# Mitral Valve Repair is Underutilized in Patients with Lower Income Levels

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**The authors have nothing to disclose**

# BACKGROUND

- Healthcare disparities in CV medicine exist
- Vulnerable populations are less likely to receive angiography, PTCA or CABG
- In the US, socioeconomic status is a significant predictor of operative mortality in aortic & mitral valve surgery
- Mitral valve repair is generally accepted as a superior procedure over mitral replacement
- **The impact of income on mitral procedure selection is unknown**

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# STUDY DESIGN

- Retrospective
- NIS database
- 2005 – 2007
- Patients stratified into four income quartiles based on ZIP code
  - 1: $1-$38,999
  - 2: $39,000-$47,999
  - 3: $48,000-$62,999
  - 4: $63,000 or more

# STUDY ENDPOINTS

- Mitral repair rates
- Hospital mortality

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# National Inpatient Sample (NIS) Database

- Largest all-payer database
- Maintained by the HCUP under AHRQ
- Contains de-identified patient data
- Stratified probability sample
- 20% of hospital admissions
- Uses ICD-9-CM coding system

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## INCLUSION CRITERIA

- Mitral repair (ICD-9 35.12)
- Mitral replacement (ICD-9 35.23, 35.24)
- Age >30

## EXLUSION CRITERIA

- Closed heart valvuloplasty
- Congenital heart disease
- Coronary revascularization
- Excision of ventricular aneurysm
- Replacement of thoracic aorta
- Aortic fenestration procedure
- Other valve repair/replacement (except tricuspid)

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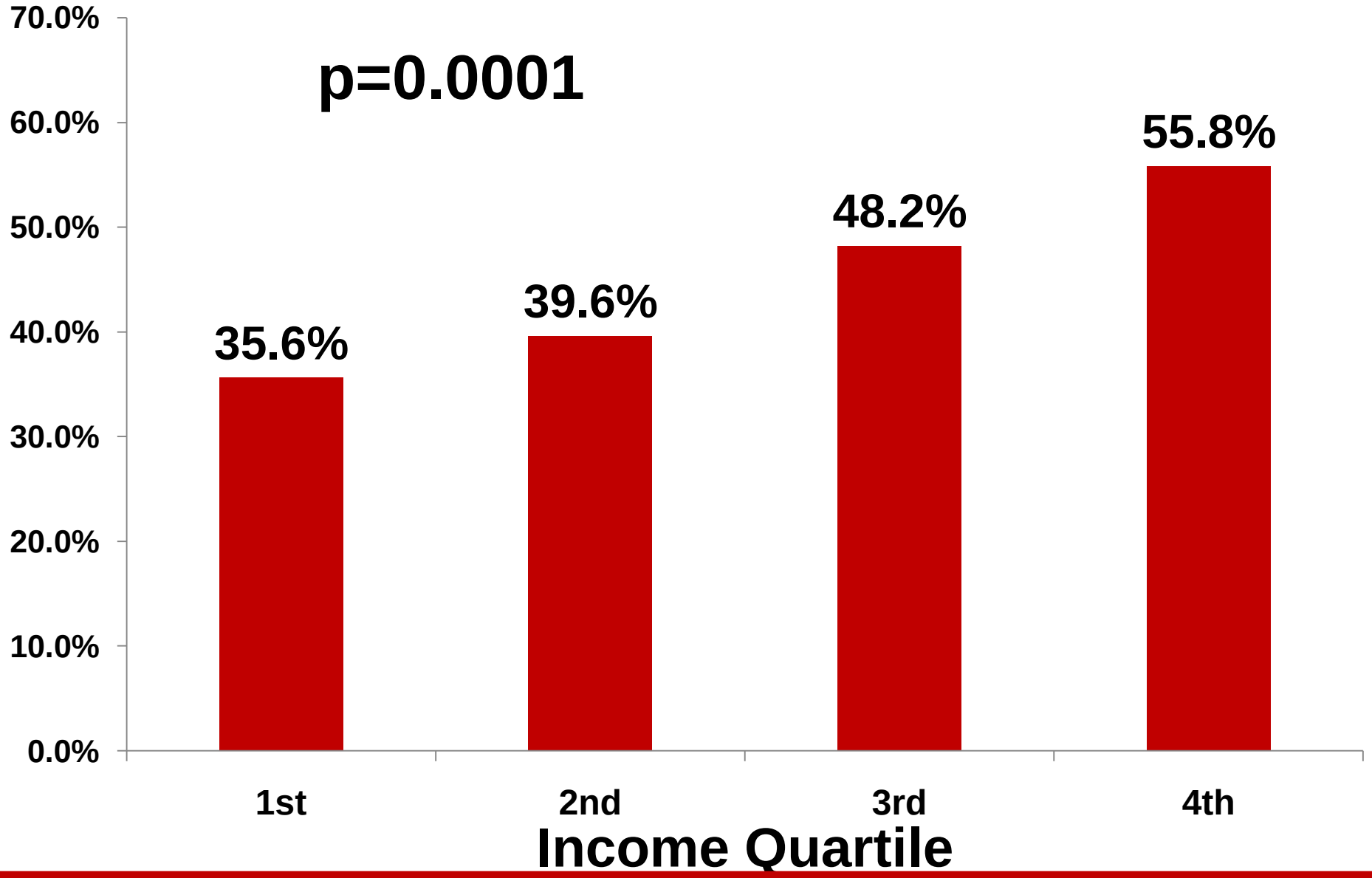
# BASELINE CHARACTERISTICS

| | 1st quartile | 2nd quartile | 3rd quartile | 4th quartile | p-value |
|---|---|---|---|---|---|
| Number of Patients | 9784 (20.9%) | 10219 (21.8%) | 12430 (26.5%) | 14482 (30.9%) | |
| Mean age | 61.0 | 62.3 | 62.3 | 62.1 | 0.0080 |
| Female (%) | 57 | 54 | 51 | 46 | 0.0001 |
| White (%) | 64 | 79 | 80 | 84 | 0.0001 |
| Urban residency (%) | 65 | 74 | 91 | 99 | 0.0001 |
| Primary Payer (%) | | | | | |
| - Medicare | 49 | 50 | 45 | 41 | 0.0001 |
| - Medicaid | 13 | 6 | 5 | 2 | 0.0001 |
| - Private Ins | 31 | 38 | 44 | 53 | 0.0001 |
| - Self Pay/Other | 7 | 2 | 5 | 3 | 0.0001 |
| Admission Status (%) | | | | | |
| Elective | 60 | 66 | 68 | 68 | 0.0104 |
| Urgent/Emergent | 40 | 34 | 32 | 32 | |
| Mean Charlson index | 1.25 | 1.07 | 0.99 | 0.88 | 0.0001 |

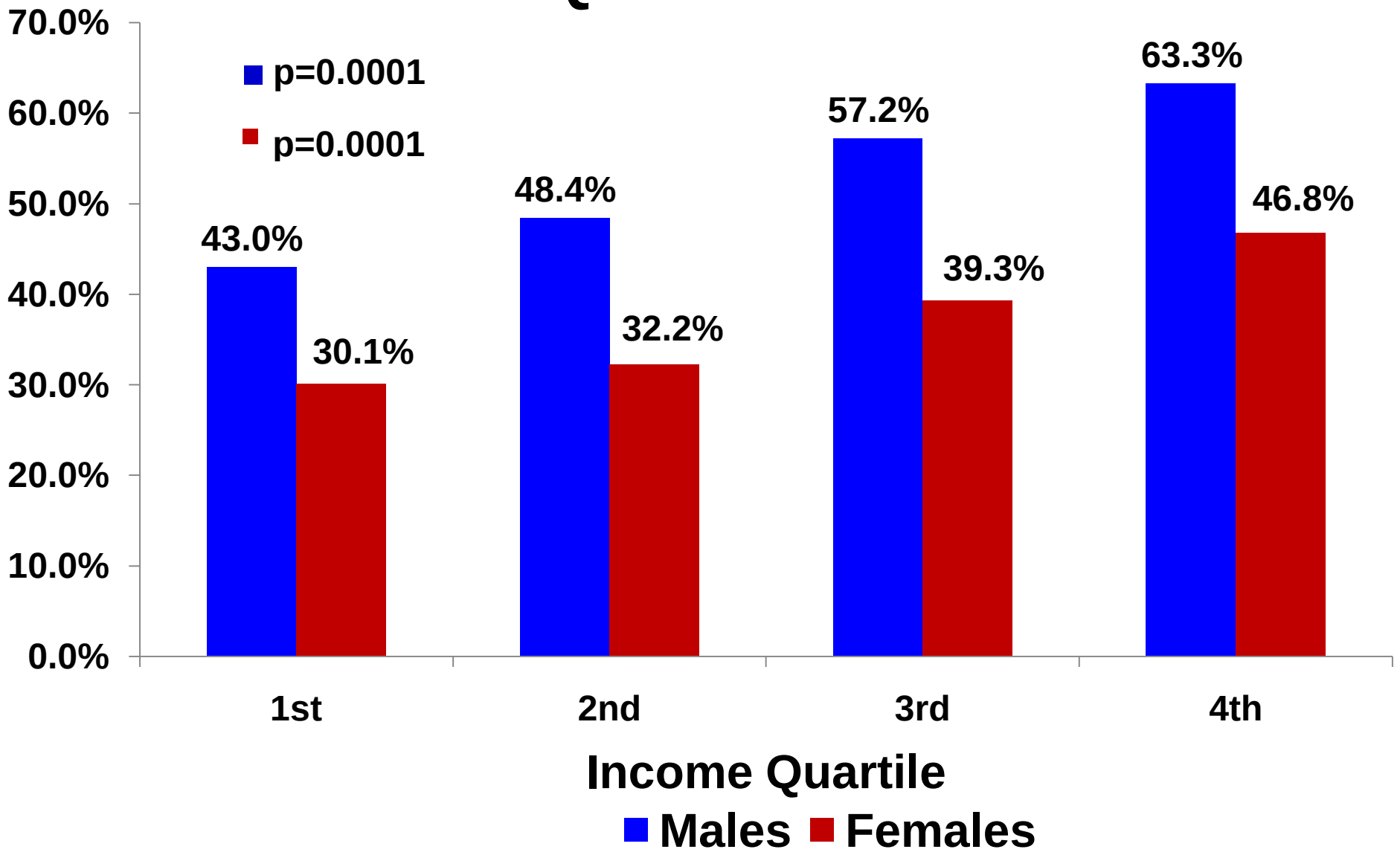
# Charlson Comorbidity Index: selected variables and corresponding ICD-9 codes used to compare patient comorbidities

| Diagnostic category | ICD-9-CM codes |
|---|---|
| Myocardial infraction | 410-410.9, 412 |
| Congestive heart failure | 428-428.9 |
| Peripheral vascular disease | 443.9, 441-441.9, 785.4, V43.4, proc 38.48 |
| Cerebrovascular disease | 430-438 |
| Hemiplegia or paraplegia | 344.1, 342-342.9 |
| Renal disease | 582-582.9, 583-583.7, 585, 586, 588-588.9 |
| Diabetes | 250-250.3, 250.7, 250.4-250.6 |
| Liver disease | 571.2, 571.5, 571.6, 571.4-571.49, 572.2-572.8 |

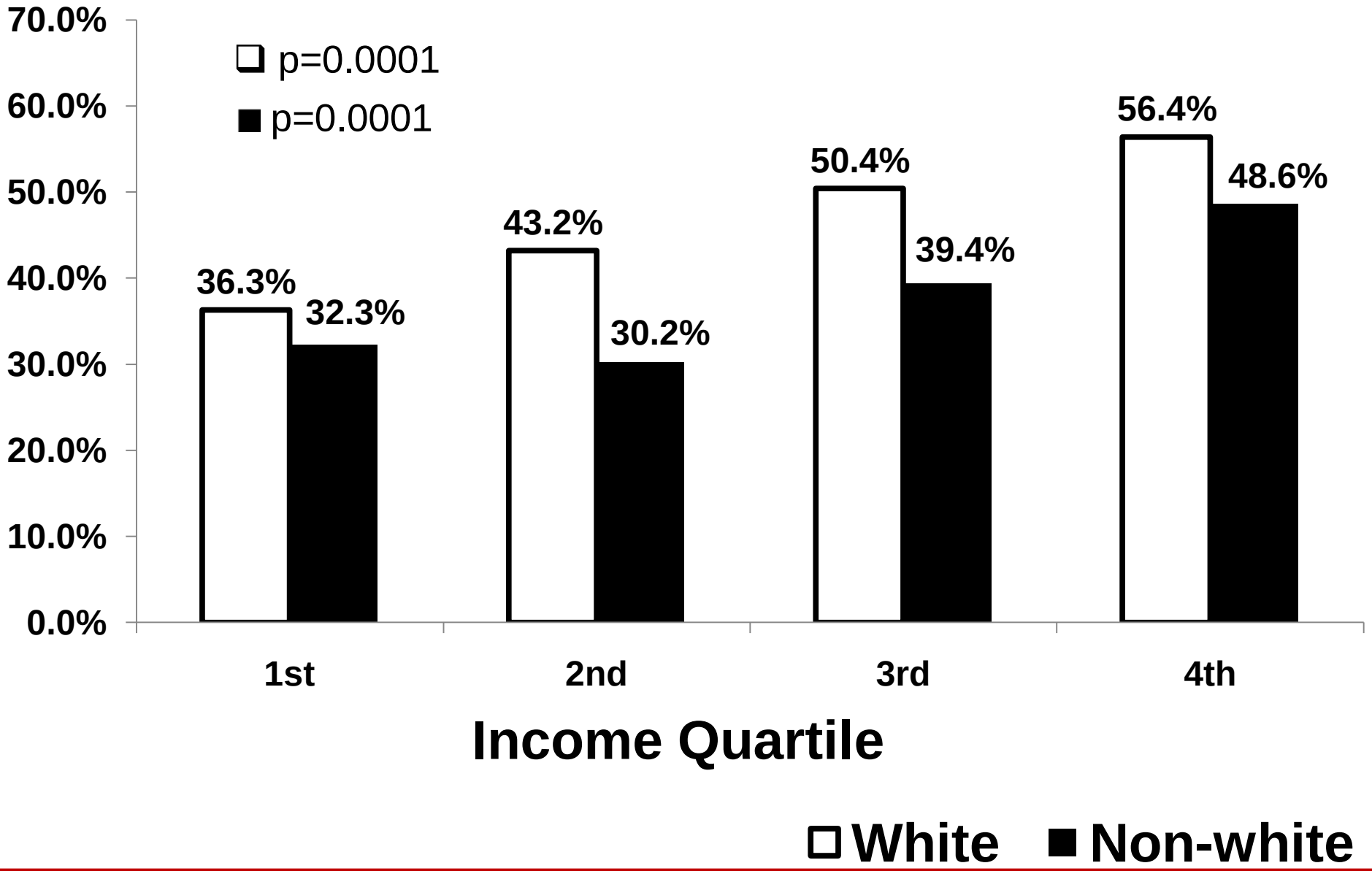
# Mitral Repair Rates by Income Quartile



# Mitral Repair Rates by Income Quartile and Gender



# Mitral Valve Repair Rates by Income Quartile and Race



# Adjusted mitral repair rates and hospital mortality stratified by income quartile

| OUTCOME | INCOME QUARTILE 1 | 2 | 3 | 4 | p-value |
|---|---|---|---|---|---|
| Hospital death OR, (95% CI) | 1.00 | 0.88 (0.58-1.33) | 0.82 (0.50-1.33) | 0.75 (0.51-1.10) | 0.5432 |
| Mitral Repair OR (95% CI) | 1.00 | 1.09 (0.90-1.32) | 1.43 (1.16-1.75) | 1.75 (1.25-2.44) | 0.0008 |

**Adjusted for age, gender, race, Charlson comorbidity index, admission status, primary payer, urban/rural status, hospital location and teaching status**

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In conclusion,

There is a significant disparity in utilization of mitral valve repair for patients with lower socioeconomic status as examined using income level

Possible explanations:

- Patient factors
  - delayed referral
  - different pathology
- Hospital factors
- Surgeon factors
  - intraoperative judgment
  - technical ability

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