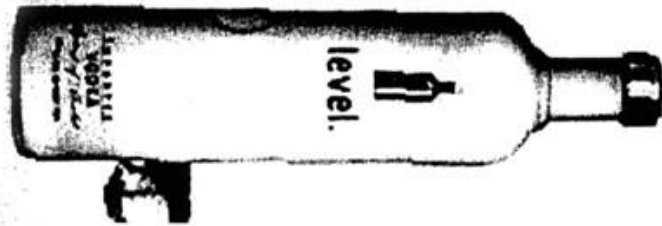


# American College of Surgeons-National Surgical Quality Improvement Program- Pediatrics (NSQIP-P)

Keith T. Oldham, MD  
Professor and Chief  
Division of Pediatric Surgery  
Medical College of Wisconsin  
Marie Z. Uihlein Chair and  
Surgeon-in-Chief  
Clinical Vice President of Surgery  
Children's Hospital of Wisconsin



October 26, 2011  
San Francisco, CA



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Posted 2004-11-29



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# 2010 Beta Phase Data

- 30 Institutions
- January 1, 2010 → December 31, 2010
- Preliminary Data



# Institutions Included in Beta Phase

American Family Children's Hospital of Wisconsin	Dennis Lund
Children's Healthcare of Atlanta	Kurt Heiss
Children's Hospital and Health System of WI	Keith Oldham
Children's Hospital Michigan	Joseph Lelli
Children's Hospital of Illinois at OSF Saint Francis Medical Center (PED)	Richard Pearl
Children's Hospital of Philadelphia	Katherine Deans
Children's Hospitals and Clinics of Minnesota	Brad Feltis
Children's Hospital Boston	Shawn Rangel
Cincinnati Children's Hospital Medical Center	Frederick Ryckman
Cleveland Clinic	Oliver Soldes
Golisano Children's Hospital	Walter Pegoli
Johns Hopkins	Fizan Abdullah
Le Bonheur Children's Medical Center	Max Langham
Lucile Packard Children's Hospital	Craig Albanese
Maine Medical Center	Albert Dibbins
Mayo Eugenio Litta Children's Hospital	Michael Ishitani
Monroe Carell Jr. Children's Hospital at Vanderbilt	John Brock
Nationwide Children's Hospital	Brian Kenney
Nemours/Alfred I du Pont Hospital for Children	Charles Vinocur
Penn State Milton Hershey Medical Center	Peter Dillon
Primary Children's Medical Center	Douglas Barnhart
Riley Hospital for Children	Deborah Billmire
Saint Louis Children's Hospital	Jacqueline Saito
The Children's Hospital Association	Moritz Ziegler
The Children's Mercy Hospital	George Holcomb
University of Maryland Hospital for Children	Roger Voigt
University of Michigan C.S. Mott Children's Hospital	Steven Bruch
Yale-New Haven Hospital	R. Lawrence Moss
University of Iowa Children's Hospital	Joel Shilyansky

# 2010 Beta Phase Data

- 1644 CPT Codes

(including neurosurgery, urology, gynecology, general and thoracic surgery, ENT, orthopedics, plastics)\*

- 456 CPT codes account for 90.69% of all cases

- eg. 1163 CPT codes < 10 occurrences ⇒ eliminated for 2011

# 2010 Beta Phase Data

Table 1- Program Case Numbers and Summary Event Rates:

# Cases entered total:	37157	
# Cases in modeling set*:	36966	
Mean #cases per hosp [range]:	1238	[15, 1565]
<i>All case mortality rate:</i>	<b>0.26%</b>	
<i>All case "Any Morbidity" rate:</i>	<b>7.89%</b>	

# 2010 Beta Phase Data

Table 2- Subcategory Case Numbers:

<u>Category</u>	<u>Total Cases</u>	<u>Mean/hosp</u>	<u>Range</u>
Peds Abd	5862	195	[4,318]
Peds Tho	455	16	[6,40]
Neonate Abd	793	27	[8,53]
Neonate Tho	87	3	[1,9]

# 2010 Beta Phase Data

**Table 3- Cases and Events in the Modeling Set**

		Neonate			Pediatrics			All Cases		
		All Surgeries	Abdomn	Thoracic	All Surgeries	Abdomn	Thoracic	All Surgeries	Abdomn	Thoracic
Sample Size		1382	788	84	35584	5836	452	36966	6624	536
	Mortality	33 (2.39%)	27	3	61 (0.17%)	23	5	94 (0.25%)	50	8
	Morbidity	258 (18.7%)	165	24	2659 (7.5%)	659	50	2917 (7.9%)	824	74
	SSI	42 (3.0%)	30	1	635 (1.8%)	229	6	677 (1.8%)	259	7



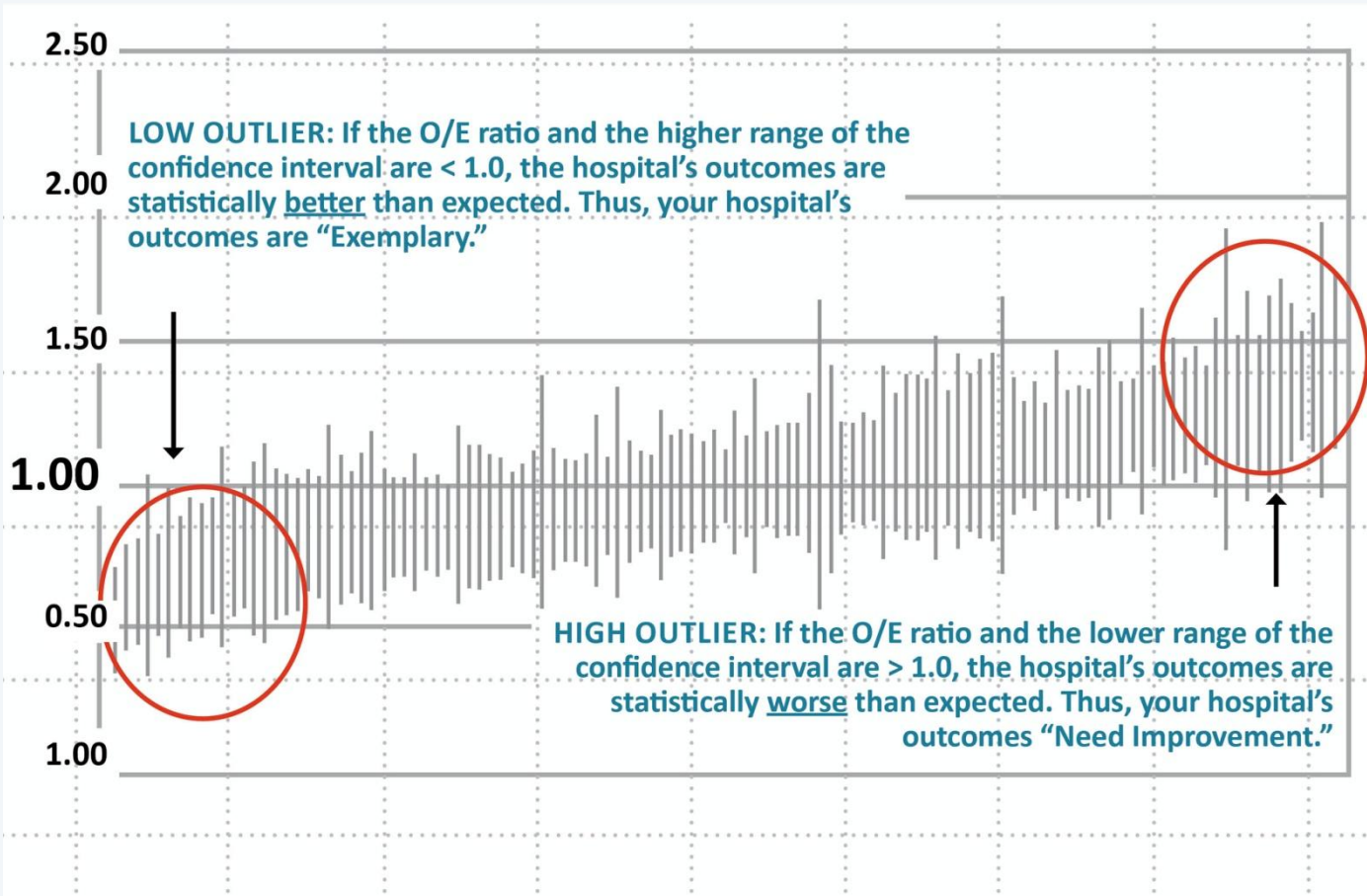
# 2010 Beta Phase Data

Table 5-

Surgeries in Neonatal and Non-Neonatal (ALL Cases)							
Variables	Categories	Number of Cases for Morbidity Model	Percent Morbidity	Univariate P-Value*	Number of Cases for SSI Model	Percent SSI	Univariate P-Value*
ASA Level	ASA level 1	12139	3.03	0.0001	12060	1.13	0.0001
	ASA level 2	16505	5.91		16280	1.59	
	ASA level 3	7475	16.32		7169	3.47	
	ASA level 4-5	847	41.68		761	4.34	
Wound class	Clean	17180	9.34	0.0001	17016	1.76	0.0001
	Clean/Contaminated	16866	5.51		16604	1.05	
	Contaminated	1332	11.34		1221	4.10	
	Dirty/Infected	1588	14.67		1429	5.46	
Neonate	Yes	1382	18.67	0.0001	1245	3.37	0.0001
	No	35584	7.47		35025	1.81	
Inpatient	Yes	16992	14.75	0.0001	16469	3.05	0.0001
	No	19974	2.05		19801	0.88	
Ventilator Dependent	Yes	919	40.37	0.0001	794	4.28	0.0001
	No	36047	7.06		35476	1.81	
Current Pneumonia	Yes	180	25	0.0001	161	3.73	0.0805
	No	36786	7.81		36109	1.86	
Surgery Type	Major Abdomen	6663	12.4	0.0001	6419	4.03	0.0001
	Major Thoracic	538	13.75		528	1.33	
	Others	29765	6.78		29323	1.40	
Age				0.9306			0.7544

\* Chi-square test for categorical predictors; P-value for point-biserial correlation between outcome and age.

# Improving Outcomes Requires Measurement



**82%**  
of hospitals  
decreased  
complications\*



**66%**  
of hospitals  
decreased  
mortality\*



**250-500**  
fewer  
complications  
per hospital per  
year\*



\*Hall BL, et al. "Does Surgical Quality Improve in the American College of Surgeons National Surgical Quality Improvement Program?" Ann Surg. 2009; 250:363-376



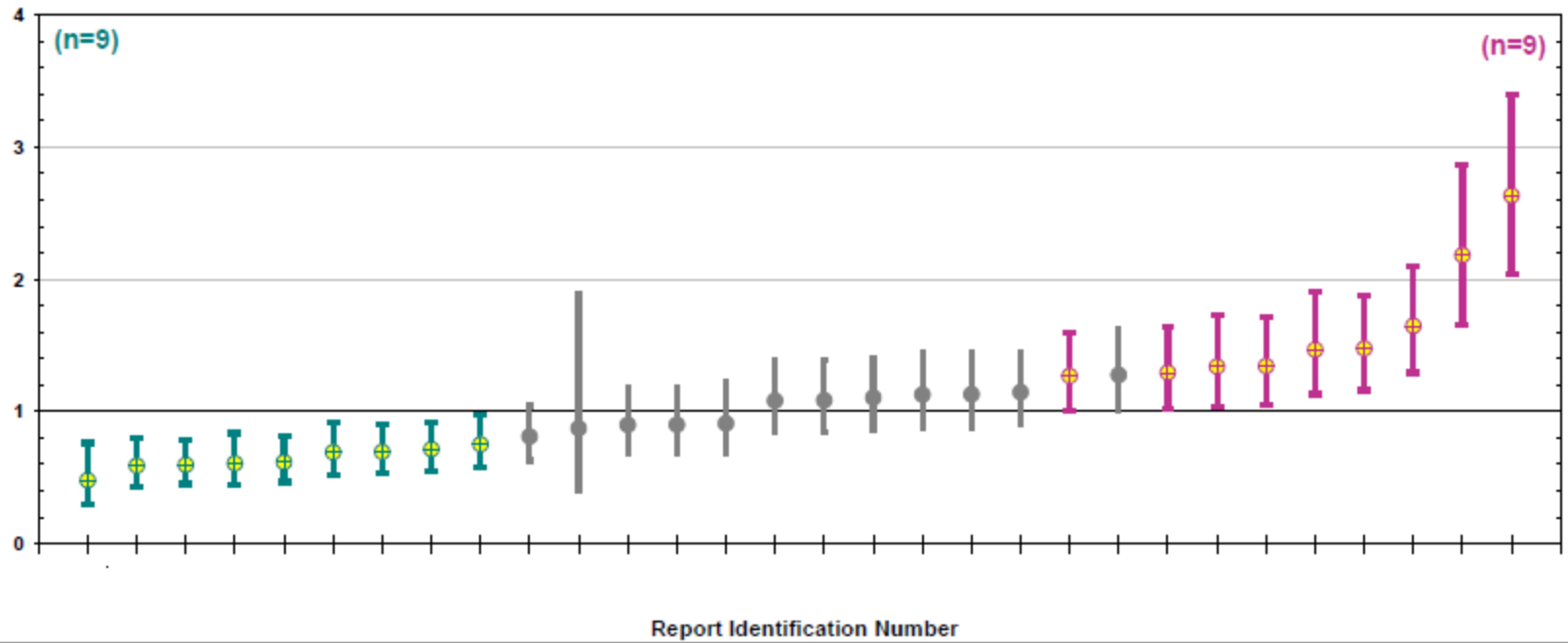
Odds Ratio

### Hierarchical Model: Neonate/Pediatric; All Surgeries; Morbidity

Based on 2010 Pediatric Program Data

95% Confidence interval

Low Outlier  
High Outlier



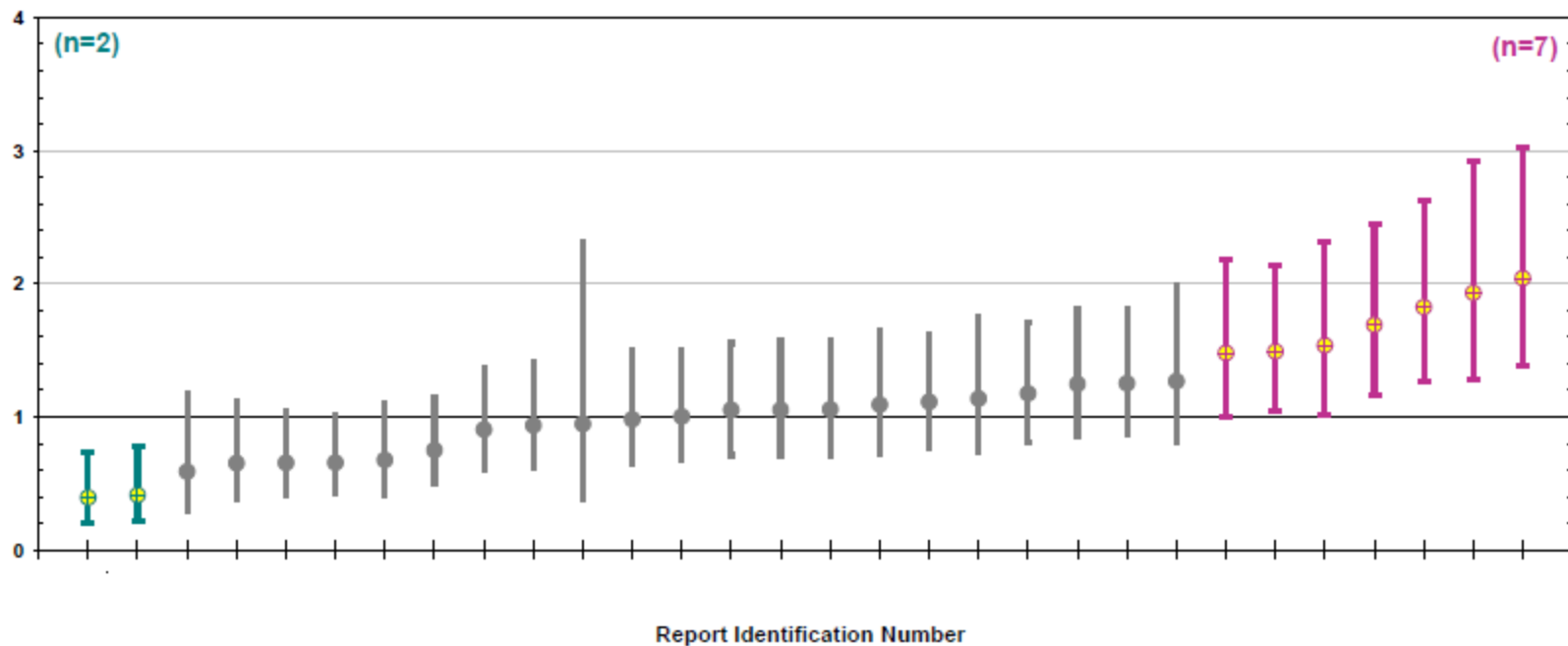
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### Hierarchical Model: Neonate/Pediatric; All Surgeries; SSI

Based on 2010 Pediatric Program Data

95% Confidence interval

Low Outlier  
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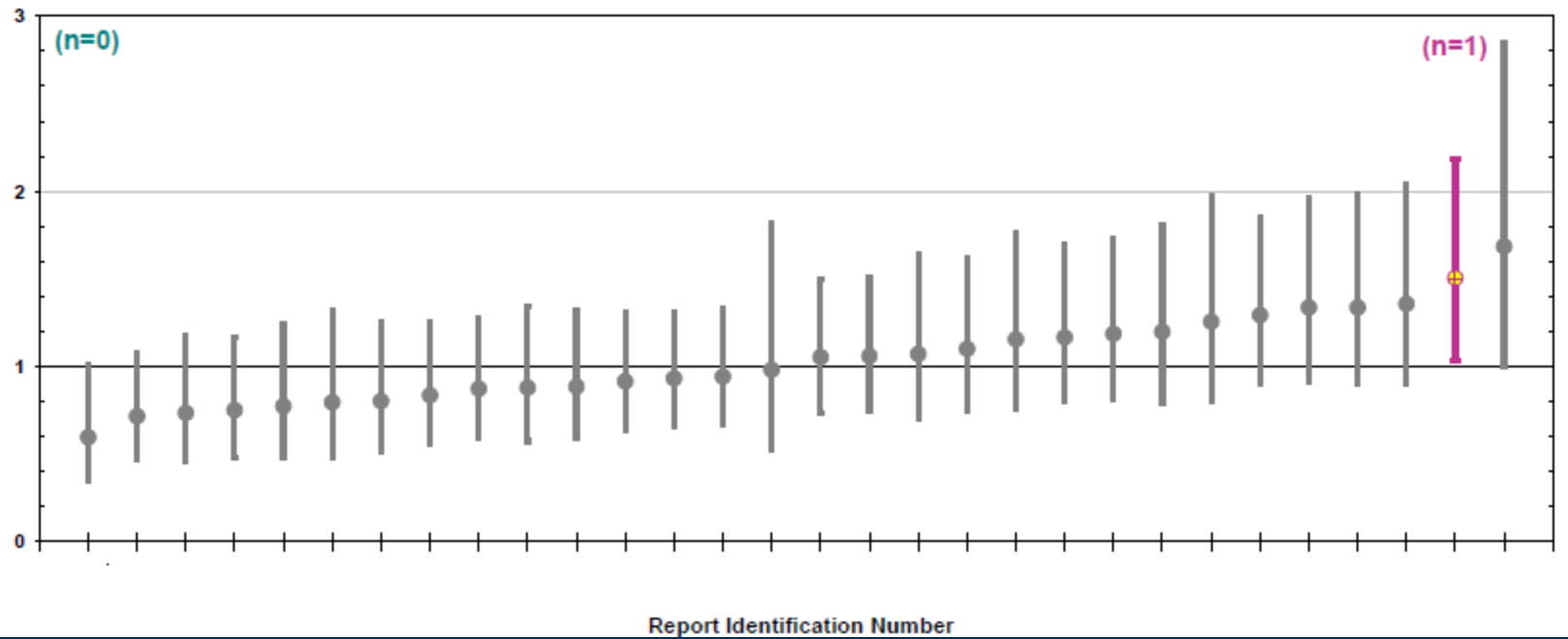
Odds Ratio

### Hierarchical Model: Pediatric; Abdominal; Morbidity

Based on 2010 Pediatric Program Data

95% Confidence interval

Low Outlier  
High Outlier



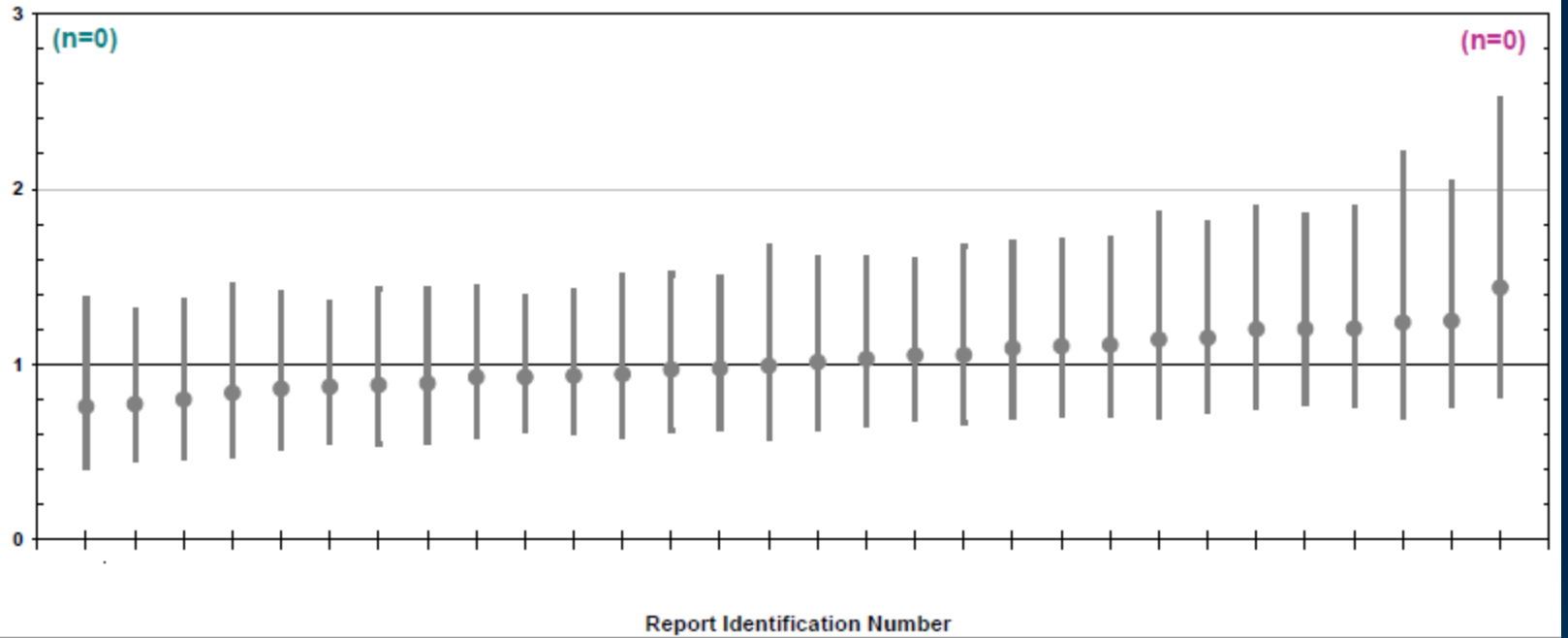
Odds Ratio

### Hierarchical Model: Pediatric; Abdominal; SSI

Based on 2010 Pediatric Program Data

95% Confidence interval

Low Outlier  
High Outlier



# 2010 Beta Phase Data

## Outliers

Models revealed the following numbers of outliers.

- a. For ALL Cases, ANY Morbidity: 9 low (good) outliers and 9 high (bad) outliers (18 outliers among 30 hospitals).
- b. For ALL Cases, Any SSI: 2 low outliers and 7 high outliers (9 outliers among 30 hospitals).
- c. For PEDS Abd Cases, ANY Morbidity: 0 low outliers and 1 high outlier. (1/30)
- d. For PEDS Abd Cases, Any SSI: 0 low outliers and 0 high outliers. (0/30)



## CPT Volume Analysis - Site

Using the CPT Volume Analysis Report a site may query the database about the number of procedures in the database and their site's relative case volumes. Sites that use the 8-day cycle to select a random sampling of cases are encouraged to monitor their case mix to ensure that it fairly represents their site's cases. Sites that conduct research may use this report to determine the volume and type of cases that may be available to develop a project.

**O/E Period:** 01/01/2010 - 12/31/2010

**CPT Percent Volume:** 100 Percent

This report includes all records. 392 of 392



## Pre-Operative Risk Factor Summary

Summary statistics for user defined patient populations are calculated by this report and may be compared to all ACS NSQIP data or to different groups of Program participants.

**O/E Period:** 01/01/2010 - 12/31/2010

**Hospital Category:** All Hospital Types

**Hospital Size:** All Hospital Beds

**Total # of Cases:** Site = 1,542 / Comparison = 37,156



## Patient Variable Statistics Report

Comparison and summary statistics about changes in patient variables may be generated. The user defines the most recent timeframe of interest and the report automatically computes comparison data for the previous years corresponding date range by either subspecialty or procedure(s).

**O/E Period:** 01/01/2010 - 12/31/2010

**See the previous year's corresponding data:** Checked

**Hospital Category:** All Hospital Types

**Hospital Size:** All Hospital Beds

**Total # of Cases:** Site = 4,377 / Comparison = 69,129



## Post-Operative Occurrence Summary

**O/E Period:** 01/01/2010 - 12/31/2010

**Hospital Category:** All Hospital Types

**Hospital Size:** All Hospital Beds

**Total # of Cases:** Site = 1,542 / Comparison = 37,156





## Post-Operative Occurrence Summary

O/E Period: 01/01/2010 - 12/31/2010

Hospital Category: All Hospital Types

Hospital Size: All Hospital Beds

Total # of Cases: Site = 1,542 / Comparison = 37,156

	All Complete Cases		Confirmed 30-Day Follow-Up Cases	
	Site	Comparison	Site	Comparison
Number of Cases	1,542	37,156	1,520	33,944
30-Day Documented Follow-Up Rate	N/A	N/A	98.6%	91.4%
<b>I. Outcome</b>				
Cases Alive @ 30 Days	1,534 99.5%	37,061 99.7%	1,512 99.5%	33,877 99.8%
Cases Dead w/in 30 Days <sup>1</sup>	8 0.5%	95 0.3%	8 0.5%	67 0.2%
<b>II. Post-Op Occurrences</b>				
Cases with 0 Occurrences	1,439 93.3%	34,051 91.6%	1,418 93.3%	30,971 91.2%
Cases with 1 Occurrence	85 5.5%	2,483 6.7%	84 5.5%	2,375 7.0%
Cases with 2 Occurrences	9 0.6%	435 1.2%	9 0.6%	419 1.2%
Cases with 3 Occurrences	7 0.5%	129 0.3%	7 0.5%	123 0.4%
Cases with 4 Occurrences	2 0.1%	43 0.1%	2 0.1%	41 0.1%
Cases with 5+ Occurrences	0 0.0%	15 0.0%	0 0.0%	15 0.0%
Mean # of Occurrences <sup>2</sup>	0.1 (0.4)	0.1 (0.4)	0.1 (0.4)	0.1 (0.4)
<b>Wound Occurrences</b>				
Superficial Incisional SSI	12 0.8%	449 1.2%	12 0.8%	434 1.3%
Deep Incisional SSI	3 0.2%	122 0.3%	3 0.2%	117 0.3%
Organ/Space SSI	1 0.1%	189 0.5%	1 0.1%	182 0.5%
Wound Disruption	5 0.3%	252 0.7%	5 0.3%	244 0.7%
<b>Respiratory Occurrences</b>				
Pneumonia	1 0.1%	189 0.5%	1 0.1%	179 0.5%
Unplanned Intubation	15 1.0%	209 0.6%	15 1.0%	201 0.6%
Pulmonary Embolism	0 0.0%	4 0.0%	0 0.0%	4 0.0%
<b>Urinary Tract Occurrences</b>				
Acute Renal Failure	1 0.1%	30 0.1%	1 0.1%	28 0.1%
Progressive Renal Insufficiency	0 0.0%	21 0.1%	0 0.0%	21 0.1%
Urinary Tract Infection	7 0.5%	266 0.7%	7 0.5%	262 0.8%
<b>Central Nervous System Occurrences</b>				
Coma > 24 hours	0 0.0%	3 0.0%	0 0.0%	2 0.0%
Cerebral Vascular Accident (CVA)/Stroke or Intracranial Hemorrhage	0 0.0%	46 0.1%	0 0.0%	43 0.1%
Seizure	3 0.2%	85 0.2%	2 0.1%	79 0.2%
Nerve Injury	1 0.1%	43 0.1%	1 0.1%	42 0.1%
<b>Intraventricular Hemorrhage (IVH) grade</b>				
Grade I	2 0.1%	8 0.0%	2 0.1%	8 0.0%

# PRELIMINARY 2010 Beta Phase Data SUMMARY

1. Preliminary-hierarchal modeling still in development
2. Never before, this type of risk adjusted clinical surgical data allowing comparison across children's institutions
3. ACS-NSQIP-Pediatrics now 44 institutions
4. Periodic, risk adjusted reporting
5. Local use of these data

# Quality Improvement: A Shared Interest and Mission

## *National Strategy for Quality Improvement in Health Care*

### U.S. Department of Health and Human Services



- Better care, healthy people and communities, affordable care

## *Triple Aim*

### Centers for Medicare and Medicaid Services



- Improving the experience of care, improving the health of populations, and reducing per capita costs of health care

## *Learning Health Care System*

### Institute of Medicine



- Concept and contextualization of evidence



AMERICAN COLLEGE OF SURGEONS

*Inspiring Quality:  
Highest Standards, Better Outcomes*

# Four Guiding Principles of Continuous Quality Improvement

## 1. Standards

- Individualized by patient
- Backed by research

## 2. Right Infrastructure

- Staffing levels
- Specialists
- Equipment
- Checklists

## 3. Rigorous Data

- From medical charts
- Backed by research
- Post-discharge tracking
- Continuously updated

## 4. Verification

- External peer-review
- Creates public assurance



AMERICAN COLLEGE OF SURGEONS

*Inspiring Quality:*

*Highest Standards, Better Outcomes*

# Potential Cost Savings if U.S. Hospitals Adopt ACS NSQIP

Reducing preventable complications improves care and reduces costs:

- Reduction in complications: **250-500\***
- Average cost per complication: **\$11,626**
- Average savings per hospital: **\$2,906,500 - \$5,813,000**
- Potential yearly savings across 4,500 hospitals: **\$13 - \$26 billion**
- Estimated total savings over a decade<sup>\*\*</sup>: **\$130 - \$260 billion**

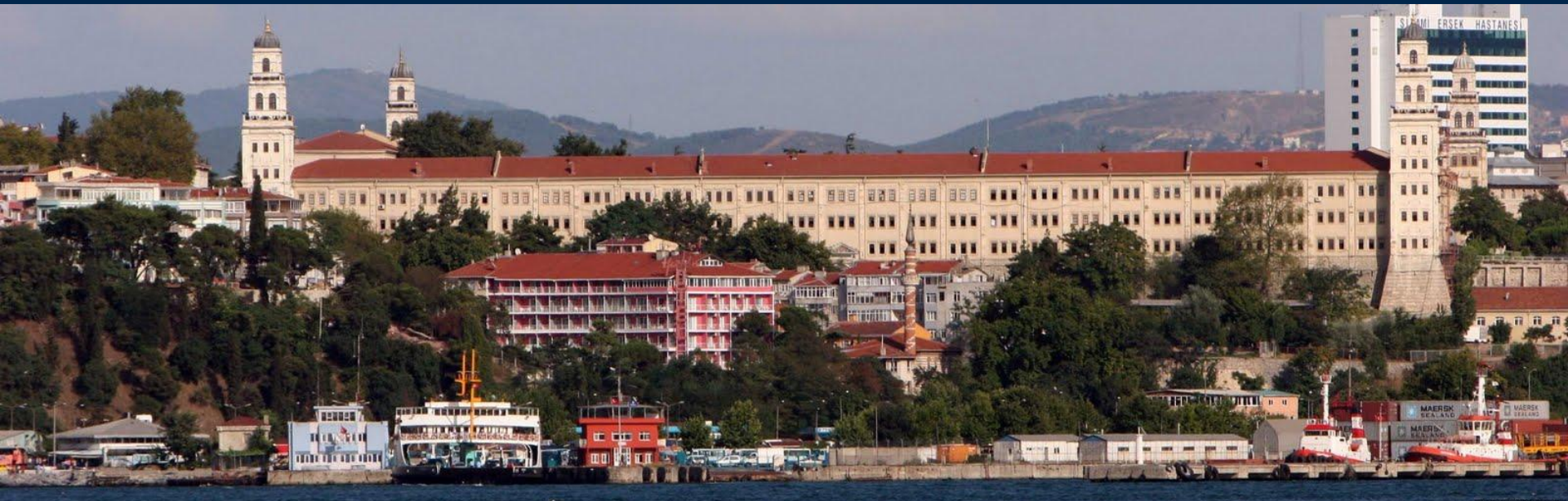
\*Per hospital/per year; Hall BL, et al. "Does Surgical Quality Improve in the American College of Surgeons National Surgical Quality Improvement Program?" Ann Surg. 2009; 250:363-376

\*\*Length of time used for health reform calculations



**NATIONAL SURGICAL QUALITY IMPROVEMENT PROGRAM**  
*Inspiring Quality:  
Highest Standards, Better Outcomes*





THE MASS. GEN. TO MED. SCIENCE DE  
FOR HER VERY EXISTENCE  
FOR ALL HER EXPERT LABOR  
AND MUCH MORE

I WONDER IF CLINICAL TRUTH  
IS INDIVISIBLE WITH MEDICAL SCIENCE?  
CAN'T MY CLINICAL PROGRESS MAKE  
A LING-WITHOUT-HUMBLED?

BILL HEAD  
THE COMMUNITY TO  
MASS GEN. HOSPITAL DE  
GENERALIZATION AND STRIFE  
BY THE END OF THE NINETEEN



THE BACK BAY GOLDEN GOOSE-OSTRICH



