



HIMSS¹⁹ CHAMPIONS OF HEALTH UNITE

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Empowering Providers with Data to Affect Behavior and Reduce Cost

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Conflict of Interest

Lauren Onken, MHA

Has no real or apparent conflicts of interest to report.

Shaun McDonald

Has no real or apparent conflicts of interest to report.



Agenda

- UNC Health Care System Overview
- Local Problem
- Design and Implementation
- Leveraging Health IT
- Value Derived
- Next Steps



Learning Objectives

- Recognize the value of detailed data in driving change and program development
- Illustrate how to statistically account for variations and complexity
- Demonstrate how to affect behaviors through the use of accurate and meaningful data



UNC Health Care System Overview

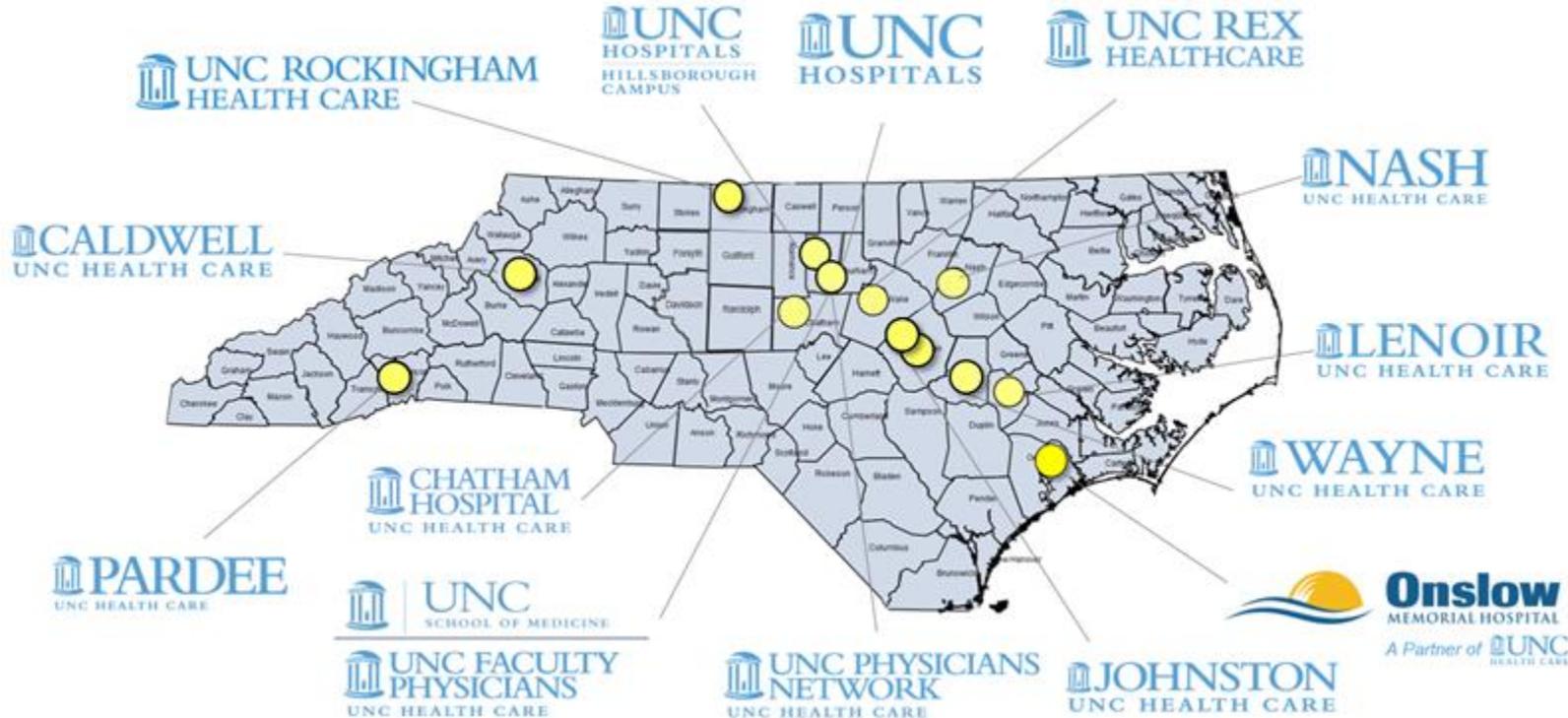
Integrated, not-for-profit health care system, owned by the State of North Carolina and based in Chapel Hill. We provide comprehensive patient care, facilitate physician education and research excellence, and promote the health and well-being of all North Carolinians.



<u>Key Stats</u>	<u>2011</u>	<u>2017</u>
Net patient revenues	\$2.0B	\$4.9B
Licensed beds	1,530	>3,400
Employees	14,000	>31,500
Medical staff	3,186	>5,400
Employed MDs	2,110	>3,200
Surgeries	60,000	>120,000
ED visits	151,000	>510,000
Clinic visits	1.1M	>3.5M



Providing high quality care across the state



Pharmaceutical costs are rising and impacting patient care

- Rising pharmaceutical costs threaten patient access to drug therapies, but also challenge providers' ability to deliver value-based care to their patients
- The American Hospital Association (AHA) and the Federation of American Hospitals (FAH) commissioned a study at the University of Chicago in 2016 to better understand how drug prices are changing in the inpatient hospital setting [1]

23
Percent

Increase in annual inpatient drug spending from FY13-FY15
(5.2 to 6.5M)

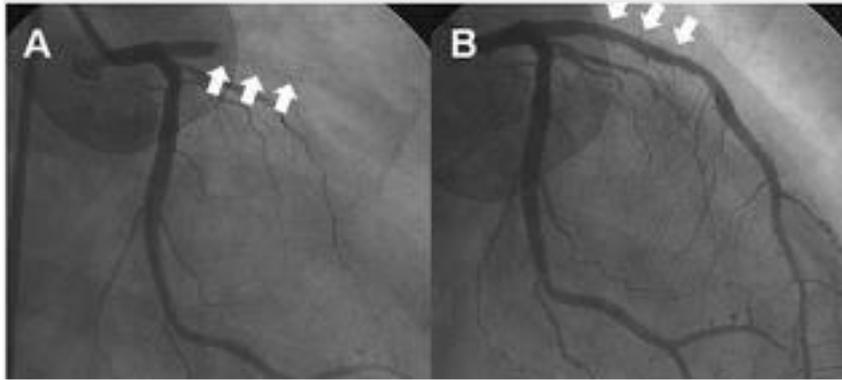
90
Percent

Of hospitals reported that inpatient drug prices increases had a **moderate or severe effect on their ability to manage costs**



Case Study: Percutaneous Coronary Intervention (PCI)

- **Patient:** 57 year old male presents to ER with crushing chest pains
- **Exam:** Diaphoretic and restless, blood pressure 90/69, heart rate 110
- **EKG:** ST elevation anterior leads
- **Diagnosis:** STEMI (acute heart attack)



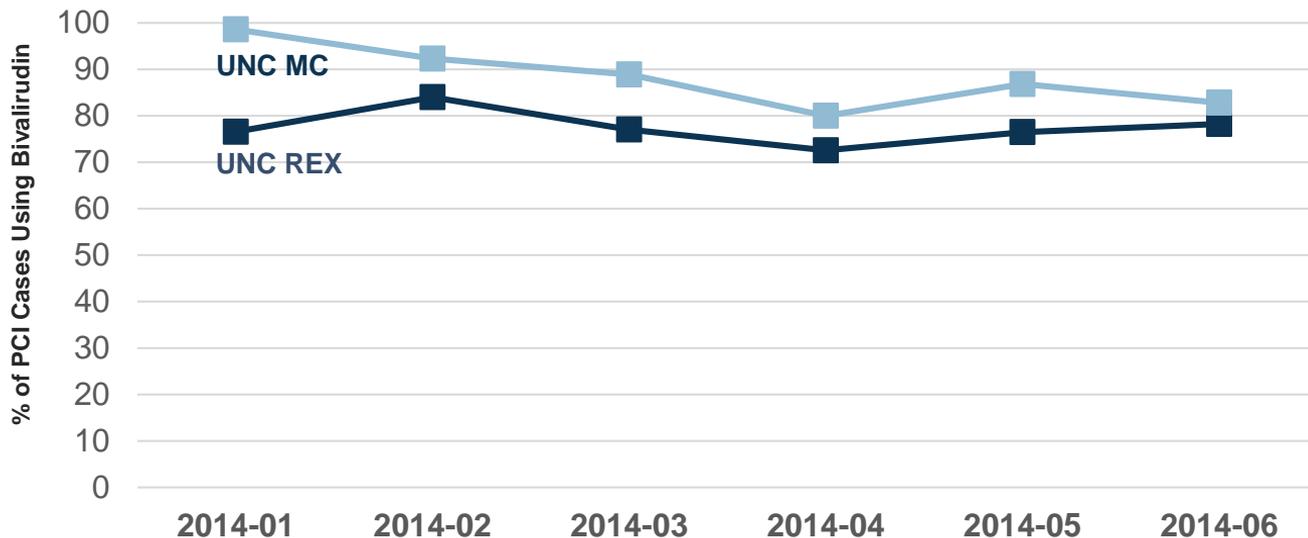
Best practices changed with new studies

- **2008: “HORIZONS-AMI” study Resulted in a nationwide increase in bivalirudin use for all PCI**
- **2008 – 2014:**
 - Transradial PCI becomes more widespread reducing bleeding risk
 - Sporadic cases of stent thrombosis with bivalirudin reported in the literature
- **2014: “HEAT-PPCI” study challenged the use of bivalirudin**
 - Suggested that a heparin strategy reduced the incidence of major adverse ischaemic events with no increase in bleeding complications
 - Showed bivalirudin was about 300 times more expensive than heparin. It was estimated that switching to heparin would reduce the cost of their annual 1000 PPCI cases by £500 000, ~ \$640,000 (US dollars)
 - **Despite the new information from the “HEAT-PPCI” study and our own cost data, many physicians were reluctant to stop using the bivalirudin.**

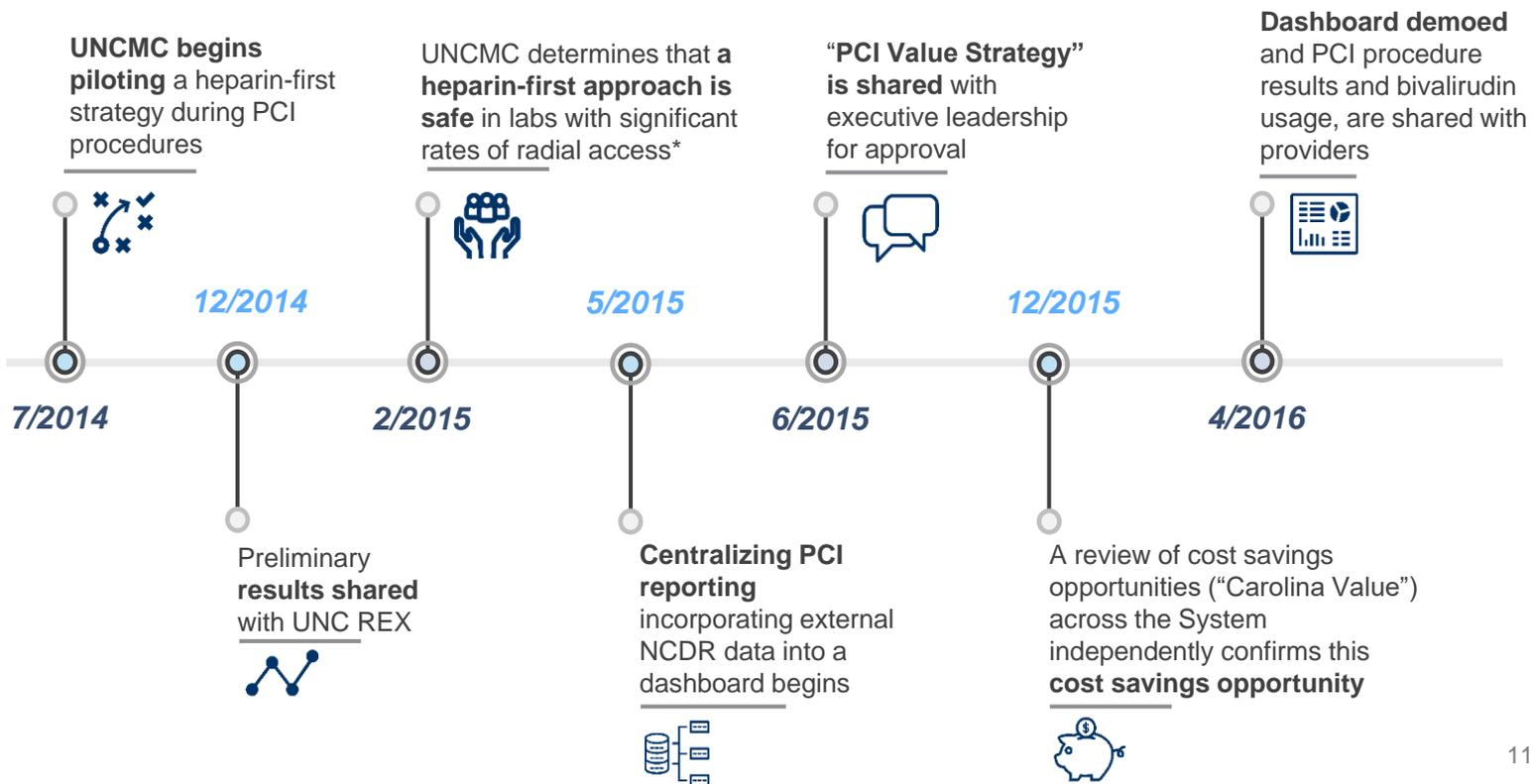


Bivalirudin was the primary anticoagulant used for PCIs

- **Baseline:** Percentage of PCI cases using bivalirudin was 88.24% at UNC Medical Center and 77.47% at UNC REX
- **High pharmaceutical costs + high utilization = high procedure costs and questionable value**



Our journey, from a heparin-first pilot to the creation of a dashboard to drive change



A committee was formed with multiple subject matter experts (SMEs)

Governance Committee

Core Multidisciplinary committee (e.g. physician and operational leaders, analysts, etc.)

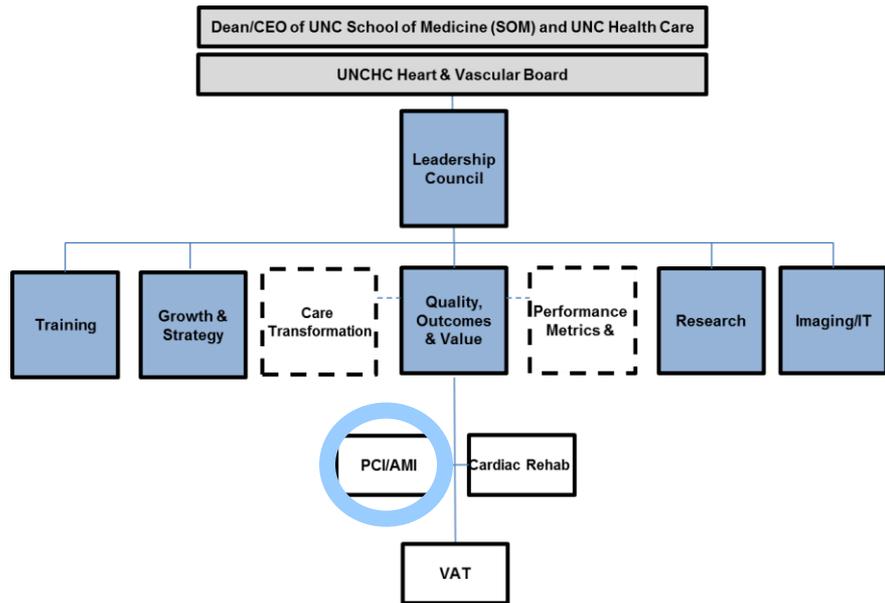
Initial work identified opportunities to:

- 1) Standardize best practices
- 2) Improve quality
- 3) Reduce direct costs, improve current contribution margin, and position UNCHCS for bundle payment success
- 4) Improve operational efficiency and throughput

Selected opportunities included:

- ✓ 1) *Reduce use of bivalirudin & substitute heparin*
- 2) Utilize lower cost routine supplies
- 3) Reduce variation in supply usage

Structure and Focus



This project was well-suited for the DMAIC methodology



To create our PCI dashboard, we used our standard development process/approach



- Create a system-wide solution
- Centralize key metrics pulled from multiple systems
- Create a shared understanding of performance and opportunities

- Near real-time data so progress and initiatives can be regularly monitored
- Opportunities should be easily identifiable and visible

- Source systems identified, data mapped to data model, and ETL to move the data into our data warehouse
- Reporting layer created within BI tool to simplify reporting efforts
- Metric logic built into objects to pre-calculate values

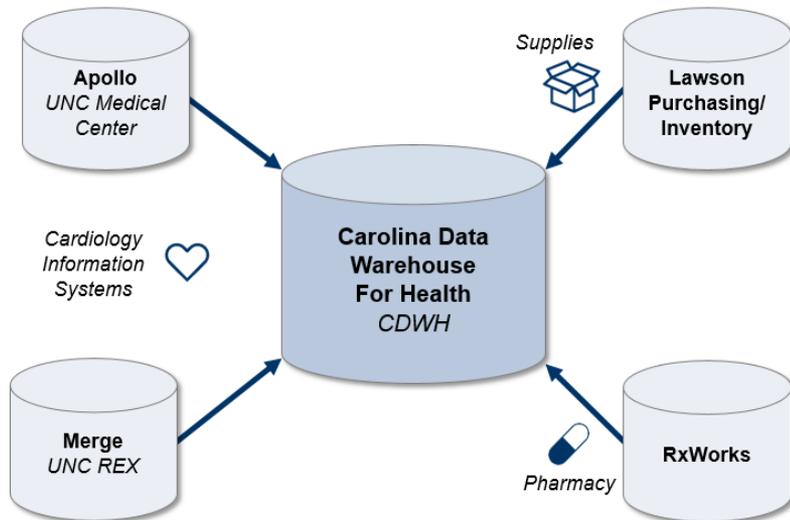
- Results are validated against data submissions to national registries
- Source system validation to ensure data matches what is shown

- Metric calculation documentation created
- Made dashboard accessible to executive and analysts supporting these departments
- Providers review their own data to understand performance and opportunities

After gathering initial requirements, we married disparate data sources

To gain a comprehensive view of our PCI events, we married data elements stored across multiple databases

Integrating Data Into the Data Warehouse



Data Elements

1. Carolina Data Warehouse for Health

- Enterprise Data Warehouse contains a data mart with cardiac data curated for analytics

2. Lawson

- Item number, manufacturer, last purchase price

3. RxWorks

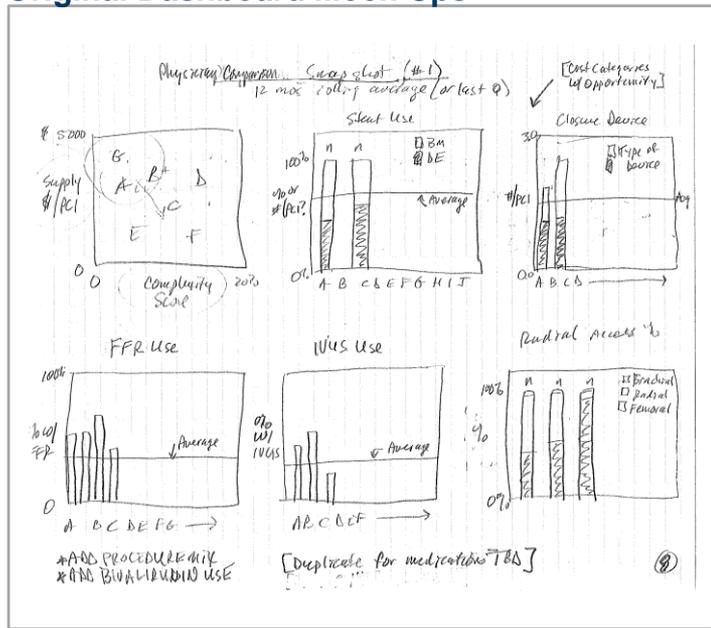
- NDC code, lot number, last purchase price

4. Apollo and Merge

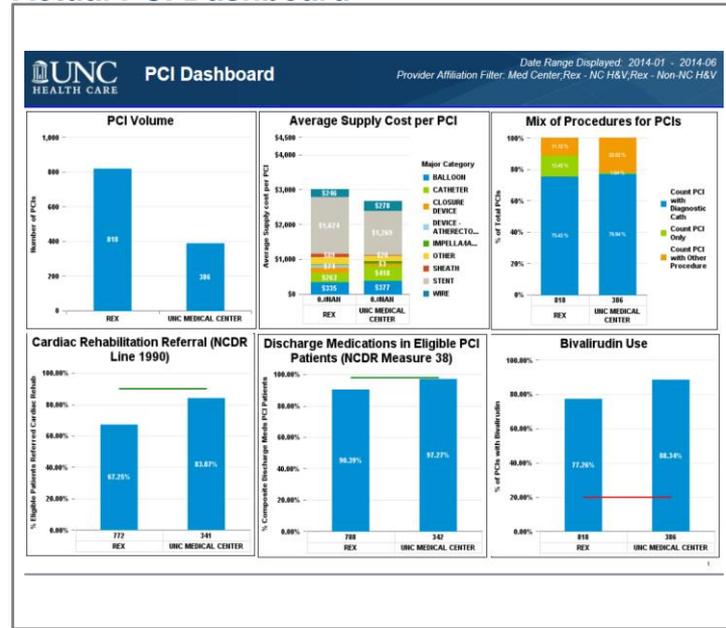
- Supply usage/waste, event timestamps, interventionalists, patient15 encounter information

Next we created a few mock-ups, eventually landing on our final dashboard design

Original Dashboard Mock-Ups



Actual PCI Dashboard



The goal of this dashboard was to “change behavior”

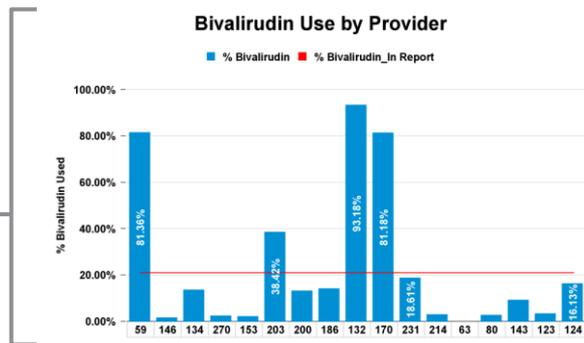
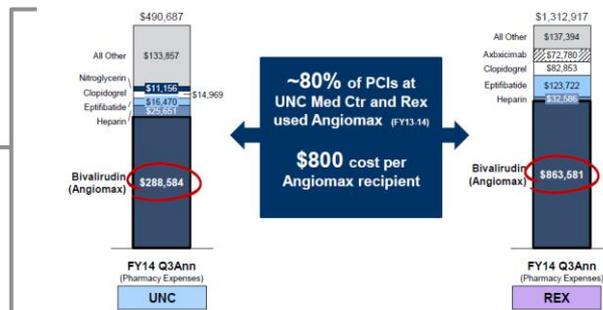
Primary Goal: Understand and share the ordering practice patterns and behaviors to help shift the mindset of our providers

Educate providers about the cost of drugs

Demonstrate maintained or improved outcomes as a result of the switch from bivalirudin to heparin

Minimize case-complexity and population differences by using statistical clustering

Educate providers about their peer’s usage

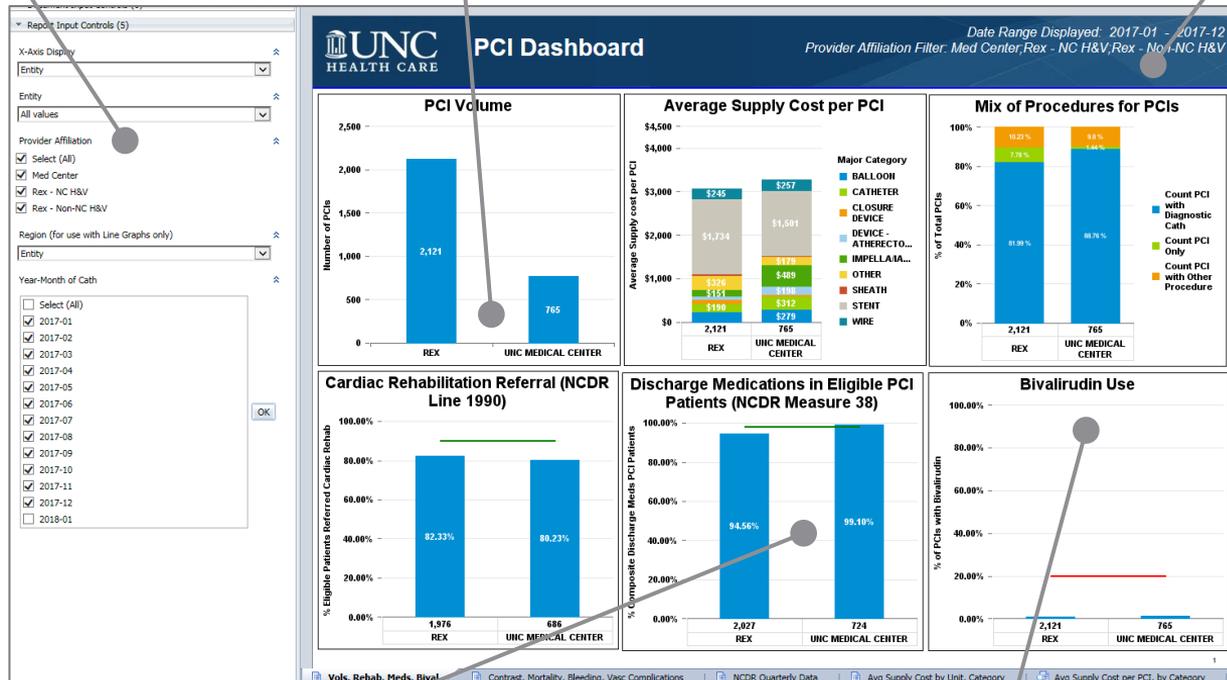


Using the PCI dashboard - Functionality

Flexible Controls

Side-by-Side Comparisons

Filters Currently Applied



Providing accurate and meaningful data can change physician behavior

Sharing Data With Colleagues

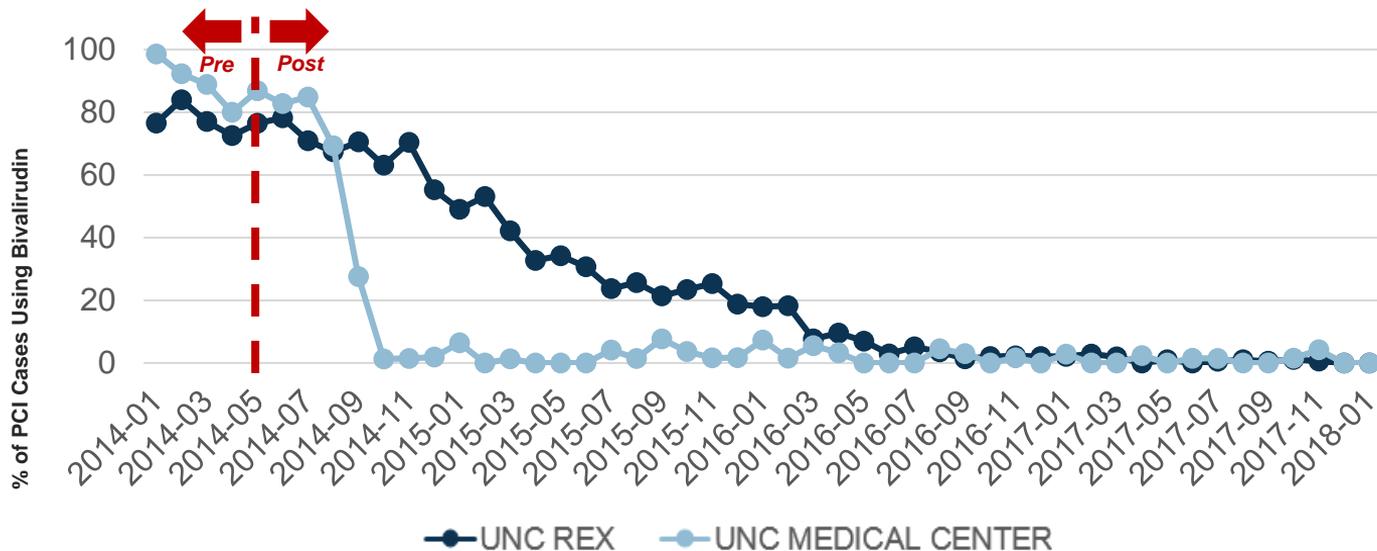
- The dashboard was shared at many meetings and other forums to maximize awareness
- Physicians received un-blinded dashboards and had access to their colleagues' information. Staff received blinded dashboards.

*“The **cardiologists received the information in an extremely positive fashion.** After training, most doctors and us interventional cardiologists work independently during cases and patient care with limited exposure to our partners. **Being able to share practice patterns and understand cost/quality among peers resulted in positive change in behavior.**” - Dr. Joel Schneider, UNC REX Physician Champion*



Significant reduction in the percentage of PCI cases using Bivalirudin

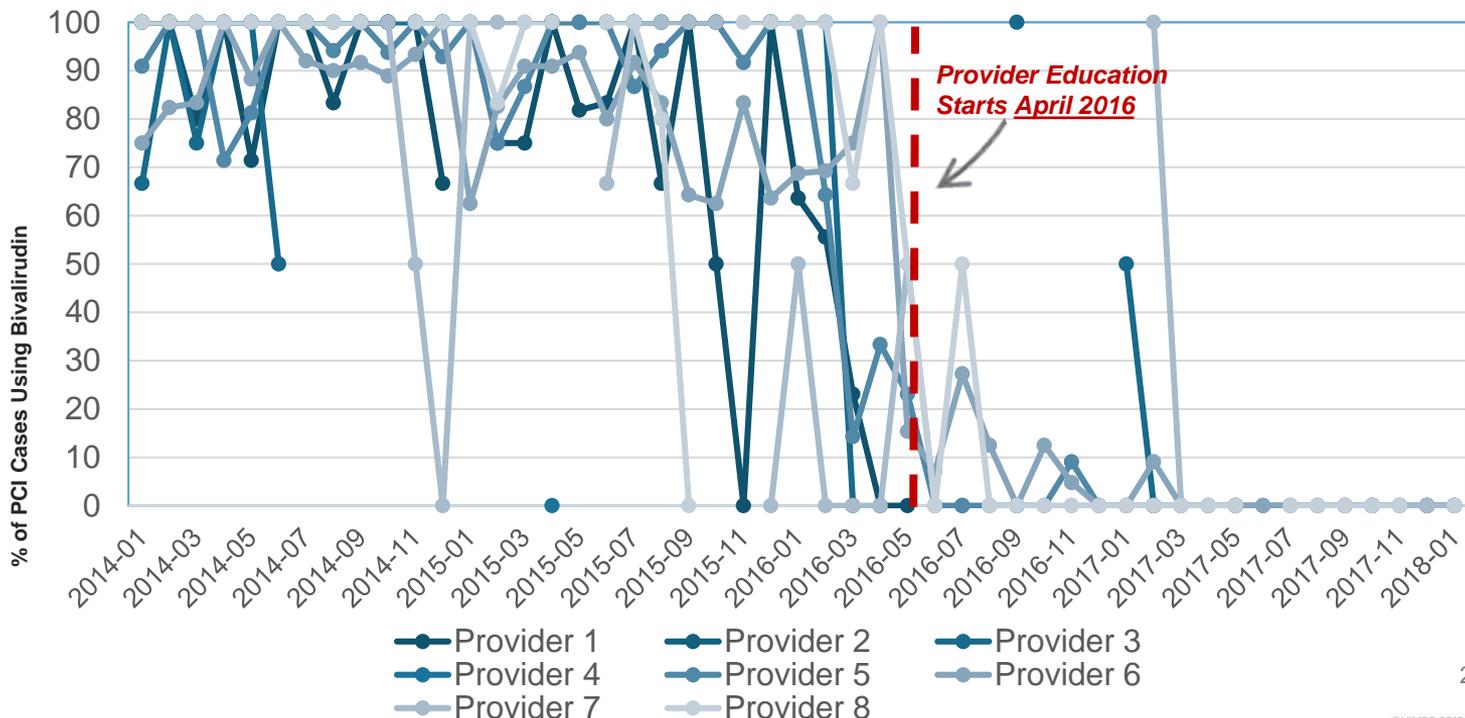
Bivalirudin usage declined significantly during this initiative and has consistently remained very low



There's been a **90% percent reduction** in Bivalirudin usage since the start of this effort

The dashboard played a key role in supporting education and adoption efforts

Visible change in behavior after education and dashboard roll-out



This reduction represents a total savings of ~\$1.6 million annually

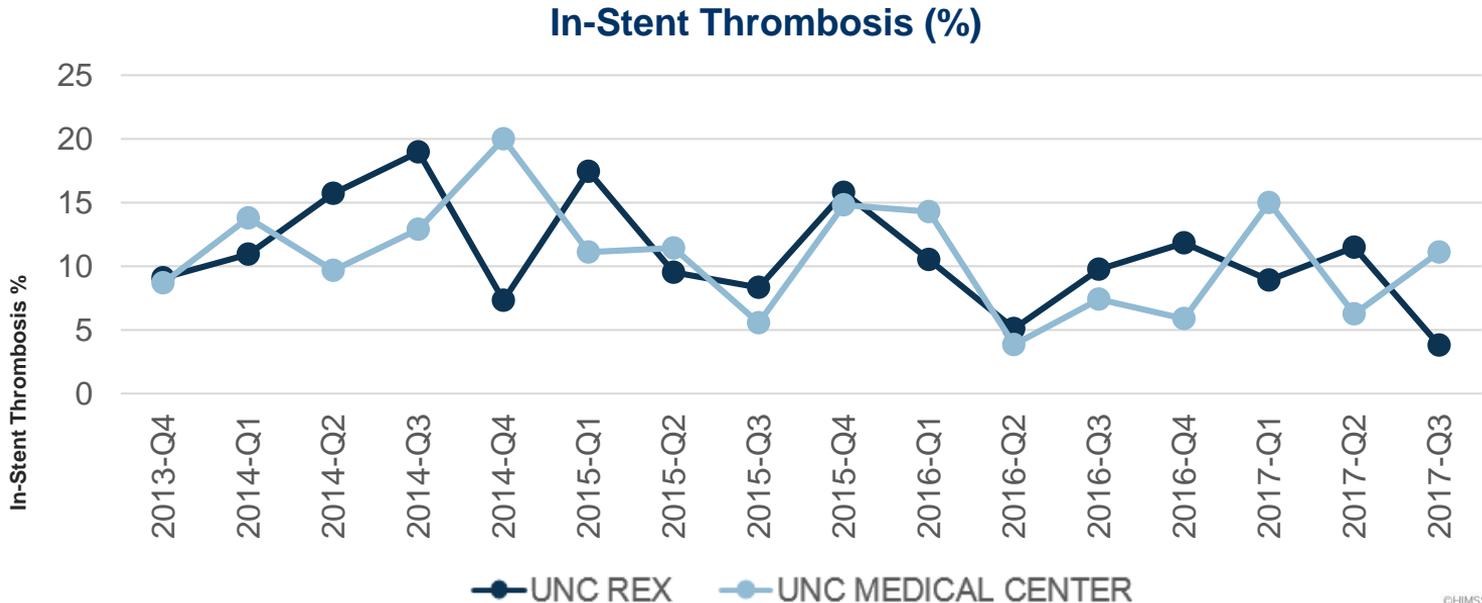
- Savings is calculated as the cost difference between Heparin and Bivalirudin per administration multiplied by the number of cases
- ROI – Savings for CY17

Item	Amount
Additional Hardware Infrastructure Required	+ \$0
Heparin Medication Cost Per Administration	+ \$4.68
Bivalirudin Medication Savings Per Administration	- \$727.65
Total Savings from Education in CY17 (284 cases during CY17 – 8 providers)	- \$176K
Total Savings from overall initiative in CY17 (2,886 cases during CY17)	- \$ 1.6 Million



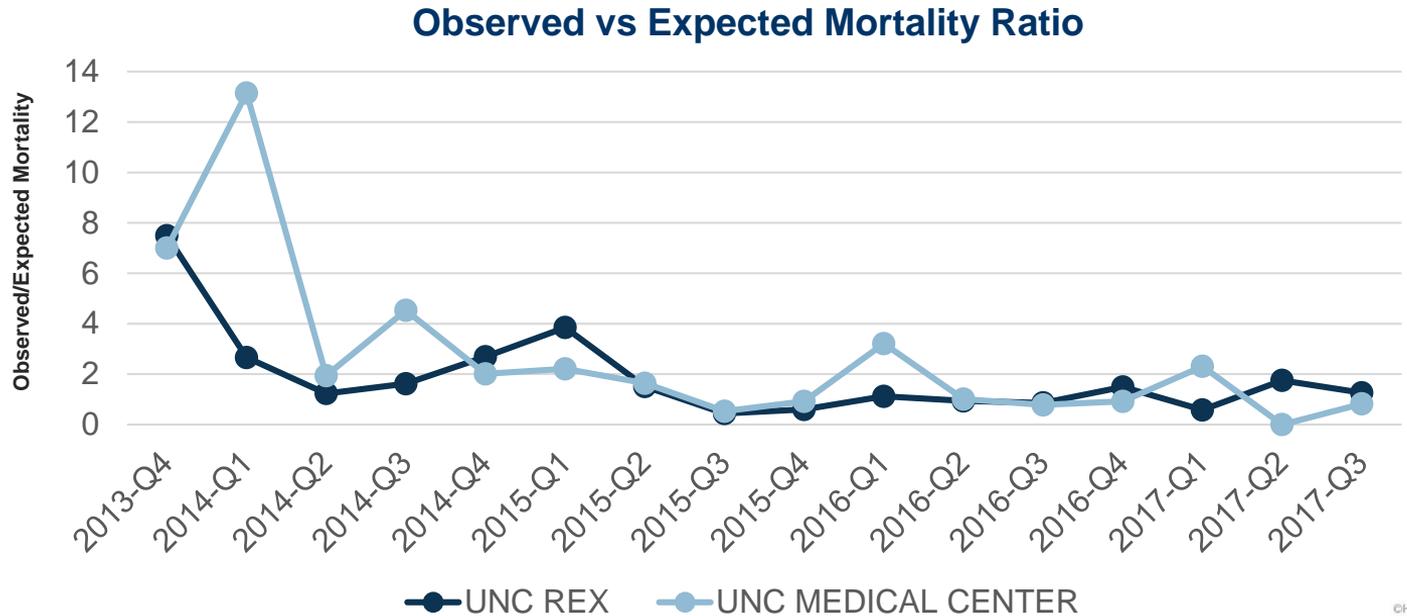
Most importantly, this substitution has not impacted patient quality or safety

Adverse events and vascular complications are the primary measures monitored to ensure that anticoagulation medications are working correctly and preventing harm



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UNC HC took an education-first approach to change influence provider behavior

- **Overwhelming physicians with additional, disruptive prompts could increase alert fatigue and lead to patient safety events [1]**
 - Intrusive provider alerts are only used as a means of last resort or when the prevention of adverse events warrants such an interruption
- **Educating providers first is the most successful method to changing behavior**
 - Provider level un-blinded data works best when providers know that leadership is also reviewing the same data and has been effective with the following:
 - Education on process or performance
 - Best practice sharing
 - Healthy competition



Next Steps – Continuous Improvement

1. The PCI dashboard allows continued monitoring for adverse events as well as other supply cost opportunities for savings and standardization
2. The translational model of moving positive findings from one institution to another by leveraging comparative can lead to other value-added opportunities at other hospitals across the Health Care System
3. Analyzing and sharing practice patterns through the dashboard can identify new opportunities and influence individual physicians to adopt best practices
4. Scale this concept to other procedures and entities in cardiology such as AICD implantation, STEMI management, stress testing, etc.



Questions

- Reminder: *please complete the online session evaluation*
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