Use of Large Databases for Cancer Prevention and Control Research

Gregory S. Cooper, MD

Case Western Reserve University

Goals

- Introduction to large database research
- Colon cancer screening
- Screening for Barrett’s esophagus

Existing Cancer Data Sources

- Screening
  - Telephone surveys (BRFSS)
  - Single health plan/institution
- Incidence/Treatment
  - Population-based registries (state, region)
  - Health plan/institution
- Follow Up
  - Health plan/institution

Limitations of Existing Data

- Generalizability
- Screening
  - Recall biases
  - Oversample higher SES
- No national-level registry
- Cancer patients
  - No pre- or post-treatment data

"Breakable bones, a tendency to bleed when cut, vulnerability to germs and viruses. These are all preexisting conditions."

Advantages of Claims Data

- Nationally Representative
  - Community practice
  - Different treatment locations
  - Efficacy vs. effectiveness
- Large Sample Sizes
- Little Incremental Research Costs
- Turnaround Time Typically Low

Disadvantages

- Not Designed for Research
  - Nonstandardized definitions
  - No data on severity
- Coding Inaccuracies
  - Systematic
  - Random
- Missing Patients (VA, Age Cutoff, HMO, Outpatient)

Sources of Claims Data

- Federal Government
  - Medicare
  - VA
- State Level
  - Medicaid
  - Hospital discharges
- Private Insurers

Types of Medicare Files

- Part A 100% of patients (hospitalizations, skilled nursing short stay)
- Part B > 95% of patients (extra premium, outpatient treatment, physician services)
- All contain demographics, diagnosis (ICD-9) and procedure codes (ICD-9 hospital, CPT-4 outpatient services)

Diagnosis Codes - Example

- Enterostomy Malfunction
- Intestinal Adhesion with Obstruction
- Depressive Disorder
- Surgical Complication GI Tract
- Postoperative Infection

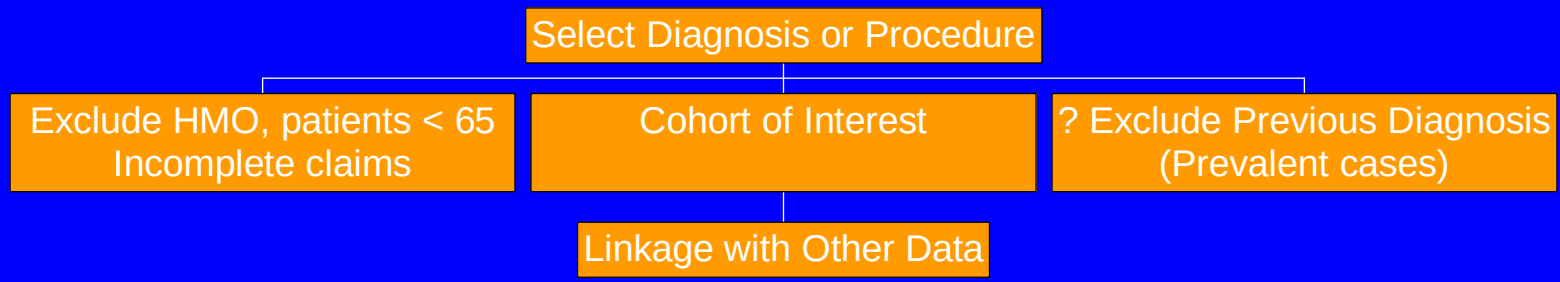
Procedure Codes - Example

- Pericolostomy Hernia Repair
- Peritoneal Adhesiolysis
- Culture-Peritoneum
- Culture and Sensitivity-Lower Resp Tract
- Pulmonary Artery Wedge Monitor
- Insert Endotracheal Tube
- Mechanical Respiratory Assistance
- Small Bowel Series

Example - Narrative

- Patient with history of bowel resection admitted for surgical repair of malfunctioning enterostomy. On HD#1, underwent repair of pericolostomy hernia & lysis of adhesions. Developed postop infection & became acutely unstable. On HD#7, required PA monitoring, endotracheal intubation & mech ventilation.

Basic Methodology



Appropriate Conditions to Study

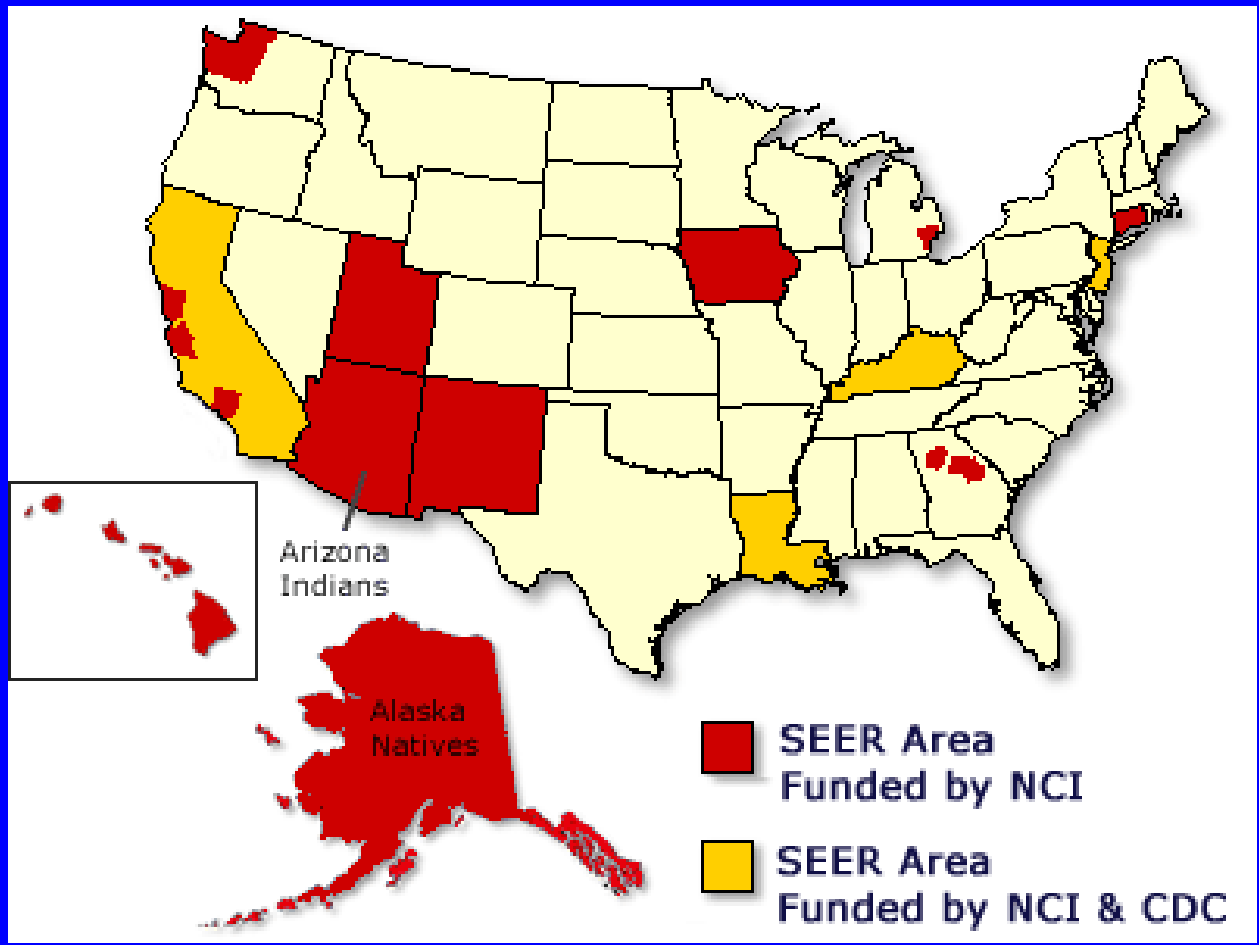
- Common diagnoses
- Seen in Medicare age population
- Result in hospitalization or encounter
- Coded frequently
  - Impact on reimbursement

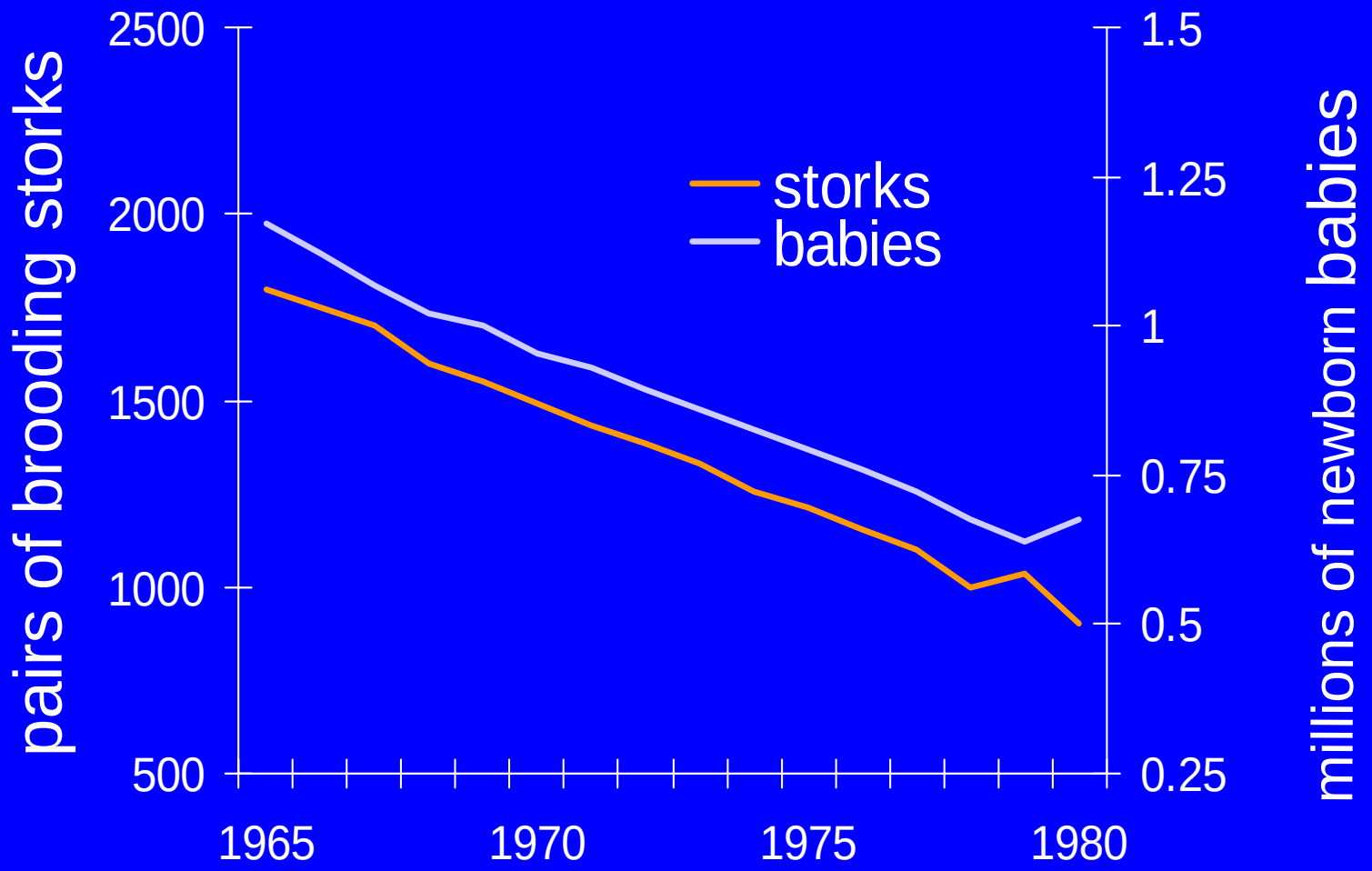
Potential Linkages

- Socioeconomic Measures
  - Census data (proxy)
- Tumor Registry
  - SEER-Medicare
- Physician and Provider
  - AMA Master File, AHA

SEER-Medicare Database

- Collaborative effort with NCI and CMS
  - patients ≥ 65 years linked by unique identifiers
- SEER population-based registries (states and metro areas)
  - Covers ~ 25% of US population
- All Medicare files
  - inpatient and outpatient records


Arizona
Indians
Alaska
Natives
SEER Area
Funded by NCI
SEER Area
Funded by NCI & CDC


pairs of brooding storks
2500
2000
1500
1000
500
1.5
1.25
1
0.75
0.5
0.25
millions of newborn babies
storks
babies
1965
1970
1975
1980

Colon Cancer Screening

What is current status of colon cancer screening?

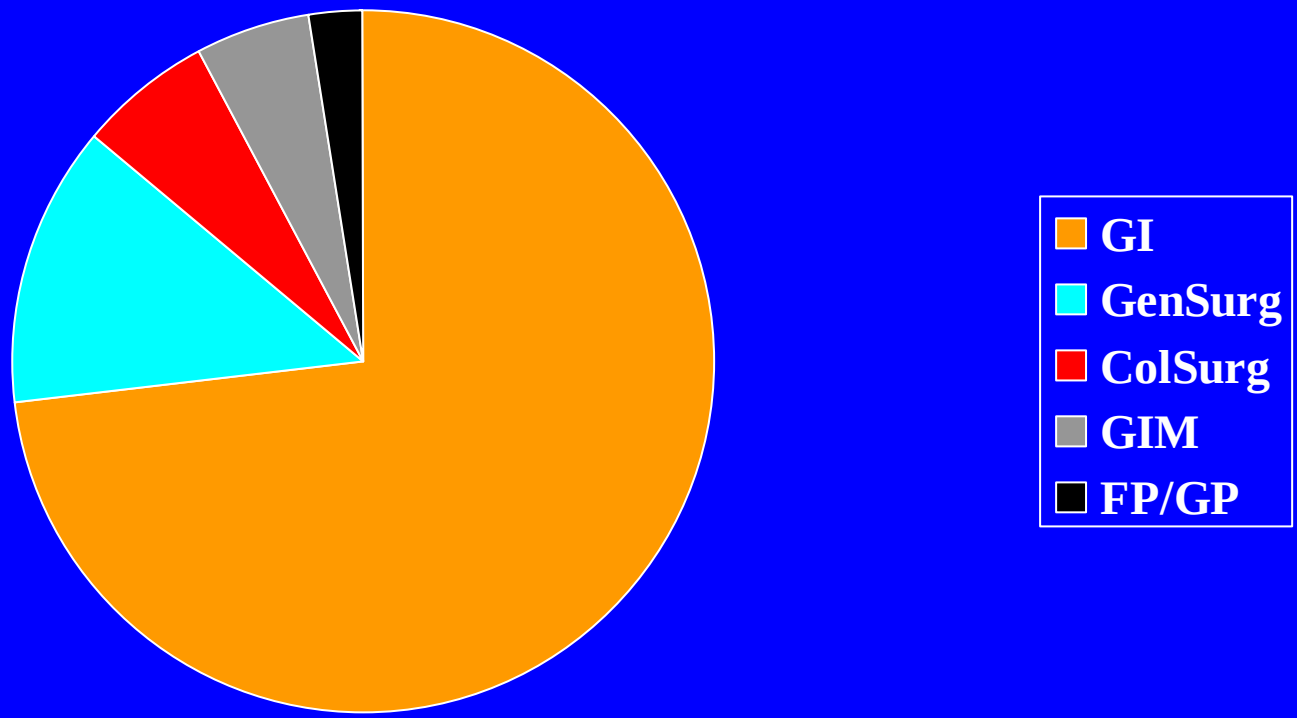
What interventions protect against cancer development?

Physician Specialty and Endoscopic Procedures

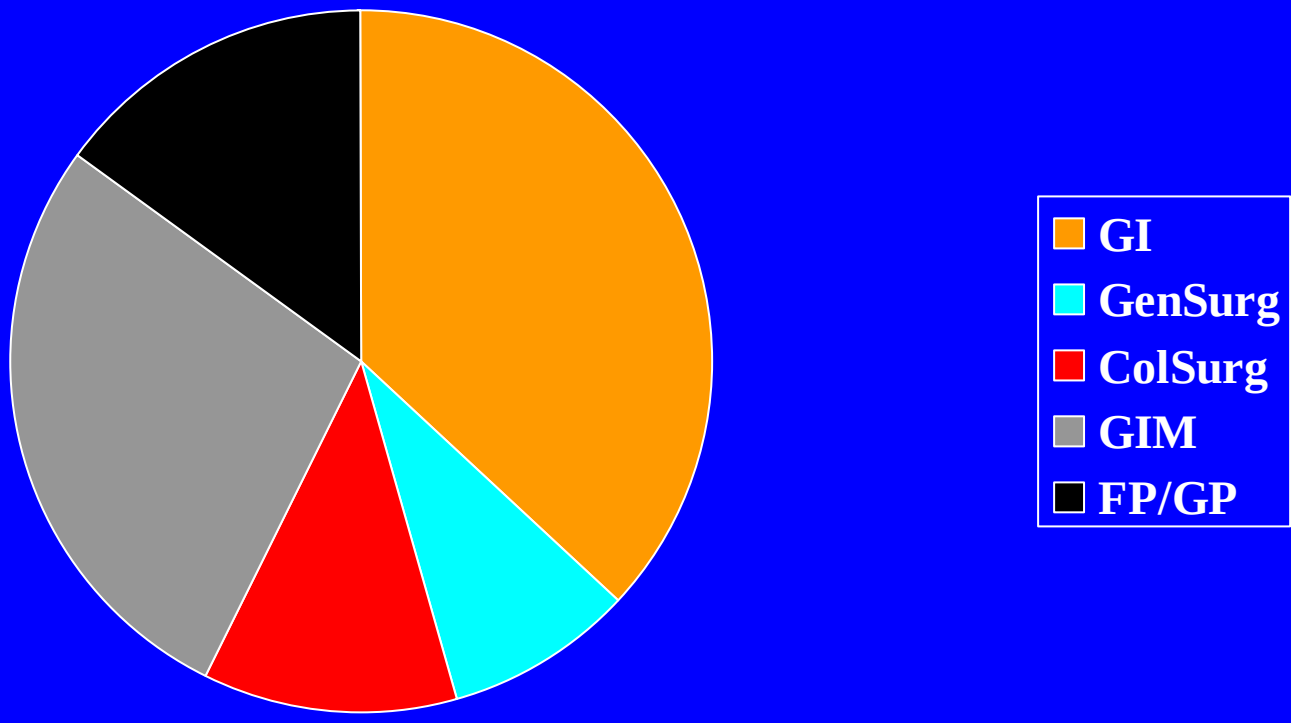
- 5% sample of Medicare claims, 1993
- Procedures examined
  - Colonoscopy
  - EGD
  - Sigmoidoscopy
- Medicare and AMA designated specialties

Meyer, J Gen Intern Med 2000

Colonoscopy by Specialty



Flexible Sigmoidoscopy Use



Procedure Characteristics

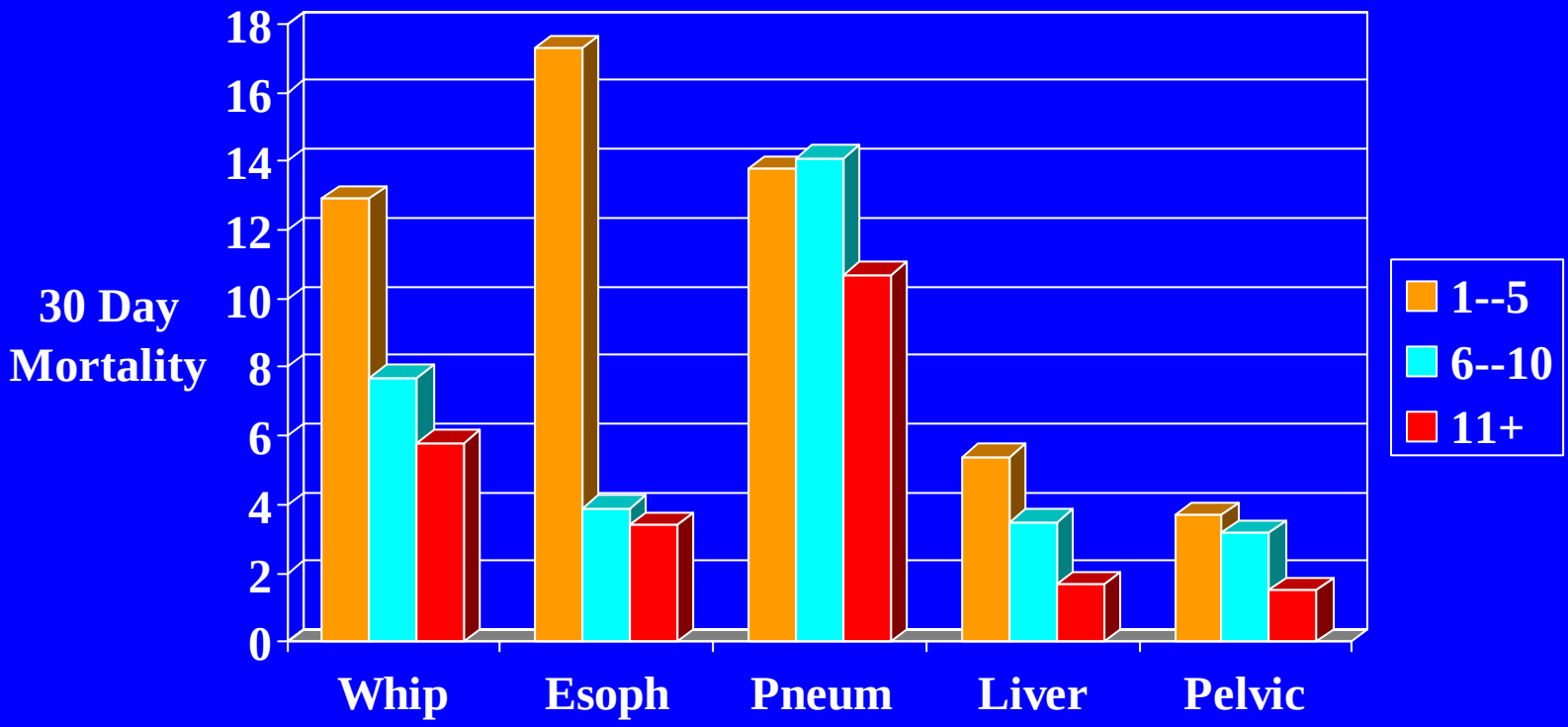
- Specialists more likely to perform therapeutics, cancer or bleeding indications
- Generalists more likely in underserved counties
- Most colonoscopies and EGD's by PCP's in counties with at least one GI

Hospital Type and Patient Outcomes

- SEER-Medicare database 1984-93
- Major surgery: Whipple, esophagectomy, pneumonectomy, liver resection (colorectal), pelvic exenteration
- Hospitals classified by total number of procedures
- Adjusted for age, stage and comorbidity

Begg, JAMA 1998

Hospital Volume and Mortality



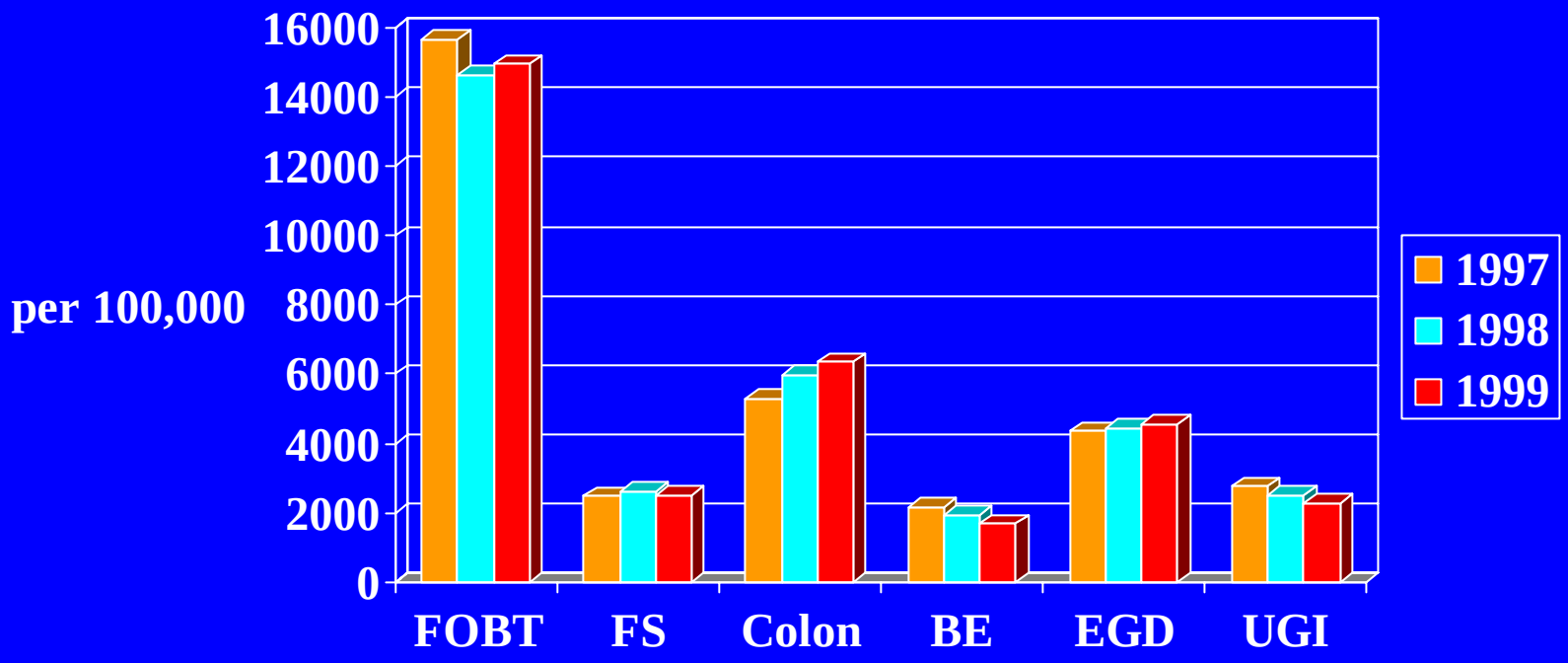
Current Status of Screening

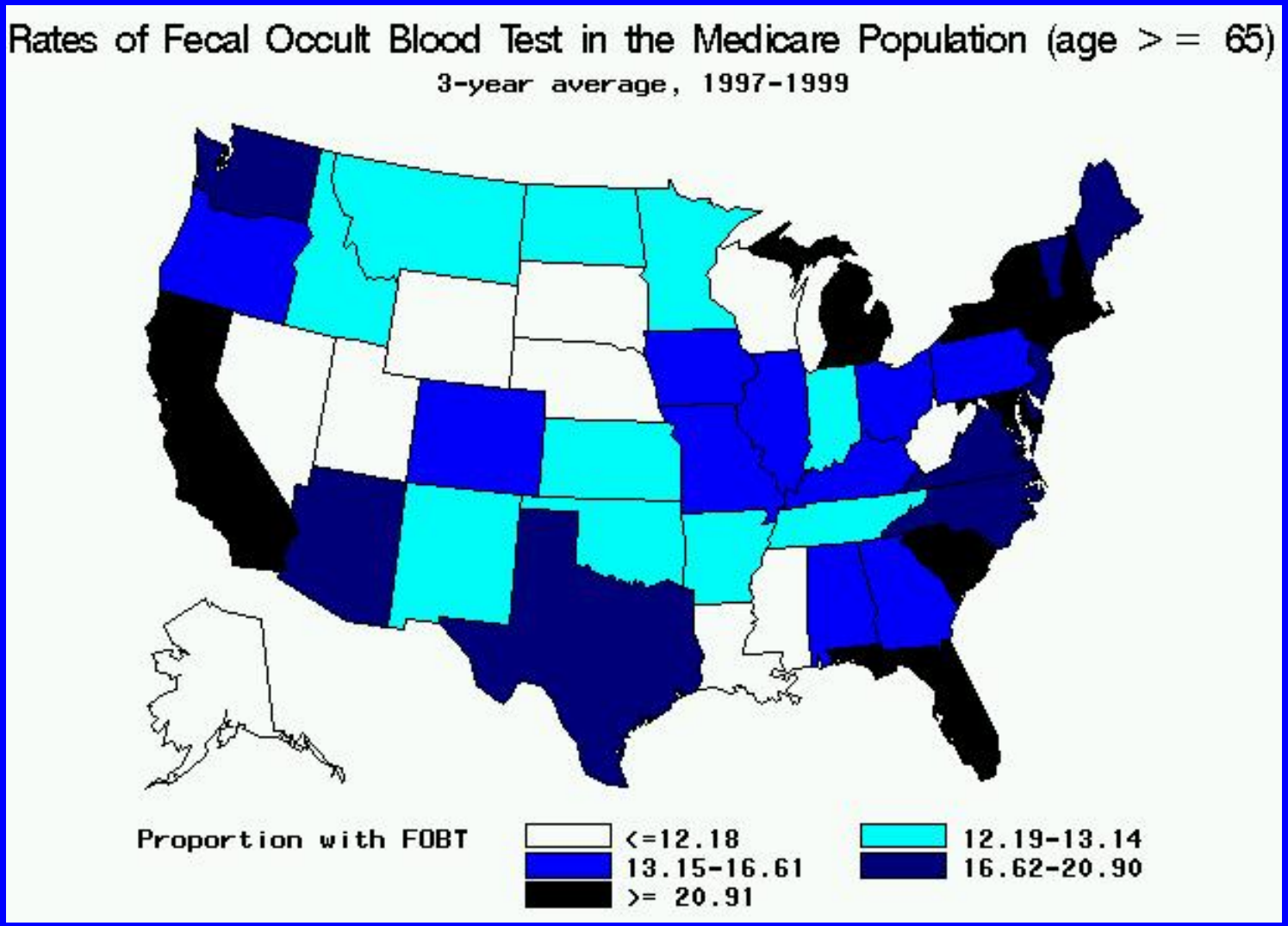
- Use largely determined by telephone surveys
- Differences among population subgroups
- Impact of 1998 legislation
  - Colonoscopy in “high risk” every 2 years (fam hx, hx polyp or cancer, IBD)
  - Yearly FOBT, sigmoidoscopy every 4 years, screening barium enema as substitute

Cohort

- 1997-1999 Medicare Physician/Supplier and Outpatient files
- Claims for FOBT, flex sig, BE, colonoscopy
- Two comparison procedures (UGI and EGD)
- Approximately 25 million beneficiaries/year

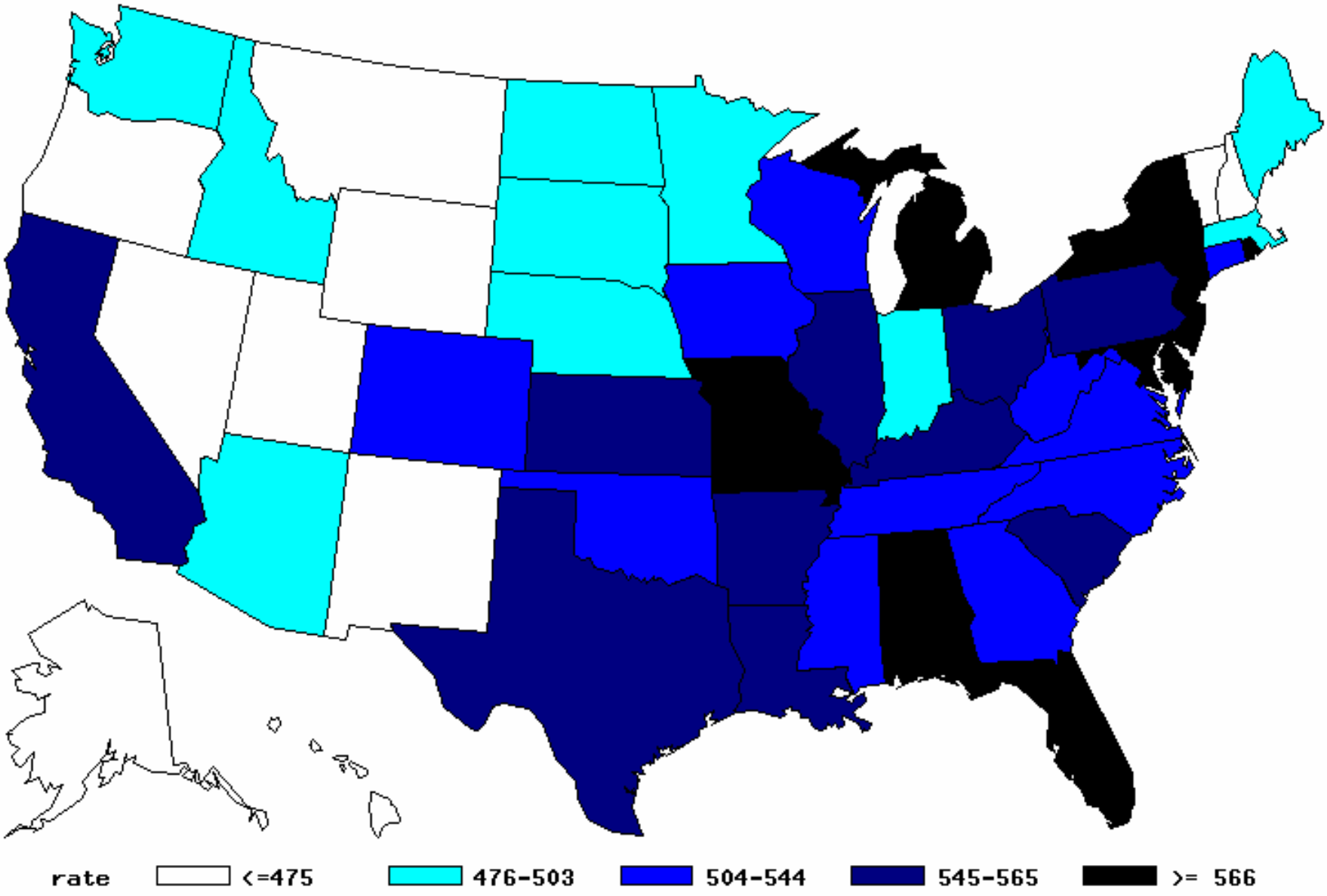
Annual Procedure Use



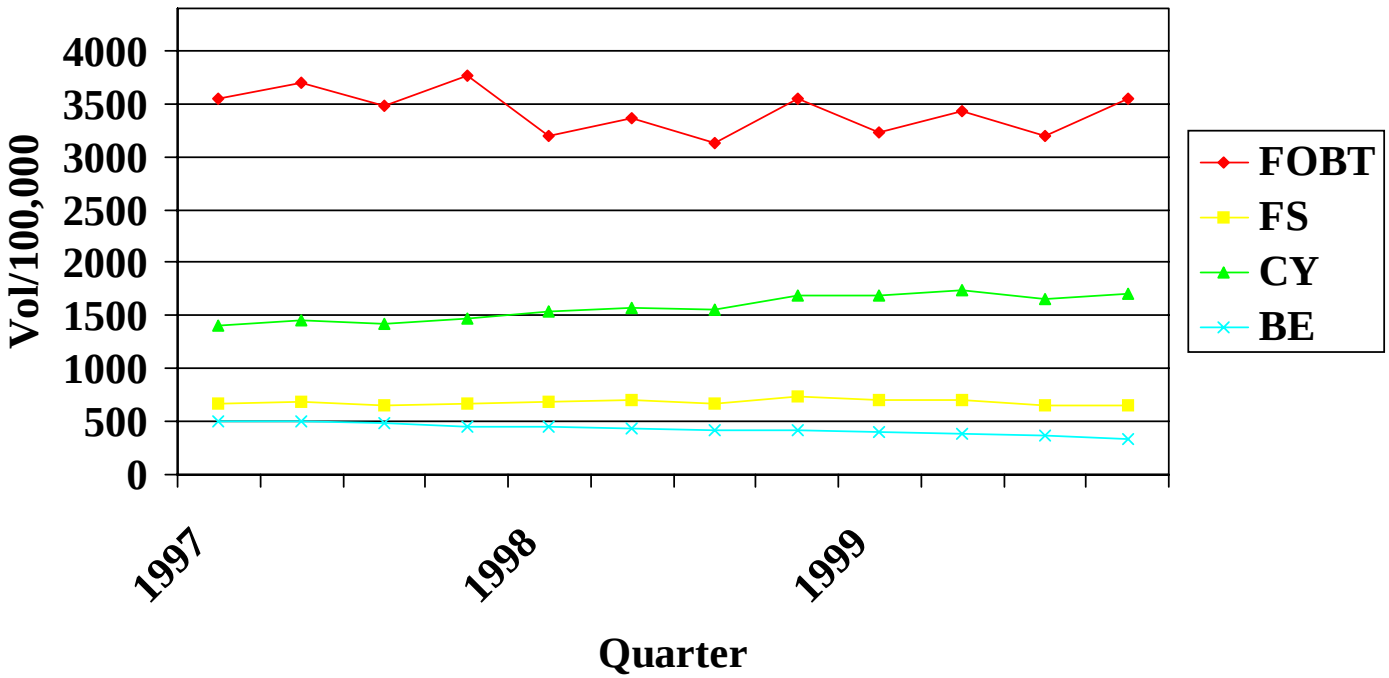

Rates of Fecal Occult Blood Test in the Medicare Population (age >= 65)
3-year average, 1997-1999
Proportion with FOBT
<=12.18
12.19-13.14
13.15-16.61
16.62-20.90
>= 20.91

Rates of Colonoscopy in the U.S. Population (age > 65)

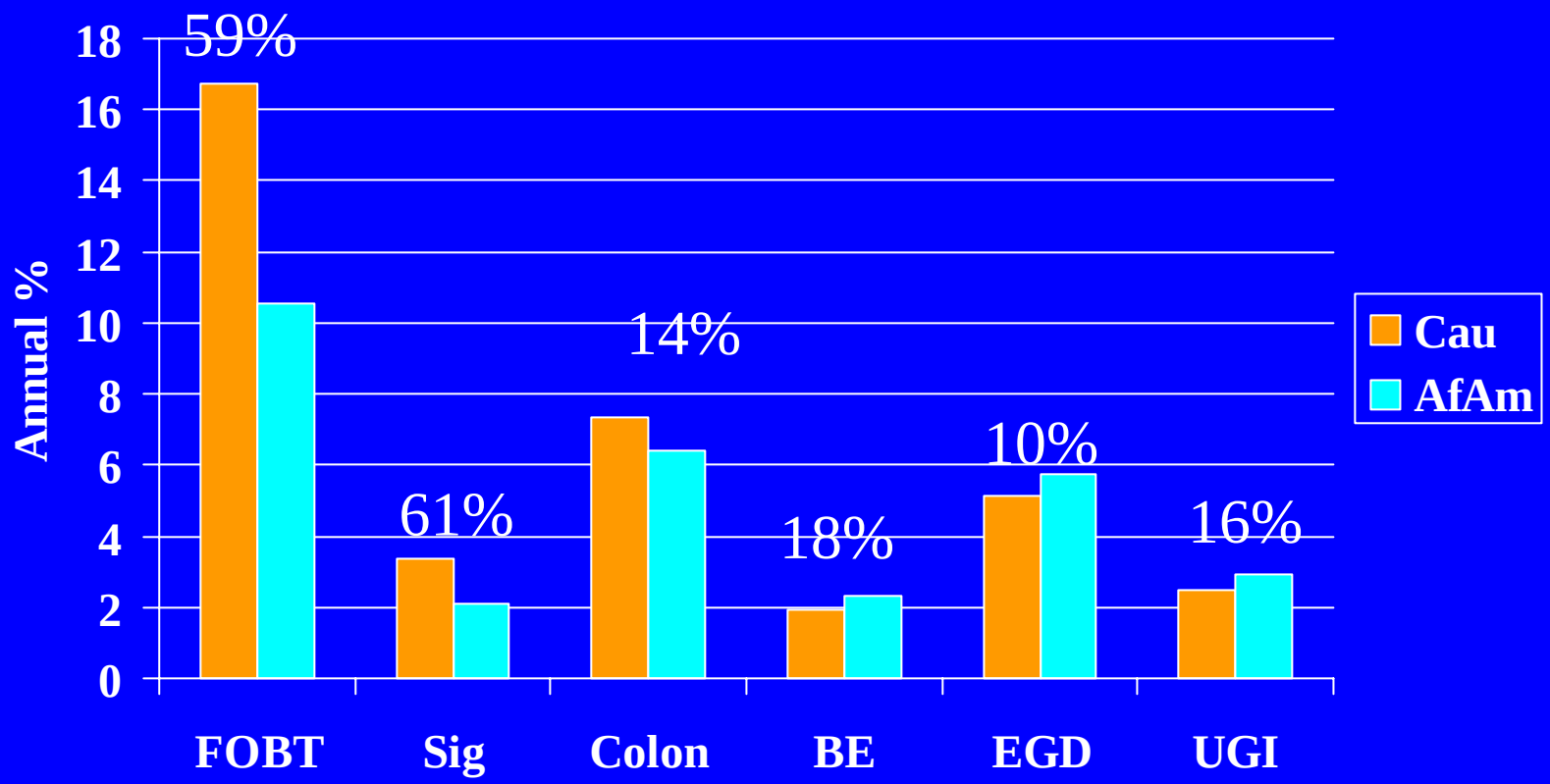
3-year average, 1997-1999



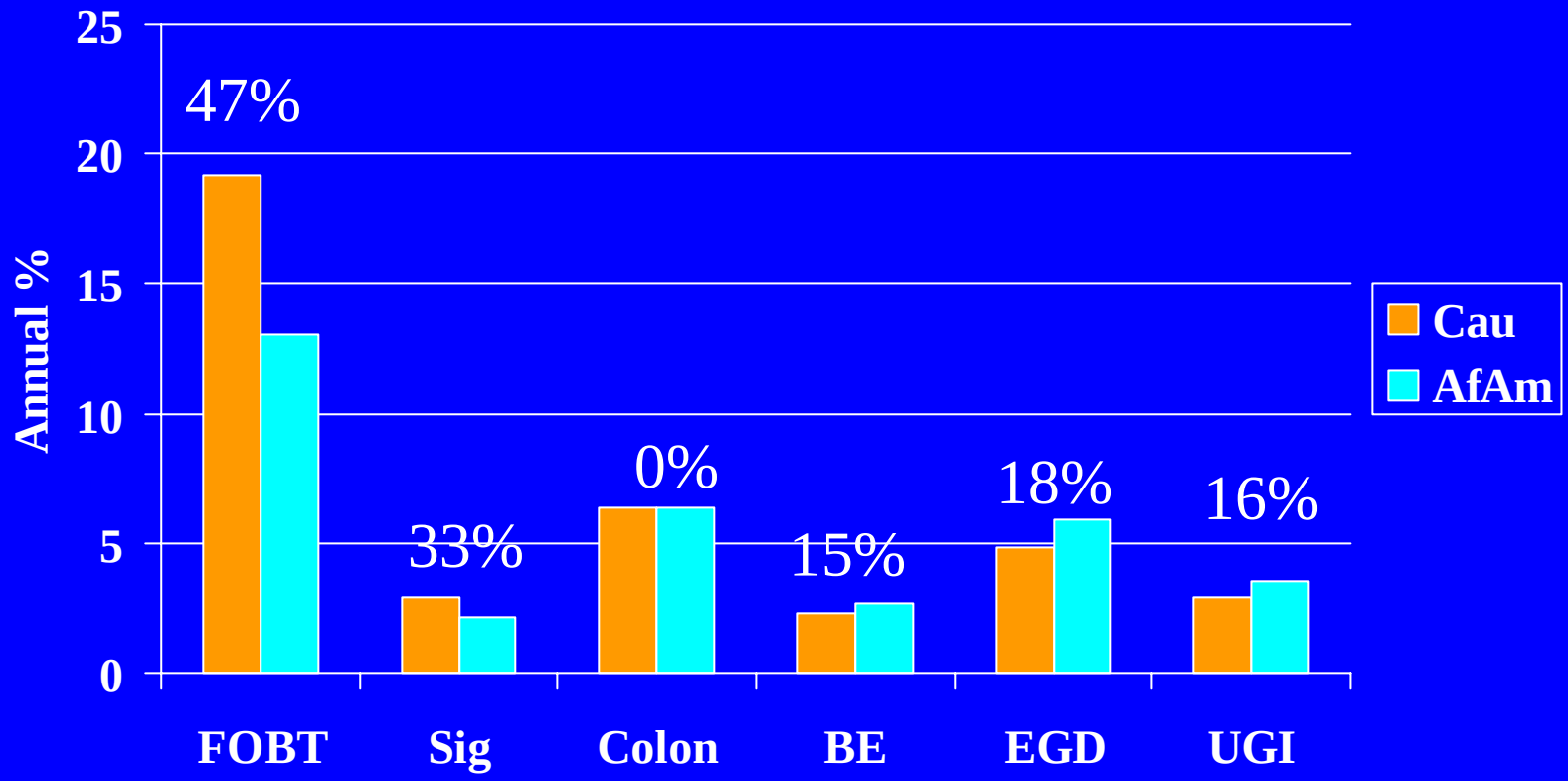
Procedure Use by Quarter-Males



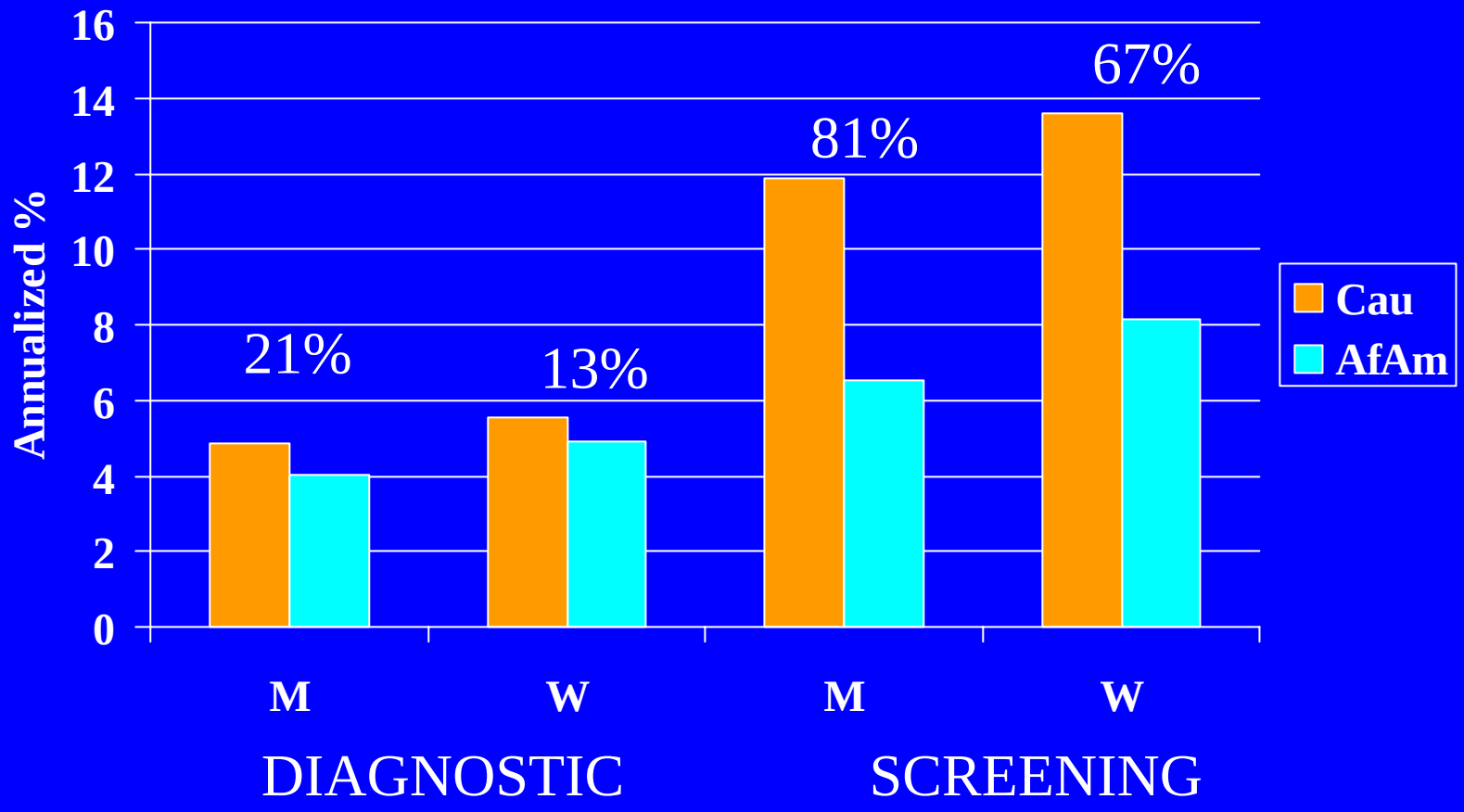
Procedure Use in Men Three Year Average



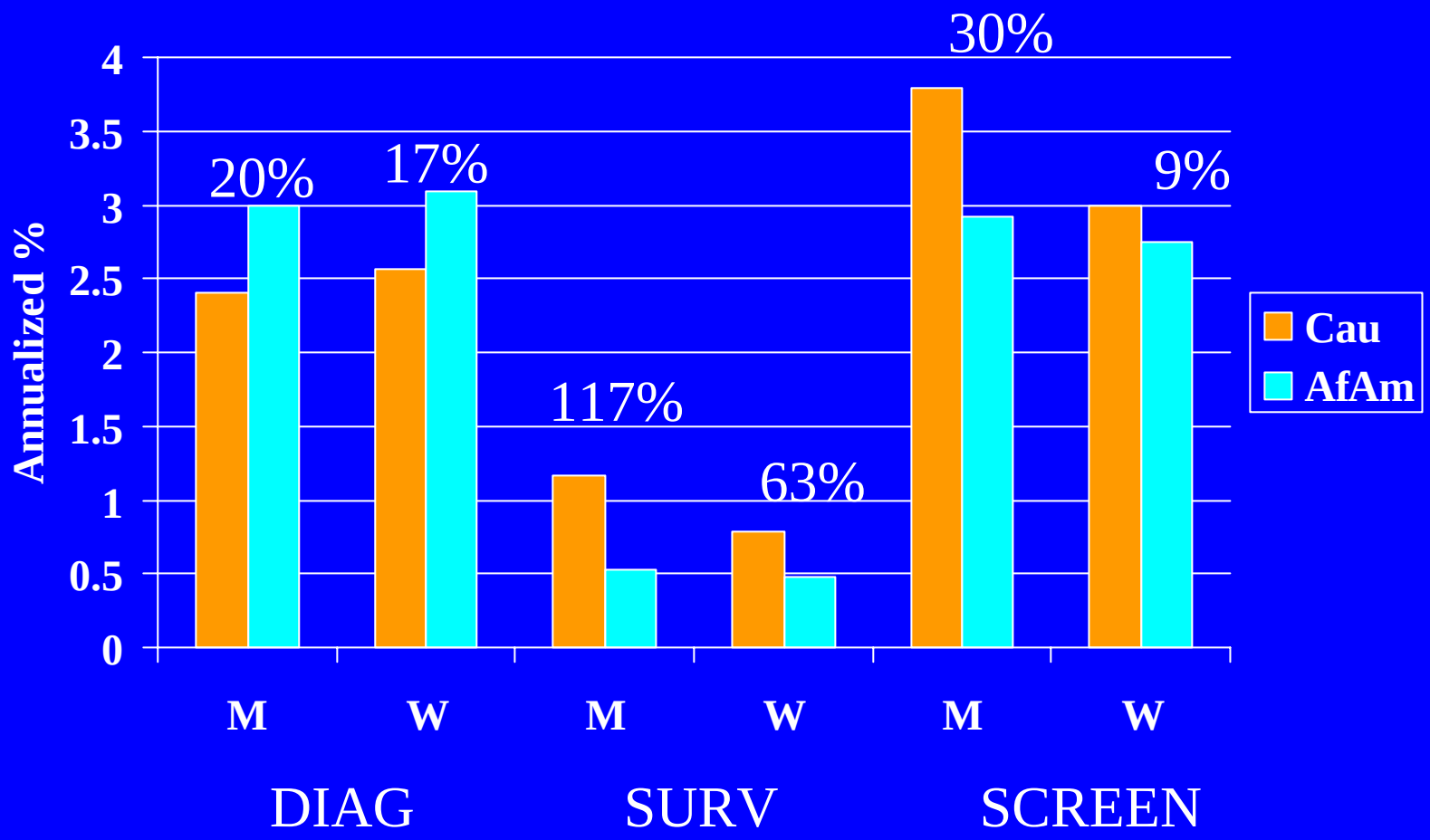
Procedure Use in Women Three Year Average



Racial Differences in Indications for FOBT



Racial Differences in Indication for Colonoscopy



Summary

- Use of screening procedures lower than targets
- Little impact of reimbursement changes
- Use of colonoscopy increased despite reimbursement issues
- Racial disparities persist

Barrett’s Screening

Does endoscopic screening improve outcome?

Prior EGD for Esophageal Adenocarcinoma

- Screening for and Surveillance of Barrett's Esophagus Recommended
- Goal to Detect Presymptomatic High Grade Dysplasia and Adenocarcinoma
- Actual Use and Potential Impact of Screening Not Well Defined

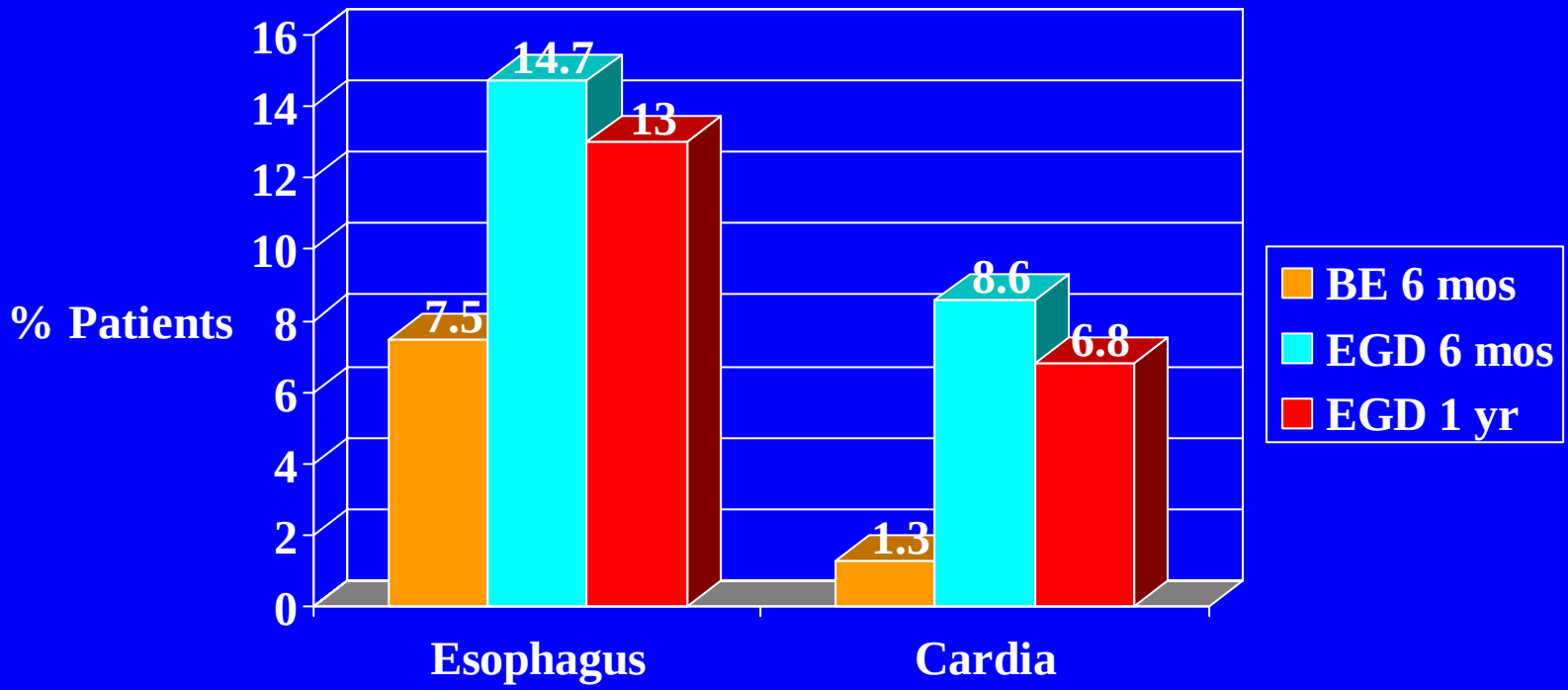
Cohort

- SEER-Medicare Database
- Patients with Adenocarcinoma of the Esophagus (n=777) or Cardia (n=856)
- Diagnosed 1993-6
- Age ≥ 70
- Non-HMO enrollees
- Staged

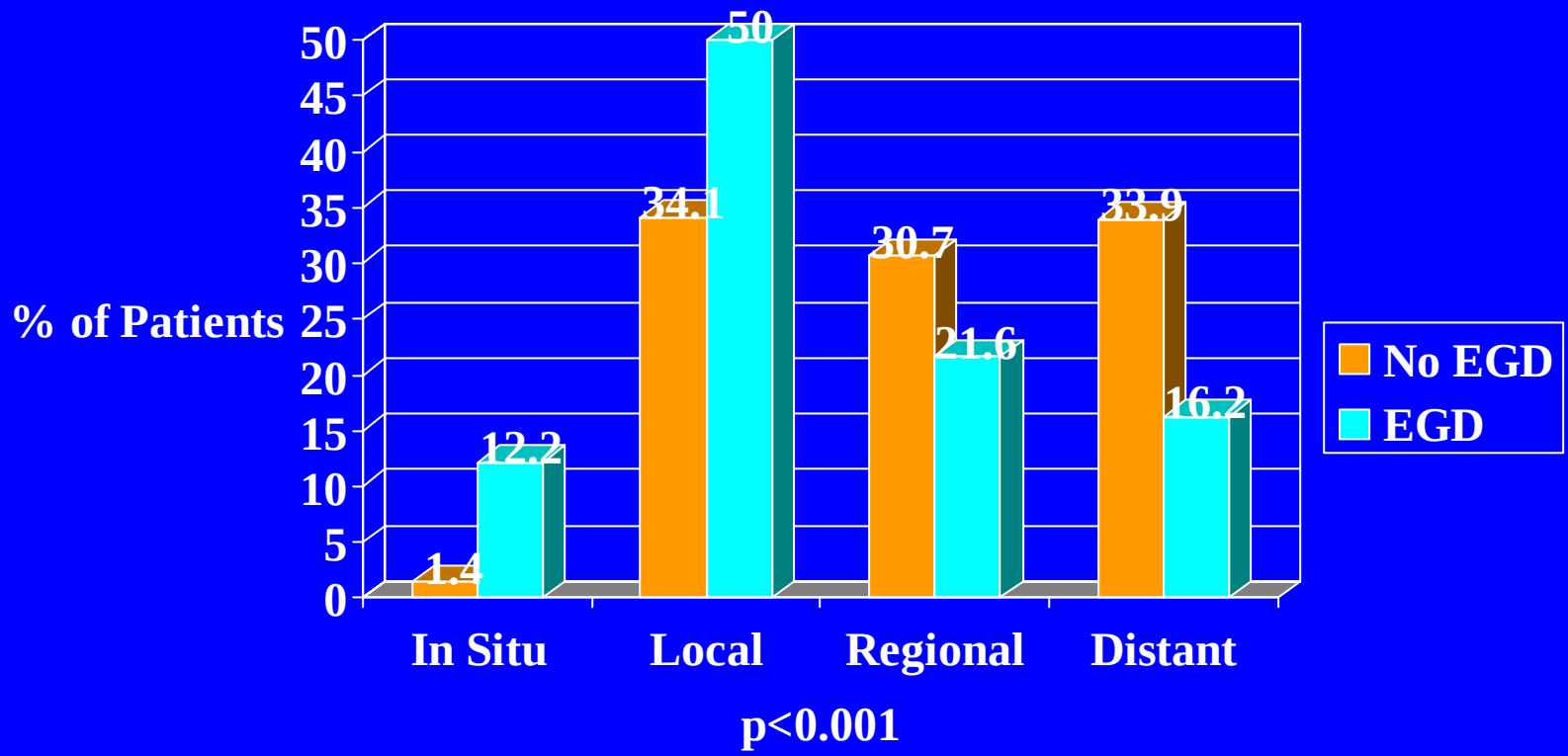
Measures

- EGD Prior to Diagnosis
  - > 6 months
  - > 1 year
- Prior Diagnosis of Barrett's Esophagus
- Stage at Diagnosis
- Survival - unadjusted, adjusted

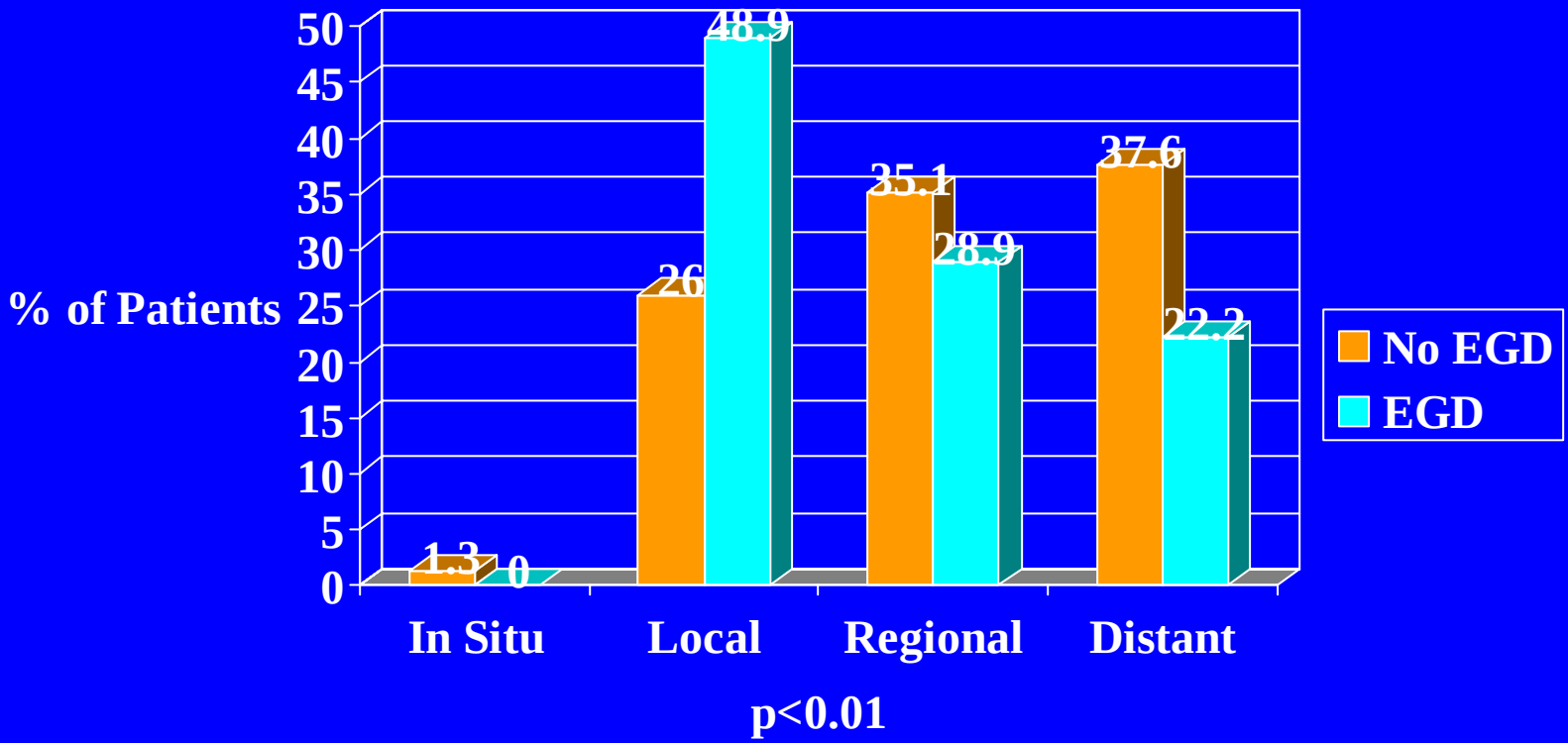
Rate of Barrett's Diagnosis & Prior EGD



Staging Comparisons: 1 Year EGD & Esophageal Cancer



Staging Comparisons: 1 Year EGD & Cardia Adenocarcinoma



Outcomes of Patients With and Without Prior EGD

- Median Survival Time
  - Cardia: 8 months EGD vs. 6 months others
  - Esophagus: 7 months EGD vs. 5 months others
- Adjusted Survival
  - Cardia: Hazard Ratio 0.87 (0.63-1.20)
  - Esophagus: Hazard Ratio 0.73 (0.57-0.93)

Conclusions

- EGD Performed > 1 Year Prior to Diagnosis of Esophageal or Cardia Adenocarcinoma Associated with Earlier Stage at Diagnosis and Improved Survival
- Most Patients at Risk Appear Undiagnosed

Summary - 1

- Claims data provide a unique opportunity to study:
  - Epidemiological measures
  - Patterns of care/practice patterns
  - Treatment/outcome differences
  - Provider performance
- Data are linkable with registry, population demographics, provider characteristics

Summary - 2

- Complexity of files
  - inpatient alone simplest but also most limited
  - outpatient and pharmacy data complex
- Limitations of data
  - adequate severity adjustment
  - incident vs. prevalent cases
  - miscoding (random vs. systematic)