



# **Novel Changes in Bundled Payments Cleveland Clinic Experience**

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# Background

- **Healthcare costs account for 17.2% of the GDP\***
- **Traditional payment methods are not associated with better patient outcomes\*\***
- **Alternative payment models are being explored that promote quality, efficiency, and effectiveness in health care delivery**

\* The Commonwealth Fund, Issues in International Health Policy, May 2012

\*\* HealthAffairs, Health Policy Briefs, October 2012

# The Value Equation

Traditional Definition  $\longrightarrow$  Value =  $\frac{\text{Outcomes}}{\text{Cost}}$

Value =  $\frac{\text{Quality} + \text{Patient Experience} + \text{Patient Reported Outcomes}^*}{\text{Event} + \text{Episode} + \text{Ongoing Care}}$

**Cost Reduction**  
5-10% per case

**Cost Avoidance**  
10-15% of cases

**Value Analysis:  
Predictive Model powered by Truven**

\*Return to work and quality of life

# Bundled Payments

- **Bundled payments employ a single payment for all services related to a treatment or condition**
- **Goals:**
  - **Target a common procedure with variation in costs and outcomes**
  - **Cover essential clinical items and services**
  - **Provide a financial incentive to reduce inappropriate care**
  - **Yield a “win-win-win” outcome for payers, providers, and patients**
  - **Be simple enough to administer effectively**
  - **Maintain or improve quality of care**
  - **Appear seamless to policy holders**
  - **Be scalable and sustainable**

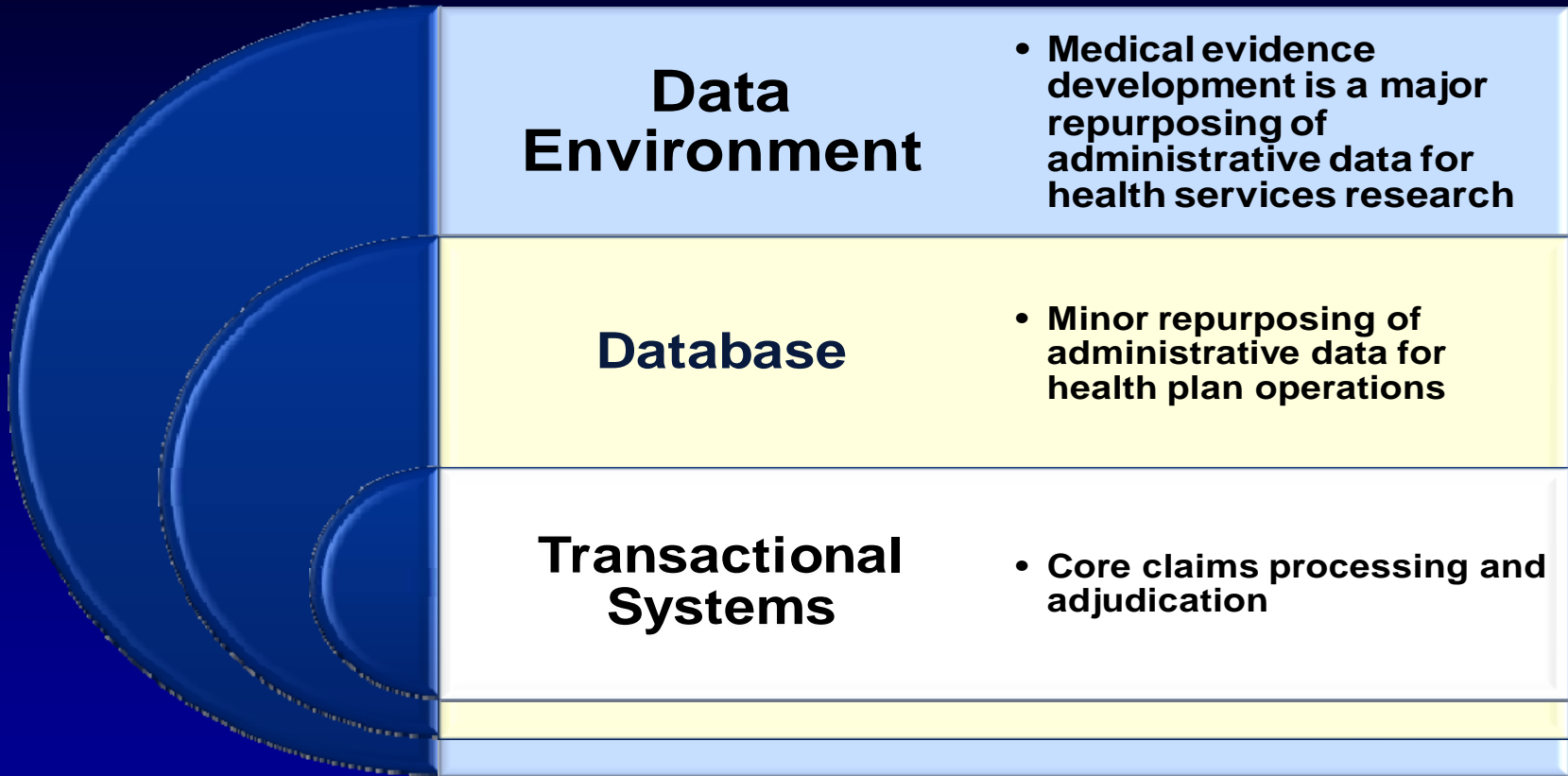
# The Problem

- Episodes of care should be risk adjusted\*
- Traditional risk adjustment approaches rely on healthcare claims data\*\*
- Primary Objectives:
  - Integrate payer claims data with provider clinical data for development of the LPR
  - Demonstrate the application of the LPR for risk adjusting bundled payments
- Secondary Objectives:
  - Determine pre-procedural risk factors for high episode costs
  - Examine the procedures and services in the PCI episodes that lead to high episode costs

\* <http://aspe.hhs.gov/health/reports/09/mcperform/report.pdf>

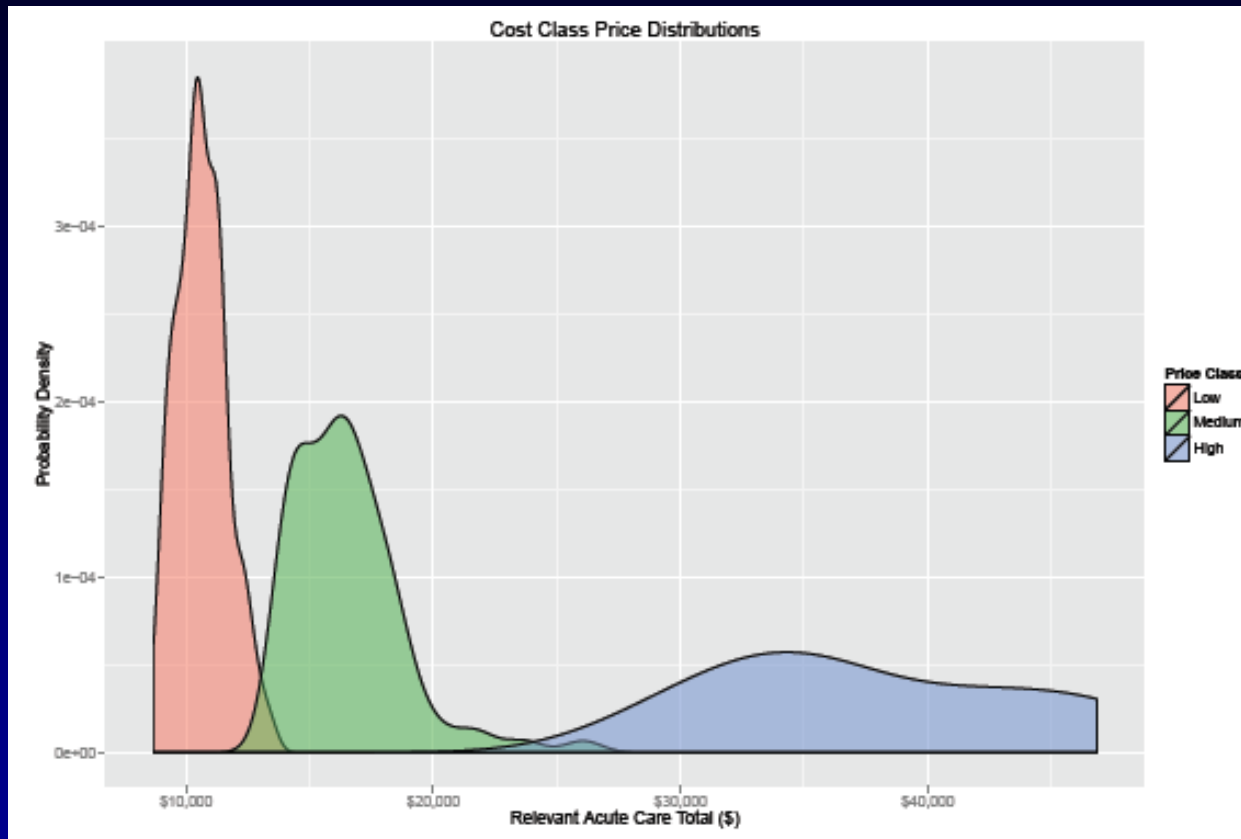
\*\*<http://www.hci3.org/sites/default/files/files/Severity%20Adjustment%20Fact%20Sheet.pdf>

# Limitations of Claims Data



What we see is not always what we get!

# Relevant Acute Care Cost Price Class Statistics



Price Class	# of Patients	Median Price
Low	216	\$10,527
Medium	82	\$16,232
High	5	\$35,411

# Stakeholders

- **Partnership:**
  - **Cleveland Clinic Foundation (CCF) and HealthCore/Anthem (HC/ANTM)**
  - **Executed Non-Disclosure Agreement (NDA), Business Associate Agreement (BAA), and Data Transfer and Collaboration Agreement (DTCA) in January 2013**
  - **Percutaneous Coronary Intervention (PCI) was selected for the research study**
  - **All parties agreed on study objectives and protocols**
- **Guiding Principles:**
  - **Protect patient privacy**
  - **Protect business interests of data sources**
  - **Protect integrity of research**

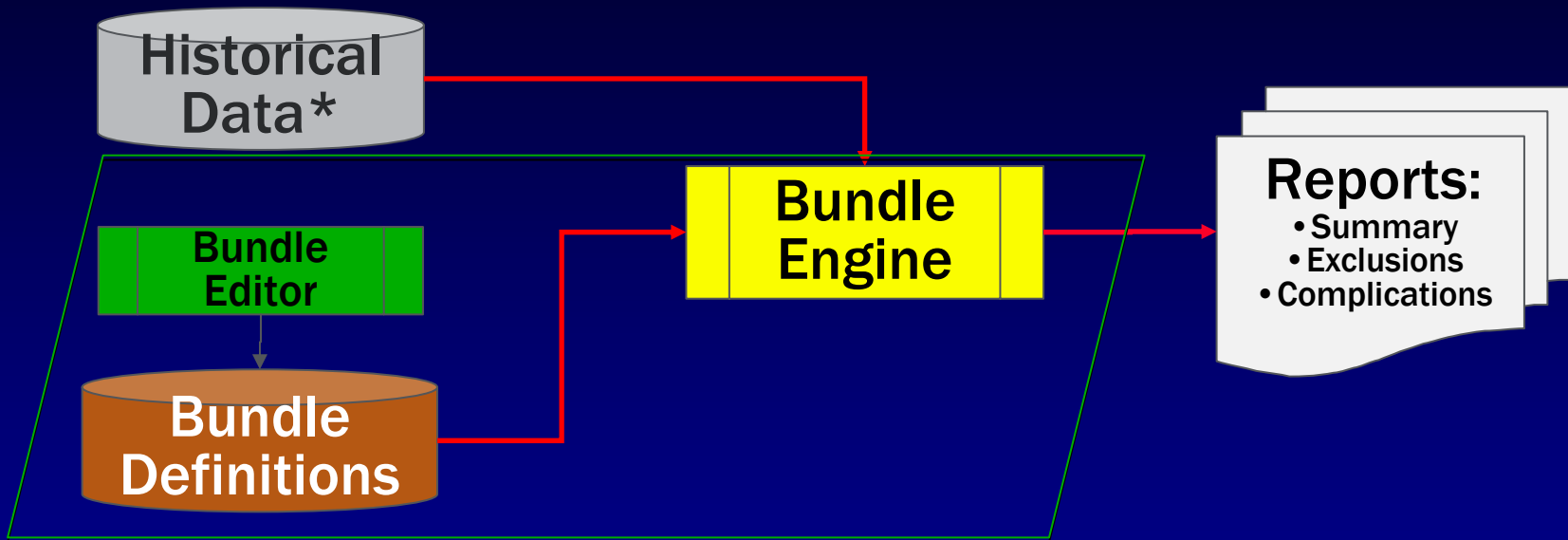


# Patients Reconciliation

Year of PCI Event	Total Unique Patients	Matched CCF & HCI	Percent Matched	Yet To Be Matched Cleveland Clinic (CCF)	Yet To Be Matched HealthCore (HCI)
2006	238		0%	238	
2007	204		0%	204	
2008	205	7	3%	184	14
2009	286	118	41%	75	93
2010	273	111	41%	89	73
2011	284	112	39%	98	74
2012	283	78	28%	145	60
<b>Totals</b>	<b>1773</b>	<b>426</b>	<b>24%</b>	<b>1033</b>	<b>314</b>

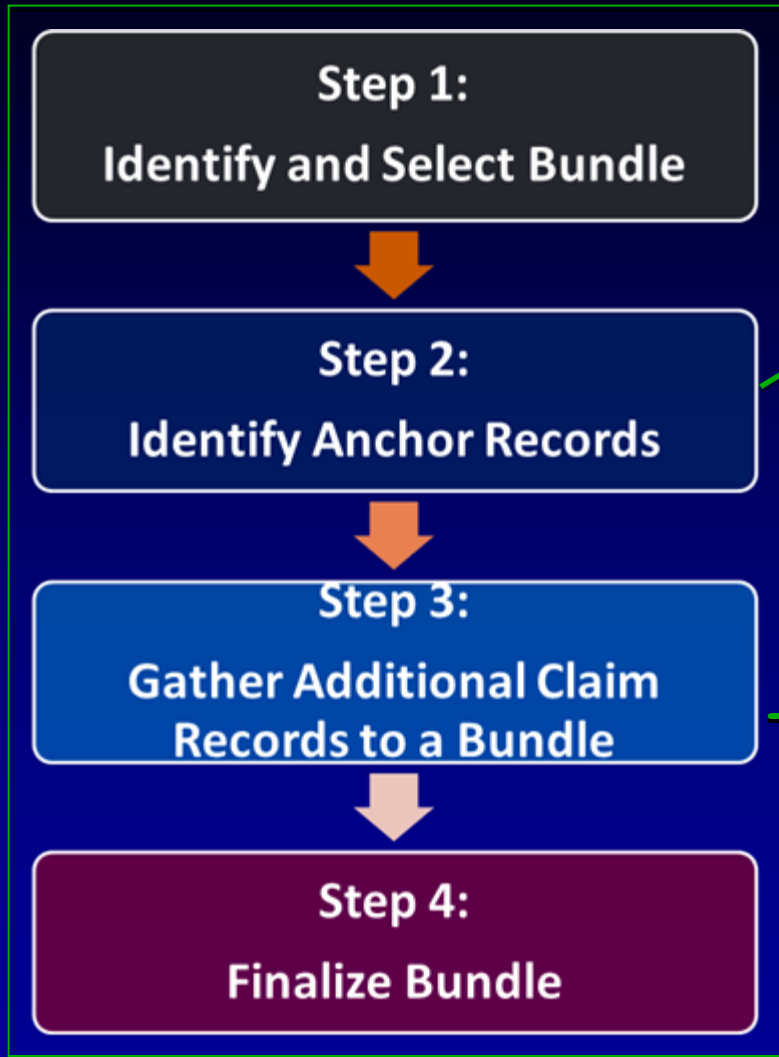
\* Before Final Filtering for Age, Insurance Product, and Eligibility Periods

# Bundle Grouper



- **CCF grouped claims into PCI treatment episodes capturing utilization 30 days pre and 180 days post PCI surgery**
- **HC/ANTM received grouper output and replaced imputed costs with actual allowed amounts for use in research study**

# Bundle Grouper Process



## 1. Identify the trigger claim

- Use procedure and/or diagnosis code information

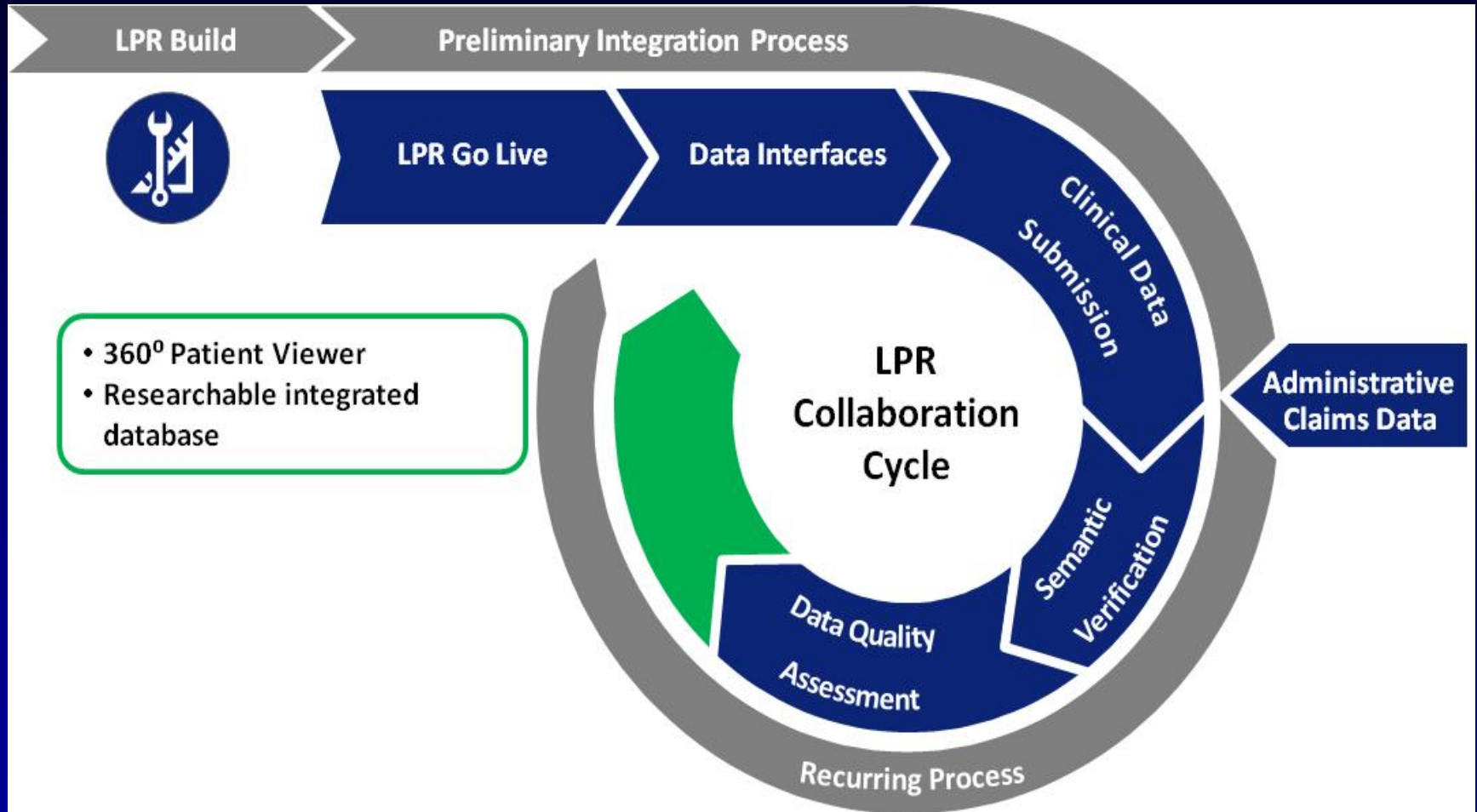
## 2. Determine services during the time window

- Time windows defined before and after trigger service
- Definition considers the relevance of timing of a patient's services

## 3. Identify unexpected outcomes

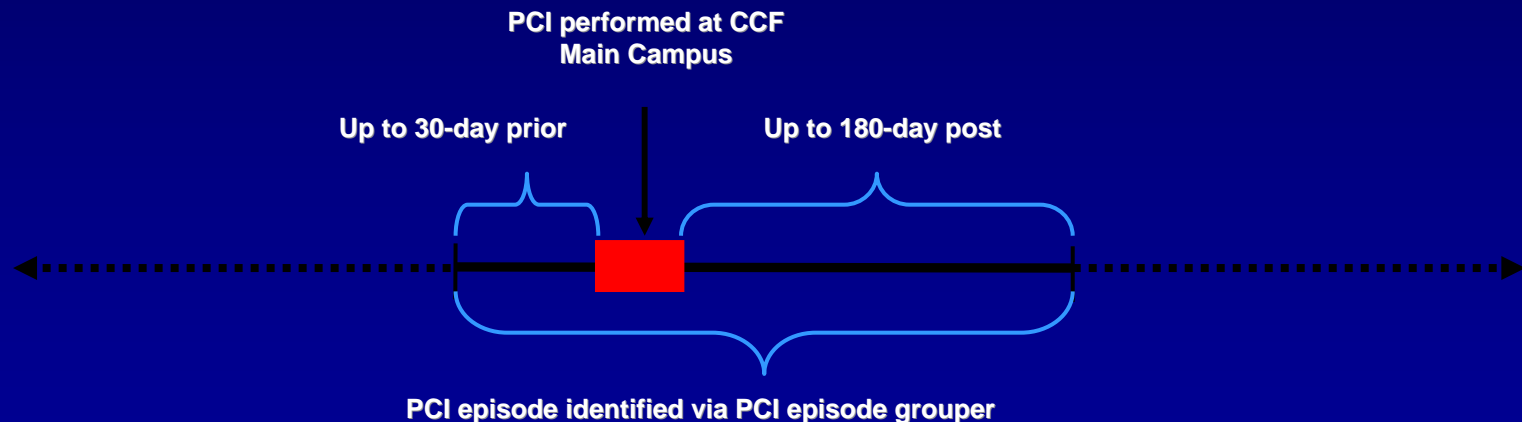
- Identifies inpatient admission for medical or surgical complication

# LPR Development Process



# Study Design and Population

- Retrospective observational study design
- Patients receiving PCI procedures at Cleveland Clinic Main Campus
- Patients ages 18 – 75 years old at time of PCI
- Study period: 1/1/2006 through 12/31/2012



1/1/2006

PCI Registry data + HIRE data + Grouper output

12/31/2012

# Statistical Methodology

## Modeling

- Variables associated with costs and deemed clinically relevant were considered
- A backward selection algorithm was used to choose the best fit model
- Cross validation was performed to avoid overfitting the data

### Cost as a Continuous Outcome

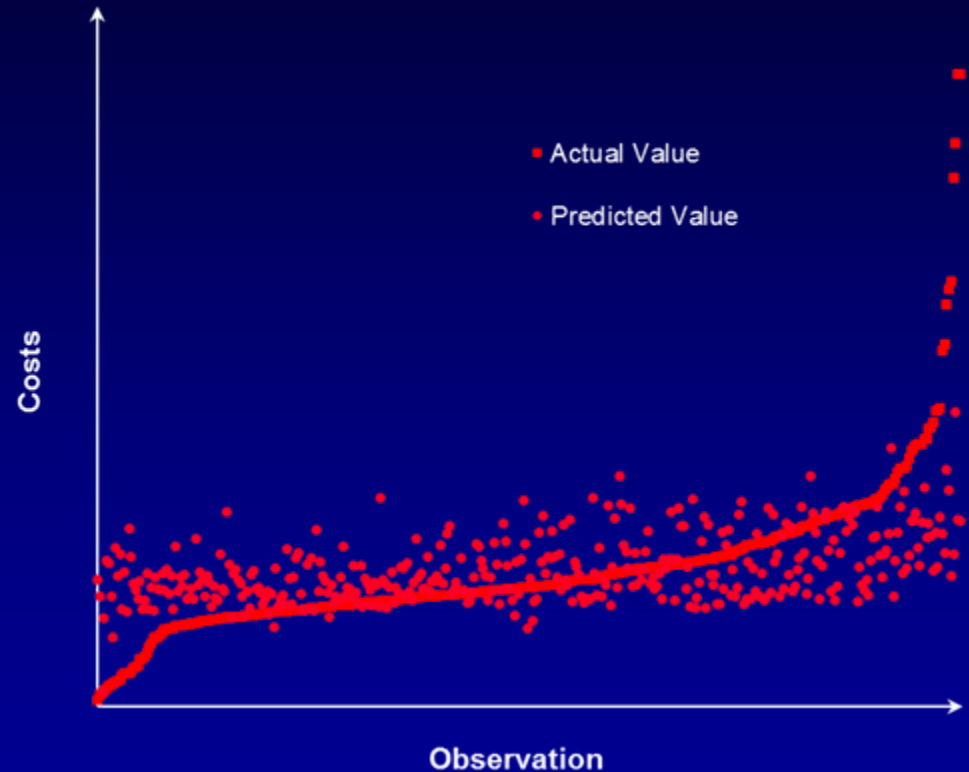
- Generalized linear models with a gamma distribution were used to predict costs

### Cost as a Dichotomous Outcome

- Modeled using logistic regression to predict a patient having costs in the top 25 percentile

# Predictive Model – Continuous Outcome (n=388)

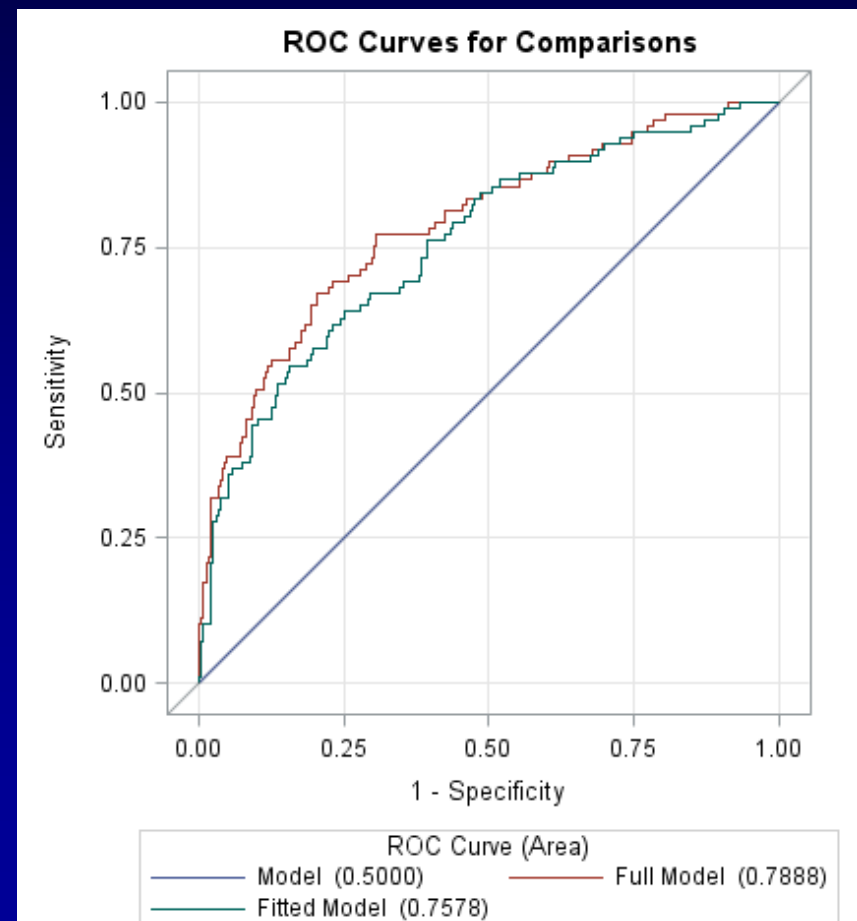
Variables included	Effect direction
<b>Main effects</b>	
Age	↓
Elective PCI (vs. Emergent PCI)	↓
Prior MI	↑
Prior PCI	↑
CAD presentation of STEMI	↑
CAD presentation of NSTEMI	↓
Stress/imaging study - positive results	↑
<b>Interaction Terms</b>	
Age <sup>2</sup>	
BMI <sup>2</sup>	
Age * BMI	
Age <sup>2</sup> * BMI	
Age <sup>2</sup> * BMI <sup>2</sup>	
Age <sup>2</sup> * CAD presentation of NSTEMI	
Prior MI * Stress/imaging study - positive results	
Prior PCI * CAD presentation of STEMI	



# Predictive Model – Dichotomous Outcome (n=388)

Model predicting “high costs” as the outcome (top quartile of costs)

Variables Included	Effect direction
<b>Independent Variables</b>	
Age	↓
BMI	↓
Elective PCI (vs. Emergent PCI)	↓
CAD presentation of STEMI	↑
CAD presentation of unstable angina	↓
Stress/imaging study - positive results	↓
<b>Interaction Terms</b>	
Age * BMI	
CAD presentation of unstable angina *	
Stress/imaging study - positive results	





# Results Stratified by Elective vs. Non-elective

## Emergent PCI (n = 183)

Variables included in fitted model	Effect direction
<b>Independent Variables</b>	
Age	↑
BMI	↑
Stress/imaging study - positive results	↓
<b>Interaction Terms</b>	
Age * BMI	
Age * BMI <sup>2</sup>	
BMI <sup>3</sup>	

AUC = 0.71

## Elective PCI (n = 205)

Variables included	Effect direction
<b>Independent Variables</b>	
BMI	↑
Family history of premature CAD	↑
Prior MI	↑
Beta blocker use within past 2 weeks	↑
<b>Interaction</b>	
BMI * Prior MI	

AUC = 0.72

# Limitations

- **Small sample size and limited power in the integrated data, especially with stratifying by PCI status and treating cost as a dichotomous outcome**
- **Possible incomplete capture of Medicare costs in individuals 65 years and older**
- **Potential limitations in application to non-commercial and non-Cleveland Clinic patients**
- **Limited auditing of registry data sources**

# Challenges – Business

- **Stakeholder alignment is key**
- **Many health systems are not ready from a technological perspective**
- **Trust between parties has to be established**
- **Understanding the data complexity and ability to integrate data is essential**
- **Development and implementation costs can be high**
- **The results can be transformational for the healthcare system**

# Challenges - Technical

- **Interoperability challenges**
- **Lack of integration at data sources**
- **Non-standard codes / source level data quality issues**
- **One time data input into the LPR does not take into account any future system changes**
- **Issues with persisting data at the database level**

# Findings

- **Clinical data and administrative healthcare data are limited by collection methods and clinical accuracy**
- **HC/ANTM's in-depth data quality assessment was valuable when utilizing clinical data for research purposes**
- **Integrating multiple data sources is complex**
- **Expectation management for timelines and budgets is essential**
- **Interoperability issues should be considered early in the project**



**Cleveland Clinic**

**Every life deserves world class care.**