

Background

- **Current ACC/AHA guidelines recommend patients with ST-elevation MI receive primary PCI within 90 minutes of hospital arrival**
- **Prior studies assessing association of door-to-balloon time for primary PCI and patient outcomes are mixed**
 - **No independent association**
 - **No increased mortality after an initial delay**
 - **Increased mortality only after 1, 2 hours of delay**
 - **Any delay in time to treatment independently associated with poorer outcomes**



Background

- **Varied findings may reflect methodological differences in modeling door-to-balloon time**
 - **Modeled as linear, categorical variable**
 - **Results in loss of statistical power**
 - **Assumes time to treatment exhibits linear or ordinal relationship with mortality**
- **Prior studies assessing association of door-to-balloon time for primary PCI and patient outcomes are mixed**
 - **Is mortality increased only after 90 minutes?**
 - **Is any delay in time to treatment harmful?**



Study Objective

- **Assess the association between door-to-balloon time and mortality in a national registry of patients undergoing primary PCI**
- **Characterize the nature of any identified association between door-to-balloon time and mortality**
 - **Is there an initial period within which delayed time to treatment is not harmful?**
 - **Or is any delay in door-to-balloon time associated with increased harm?**



ACC/NCDR CathPCI Registry

- **National, voluntary, ACC-sponsored registry**
- **Largest contemporary, clinically detailed registry of cardiac catheterization, PCIs**
- **2005 CathPCI contains 660,665 records from >600 sites across the United States**
- **CathPCI includes demographic data, medical history, angiographic findings, treatments, in-hospital course**
- **Data quality ensured through standardized data elements and definitions, systematic data entry and transmission, rigorous quality assurance**
- **Limited to patients treated in 2005**



Study Sample

- **Analysis limited to patients who underwent primary PCI for ST-elevation MI in 2005**
 - **29,372 cases identified**
- **Cases excluded if:**
 - **Age <18 years, >99 years**
 - **Arrived by inter-hospital transfer**
 - **Received thrombolytic therapy**
 - **Center performed <5 primary PCIs**
 - **Door-to-balloon time missing, <15 min., >6 hrs.**
- **Study cohort 18,312 cases**



Door-to-Balloon Time

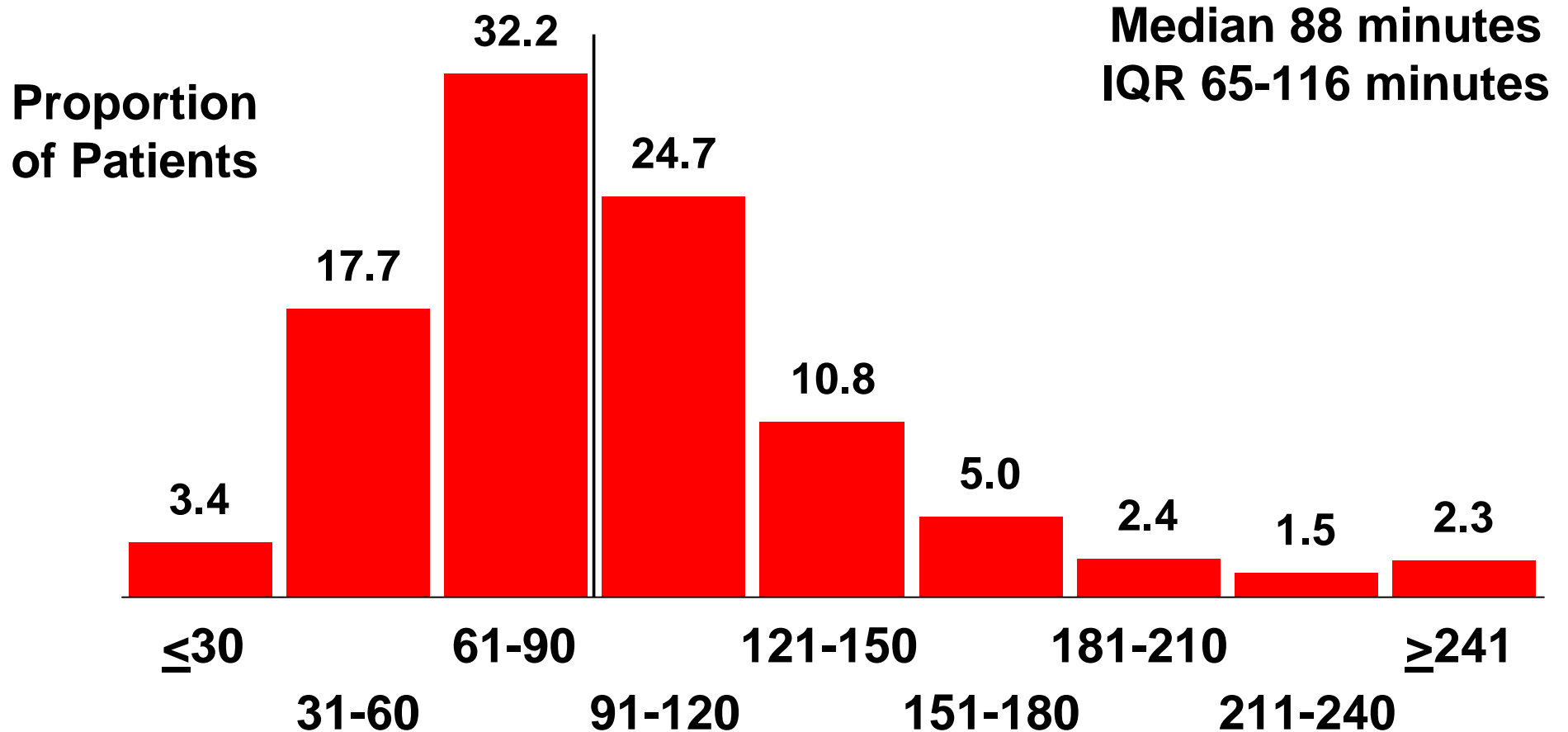
- **Time in minutes between patient's arrival at hospital and first balloon inflation**
- **For descriptive purposes, door-to-balloon time was modeled in 30 minute increments**
- **For all other analyses, modeled as a continuous variable**

Statistical Analyses

- **Characterized distribution of door-to-balloon times**
- **Logistic regression analysis using fractional polynomial modeling to characterize the association between door-to-balloon time and in-hospital mortality**
 - **Compares combinations of linear, non-linear transformations of door-to-balloon time**
 - **Identifies best fit by comparing model deviances**
- **Analysis repeated adjusting for patient age, sex, race, medical history, presentation**

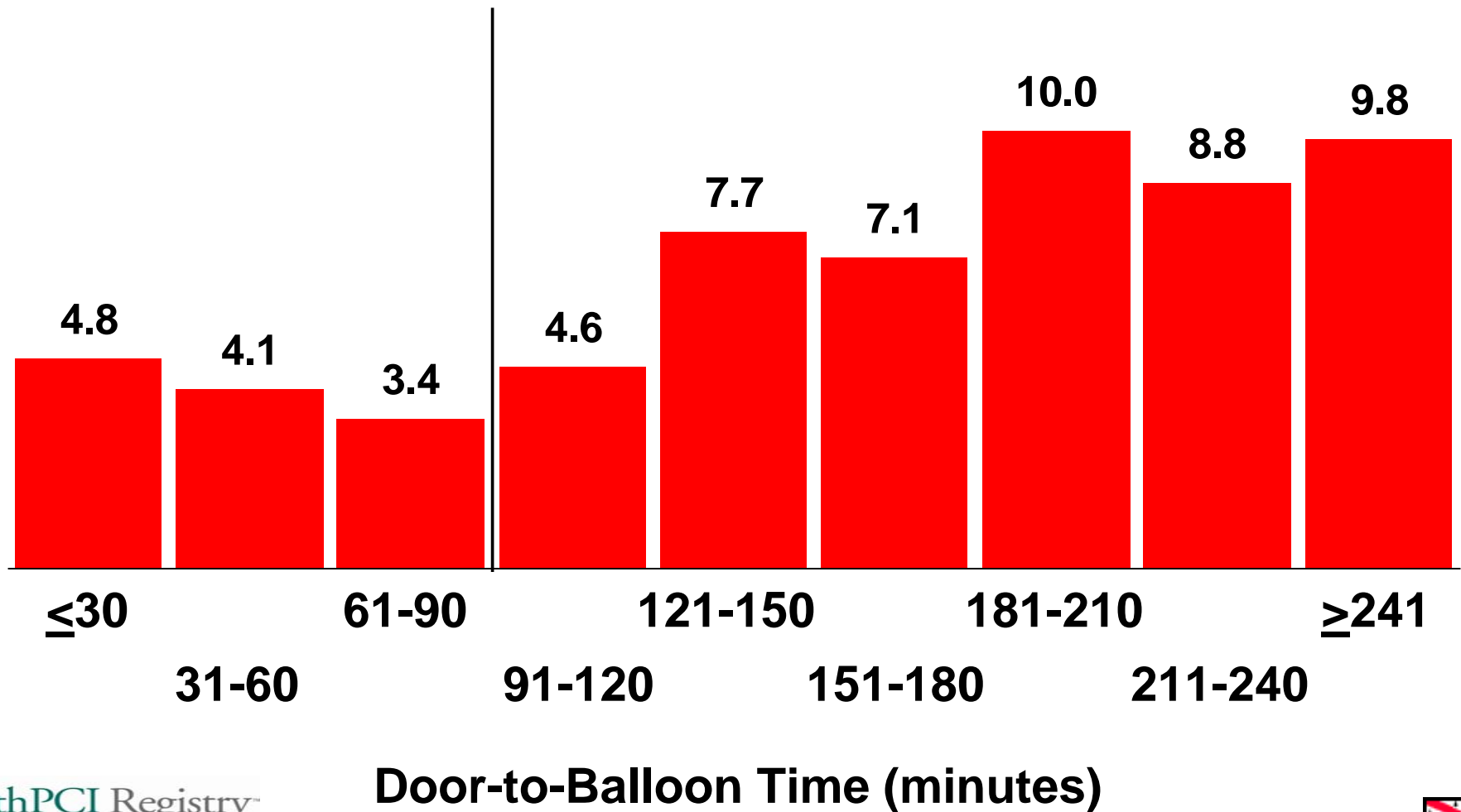


Door-to-Balloon Time Distribution



Crude In-hospital Mortality

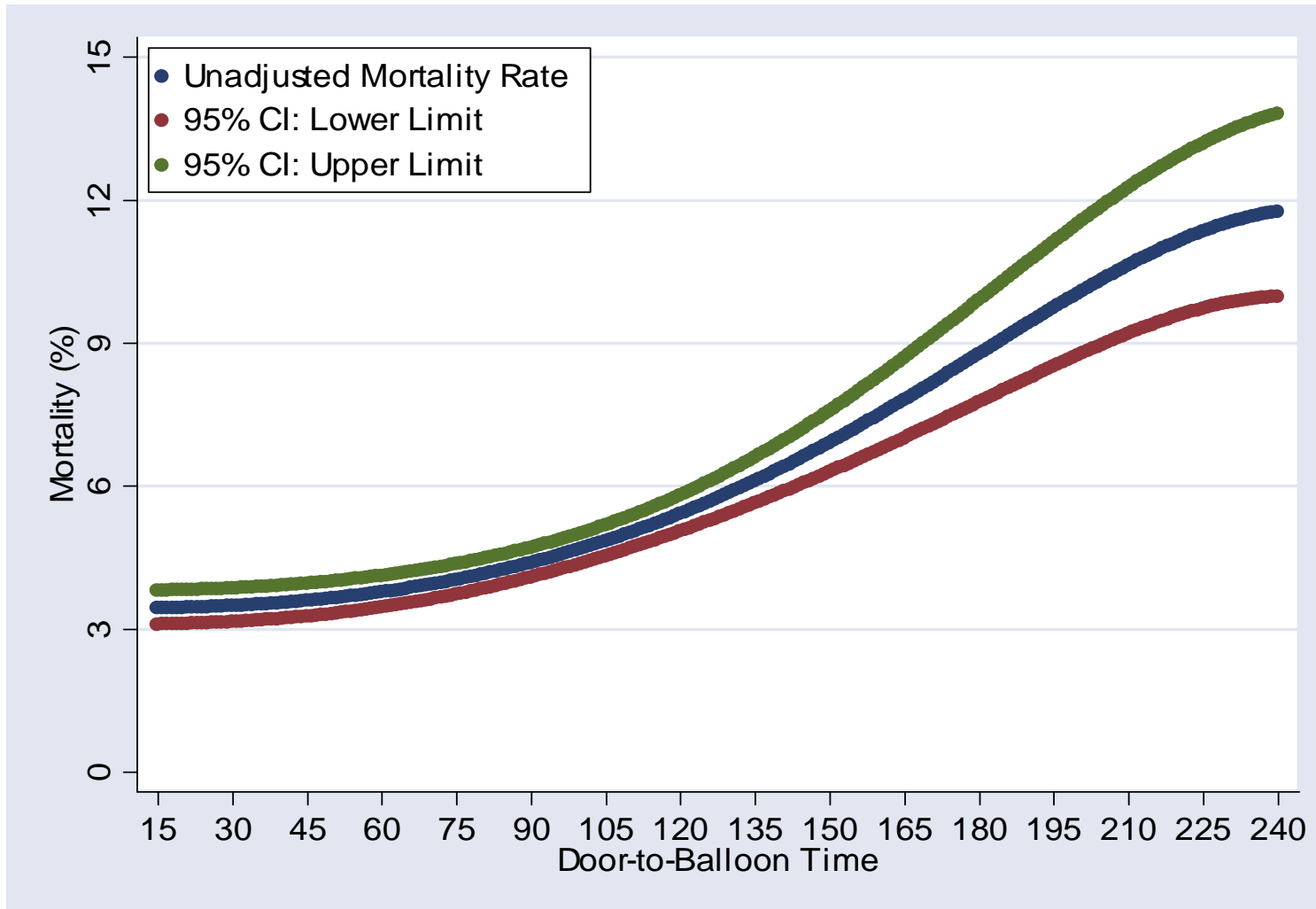
Trend $P < 0.001$



Door-to-Balloon Time (minutes)



Fractional Polynomial - Crude



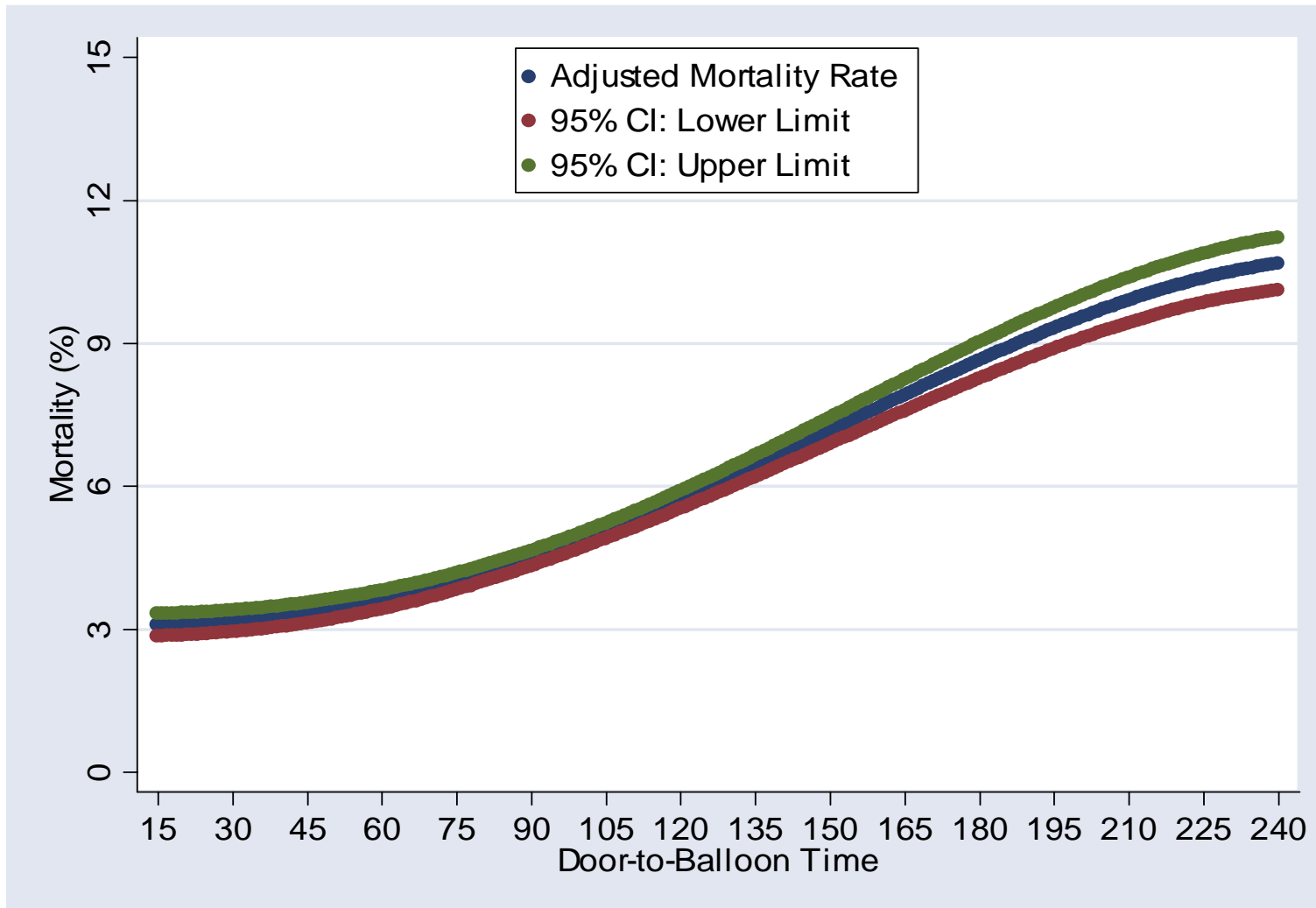
**Overall
in-hospital
mortality
4.9%**

**Best fit
with 2nd
degree
polynomial**

**P<0.001 vs.
linear term**



Fractional Polynomial - Adjusted



**Overall
in-hospital
mortality
4.9%**

**Best fit
with 2nd
degree
polynomial**

**P<0.001 vs.
linear term**



Limitations

- **Unable to account for total ischemic time prior to admission**
 - **Total symptom time may be problematic based on limitations of patient self-report**
- **Excluded 1,120 cases due to missing, short (<15 min.), or long (>6 hour) door to balloon times**
 - **Represents 6% of potential cohort, thus notable bias unlikely**

Conclusions

- **Continuous association between door-to-balloon time and in-hospital mortality in patients undergoing primary PCI**
- **Increased mortality associated with any delay in time to treatment, even among patients treated within 90 minutes of admission**
- **Findings suggest efforts should focus on minimizing door-to-balloon times to the greatest extent possible, even among those meeting current ACC/AHA guideline recommendations**

