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High-Sensitivity Troponin and the Diagnosis of NSTEMI in Hospitalized Medical Patients

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Conflict of interest

NONE

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Background

- The 3rd universal definition of MI
  - "…detection of a rise and/or fall of cardiac troponin with at least one value above the 99th percentile upper reference limit and with a strong pre-test likelihood"
- ACCF 2012 expert consensus document
  - "…an elevated troponin is a finding that represents the likely occurrence of myocardial necrosis and does not in and of itself provide any indication of the etiology"

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Background

- Troponin levels were obtained in 25% of ER all-comers *(McFalls et al. Am J Med. 2011)* and it's utilization is steadily growing at 6.9% annually
- Several studies examine relative and absolute changes in hsTn levels in the distinction of ischemic vs. non-ischemic conditions
  - Diff>0.009ug/l - *Mueller et al. Clinical Chemistry, 2012*
  - Diff>30% - *Agewall et al. EHJ, 2011*
  - Diff>50% (20% if b/l is ⇧) - *Thygesenet al. EHJ, 2012*

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Background

- Since 2010, high-sensitivity troponin assays are being used in Rabin Medical Center

- Data is lacking on the prevalence and kinetics of elevated high-sensitivity troponin levels in hospitalized complex patients

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Study outline

- All patients hospitalized to 8 medical wards in Rabin Medical Center, Israel throughout 2011
- 18,830 admissions of 13,029 patients were included in the study
- 5,696 admissions of 4,615 patients with at least one high-sensitivity Troponin (hsTn) measurement **(30%)**
- 10,021 hsTn measurements were included

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Baseline Characteristics

Age (average±stdev)	71.5±15
Male gender (%)	53.5
Acute diagnosis (%)	
Non specific chest pain	24.1
Acute coronary syndrome	2.1
Myocardial infarction	4
Heart failure	23
Anemia	21.9
COPD exacerbation	17.2
Acute renal failure	6.3
Pulmonary emboli	2
Sepsis	2

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Baseline Characteristics

Patient Comorbidities (%)	
Ischemic heart disease	41.7
Heart failure	24.3
Post CVA	14.1
Diabetes	35.7
Chronic renal failure	19.4
Atrial Fibrillation	25.2
COPD	16.9
Malignancy	13.7

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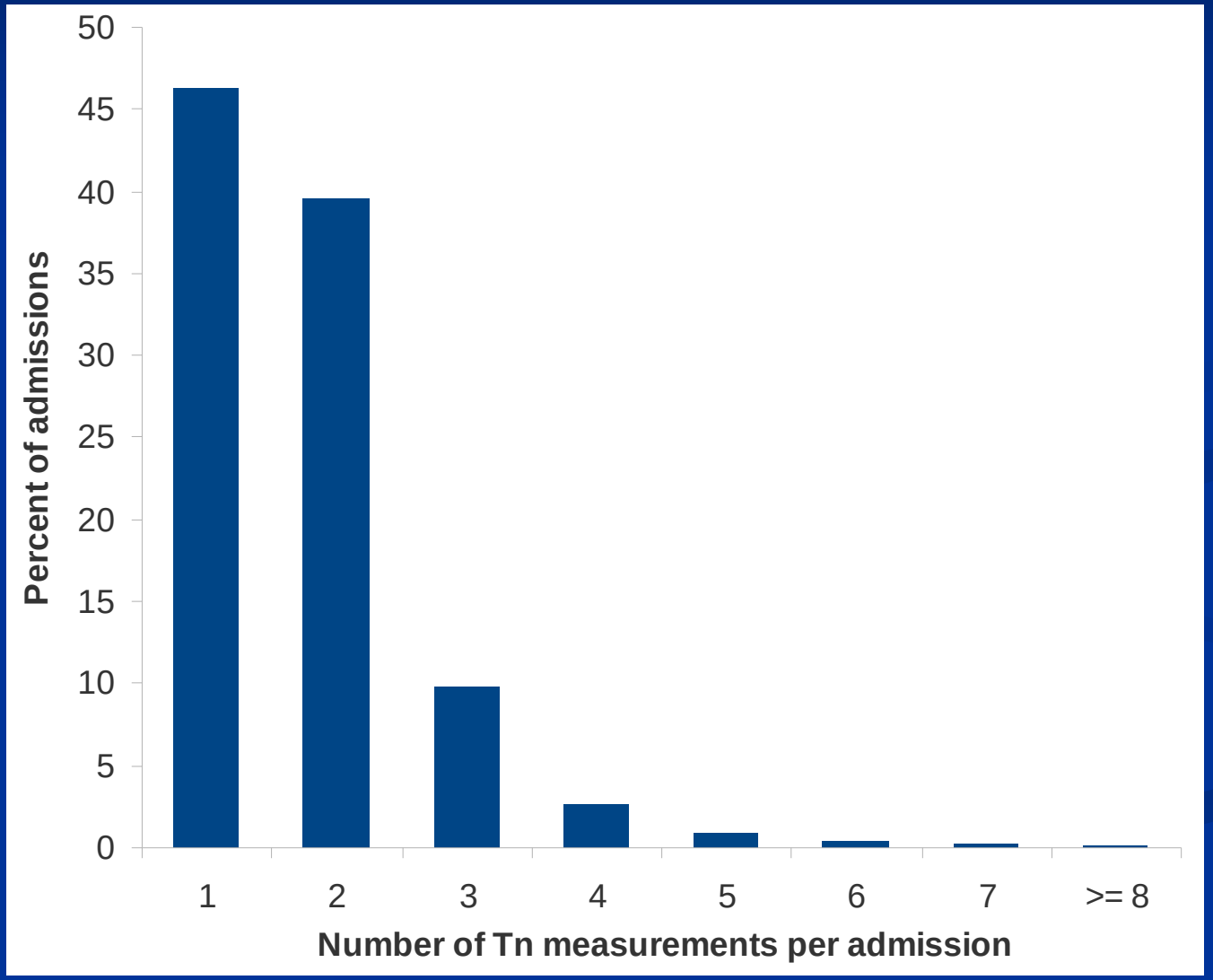
HsTn Measurements per Admission



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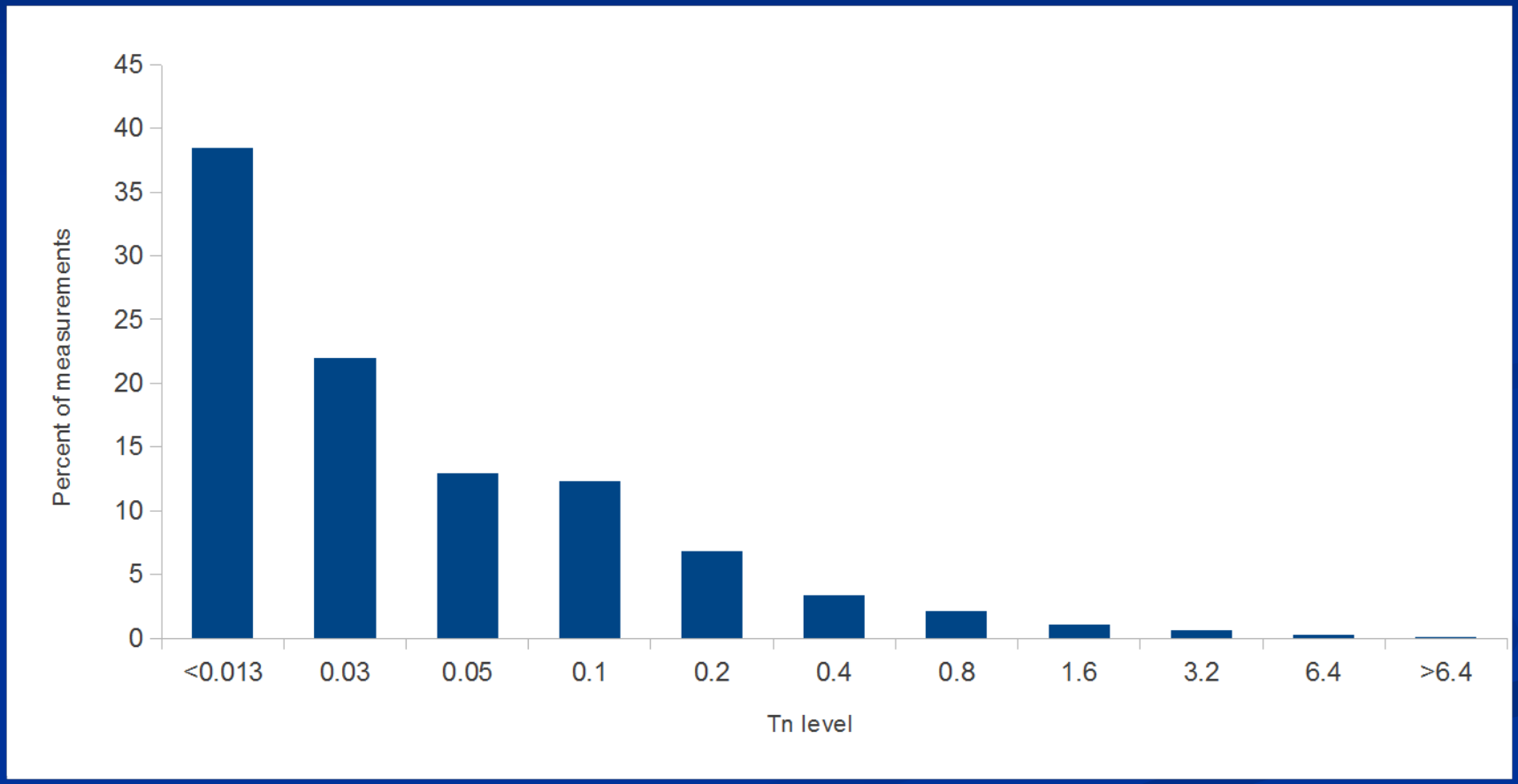
HsTn levels Distribution



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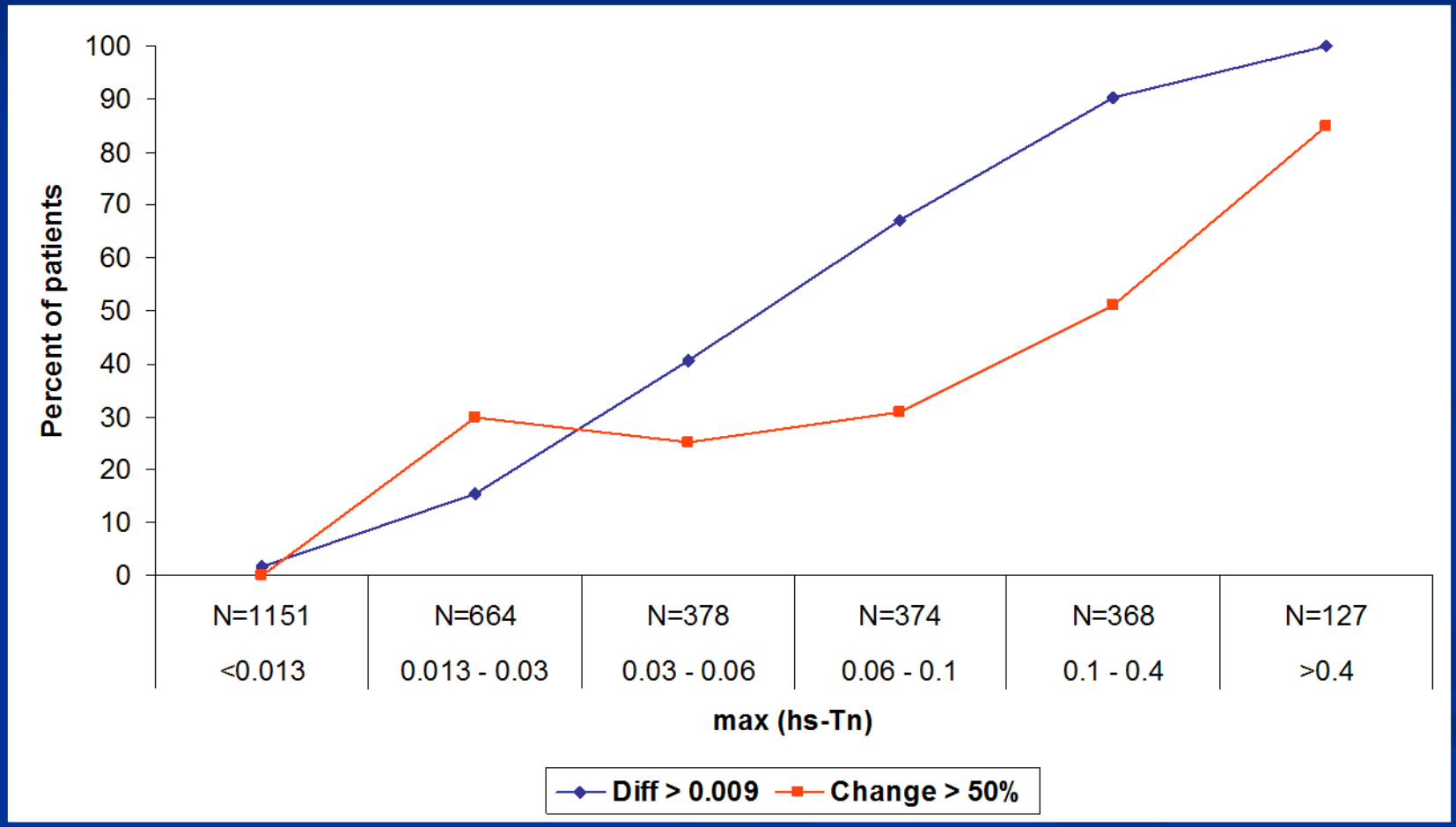
Absolute and Relative Change by hsTn Levels



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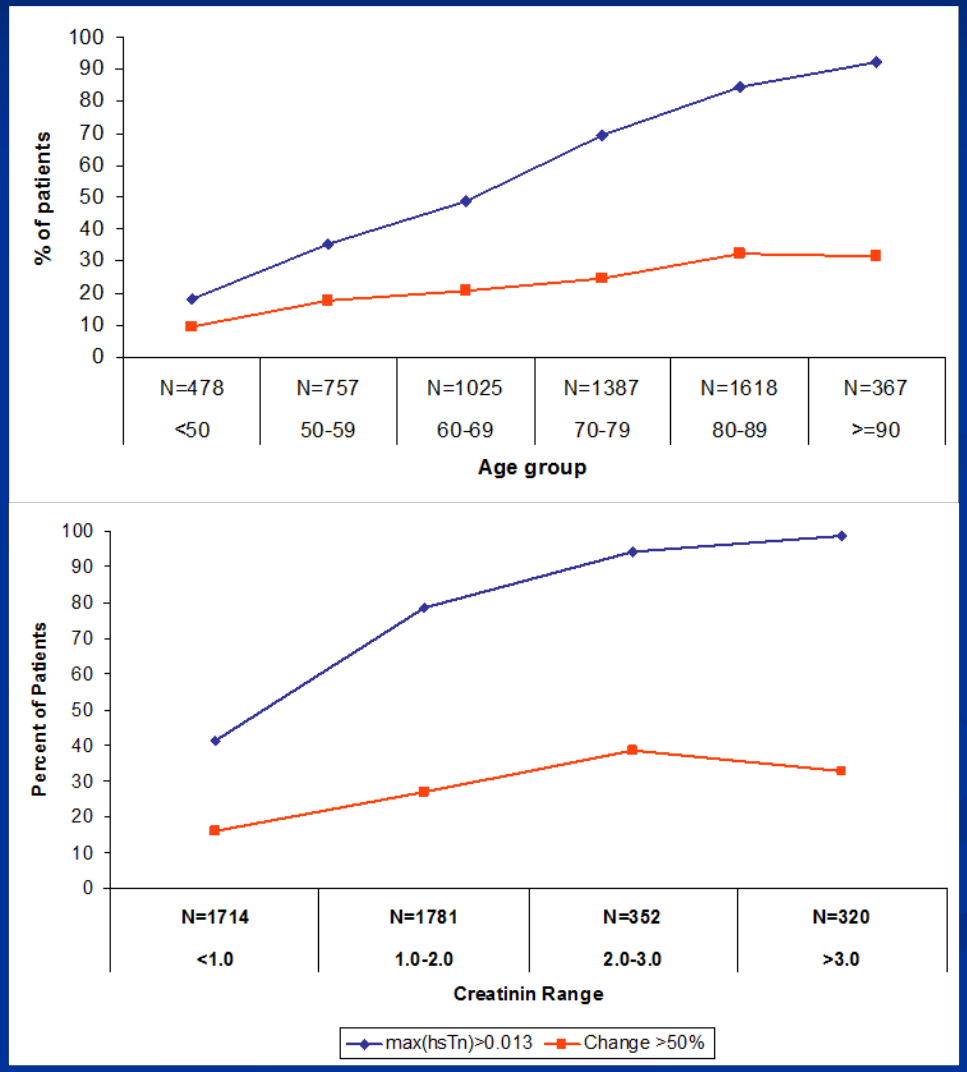
HsTn levels & % Change by Age & Renal Function



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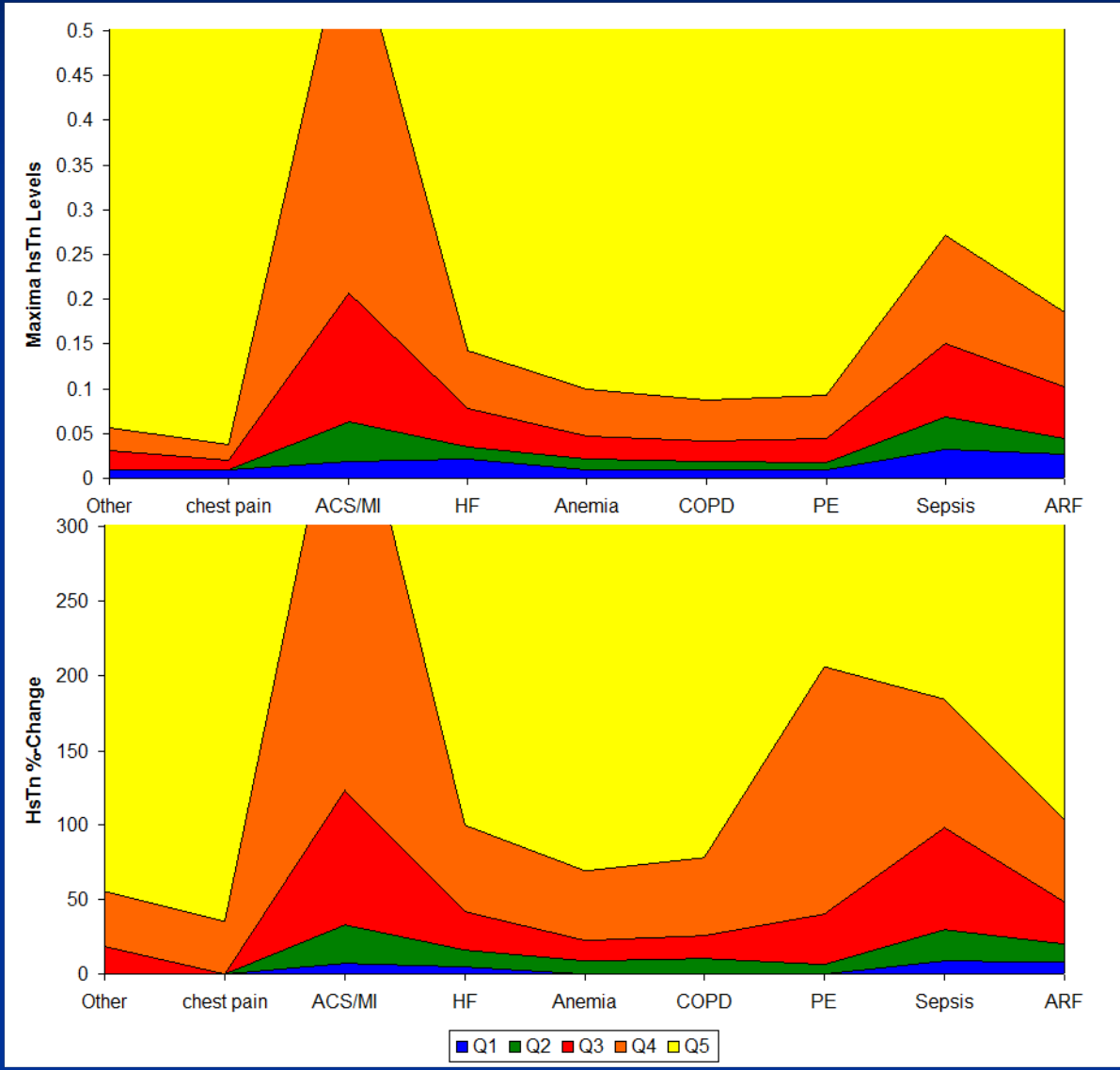
HsTn Levels and Kinetics per Acute Dx



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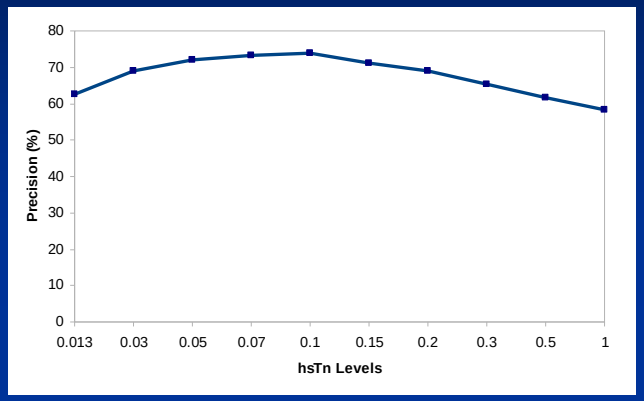
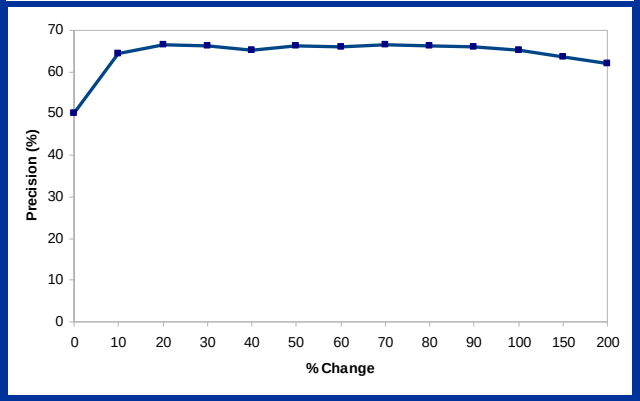
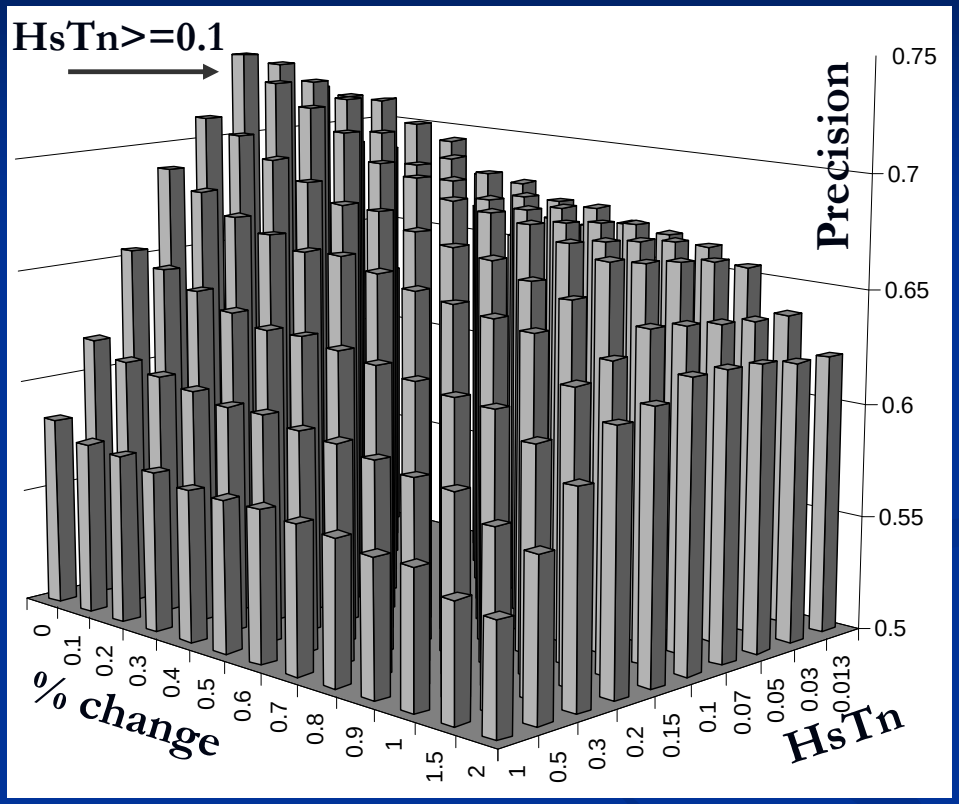
Optimization for hsTn Levels and %-Change Cutoffs







- %-change does **not** contribute to precision
- HsTn threshold of 0.1 ug/l includes **60%** of ACS/MI and excludes **88%** of non-ACS/MI admissions

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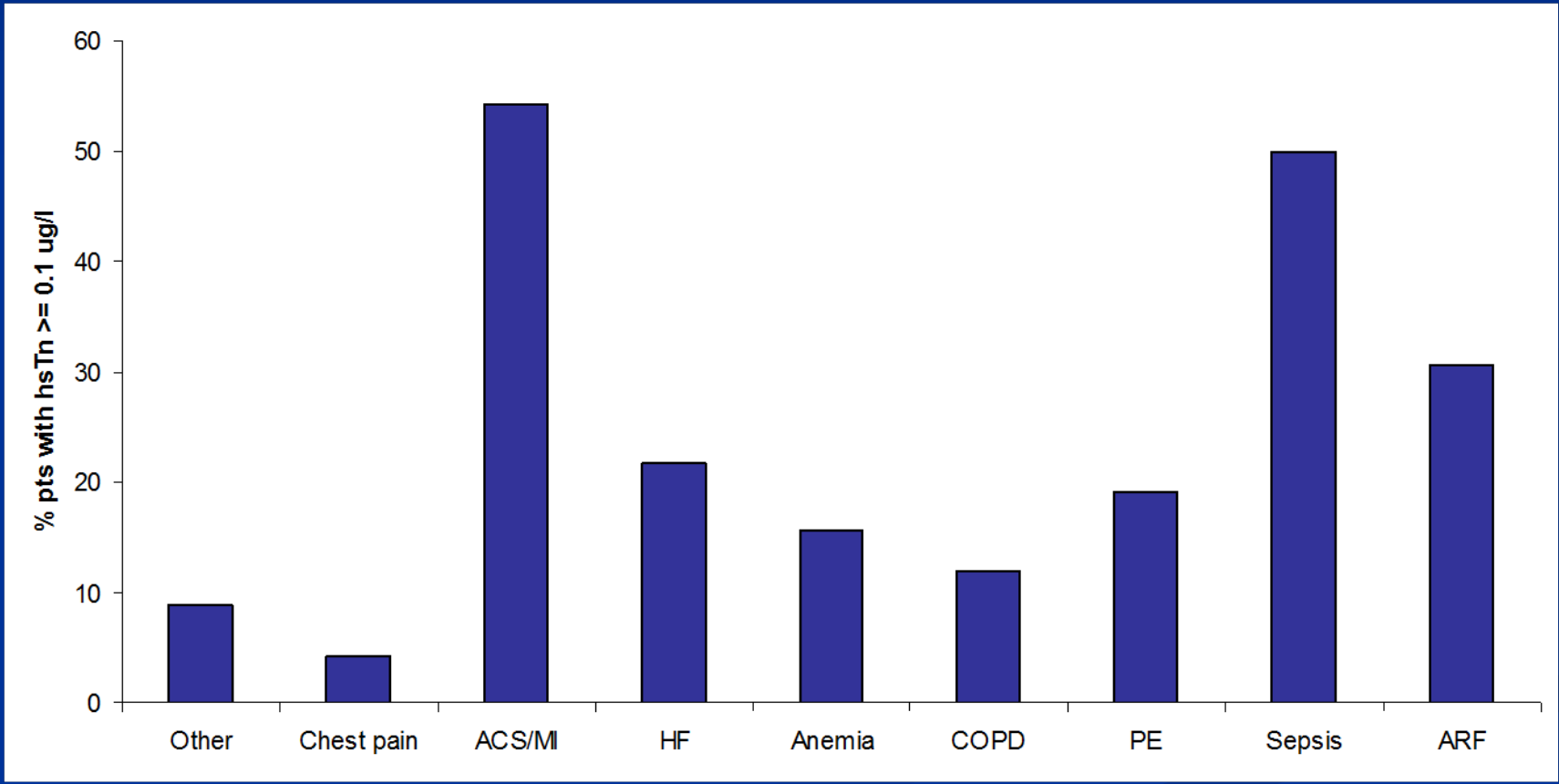
HsTn >= 0.1 ug/l



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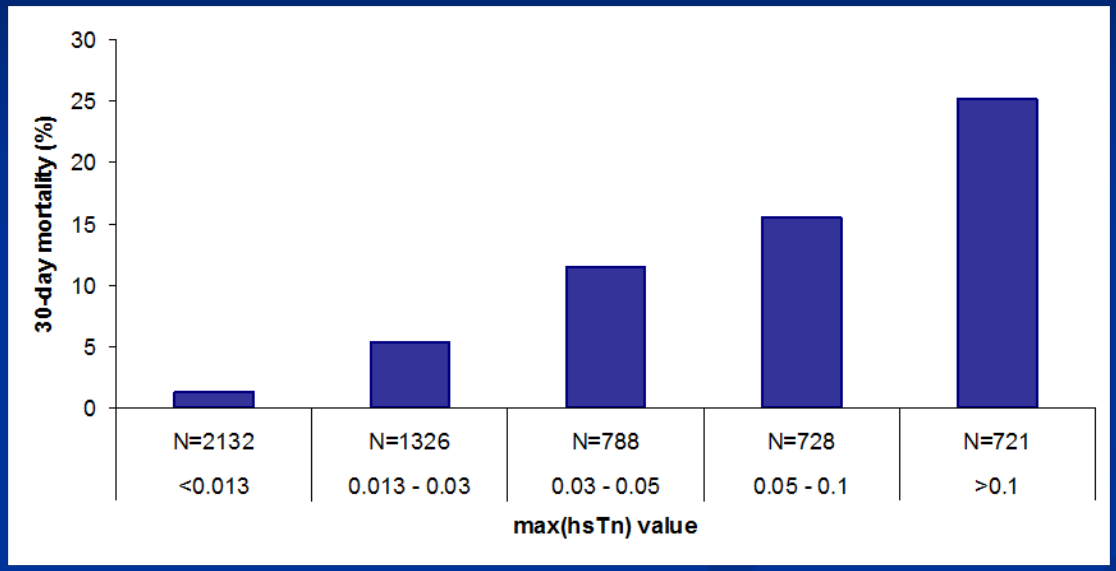
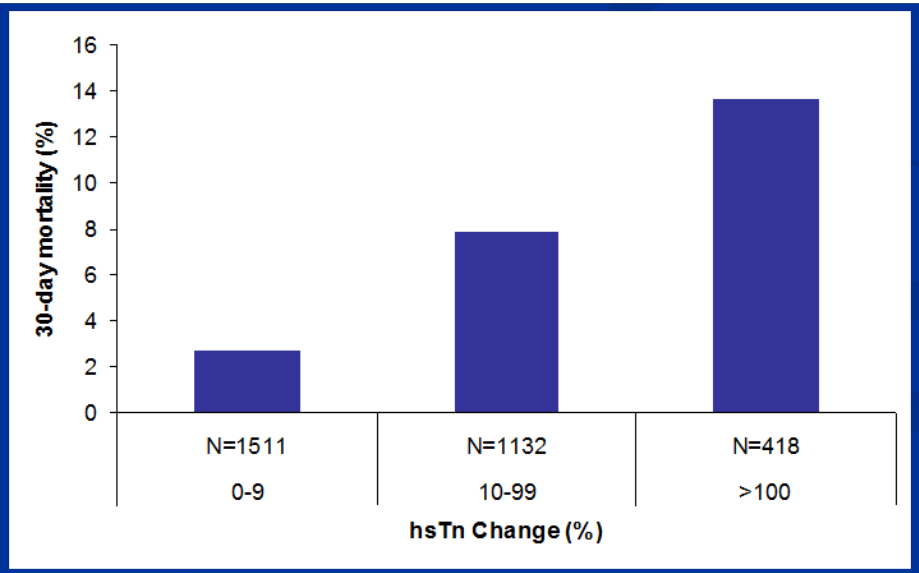
HsTn and 30-day Mortality





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Multivariate Analysis for 30-day Mortality

Parameter	OR (95% CI)	p
Age	1.03 (1.02, 1.04)	<0.0001
Creatinin	1.17 (1.1, 1.26)	<0.0001
Chest Pain	0.18 (0.1, 0.32)	<0.0001
Sepsis	11.17 (7.27, 17.17)	<0.0001
ARF	1.66 (1.18, 2.33)	0.004
MI/ACS	0.46 (0.27, 0.79)	0.005
hsTn>0.013	4.58 (2.8, 7.49)	<0.0001

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Conclusions I

- Elevated hsTn as well as its dynamic changes are common among hospitalized patients in Internal Medicine wards across multiple medical conditions
- Age and chronic renal failure are associated with elevated hsTn levels
- In 94% of the patients who had elevated hsTn the cause was not ACS/MI

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Conclusions II

- High max hsTn levels but **not** magnitude of dynamic changes were more frequent among patients with ACS
- HsTn > 99% percentile is and independent predictor for early mortality
- These results underline the complexity of the utilization of hsTn in diagnosis of NSTEMI in medical patients with atypical symptoms