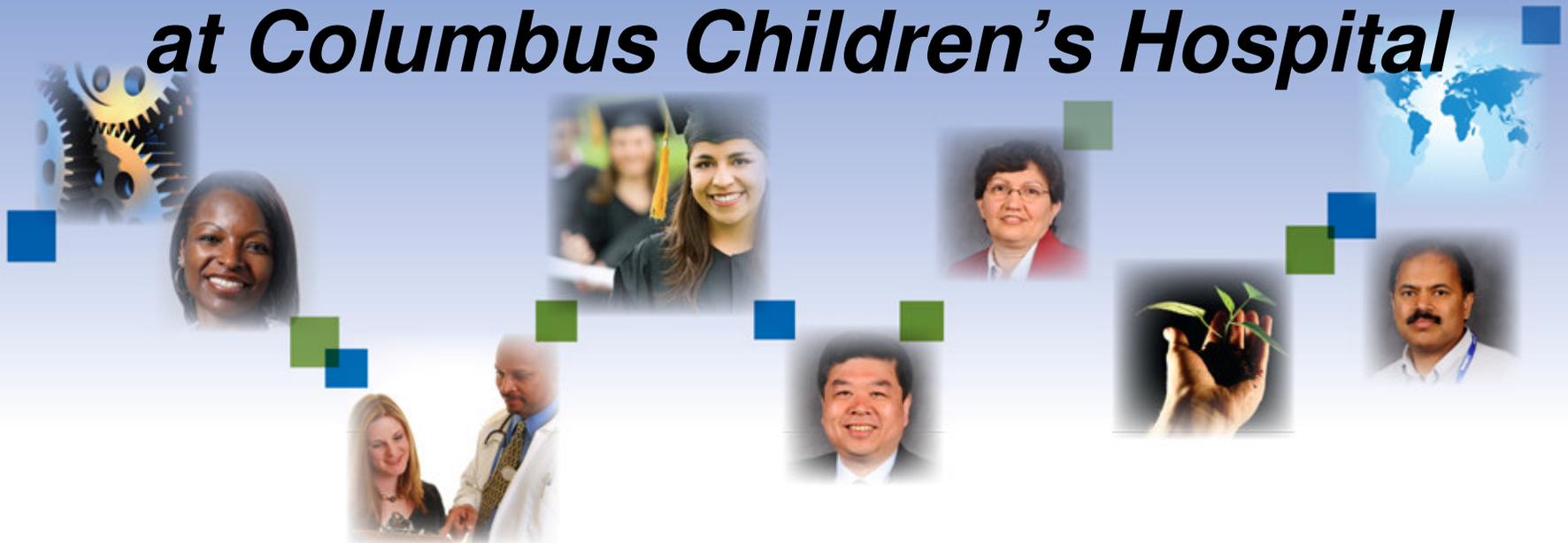


Achieving Zero Percent Antibiotic Administration Rate Errors and Elimination of Surgical Sentinel Events at Columbus Children's Hospital



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Adapted from Chapter 7 of [*Benchmarking for Hospitals: Achieving Best-in-Class Performance Without Having to Reinvent the Wheel*](#)



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About Columbus Children's Hospital

- Located in Columbus, Ohio; now known as Nationwide Children's Hospital
- Primary pediatric healthcare provider for 37 counties in Ohio
- More than 800 medical staff members and 4,500 employees

Mission: Columbus Children's Hospital believes that no child should be refused necessary care and attention for lack of ability to pay. Upon this fundamental belief, Children's is committed to providing the highest quality:

- Patient care and advocacy
- Pediatric research and education
- Outstanding service to...patients and families



The Project Team

- **Co-Project Director and Project Champion:** Dr. Donna Caniano, Chief of the Department of Pediatric Surgery
- **Co-Project Director:** Dr. Terry Davis, Chief Surgical Administrator



The Problem

- An internal study at Columbus Children's Hospital found that in 2004 only **64 percent** of patients with acute appendicitis received the correct antibiotic at the right time.
- The project was eventually expanded to address all forms of errors associated with surgical procedures.



Project Goals

- Achieve **zero percent** antibiotic administration rate errors
- Achieve **no sentinel events** (errors) in surgery



Root Cause Analysis

Columbus Children's Hospital took a systems approach to root cause analysis.

- According to Dr. Donna Caniano:
 - The **classic model** views an error as the result of an individual mistake by a nurse, technician, or physician. The solution is to identify the individual and work with him/her to correct it.
 - The **systems approach** views an individual's error, and potential solutions, as rooted in systems.
- Example: A nurse makes a medication error ...
 - Looking at why the nurse made the medication error in the first place reveals it's a systems problem.
 - S/he (may be) the only RN on the floor and is caring for patients as well as distributing medications and doing administrative work.



Addressing Root Causes

To address root causes, Columbus Children's Hospital developed Operation Takeoff:

- 1) Standardized patient verification and timeout process among services to include surgeon presence before prep/drape.
- 2) Revised policy requiring site marking on all cases involving laterality. Also, an x can no longer mark the spot.
- 3) Redesigned surgical site verification checklist.
- 4) Use of timeout placards in instrument sets.
- 5) Redesigned OR marker boards, including for away games.
- 6) Large scale marketing and education campaign. Redundant checks were also built into the system.



Addressing Root Causes

Tools used included:

- Benchmarking
- Pareto analysis
- Root cause analysis
- Reliability analysis
- Brainstorming by the Children's Quality Improvement in Surgery team



Addressing Root Causes

Staff Response

- **Nursing Staff**

- Some nursing staff advocated delaying implementation for three months until a new building was completed.
- Formal meetings and training sessions, including mock runs, were held with the nursing staff. Patient care was emphasized.
- Nursing staff bought in to the immediate implementation.

- **Surgeons**

- Some surgeons initially resisted the initiative, but most have been won over by the results.
- “Surgeons are accepting redundancy kicking and screaming...but they are coming in.”



Return on Investment

- The total cost of the project was about \$10,000.
- In 2004 (baseline) **64 percent** of acute appendicitis patients received ATB correctly, a **36 percent** error rate.
- In 2006, the first year of Operation Takeoff, **98.2 percent** received ATB correctly, a **1.8 percent** error rate.
- In 2006 there were no surgical errors and only two near misses.
- Dr. Caniano still wants to improve on these results.

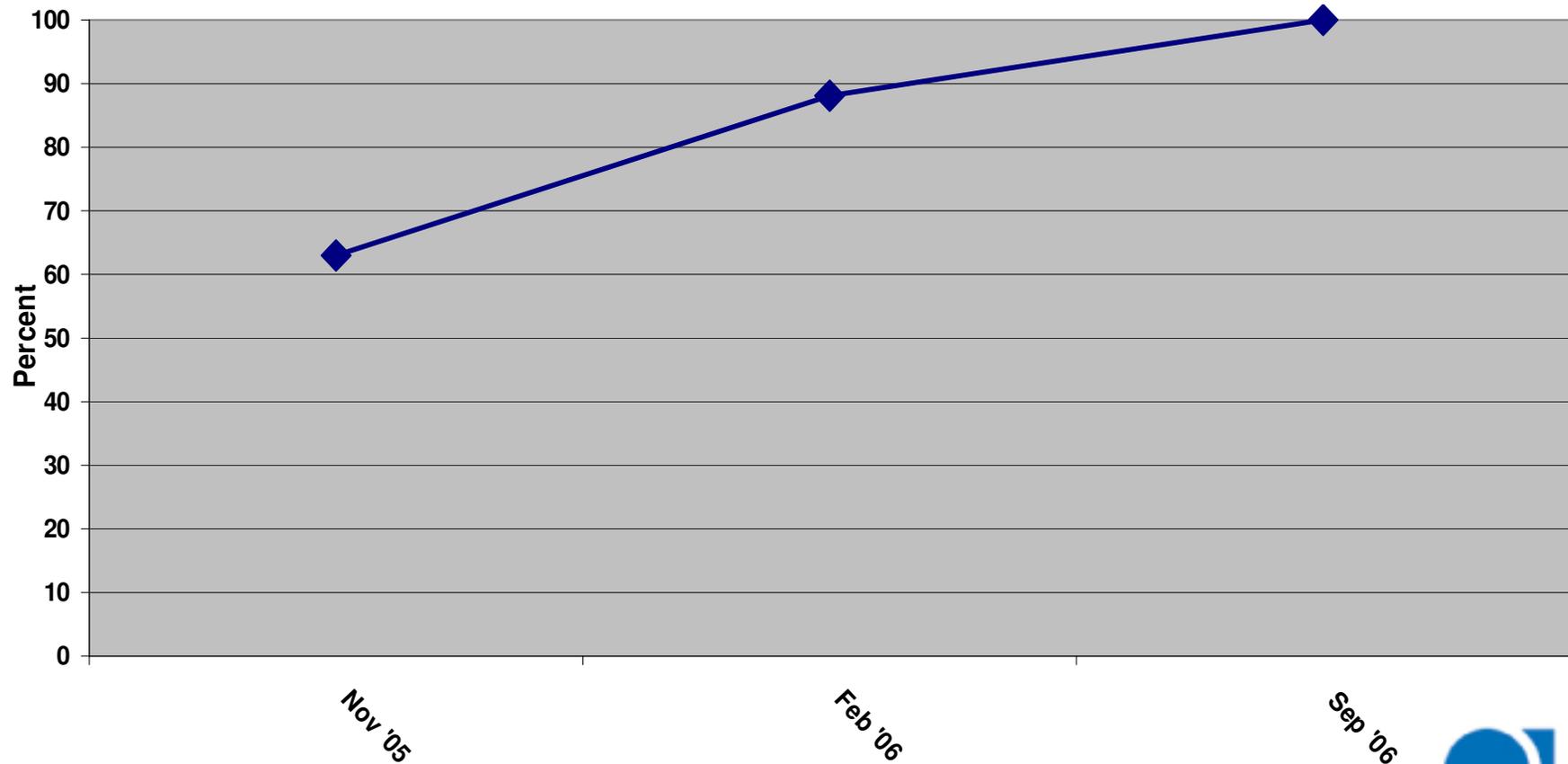


Monitoring and Evaluating Over Time

- Near-miss events are subjected to root cause analysis in the same way as sentinel events.
 - Dr. Caniano “would like to know right away if we have an event today. It is hard in medicine to get real-time stopping. But what we would really like is an analysis within 24 hours because the longer the gap between the event and the analysis, the more information is lost and distorted.”
- “Secret shoppers,” designated nurses who are not identified to the staff, monitor compliance.
 - Even Dr. Caniano doesn’t know when a secret shopper is making observations. Dr. Caniano shares assessment information quarterly with every surgeon. Information is also posted on surgery dashboard indicators.



Percent of Procedures with Time Out Performed Prior to Incision



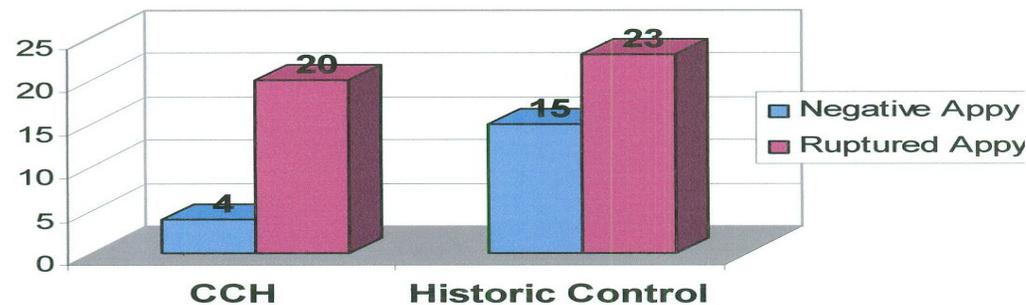
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General Pediatric Surgery Dashboard Indicator



% Negative vs. Ruptured Appendicitis Columbus Children's Hospital 2004



Percent of Negative Appendectomies and Ruptured Appendicitis Columbus Children's Hospital, 2004

The rate of negative appendectomies (i.e. the number of patients undergoing an appendectomy without pathologic evidence of acute appendicitis) has historically been reported as 15%. This national benchmark is typically linked with an associated rate of ruptured appendicitis on an institutional basis (23 to 25%). Specifically, authors have cautioned that a reduction in the rate of negative appendectomies (which may be the result of longer non-operative observation until the diagnosis becomes more certain) may result in an increased rate of appendiceal rupture.

All pathology reports for patients undergoing appendectomy during 2004 were reviewed. Of the 408 appendices that were examined in the Department of Anatomic Pathology, 100 were considered incidental and not included in this analysis. Of the remaining 308 specimens, 13 (4%) had no pathologic changes (i.e. Negative Appendectomies), 63 (20%) were ruptured and 232 (80%) were non-ruptured. These data confirm that our preoperative diagnostic algorithm, including the appropriate use of CT scanning, have allowed us to have a very low rate of negative appendectomies compared to the historical data, without increasing the overall rate of cases ruptured at the time of surgery. No comparative regional or national data are available at this time.



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