

Changes in the Diagnostic Classification of Non-ST Elevation Acute Coronary Syndromes (NSTE-ACS) as Myocardial Infarction Versus Unstable Angina During 1987-1999

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Introduction

- Non-ST elevation acute coronary syndromes (NSTE-ACS) account for approximately 1 million hospitalizations annually
- Among patients with NSTE-ACS the diagnostic distinction between myocardial infarction (MI) and unstable angina (UA) depends largely on serum markers of myocyte necrosis
- Differential ICD-9 coding can impact:
 - Tracking of disease incidence and prognosis
 - Reimbursement (DRG relative weight for AMI is 1.07, UA .538)

Research Question

- Has the widespread clinical adoption of more sensitive and specific markers of myocyte necrosis (serum troponin) in the late 1990's changed the proportion of patients assigned to MI ICD-9 codes?
 - ICD-9 for MI is 410
 - ICD-9 for UA is 411

Methods

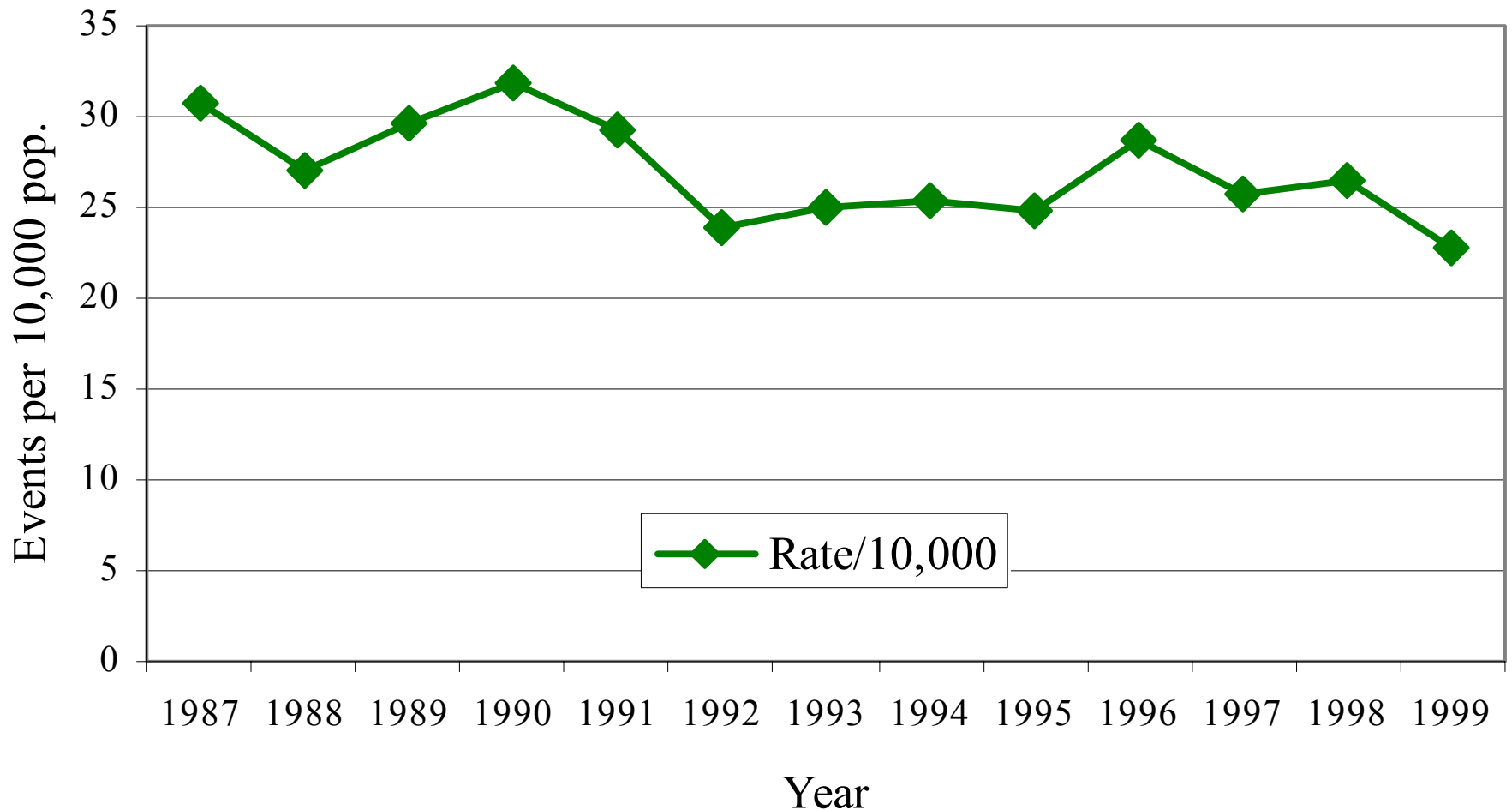
- The Atherosclerosis Risk in Communities (ARIC) study used a retrospective surveillance system for continuous monitoring of coronary heart disease hospitalizations in 4 U.S. communities
- All hospitalizations for patients age 35-74 in the four communities were screened for hospital determined ICD- 9 codes indicating a cardiac diagnosis
- Trained staff members abstracted data from eligible medical records regarding
 - Demographics
 - Clinical data: history, symptoms, ECG, enzymes
 - Therapies: medical, procedural
 - ECG's independently interpreted using the Minnesota Code

Methods

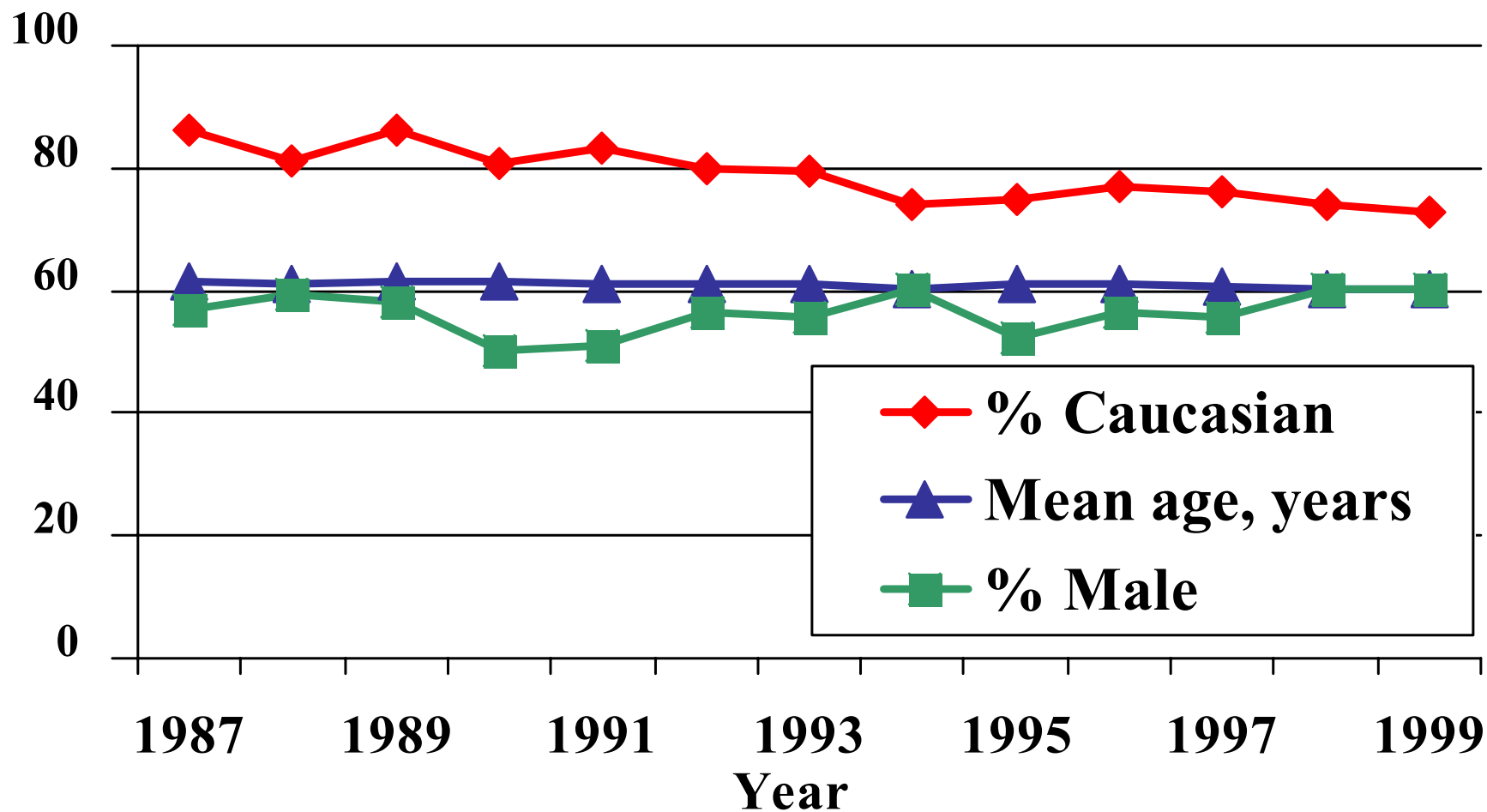
- Annual cross sectional samples of patients with:
 - 1) Chest pain of cardiac etiology
 - AND
 - 2) Either ST-depression or T-wave inversion on initial ECG
- Hospital-coded primary discharge diagnoses were tabulated by year of admission

Results

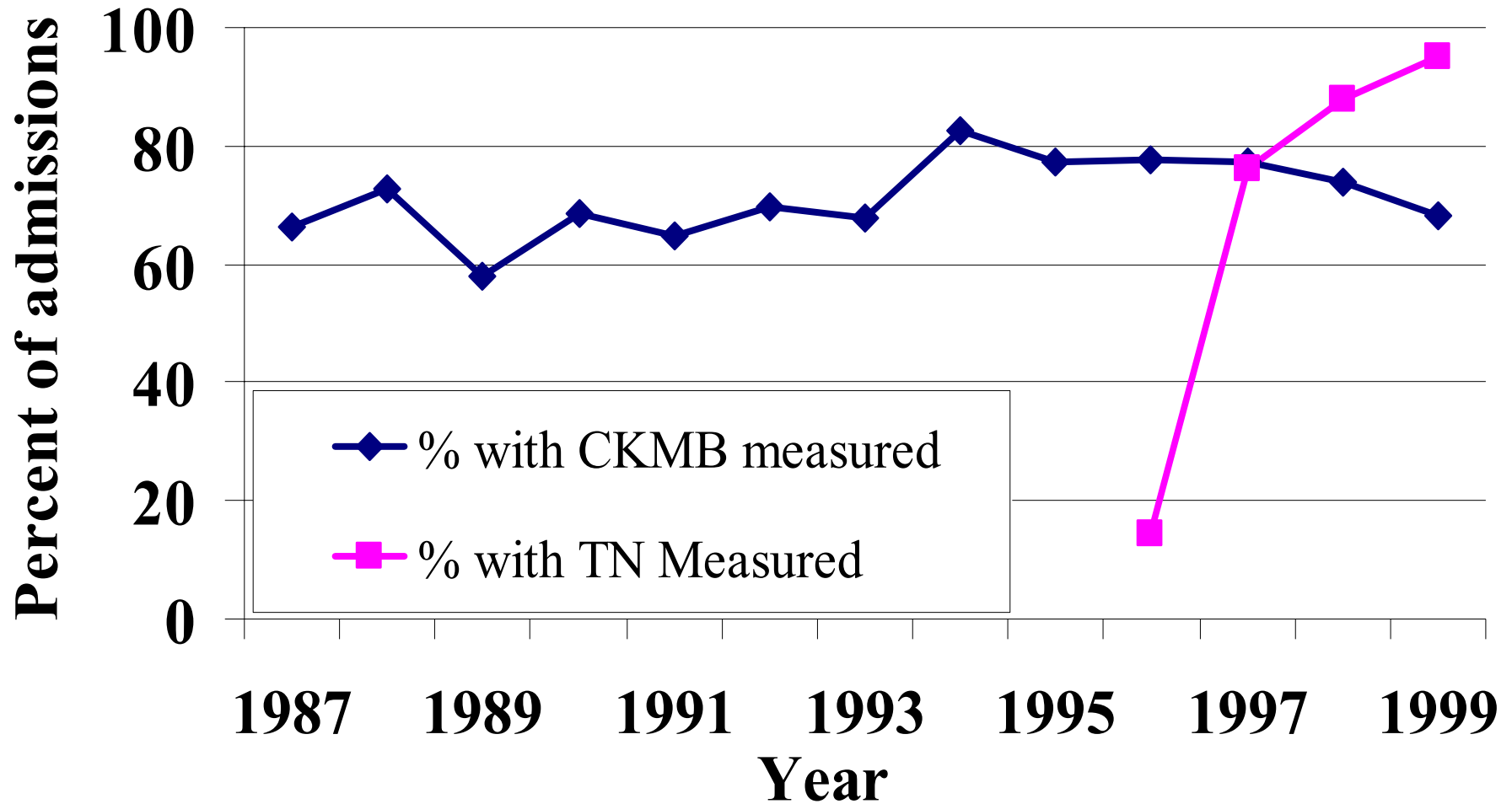
Crude Incidence Rate of NSTEMI-ACS in ARIC Communities, 1987-1999



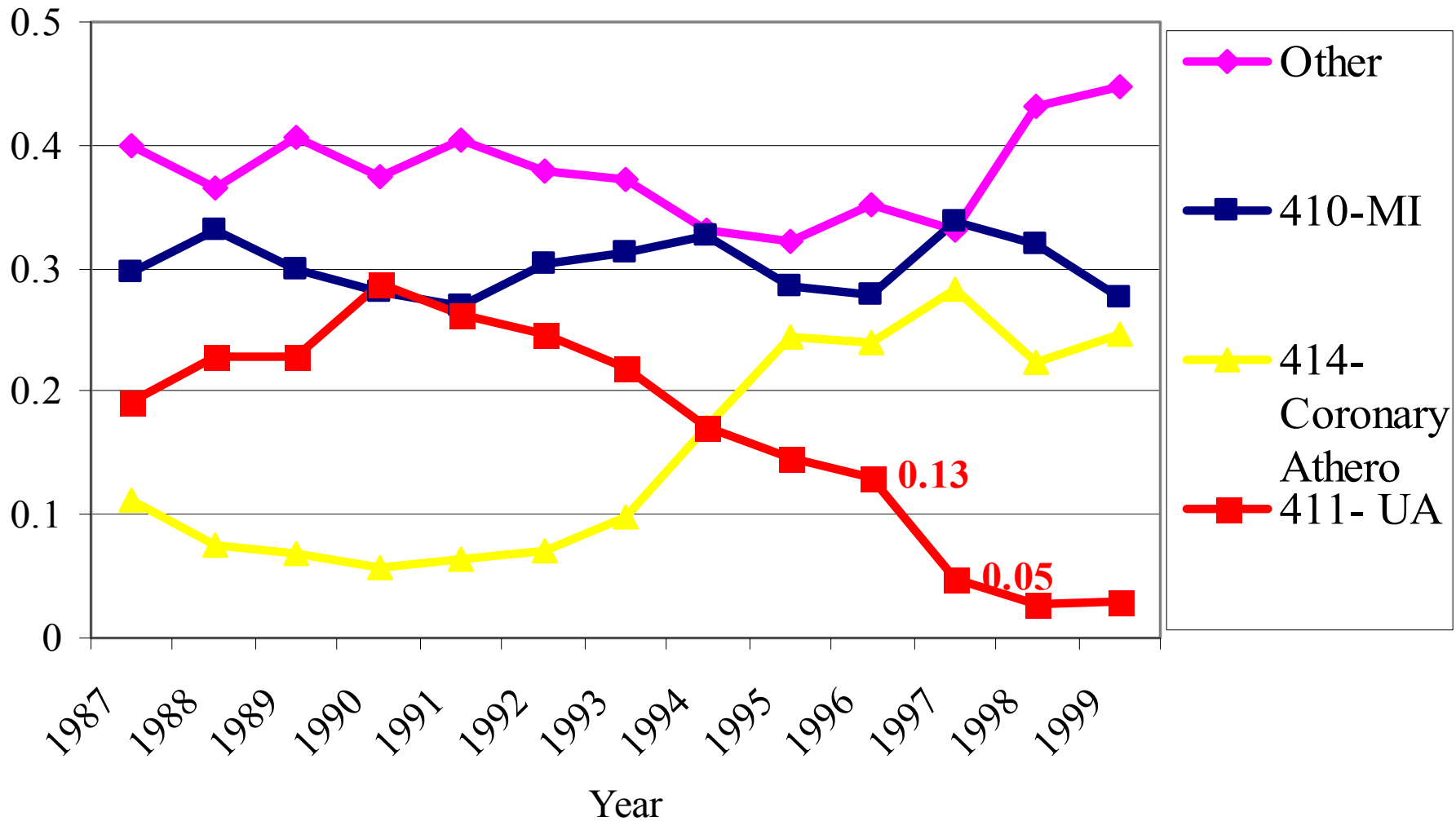
Demographic variables by year of admission for NSTEMI-ACS patients (cardiac chest pain and ST depression or T-wave inversion)



Percentage of NSTEMI-ACS Admissions with CKMB or Troponin Measured During Hospitalization



Proportion of NSTEMI-ACS Patients* with Different Primary Discharge Diagnoses, 1987-1999



* Number of patients with NSTEMI-ACS > 400 for each year

Proportion NSTEMI-ACS Patients Diagnosed As MI or UA by Enzyme Levels, 1997-1999

CKMB	Troponin	N (%)	Percent Diagnosed as:	
			MI	UA
+	+	611 (22)	75	2
	-	328 (12)	57	1
-	+	282 (10)	60	5
	-	1607 (57)	7	3
All		2828 (100)	33	3

Limitations

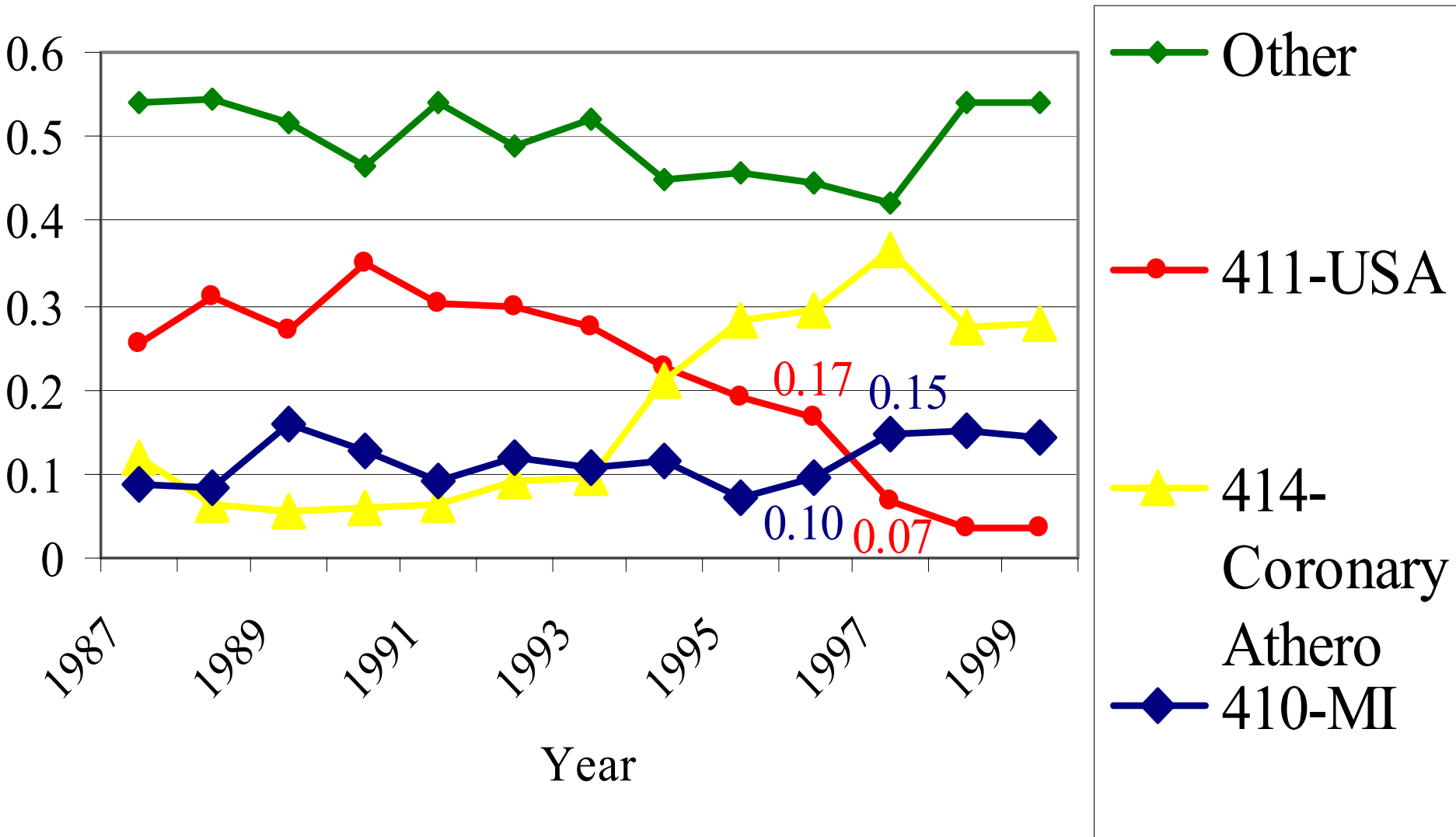
- Ecological association between the introduction of serum troponin assays and changes in ICD-9 coding
- Analysis does not directly address reimbursement consequences (DRG coding and dollars billed)
- Future analyses should adjust for changes in the age composition of the population

Conclusions

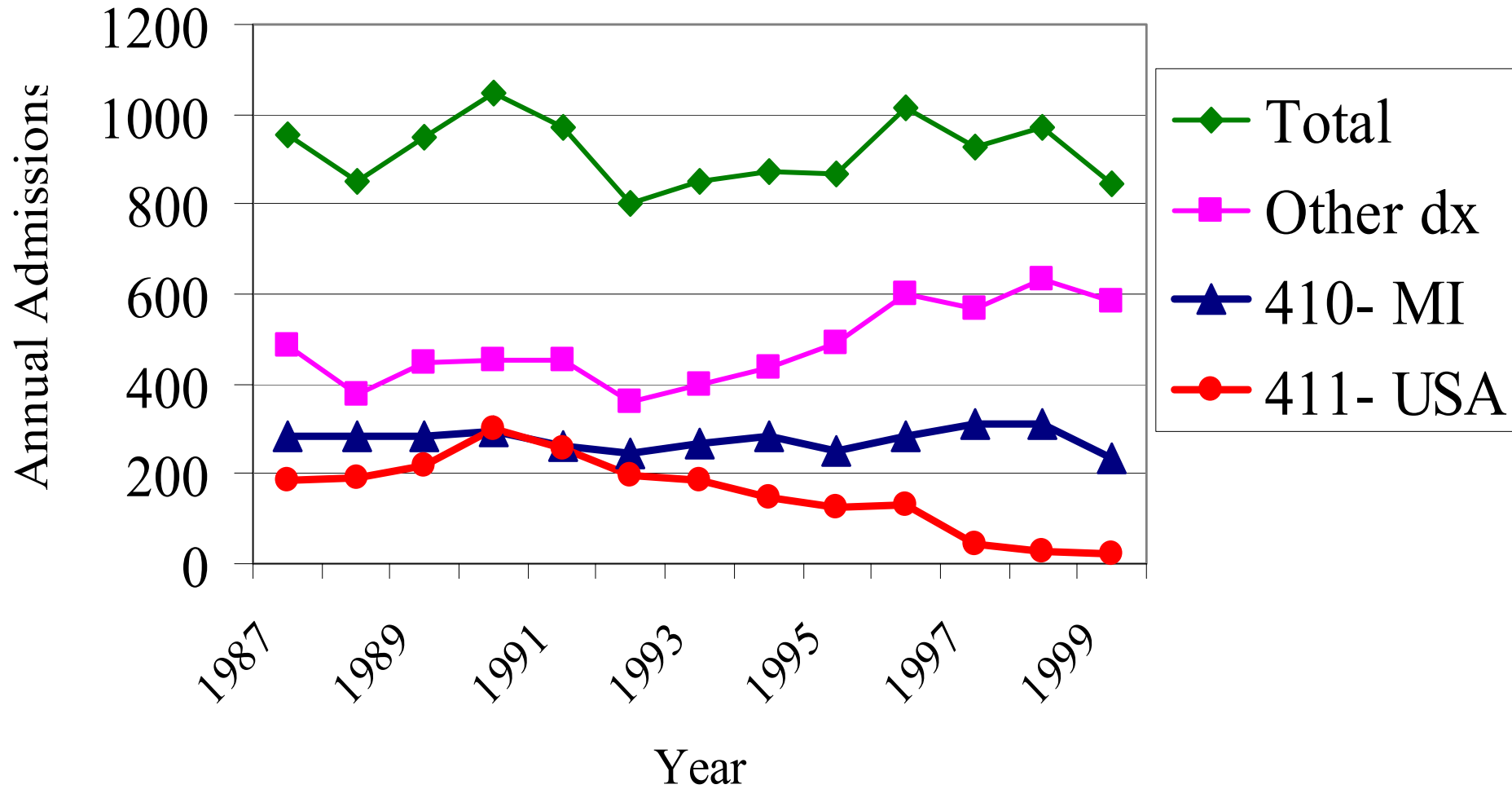
- NSTEMI-ACS discharge diagnosis patterns have changed markedly over the past decade
 - UA decreased steadily since 1990
 - UA dropped from 13% in 1996 to 5% in 1997
- NSTEMI-ACS patients with CKMB negative tests are often diagnosed with MI on the basis of positive troponins.
 - Among troponin (+): 60% have MI as primary diagnosis
 - Among troponin (-): 7% have MI as primary diagnosis

Backup Slides

Proportion of Discharge Diagnosis Among Patients with Normal CKMB values



Number of Events by Discharge Diagnosis for NSTEMI-ACS Admissions



Changes in Discharge Diagnosis Proportions, Two Years Before and After the Introduction of the Troponin Assay

