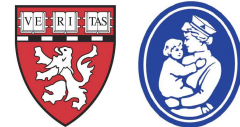


Quality of Hospital Care for Children with Medical Complexity

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Goal of This Discussion

- **Describe U.S. experiences with quality improvement initiatives for hospital care of children with medical complexity**
 - Hospital Readmission
 - Medication Errors

Part I

Pediatric Hospital Readmissions

History of Quality Improvement

U.S. Children's Hospitals

- **Children's Hospitals**

- 70+ in the U.S.
- Almost one in every U.S. state
- Some reside in competing markets
- Variation in size, casemix, catchment area
- Similar data structures for healthcare claims

History of Quality Improvement

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Data transferred from hospital to insurance company for payment of a patient care encounter

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- **Similar data structures for healthcare claims**



Federal standards on data transferred:

- *ICD diagnosis & procedure codes*
- *Age, gender, race/ethnicity*

History of Quality Improvement

U.S. Children's Hospitals

- **Children's Hospital Executives**
 - Aggregated claims data across hospitals
 - Created a central, longitudinal claims database*
 - Accessible to anyone from the hospitals
 - For quality improvement, research, policy, etc.

**Pediatric Health Information System (PHIS)*

History of Quality Improvement

U.S. Children's Hospitals

- **Pediatric Health Information System**
 - Claims used for development of quality measures
 - Benchmarking and setting targets for QI initiatives
 - Identification of best practices
 - Dissemination and spread of findings

Pediatric Hospital Readmissions

Pediatric Health Information System (PHIS)

- **Nationwide Measure of Readmission**
 - Commissioned by U.S. Government to develop for children
 - Little information available on the meaning and value of pediatric readmissions
 - We used PHIS to develop and test the measure specifications

Pediatric Hospital Readmissions

Pediatric Health Information System (PHIS)

- **Readmission definition**
 - Within 30 days of discharge
 - For any unplanned reason
 - With elective readmissions removed

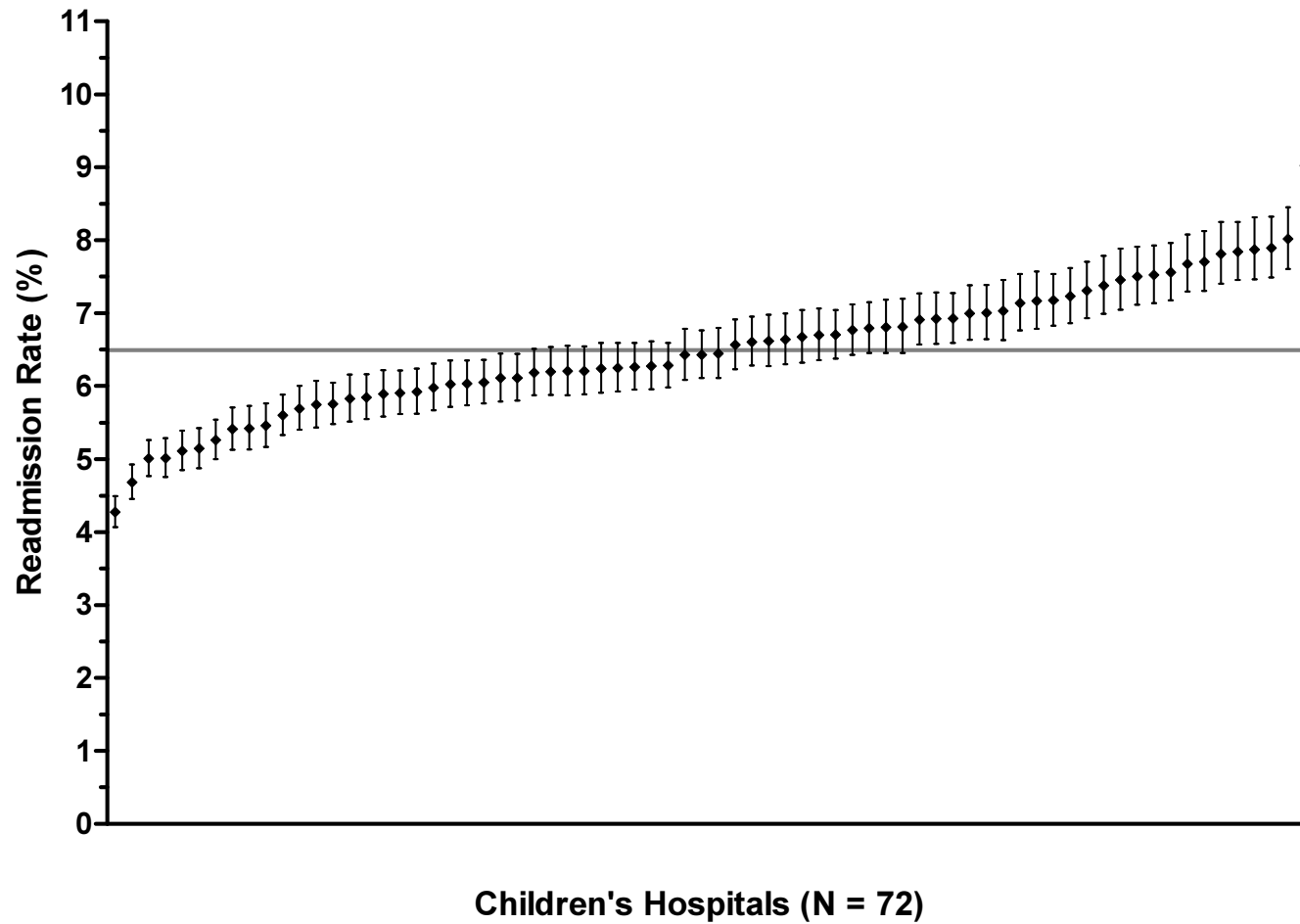
Pediatric Hospital Readmissions

Pediatric Health Information System (PHIS)

- **Hierarchical regression models**
 - 30-day unplanned readmission as the outcome
 - Random effect for hospital
 - Fixed effects for case-mix adjusters
- **Tested for variation across hospitals**
 - Covariance test of the hospital random effect
 - Statistical significance, $p < 0.05$

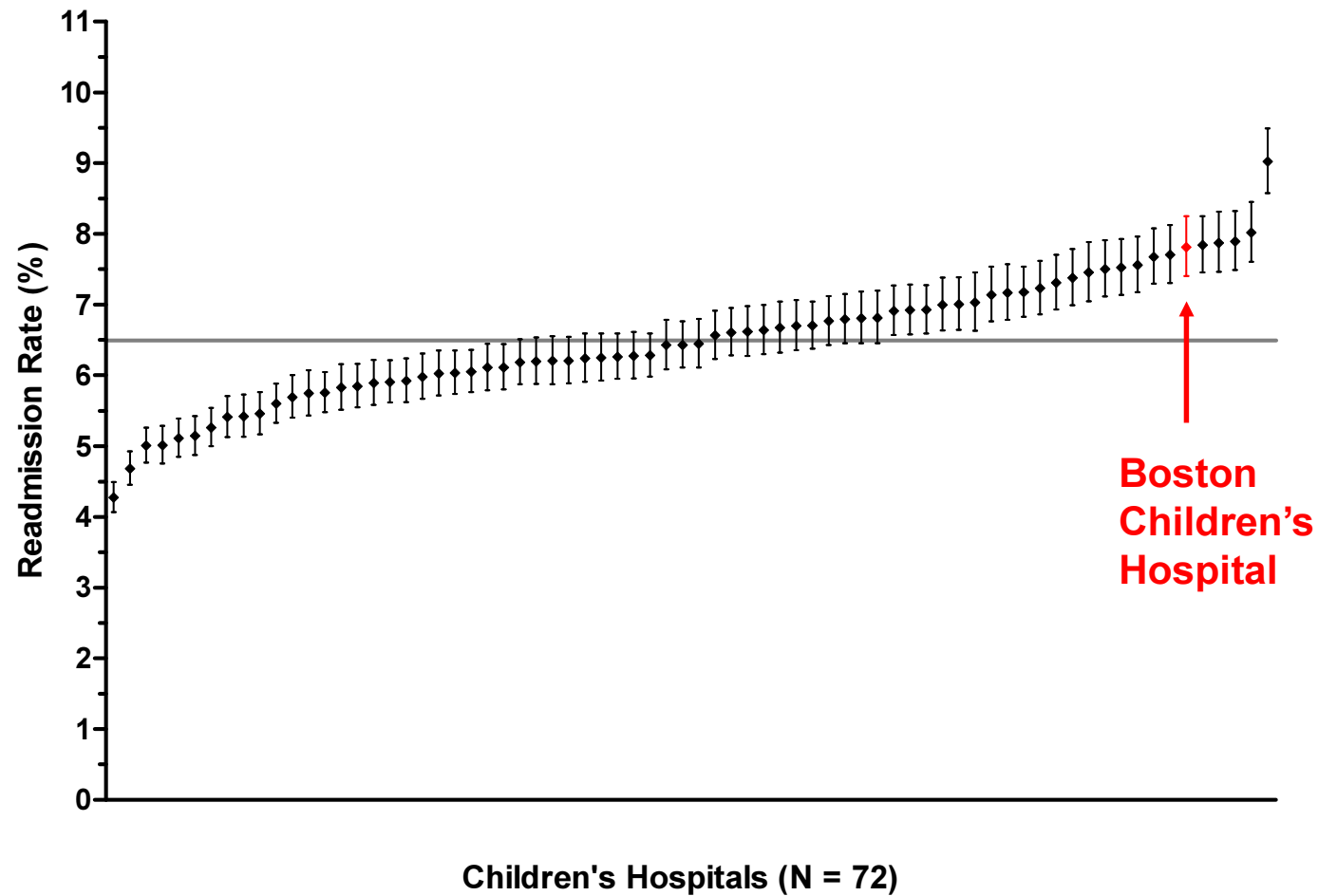
Variation Across Children's Hospitals

All-Cause Readmission Rate



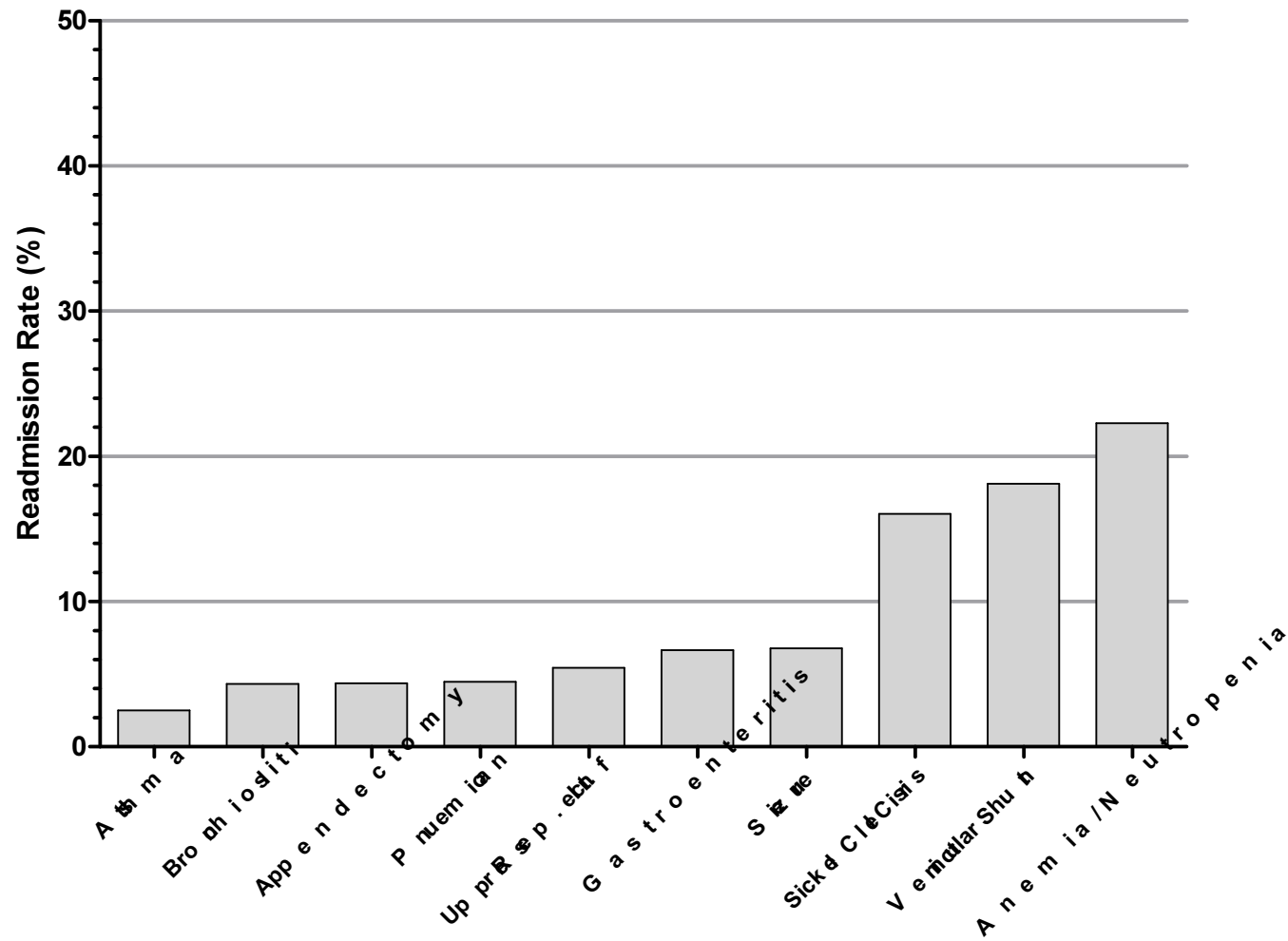
Variation Across Children's Hospitals

All-Cause Readmission Rate



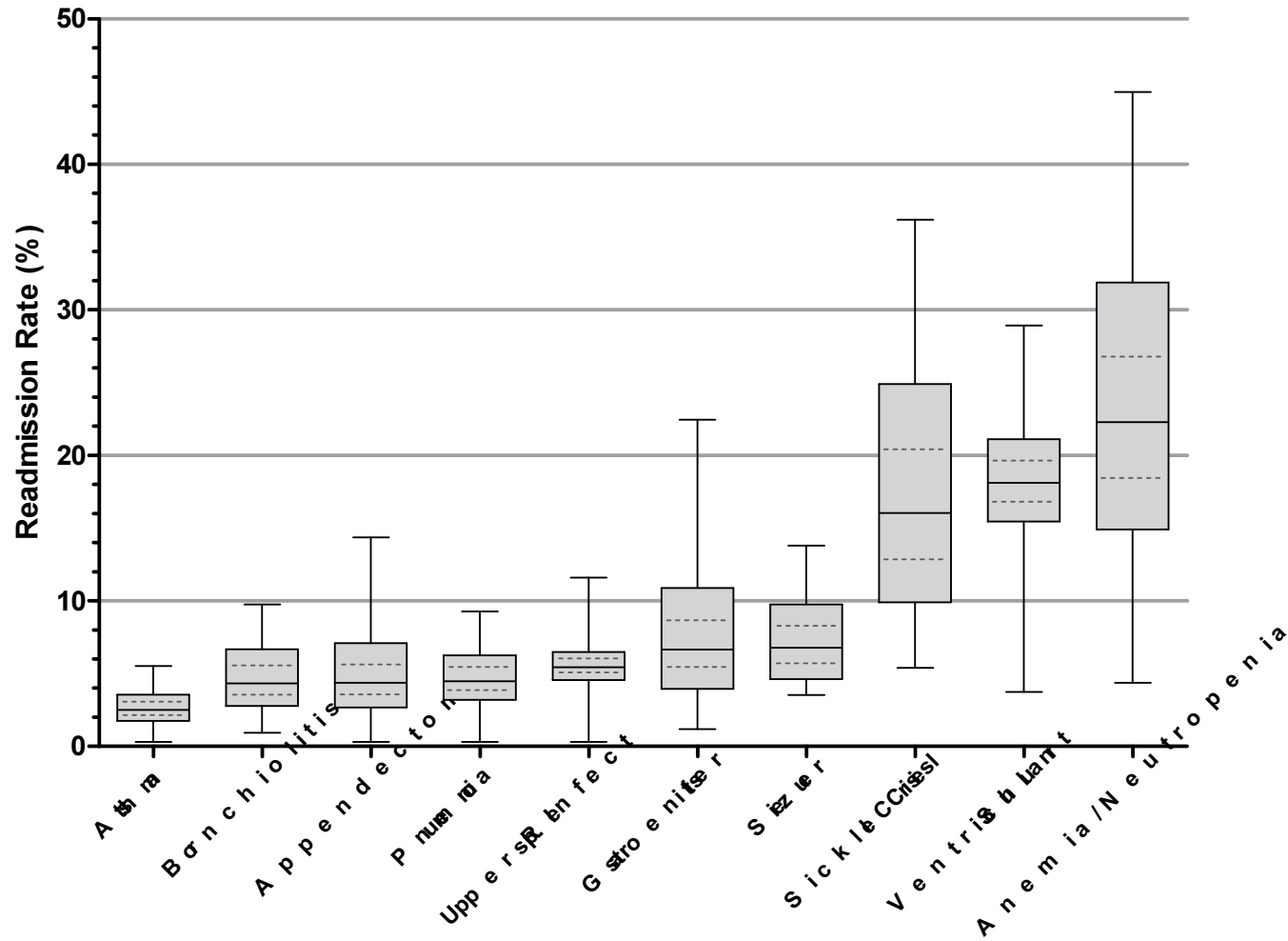
Variation Across Children's Hospitals

Condition-Specific Readmission Rates



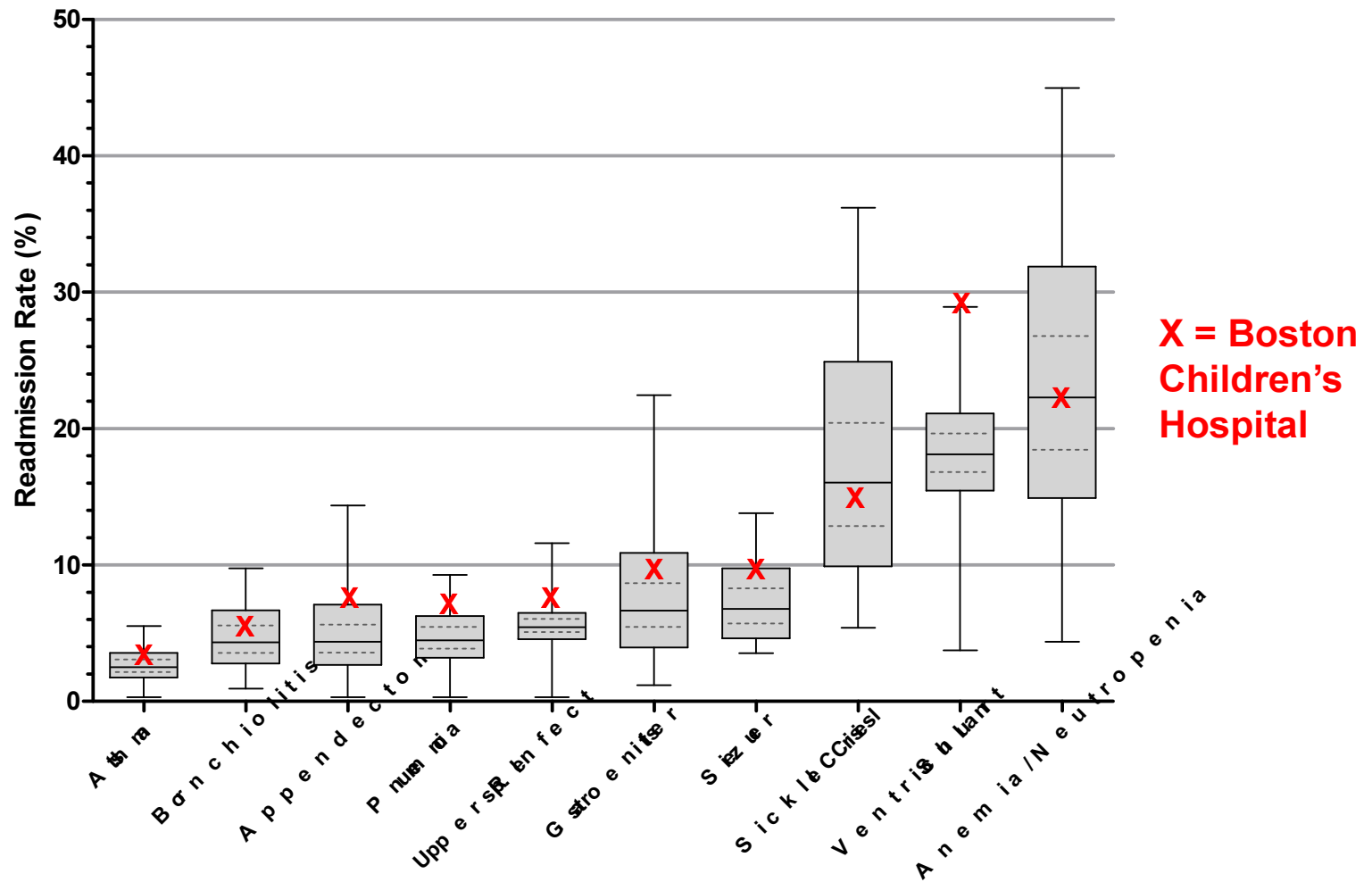
Variation Across Children's Hospitals

Condition-Specific Readmission Rates



Variation Across Children's Hospitals

Condition-Specific Readmission Rates



Pediatric Hospital Readmissions

Pediatric Health Information System (PHIS)

- **Main Findings**

- Significant hospital variation exists
- Our hospital had high readmission rates
- A substantial percentage of readmissions could be avoided if all hospitals had the lowest rates

Action Taken: Pediatric Discharge Framework

At admission, begin the steps below to prepare the child and family for a successful hospital discharge.

1. **Involve the Child's Care Team**

Have discharge conversations with the family members, healthcare providers, and anyone else who will be taking care of the child's health during and after discharge. Establish roles and responsibilities of discharge care among the child's care team.

2. **Specify Discharge Goals**

These are the desired goals to be achieved for the child to safely leave the hospital. Goals may include achievement of a specific physiologic state, cognitive or functional ability, or caregiving competency.

3. **Assess Discharge Needs**

These are medical resources, services, and supports that the child will need after they leave the hospital. Discharge needs may include:

- Contingency plans of care
- Family leave from work
- Follow-up appointments
- Laboratory/radiographic testing
- Medical equipment
- Medical home
- Medications
- Nursing at home or school
- On-going care coordination
- Rehabilitation
- Specialized diet and nutrition
- Therapies (e.g., physical therapy)

4. **Address Issues That May Affect the Child's Health and Safety After Discharge**

Issues that could affect the child's health, for better or worse, and influence the success of hospital discharge include:

- Child's home and school environment
- Cultural and religious beliefs
- Health literacy
- Insurance coverage and procedures
- Parent-provider communication
- Resolution of admission diagnosis
- Stability of child's comorbid conditions

Although it may not be possible to address and resolve every issue, it is important to recognize and discuss them with the family.

5. **Make Discharge Plans**

Make a plan to achieve the discharge goals, meet the discharge needs, and address - as best as possible - the issues that that will affect the child's health and safety after discharge. Teach the plan to the family and empower them to help execute it.

6. **Monitor Discharge Progress**

Review, reassess, respond to, and confirm all discharge care activities throughout the admission to monitor discharge progress. Document the discharge goals, needs, issues, plans, and progress in both the discharge summary for providers and the after-hospital care plan for the family. Make sure that all of the child's discharge information (e.g., medications, equipment, etc.) is documented accurately and completely.

7. **Finalize Discharge**

Stop and pause to affirm each statement below with the child and family:

The discharge goals were achieved.

Plans are set to meet discharge needs.

The issues that will influence the success of hospital discharge were addressed.

Important discharge information (e.g., medications) was reconciled.

Discharge documents were exchanged with both the child's family and providers.

The family was able to teach-back discharge plans.

The family confirmed that they are ready for hospital discharge.

Decide whether to proceed or go back and make new plans to address outstanding issues.

8. **Discharge The Child**

Upon successful completion of the previous steps and care team agreement, proceed forward with the child's actual discharge.

9. **Follow-Up After Hospital Discharge**

For at-risk patients, make contact with the family and post-discharge providers to make sure the child has remained safe and healthy.

Action Taken

Reduce Pediatric Hospital Readmissions

- **Implementation of discharge bundles**
 - Proactive discharge planning at admission
 - Readiness assessments
 - Delayed discharge
 - Enhanced contingency plans
 - Better discharge care communication

Action Taken

Reduce Pediatric Hospital Readmissions

- **Implementation of discharge bundles**
 - Proactive discharge planning at admission
 - Readiness assessments
 - Delayed discharge
 - Enhanced contingency plans
 - Better discharge care communication

Readmission rates did not decrease.

Action Taken

Reduce Pediatric Hospital Readmissions

- **Post-Discharge Home Visits**
 - For children with medical complexity
 - Conducted by experienced hospital nurse
 - Reinforce discharge care plan
 - Identify and address post-discharge issues

Action Taken

Reduce Pediatric Hospital Readmissions

- **Post-Discharge Home Visits**

30-day Hospital Readmission Rates*

- Home visit patients = 22%
- Matched controls = 29%

**propensity scored with a greedy matching algorithm on 1:2 ratio of cases to controls on reason for admission, number and type of chronic conditions, age, race/ethnicity, payor, and length of stay*

More Action Taken

Pediatric Quality Improvement

- **Children's Hospitals Commitment to QI**
 - Protected time for clinicians
 - Funding for programmers / statisticians
 - Integration with health services researchers
 - Expanded use of aggregated claims data
 - Topic-based multi-site, QI collaborations

Part II

Medication Safety for Hospitalized Children with Medical Complexity

Chronic Medication Management

Hospitalized Children with Medical Complexity

- It takes a lot of time and effort to correctly order the chronic medications
- It's easy to brush over medications & not spend enough time thinking about them
- Standard med rec procedures are not fully mitigating risk of errors during hospitalization
- Despite best efforts, medication problems arise after hospital discharge

Overarching Aim of Medication Safety

Hospitalized Children with Medical Complexity

Install, sustain, and spread reliable, effective care processes that will ensure safe ordering and administration of medications for hospitalized children with medical complexity.

Project Team

Organizational Overview

Nursing

Jayne Rogers

Amy Pinkham

Sarah Grodsky

Sarah Wells

Hospitalists

Sangeeta Mauskar

Jonathan Hron

Alisa Khan

Sarah McBride

Accountable Care

Joanne Cox

Pharmacy

John Wright

Project Management

Kevin Blaine

Maggie O'Neill

Biostatistics

Patrice Melvin

Quality Improvement

Jessica Kerr

Outpatient

David Hall

Arda Hotz

Katie Huth

Amy Starmer

Sarah Wilkerson

Home Care

Meghan Tschudy

Baseline Performance

Medication Safety for Hospitalized CMC

Baseline Rate of Medication Problems

- 46 med errors per 1,000 bed days
- 10.3% of admissions

Characteristic

Finding

Timing of Error

At Admission

64%

During hospitalization

22%

At Discharge

14%

Timeliness of error recognition

Immediately

38%

Same day

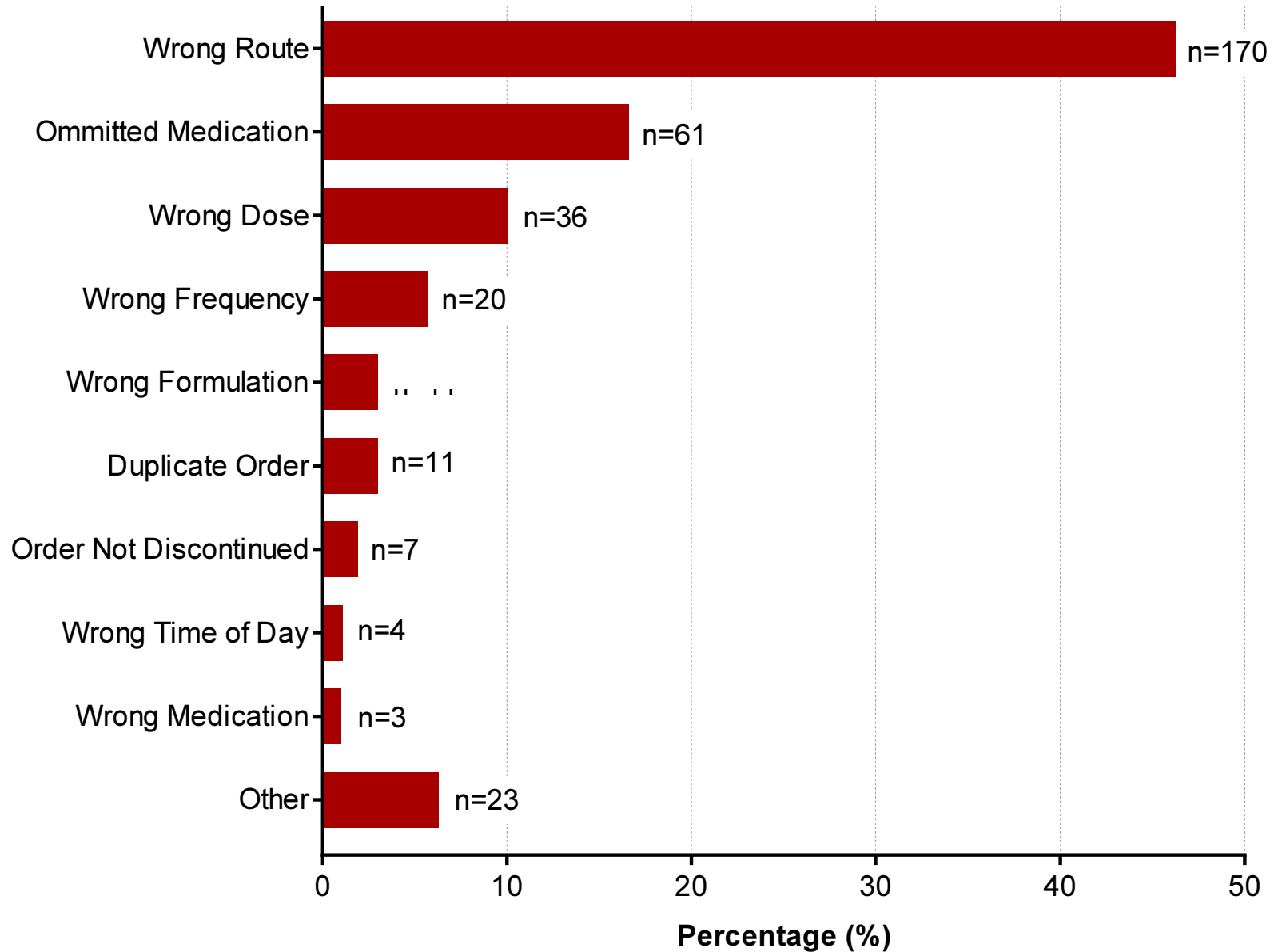
30%

More than one day

32%

Baseline Performance

Types of Med Errors Detected & Addressed



Baseline Performance

Effect of Medication Errors on Hospital Length of Stay

- **Multivariable median regression**
 - Outcome: length of hospital stay
 - Main fixed effect: medication error
 - Controlling for confounders
- **Median 2.5 hospital days added with medication error**

Opportunity for Quality Improvement

Medication Ordering at Admission for CMC

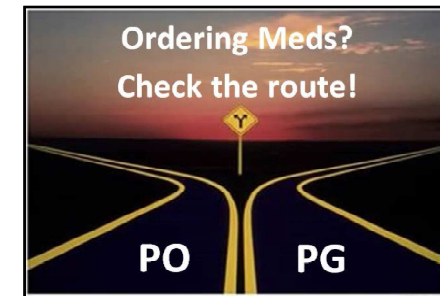
- **Standard Med Reconciliation** (baseline care)
 - One-time event at admission
 - Pediatric resident, nurse, and family
- **Enhanced Med Reconciliation** (our intervention)
 - Daily med rec during morning rounds
 - Performed by inpatient CCS advanced practice nurse
 - Safety check: *med omissions, duplications, dose, route, frequency, timing, etc.*
 - Immediate resolve of detected med issue

Recurrent Medication Reconciliation

Hospitalized Children with Medical Complexity

- **Raise awareness and educate**

- Dedicated lectures to staff
- Posters in the work room
- Reminder post-its



- **Think-out-loud recurrent med rec**

- Med rec Mondays
- Staff watched inpatient CCS advanced practice nurse perform the reconciliation

Measurement & Outcomes

Medication Safety Interventions

<u>Characteristic</u>	<u>Finding</u> (to date)
Patients reached	1585
Medication error rate	
<i>Baseline</i>	10.3%
<i>Intervention period</i>	7.7%
Days in hospital avoided	120
Estimated U.S. dollars saved	\$400k

Goal of This Discussion

- **Describe U.S. experiences with quality improvement initiatives for hospital care of children with medical complexity**
 - Hospital Readmission
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Thank you!

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