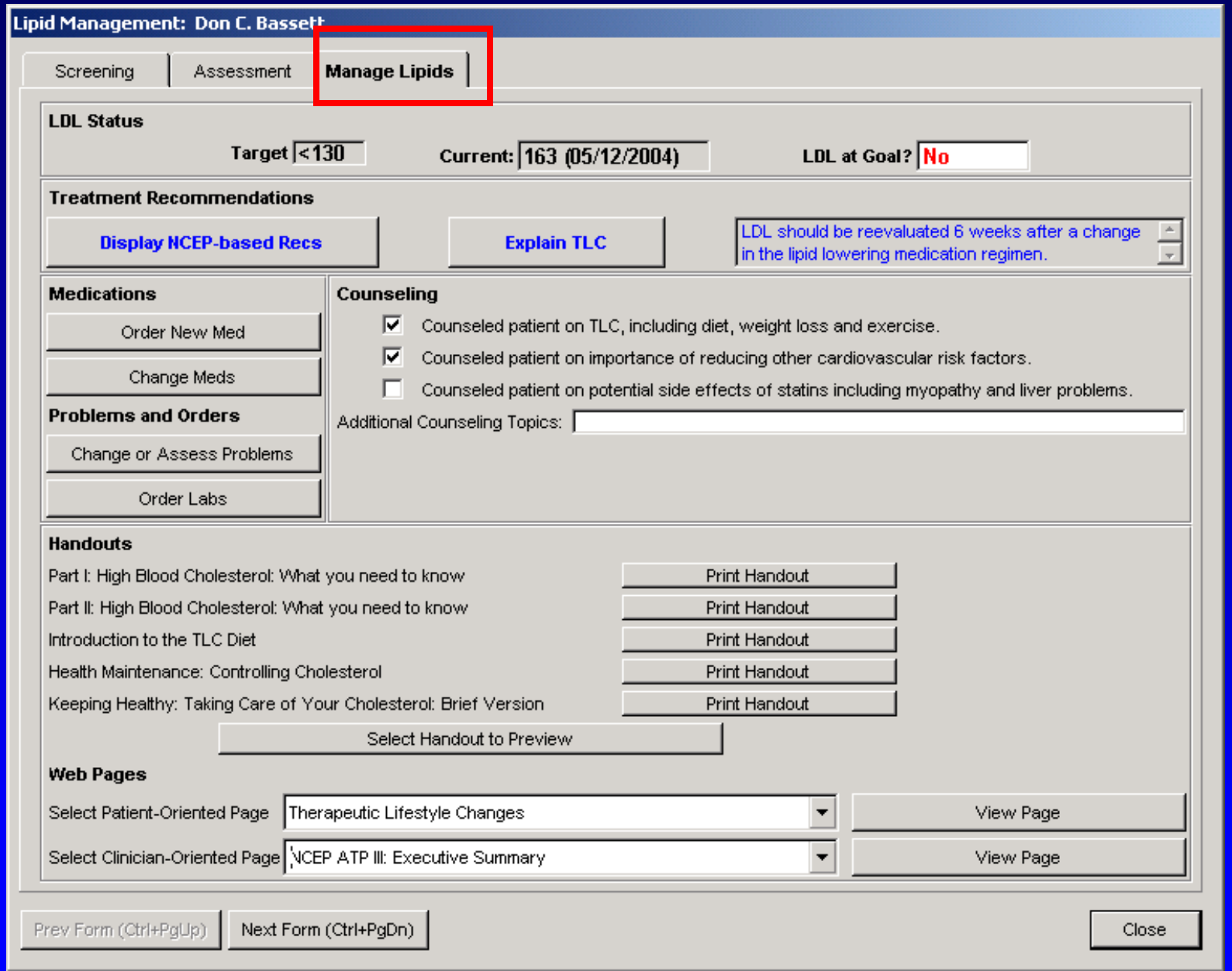
Lipid Management Form



Lipid Management Form



Lipid Management Form



Patient Letter #1

The physicians at << >> are dedicated to providing the highest quality care for our patients. National guidelines recommend that all adults should have their cholesterol checked periodically, and that adults with a high cholesterol should be treated with diet or medications or both.

Specifically, guidelines from the National Education Program (NCEP) recommend that everyone age 20 and older should have their cholesterol measured at least once every 5 years, or more often if it is high. Persons with specific types of heart disease (coronary heart disease, or CHD), other diseases of the blood vessels (such as peripheral vascular disease or aortic aneurysm), or diabetes are at higher risk and should have their cholesterol checked at least every year.

In our office, we use a sophisticated computer system to track the status of your cholesterol tests. Our records show that you are due to have your cholesterol checked according to these guidelines.

Please call the office to arrange to have a cholesterol test done at your earliest convenience.

Please note that since this is based on our computer records, it may not accurately reflect tests that were ordered by another physician. If you had a recent cholesterol test done by another physician, or if you are getting your cholesterol treated by another physician, please let us know.

Feel free to call me or come in to discuss with me if you have any questions.

Sincerely,

Lipid Test Due

Design

- Randomized, Controlled Trial

Physician Criteria

- Members of the Medical Quality Improvement Consortium (MQIC)
- Centricity EMR user for at least 1 year
- Physicians (MD or DO)
- Primary Care Specialty or Cardiology
- 8 hours or more per week in outpatient practice

Patient Population

- Age 20-79 years
- At least one office visit to study physician before and during study year

Outcome Variables

- Proportion of Patients at LDL Goal
- Proportion of Patients Tested Adequately for Hyperlipidemia
- Proportion of Patients with Unrecognized Hyperlipidemia
- Proportion of High-Risk Patients Appropriately Prescribed Lipid-Lowering Medications
- Recommendation of Non-Pharmacologic Interventions
- Use of Disease Management Tools

Independent Variable

- Whether or not the physician was randomized into the intervention arm or the usual care arm of the study

- Offices randomly assigned within blocks of similar practices

Control Variables

- Physician specialty
- Teaching vs. non-teaching practice
- Urban/suburban/rural practice
- Geographic location (NE, NW, etc)
- Practice size and type (solo vs. group, whether part of larger health care system)
- Hours per week in direct outpatient care
- Patient volume
- Patient mix (e.g., proportion of patients ages 20-79, proportion with CHD or diabetes)
- Patient-sharing (i.e., proportion of visits where physician's patients are seen by another provider)
- Years in practice
- Years using Centricity

Data Sources & Analysis

DATA SOURCES

EMR MQIC Database	The primary data source will be EMR data from the MQIC database.
Physician Questionnaire	Questionnaires will be administered at three time points: baseline, midpoint (6 months) and endpoint (12 months) for both the control and intervention groups
Focus Groups	Conducted for a sample of volunteer physicians and their patients

Analysis

- Data collection at physician level but primary unit of analysis will be the patients
- Data will be analyzed using hierarchical, logistic regression (HLR)

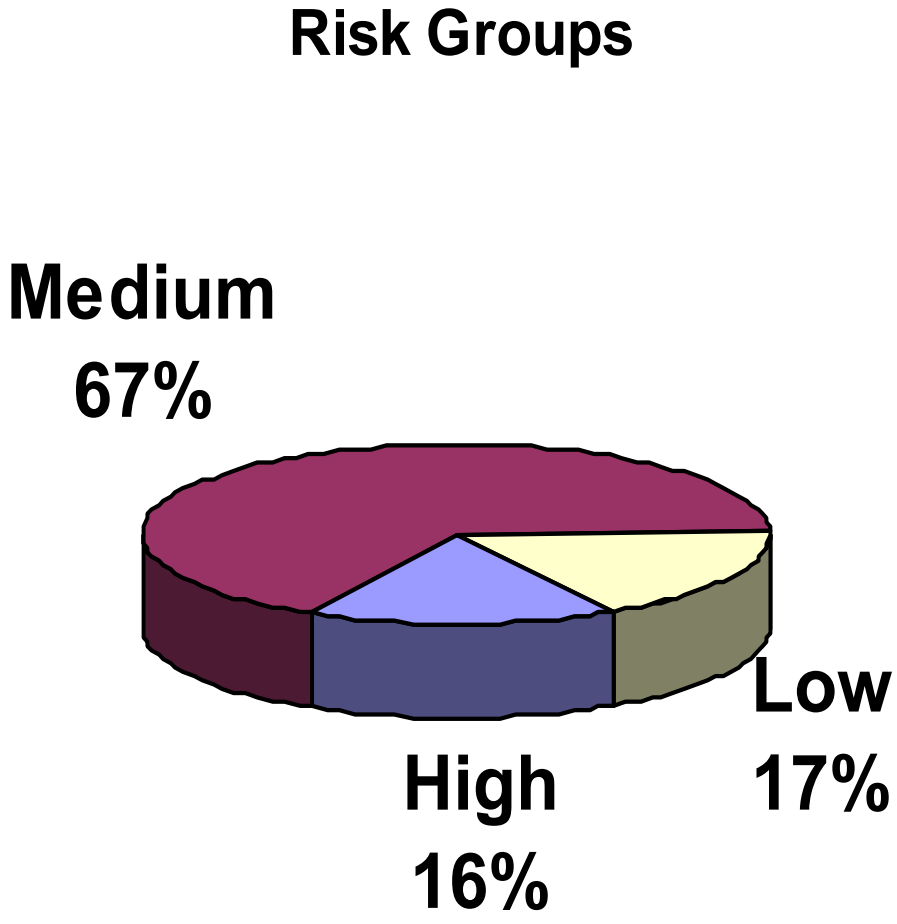
Demonstration of EMR Tool

Go to Centricity

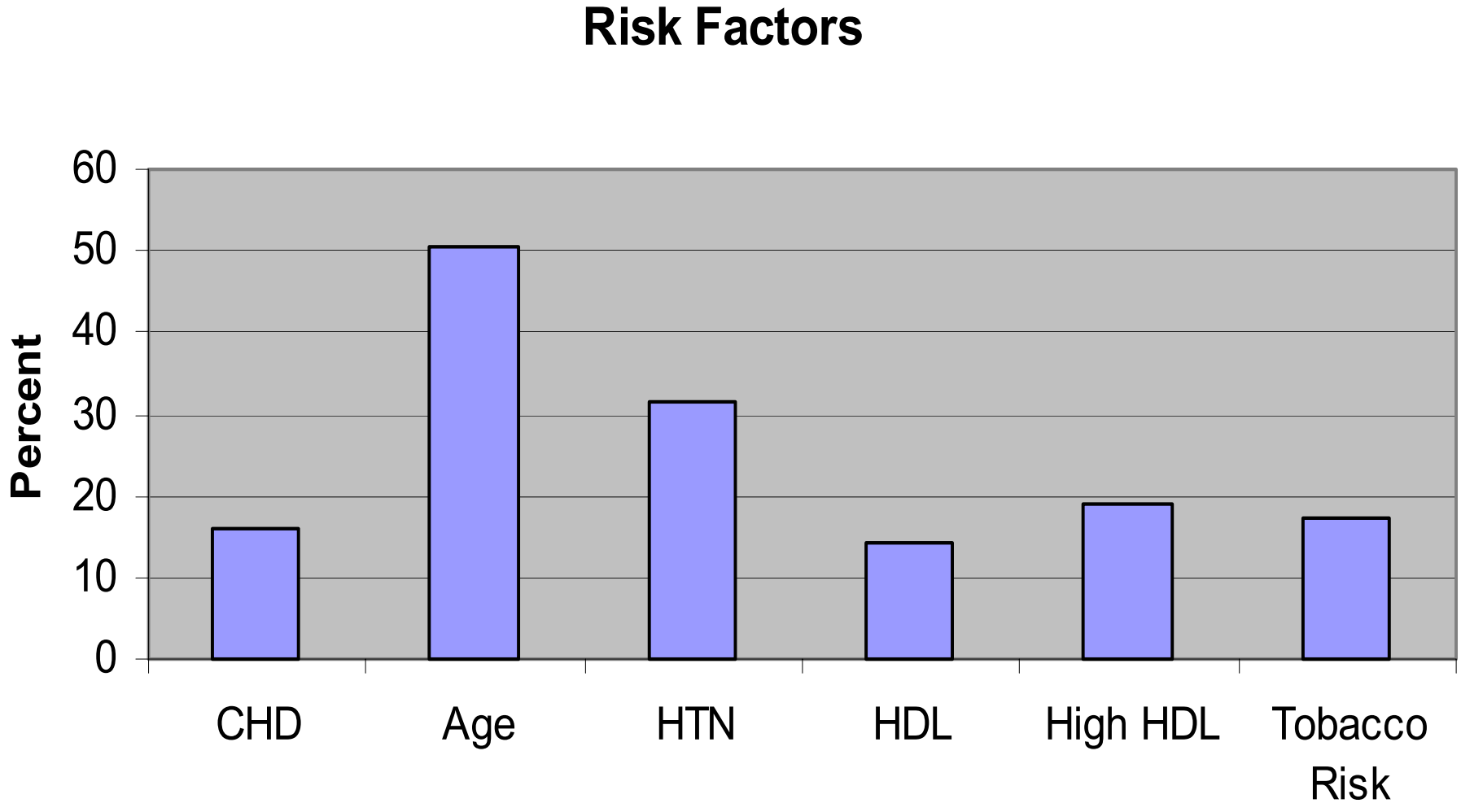
Current Status

- 26 offices (with 120 physicians) randomized to intervention vs. usual care
- Go live date November 1, 2005
- Completed baseline analysis
- Will do preliminary analysis at 6 months, final analysis at 12 months

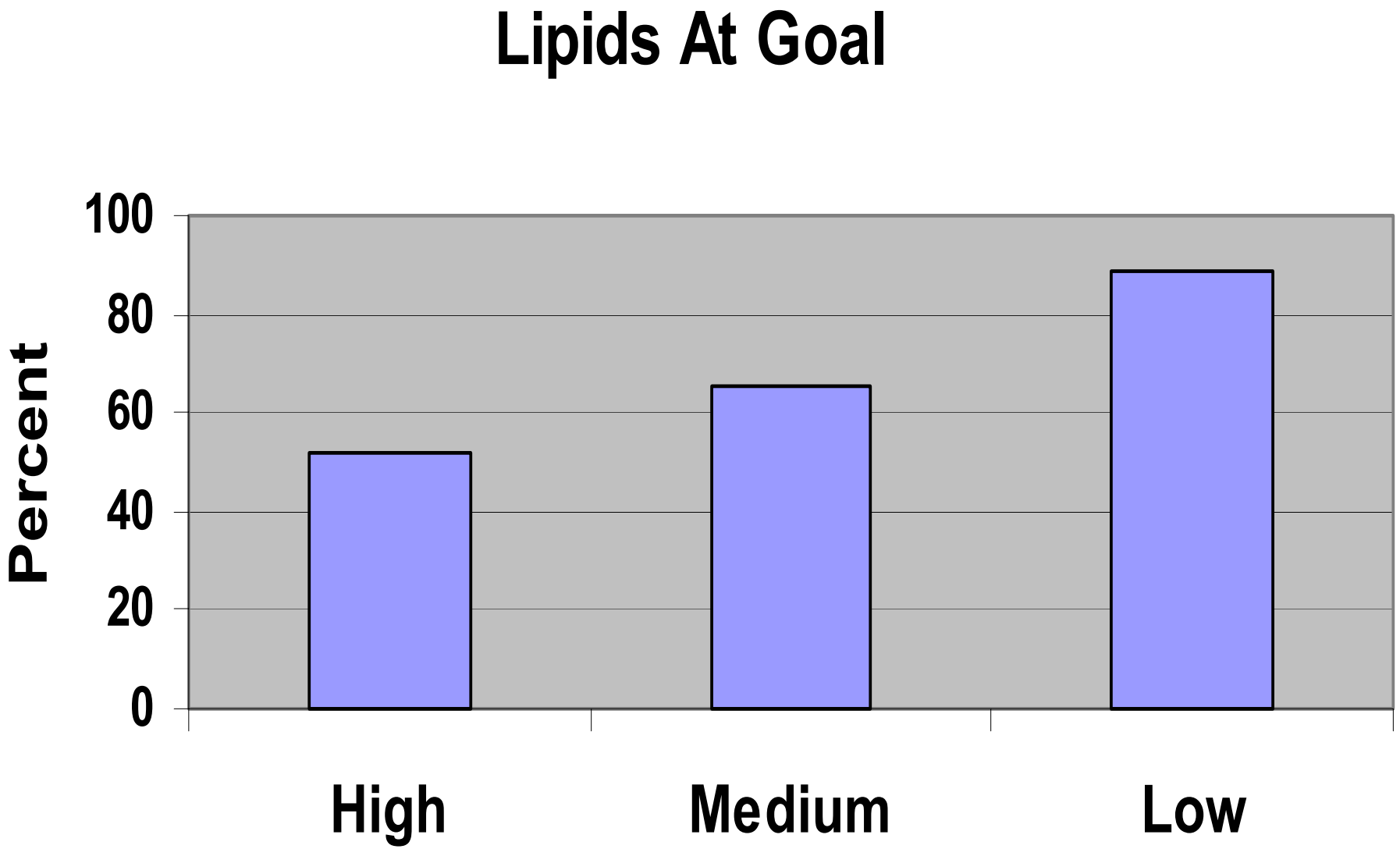
Results: Baseline MQIC Data



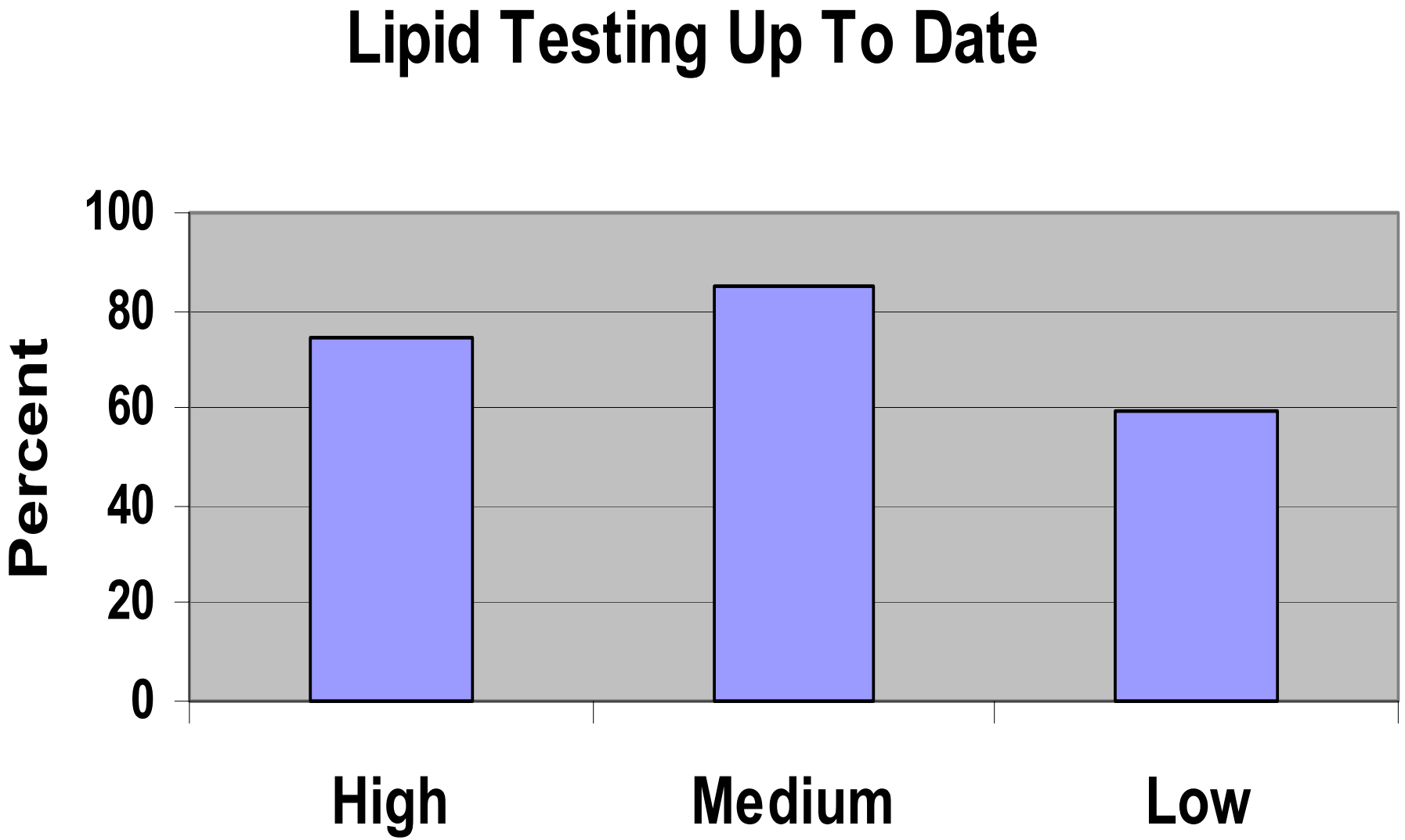
Results: Baseline MQIC Data



Baseline Outcome Variables



Baseline Outcome Variables



Results: Baseline Questionnaire

- **76 valid responses**
  - 55 FP/GP, 19 IM
  - 52 private practices, most commonly 11-30 yrs
- **Practice Patterns: EMR and Web**
  - Most are experienced EMR users (half > 5 yrs)
  - Almost half use EMR to help with pt mgmt, one-third for lipid mgmt
  - Almost all have web access, nearly half use for pt ed during visits
  - Most recommend web sites to pts (CDC, WebMD, AAFP most common)

Results: Baseline Questionnaire

- **Practice Patterns: Lipid Mgmt**
  - Tend to test more often than recommended
    - Every 6 months for high risk, annual for moderate, 1-5 yrs for low
  - Thresholds for diet therapy also aggressive
    - 70 –100 for high risk, 100-130 for moderate, 130-160 for low risk
  - Medication thresholds similar to diet therapy thresholds
  - Feel biggest barriers to lipid therapy are cost, pt concerns of side effects, pt adherence

Summary of Results

- Significant room for improvement in lipid control
  - Particularly for highest risk group
- Also room for improvement in lipid testing
  - More so for lowest risk group
- Rates higher than in previous literature
  - For highest risk, 52% vs. 18-32%
  - Similar to what was found in larger MQIC study
  - Could be related to better care/documentation with EMR
- Intervention and Usual Care groups similar
- Docs experienced EMR users, use Web for pt care
- More aggressive with lipid management than guidelines
  - Suggests problem is with system/organization rather than physician knowledge or intent

Using Electronic Medical Records (EMR) Disease Management Tools to Improve Recognition and Management of Depression in Primary Care

James M. Gill, MD, MPH
Jefferson Medical College

Purpose

The purpose of this study is to examine the patterns of care for patients with depression in ambulatory practices, and to examine the impact of an EMR-based disease-management intervention on quality of primary care. The study will be composed of **two** separate components:

Retrospective Study	Examine diagnosis and treatment for depression over the previous three years. Include diagnoses, medications, laboratory testing and co-morbidities.
Prospective Study	Randomized clinical trial using electronic forms that will be embedded into the EMR, based on nationally recognized evidence-based guidelines for care of depression.

Retrospective Study

- Purpose: To examine patterns of care for persons with depression in ambulatory practices
- Outcomes:
  - Diagnoses
  - Hours per week in direct outpatient care
    - Both prevalence and incidence (new)
    - Categorized by type of depression
  - Medications
    - Both prevalent and initial medications
    - Examine discontinuation, change and augmentation
  - Laboratory Testing
  - Co-morbidities

Prospective Study

- Many of details will be driven by results of retrospective study
- Framework based on current lipid study

Design

- Randomized, Controlled Trial

Participant Population

- Members of the Medical Quality Improvement Consortium (MQIC)
- Physicians (MD or DO)
- Adult Primary Care Specialty (family medicine, general internal medicine)
- 8 or more hours per week in outpatient medicine practice
- Centricity EMR user for at least 1 year
- Not currently using EMR based forms for management of depression, e.g., CCC forms

Future Studies

- Hypertension
- Diabetes
- GERD/Dyspepsia
- Use of atypical antipsychotic agents