



## Medical Errors

---

**David Renton, MD, MPH, FACS**

*Associate Professor*

*Associate Chief Quality Officer for Perioperative Services*

*Department of Surgery*

*The Ohio State University Wexner Medical Center*

**MedNet21**  
Center for Continuing Medical Education



## Medical Errors

- Definition: Preventable adverse effect of care, whether or not it is evident or harmful to the patient.
- Important to understand the types and pervasiveness of medical errors in our hospitals and clinics
- With this knowledge, we can then find ways to create a culture that prevents errors before they occur

## Medical Errors

- In 1999/2000 the Institute of Medicine published their report *To Err is Human: Building a Safer Health System*.
- This groundbreaking report estimated that between 49,000 and 98,000 deaths were attributable to medical errors in America per year
- This made medical errors the nations 3<sup>rd</sup> leading cause of death
- Estimated 1 million people harmed by medical errors per year

## Medical Errors

- There are **48 million** surgical procedures performed in America each year
- These are done in one of **6146** Hospitals in America, or **9280** ambulatory surgery centers
- There were **4.38 billion** prescriptions filled in the United States in 2019

## Types of Medical Errors

- Medical Errors can be categorized into different types
- These can occur anywhere along the patient care journey
- These are the 4 types of medical errors

## Diagnostic Errors

- Error or delay in diagnosis
- Failure to employ indicated test
- Use of outmoded tests or therapy
- Failure to act on results of monitoring or testing

## Treatment Errors

- Error in performance of an operation, procedure or test
- Error in administering treatment
- Error in the dose or method of using a drug
- Avoidable delay in treatment or in responding to an abnormal test
- Inappropriate care

## Preventive Errors

- Failure to provide prophylactic treatment
- Inadequate monitoring or follow-up treatment

## **Other Errors**

- Failure of communication
- Equipment failure
- Other system failures

## **Most Common Medical Errors**

- Medication Errors
  - Includes prescribing errors
  - Administration errors
  - Filling errors by pharmacy

## **Most Common Medical Errors**

- Healthcare Associated Infections
  - Includes Ventilator Associate Pneumonias (VAP)
  - Surgical Site Infections (SSI)
  - Central line Associated Bloodstream Infections (CLABSI)
  - Catheter Associated Urinary Tract Infection (CAUTI)

## **Most Common Medical Errors**

- Diagnosis Errors
  - Missed diagnosis
  - Delayed diagnosis

# Most Common Medical Errors

- Surgical Errors
  - Wrong site surgery
  - Wrong procedure
  - Error in performance of the procedure



The screenshot shows the top portion of an ABC News article. The navigation bar includes 'abc NEWS', 'VIDEO', 'LIVE', 'SHOWS', '2020 ELECTIONS', 'CORONAVIRUS', and a search icon. The article title is 'Medical Errors, Past and Present'. The sub-headline reads 'Amid recent news of medical mistakes, a number of past medical errors stand out.' The author is 'By DAN CHILDS' and the date is 'February 19, 2009, 8:51 AM • 15 min read'. The main text begins with 'Nov. 27, 2007— -- It's every surgical patient's worst nightmare. And it happened three times at Rhode Island Hospital.' The text continues to describe a \$50,000 fine and a reprimand from the state Department of Health for a brain surgery error. It notes that while the chance of a serious mistake is small, it does happen, and that many hospitals share a similar track record.

abc NEWS VIDEO LIVE SHOWS 2020 ELECTIONS CORONAVIRUS

## Medical Errors, Past and Present

*Amid recent news of medical mistakes, a number of past medical errors stand out.*

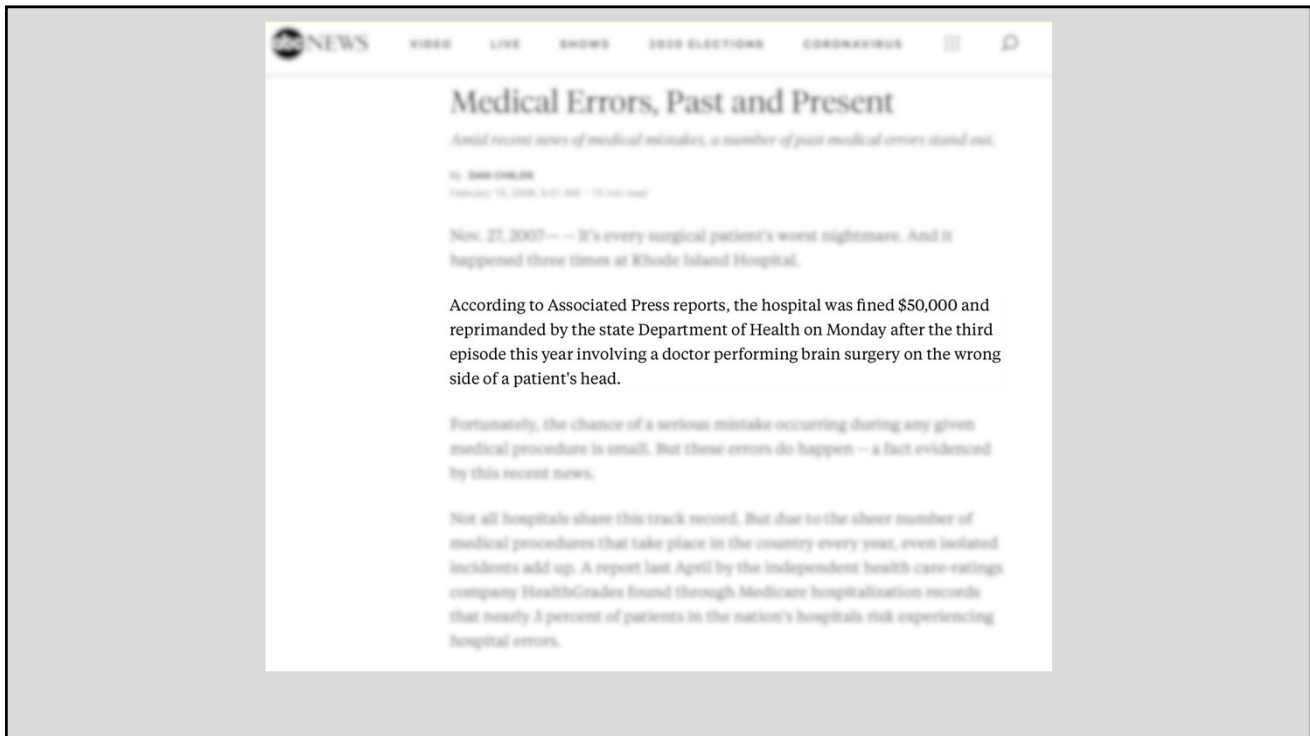
By **DAN CHILDS**  
February 19, 2009, 8:51 AM • 15 min read

Nov. 27, 2007— -- It's every surgical patient's worst nightmare. And it happened three times at Rhode Island Hospital.

According to Associated Press reports, the hospital was fined \$50,000 and reprimanded by the state Department of Health on Monday after the third episode this year involving a doctor performing brain surgery on the wrong side of a patient's head.

Fortunately, the chance of a serious mistake occurring during any given medical procedure is small. But these errors do happen -- a fact evidenced by this recent news.

Not all hospitals share this track record. But due to the sheer number of medical procedures that take place in the country every year, even isolated incidents add up. A report last April by the independent health care-ratings company HealthGrades found through Medicare hospitalization records that nearly 3 percent of patients in the nation's hospitals risk experiencing hospital errors.



## Cost of Medical Errors

- When taken just as a financial burden to the health care system, the cost of these errors is estimated to be around \$20 billion per year
- When the financial burden to the families, employers, and overall economy are taken into account, aggressive estimated put the burden at \$1 trillion annually



## How Do We Prevent Medical Errors?

- Change the goal from errors to safety
- Create a culture that recognizes that errors can occur
- This culture will recognize when errors occur, and not seek to lay blame, but look at the systems that allowed the error to happen
- Change the system and put in place safeguards that prevent the error from occurring again

## How Do We Prevent Medication Errors?

- Example
  - Medication administration in a hospital setting
  - Can be very confusing with many patients requiring multiple medications throughout the day
  - Medication administration was the most common medical error cited in the Institute of Medicine report
  - How can you create a system that helps prevent incorrect medical administration?
  - How can you create a culture that helps prevent incorrect medical administration?

## How Do We Prevent Medication Errors?

- Example
  - Medication administration in a hospital setting
  - Can be very confusing with many patients requiring multiple medications throughout the day
  - Medication administration was the most common medical error cited in the Institute of Medicine report
  - How can you create a **system** that helps prevent incorrect medical administration?
  - How can you create a culture that helps prevent incorrect medical administration?

## How Do We Prevent Medication Errors?

- Example
  - Medication administration in a hospital setting
  - Can be very confusing with many patients requiring multiple medications throughout the day
  - Medication administration was the most common medical error cited in the Institute of Medicine report
  - How can you create a **system** that helps prevent incorrect medical administration?
  - How can you create a **culture** that helps prevent incorrect medical administration?

## Bar Code Medication Administration

- Each drug to be administered is checked against the patient wristband
- Two patient identifiers will be used to make sure the correct patient is getting their medication.
- This will be done for all medications given

> [Acad Emerg Med](#). 2013 Aug;20(8):801-6. doi: 10.1111/acem.12189.

### Effect of barcode-assisted medication administration on emergency department medication errors

Joseph Bonkowski <sup>1</sup>, Cynthia Carnes, Joseph Melucci, Jay Mirtallo, Beth Prier, Erin Reichert, Susan Moffatt-Bruce, Robert Weber

Affiliations + expand

PMID: 24033623 DOI: 10.1111/acem.12189

Free article

#### Abstract

**Objectives:** Barcode-assisted medication administration (BCMA) is technology with demonstrated benefit in reducing medication administration errors in hospitalized patients; however, it is not routinely used in emergency departments (EDs). EDs may benefit from BCMA, because ED medication administration is complex and error-prone.

**Methods:** A naïve observational study was conducted at an academic medical center implementing BCMA in the ED. The rate of medication administration errors was measured before and after implementing an integrated electronic medical record (EMR) with BCMA capacity. Errors were classified as wrong drug, wrong dose, wrong route of administration, or a medication administration with no physician order. The error type, severity of error, and medications associated with errors were also quantified.

**Results:** A total of 1,978 medication administrations were observed (996 pre-BCMA and 982 post-BCMA). The baseline medication administration error rate was 6.3%, with wrong dose errors representing 66.7% of observed errors. BCMA was associated with a reduction in the medication administration error rate to 1.2%, a relative rate reduction of 80.7% ( $p < 0.0001$ ). Wrong dose errors decreased by 90.4% ( $p < 0.0001$ ), and medication administrations with no physician order decreased by 72.4% ( $p = 0.057$ ). Most errors discovered were of minor severity. Antihistamine medications were associated with the highest error rate.

**Conclusions:** Implementing BCMA in the ED was associated with significant reductions in the medication administration error rate and specifically wrong dose errors. The results of this study suggest a benefit of BCMA on reducing medication administration errors in the ED.

© 2013 by the Society for Academic Emergency Medicine.

[Acad Emerg Med](#). 2019 Aug;26(8):971-9. doi: 10.1016/j.ajem.2019.07.016.

### Effect of barcode-assisted medication administration on emergency department medication errors

Joseph Berkowich<sup>1</sup>, Cynthia Carnes, Joseph Mikuni, Jay Miralza, Beth Pinar, Eric Reichart, Susan Moffatt-Brace, Robert Weber

affiliations [expand](#)  
PMID: 34038223 DOI: 10.1016/j.ajem.2019.07.016  
[Free article](#)

#### Abstract

**Objectives:** Barcode-assisted medication administration (BCMA) is technology with demonstrated benefit in reducing medication administration errors in hospitalized patients; however, it is not routinely used in emergency departments (EDs). EDs may benefit from BCMA, because ED medication administration is complex and error-prone.

**Methods:** A retrospective observational study was conducted at an academic medical center implementing BCMA in the ED. The rate of medication administration errors was measured before and after implementing an integrated electronic medical record (EMR) with BCMA capacity. Errors were classified as wrong drug, wrong dose, wrong route of administration, or a medication administration with no physician order. The error type, severity of error, and medications associated with errors were also quantified.

**Results:** A total of 1,878 medication administrations were observed (988 pre-BCMA and 890 post-BCMA). The baseline medication administration error rate was 6.3%, with wrong dose errors representing 66.7% of observed errors. BCMA was associated with a reduction in the medication administration error rate to 1.2%, a relative rate reduction of 80.7% ( $p < 0.0001$ ). Wrong dose errors decreased by 90.4% ( $p < 0.0001$ ), and medication administrations with no physician order decreased by 72.4% ( $p < 0.007$ ). Most errors discovered were of minor severity. Antihypertensive medications were associated with the highest error rate.

**Conclusions:** Implementing BCMA in the ED was associated with significant reductions in the medication administration error rate and specifically wrong dose errors. The results of this study suggest a benefit of BCMA on reducing medication administration errors in the ED.

© 2019 by the Society for Academic Emergency Medicine.

[Acad Emerg Med](#). 2019 Aug;26(8):971-9. doi: 10.1016/j.ajem.2019.07.016.

### Effect of barcode-assisted medication administration on emergency department medication errors

Joseph Berkowich<sup>1</sup>, Cynthia Carnes, Joseph Mikuni, Jay Miralza, Beth Pinar, Eric Reichart, Susan Moffatt-Brace, Robert Weber

affiliations [expand](#)  
PMID: 34038223 DOI: 10.1016/j.ajem.2019.07.016  
[Free article](#)

#### Abstract

**Objectives:** Barcode-assisted medication administration (BCMA) is technology with demonstrated benefit in reducing medication administration errors in hospitalized patients; however, it is not routinely used in emergency departments (EDs). EDs may benefit from BCMA, because ED medication administration is complex and error-prone.

**Methods:** A retrospective observational study was conducted at an academic medical center implementing BCMA in the ED. The rate of medication administration errors was measured before and after implementing an integrated electronic medical record (EMR) with BCMA capacity. Errors were classified as wrong drug, wrong dose, wrong route of administration, or a medication administration with no physician order. The error type, severity of error, and medications associated with errors were also quantified.

**Results:** A total of 1,878 medication administrations were observed (988 pre-BCMA and 890 post-BCMA). The baseline medication administration error rate was 6.3%, with wrong dose errors representing 66.7% of observed errors. BCMA was associated with a reduction in the medication administration error rate to 1.2%, a relative rate reduction of 80.7% ( $p < 0.0001$ ). Wrong dose errors decreased by 90.4% ( $p < 0.0001$ ), and medication administrations with no physician order decreased by 72.4% ( $p < 0.007$ ). Most errors discovered were of minor severity. Antihypertensive medications were associated with the highest error rate.

**Conclusions:** Implementing BCMA in the ED was associated with significant reductions in the medication administration error rate and specifically wrong dose errors. The results of this study suggest a benefit of BCMA on reducing medication administration errors in the ED.

© 2019 by the Society for Academic Emergency Medicine.

80%

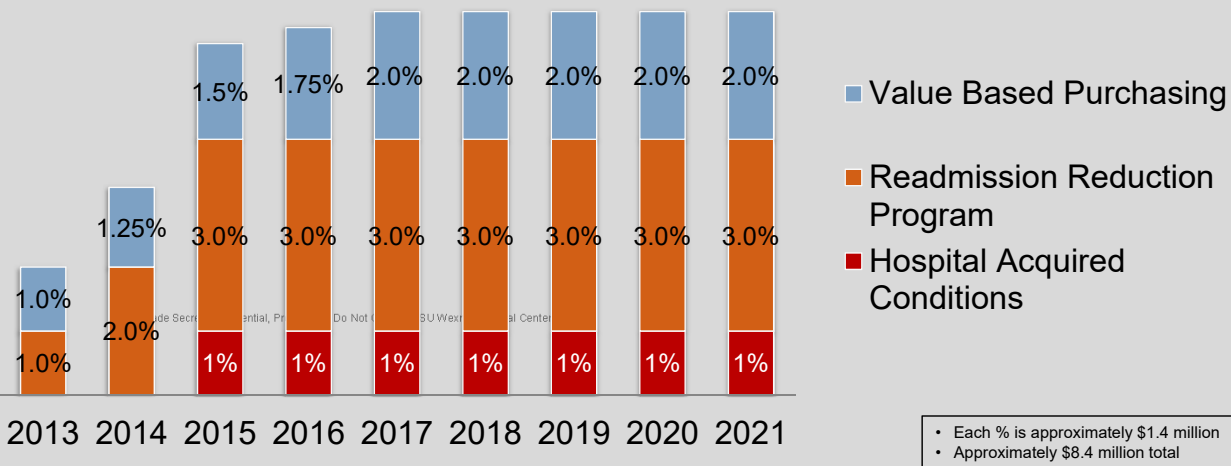
## **Culture Change in Medication Administration**

- Five rights of nursing drug administration
- 1. Right medicine
- 2. Right patient
- 3. Right dosage
- 4. Right Route
- 5. Right Time

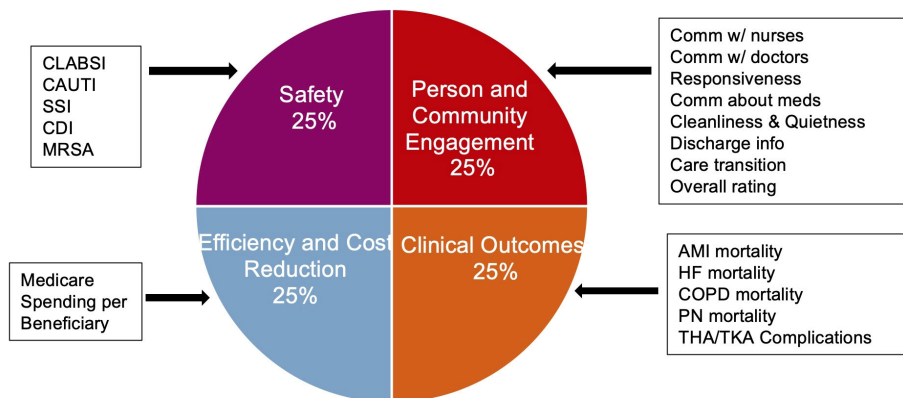
## **HealthCare Associated Infections**

- CMS has devised a system to hold hospitals accountable for quality outcomes
- They withhold a certain percentage of payments at the beginning of the year
- If you reach certain benchmarks, you can earn back this money
- If you exceed these benchmarks, you can earn more money than was at risk

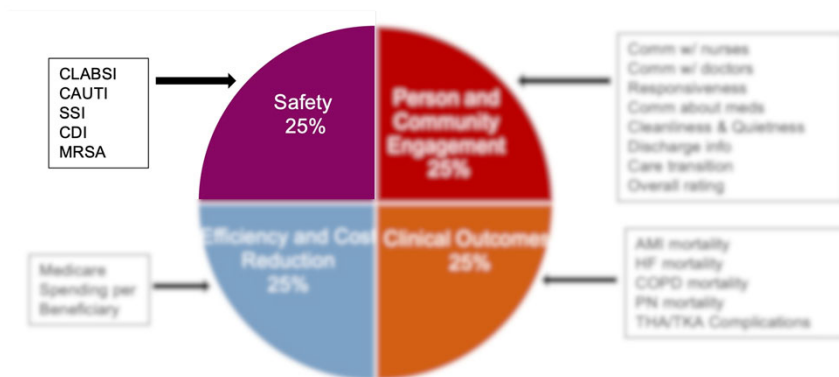
# Total Percentage of Medicare Revenue at Risk



## Value Based Purchasing



## Value Based Purchasing

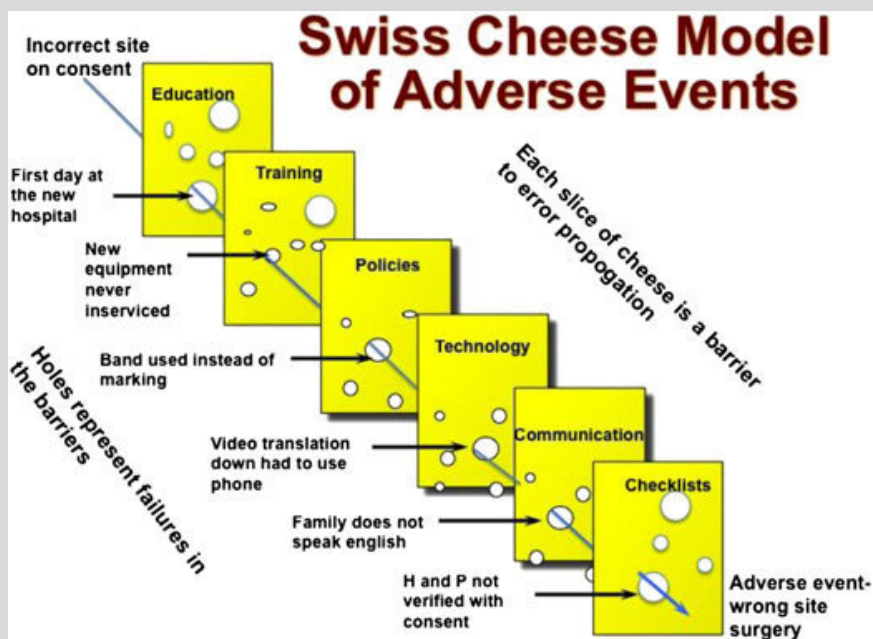


## HealthCare Associated Infections

- Hospitals found, that by reducing these HAI, they would get more money from CMS
- They also found, they could make more money overall, with decreased length of stays for patients, decreased complications, and overall better outcomes
- A win-win for everyone at the table

## Surgical Errors

- This group includes what we call “Never Events”
- A wrong site surgery or a wrong procedure events are things we think should never occur.
- How can something like this happen?





## Surgical Errors

- How do we close these holes in the system surrounding surgery?
- We look to our colleagues in the aviation industry
- 1972 was the worst year in aviation safety history.
- 460 deaths that year
- Realized that a lack of communication in the cockpit was leading to a majority of the problems

## Surgical Errors

- Instituted CRM – Crew Resource Management
- At any time in the process of aviation, anyone on the team can speak up and "stop the line"
- Meaning all concerns are heard
- This leads to investment from the whole team, and a common goal, which is error free flying

# Surgical Errors

- Operating rooms around the country have taken idea of Crew Resource Management to heart
- We now run through the same checklists, like a pre-flight check
- All voices are heard. Anyone in the OR can "stop the line" and voice concerns, and these will be addressed and remedied.

## SURGICAL SAFETY CHECKLIST

THE OHIO STATE UNIVERSITY  
WEXNER MEDICAL CENTER

The James  
THE OHIO STATE UNIVERSITY  
WEXNER MEDICAL CENTER

### SIGN IN Purposeful Pause Before Induction

Initiated/Led by Attending Anesthesiologist  
(MAC= Anesthesia Care Team Member)  
Surgical Representative Must be Present

- Team Members Introduce Themselves**
  - Include Patient
- Patient Identification**
  - Procedure
  - Site Marked by Attending Surgeon
  - Confirmed Anesthesia & Surgical Consents
- Patient Readiness**
  - Blood Products Anticipated (T & S Available)
  - Allergies
  - Positioning
  - SCDs Required and On
  - Foley Catheter Needed?
  - Confirm:
    - Antibiotics
    - Pressure Ulcer Prevention
    - Code Status
  - Equipment/Implants
    - Any Additional Case Specifics?
    - Radiology Needed?
- Anesthesia Assessment**
  - Machine/Equipment Check
  - Suction
  - Baseline BP/EKG/HR/SpO2/Temp
  - Airway/OSA Concerns
  - Oxygen Management

### TIME OUT Purposeful Pause Before First Invasive Portion of Each Procedure

Initiated/Led by Attending Surgeon

- Team Members Introduce Themselves**
- Identify Patient, Operation and Operative Course**
  - Site Verified (consent and visualized site marking matches)
  - Anticipated Operative Course
  - Confirm Blood Product Availability
  - Care of Pathologic Specimens
  - Anticipated Patient Disposition
- Fire Safety**
  - Oxygen Concentration
  - Hot Items Identified
  - Prep Used
    - Anticipated use of other flammable agents
- Allergies**
- Antibiotics Given**
  - Selection and Time
  - Documented on White Board
- Imaging Displayed** (Reviewed, Confirmed Patients' ID)
- DVT Prophylaxis**

### Procedure

Determined/Initiated by Attending Surgeon

- Attending Surgeon confirms:**
  - Red Flags Addressed
  - Cavity Search Complete
  - Procedure Performed
  - Wound Class Confirmed
  - Specimens Verified/Reviewed/Off the Field
  - Team Recommendations for Improvement
  - Equipment/Instrument Issues
- Attending Surgeon or Surgical Representative Confirms:**
  - Red Flags Resolved
    - Anesthesia Concerns
    - Counts Confirmed
      - If Incorrect, Follow Incorrect Algorithm
  - Final Patient Disposition
  - Post-Op Concerns
  - Foley Catheter Management

V9 CRM Tool, 11 David Renton, MD  
© 2012 The Ohio State University Wexner Medical Center 10.2019

**SIGN OUT PLEASE SPEAK UP WITH QUESTIONS AND CONCERNS**  
**Purposeful Pause Purposeful Pause = EVERYONE PAUSES in the OR**  
**After Last Critical Portion of**

## Conclusion

- Medical errors are preventable
- We need to look at how to fix the system, not who is to blame
- It takes a focus from everyone on the same goal:

- **Patient Safety**