



Wrong Site Surgery: The myths, the realities, the solutions

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- **Introduction: speaker credentials**
- The problem: wrong site surgery
- The mandate: JCAHO requirements
- Case studies
- New solution: Sitemarx stamp
- Conclusion

Surgeon background

J. Robert Wyatt, MD, MBA:

- Otolaryngology – Head and Neck Surgery
- Expert consultant, Texas Medical Board
- Board of Managers, Baylor Surgicare, North Garland
- Executive Committee, North Texas ENT Associates
- Medical legal consultant
- Licensed pilot since 1982

Surgeon background

Glenn Rothman MD:

- Head and Neck Cancer Surgeon
- Chairman, Department of Surgery
- Medical-legal and Medical Board consultant
- Sentinel Event leadership
- JCAHO compliance consultant
- Proposed “solution” unavailable

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Your surgeon makes errors

- To err is human – every 15 seconds
- 8 errors = one accident
- Active task vs. passive task
- Faith in others reinforces errors
- Multi-tasking increases errors
- Aviation and nuclear safety principles not adopted by healthcare industry

Fundamentals of errors

Error Type	Description	Example	Prevention
Skill-based errors	Familiar act, little attention	Slips, lapses	Pay attention
Rule-based errors	Act requiring application of rules to familiar event	Wrong rule, misapplication of correct rule, non-compliant with rule	Educate, critical thinking, accountability
Knowledge-based errors	Unfamiliar situation, no rule, problem solving task	Faulty strategy to solve problem	Stop, teach decision making skills

Learning from the experts

- Aviation and Nuclear power expertise
- Investigation versus problem-solving “Root-cause Analysis”
- Systems thinking versus get rid of the bad apples
- Reliance on diagnostic tools versus reliance of profound knowledge
- Safety as a “core value” versus safety as a “priority”
- STAR: stop...think...act...review

Wrong site surgery: The frequency debate

- 1 in 5,000 – 10,000 cases
- Not an accepted risk of surgery
- Near misses not tracked
- Near misses not analyzed
- Numbers debate undermines public trust
- Corrective efforts compromised by the numbers debate

Impact of wrong site cases

- Physical injury and possibly assault
- Loss of faith in the healthcare providers
- Surgeon litigation and licensure penalties
- Hospital litigation and accreditation penalties
- Indefensible public image risk
- Undermines surgery team cohesion

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Joint Commission mandate

- Who gets site marked?
- Who does the site marking?
- What is the acceptable mark?
- Who confirms the mark?
- The “time out”

Has JCAHO solved wrong site?

- JCAHO has brought focus to the problem
- JCAHO has required redundancy
- JCAHO has improved provider “buy-in”
- JCAHO mandated root cause analysis
- JCAHO agrees there is no evidence these measures have decreased the incidence of wrong site surgery
- No requirement to track near-misses
- Cases are reported voluntarily

Factors contributing to failures

- “Captain of the Ship” mentality
- Surgery team hierarchy
- Culture of blame and punishment
- Compelling incentives for speed
- Little attention to near misses
- Failure to adopt “best practices”
- Litigation and confidentiality

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■ **Case studies:**

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Case 1: Correct and incorrect sites both marked

- RN spouse marked husband to avoid error
- Wrong testicle removed
- Betadine site preparation blurred the words leaving both marks “the same”
- Analysis: More than one mark means nothing unique about the correct site

Case 2: Wrong site marked

- Laparoscopic LEFT inguinal hernia repair
- “L” placed on the RIGHT groin
- Analysis: “R” and “L” didn’t hold meaning for the team...added to confusion
- Failure to correlate with medical record

Case 3: Imprecise site mark

- Index finger surgery instead of ring finger
- Neither finger was normal
- Mark correctly identified the hand but not the digit
- Analysis: Lack of specificity of the site mark
- No rules to guide the team as to acceptability

Case 4: Authorship of site mark unclear

- Surgery intern marked wrong kidney
- Nurse assumed attending initials
- Attending assumed fellow initials
- Patient assumed academia meant accuracy
- Analysis: Relied on system of initials to avoid errors.
- No one knew owner of site mark initials

Case 5: Site mark washed off

- Correct knee marked by surgeon but incorrect knee prepped for surgery
- Surgery team members not bothered by lack of mark as they frequently see the ink washed away in the preparation
- Analysis: The use of markers not specifically designed for site marking caused failure because the marker itself was unreliable

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A new solution...

- A tool specifically engineered to reduce the risk of wrong site procedures and facilitate meeting Joint Commission requirements
- This tool leads to a standardized system for surgery site marking that does not vary from patient to patient, or from surgeon to surgeon
- This tool does not require significant change in complex, ingrained human behavior

The solution: Key requirements

- A consistent and unambiguous mark
- Able to withstand a skin prep
- Does not introduce increased risk or complexity to the preoperative process
- No added risk of perioperative infection
- Size allows for both accuracy and visibility
- Meets or exceeds JCAHO requirements

The Sitemarx stamp



Stamp benefits: Consistency

- From patient to patient and surgeon to surgeon, the same mark is used. This provides a visual expectation in the OR. Industrial engineering has shown that humans are visual creatures, and if a subconscious visual expectation is not met it is rapidly noted consciously
- Ophthalmology nurses' study of marks observed, most common (50%) was "other"

Stamp benefits: Unambiguous

- The stamp face can be made to imprint an unmistakable message - such as “CORRECT SURGERY SITE”, “CORRECT”, or “GO”
- With this system, every patient, with any surgeon, can be marked uniformly and consistently
- “X”, “R”, “L”, dots and arrows

Stamp benefits: Withstanding the prep

- The stamp will use a non-toxic ink designed for marking skin. Testing has demonstrated that this ink will withstand the sterile prep far better than current markers
- Most of the markers currently used withstand the sterile prep very poorly. Standard medical inks were not designed for this purpose
- Orthopedic wrong site errors are the most common and these cases have the most vigorous skin prep

Stamp benefits: Reduced infection risk

- Current markers are frequently not sterile and often used on multiple patients
- The ink contained in some of the markers currently used bear the warning label “avoid contact with unprotected skin”
- The stamp is individually packaged and sterilized for single-use
- Nosocomial infections account for ~50% of hospital deaths

Stamp benefits: Reduced complexity

- Surgeons marking differently, neighboring hospitals marking differently, and varying nursing expectations are all sources of errors
- The current marking methods unnecessarily complicate what should be a straightforward task
- Stoplights and Stop signs are all the same for a reason

JCAHO requirements

- A single use, sterile, indelible ink, disposable surgical site marking stamp meets the JCAHO requirement for a consistent, lasting, and unambiguous mark on the surgical site
- Use of the stamp in multiple facilities in the same geographic area meets achieves consistency across institutions. JCAHO recognizes that since physicians, nurses, anesthesiologists and other health care workers work in multiple institutions, consistency between institutions, not just within an institution, improves patient safety and decreases patient errors

Case 1: Correct and incorrect sites both marked

- RN spouse marked husband to avoid error
- Wrong testicle removed
- Betadine site preparation blurred the words leaving both marks “the same”
- Analysis: More than one mark means nothing unique about the correct site
- ***Stamp is clearly and unambiguously intended for the correct site only***

Case 2: Wrong site marked

- Laparoscopic LEFT inguinal hernia repair
- “L” placed on the RIGHT groin
- Analysis: “R” and “L” didn’t hold meaning for the team...added to confusion
- Failure to correlate with medical record
- ***The consistency of the stamp eliminates interpretation of the mark....a source of error***

Case 3: Imprecise site mark

- Index finger surgery instead of ring finger
- Neither finger was normal
- Mark correctly identified the hand but not the digit
- Analysis: Lack of specificity of the site mark
- No rules to guide the team as to acceptability
- ***Stamp size (~2cm) facilitates precise site marking, including small sites such as fingers and toes***

Case 4: Authorship of site mark unclear

- Surgery intern marked wrong kidney
- Nurse assumed attending initials
- Attending assumed fellow initials
- Patient assumed academia meant accuracy
- Analysis: Relied on system of initials to avoid errors.
- No one knew owner of site mark initials
- ***The mark made by the stamp is consistent from surgeon to surgeon***

Case 5: Site mark washed off

- Correct knee marked by surgeon but incorrect knee prepped for surgery
- Surgery team members not bothered by lack of mark as they frequently see the ink washed away in the preparation
- Analysis: The use of markers not specifically designed for site marking caused failure because the marker itself was unreliable
- ***The ink used in the stamp is designed to withstand a skin prep***

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Conclusion

- Wrong site and wrong patient surgery remains a problem
- Eliminating wrong site and wrong patient surgery will require widespread utilization of principles of error management, accepting safety as a core value
- Healthcare leaders need to embrace a commitment to studying our mistakes, developing best practices and sharing solutions nationwide

Conclusion

- However, many of the errors occurring today are related to specific problems with the site marking process
- A single use, sterile, indelible ink, disposable surgical site marking stamp provides a consistent, lasting, and unambiguous mark on the surgical site
- In a simple and easy to use manner, this device addresses many of the problems with the current site marking process that lead to wrong site and wrong patient errors