HOW TO DEVELOP A CULTURE OF SAFETY AND QUALITY IN THE OR

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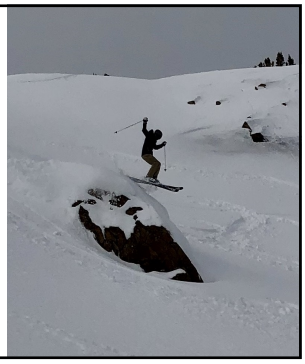

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DISCLOSURES

- Consultant and Study PI for Eximis Surgical
- Consultant Medtronics

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THERE WILL BE NO AVIATION SAFETY REFERENCES IN THIS TALK…

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OBJECTIVES

- Review the role of each **team member** in contributing to safety in the operating room
- Consider improvements in **communication** which can make the OR a safer place – preoperative "time-out", surgical "debrief"
- Understand strategies to improve **surgical site infections**
- **Track quality measures** in your operating room and use them in a constructive way

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SURGICAL TEAM

- **Surgical tech (scrub tech):** prepares room, passes instruments/supplies, assist at bedside, clean-up
- **Scrub nurse:** as above with some extended skills depending on hospital credentials
- **Circulating nurse:** completes non-scrubbed tasks in the room, documentation, passes supplies onto surgical field, responsible for initiating the time-out/debrief
- **First assist**: bedside assistance, suction/irrigation, suture passing, open and close
- **Medical student:** operate and assist under the direct supervision of resident and attending
- **Resident:** operate and assist under supervision of attending
- **Attending surgeon:** responsible for the primary operation of the case
- **Anesthesia team:** sedation and airway management, pain management, positioning
- **Ancillary staff:** perfusion team, industry representatives, proctors, etc.

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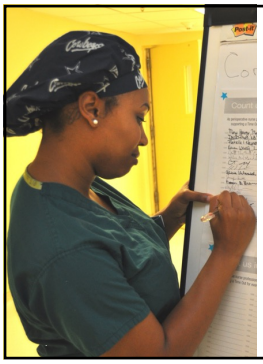

SURGICAL TEAM TIMEOUT

- **Patient identification timeout:** circulating nurse and anesthesia team verify patient and procedure with the patient AWAKE.
- **Surgical timeout:** performed with the entire surgical team in the room after the prep/drape
  - Patient name and identifier (MRN, DOB)
  - Procedure Name
  - Procedure site verification
  - Allergies
  - Preoperative antibiotic
  - VTE prophylaxis
  - Specimens
  - Fire risk
  - Discharge plan and location

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SURGICAL TIMEOUT

- **Vanderbilt** prospective study of 166 observed "Time out" procedures for non-emergent cases in 2016
- "Time out" was initiated 100% of the time
- Average duration of a "time out" was 60.8 seconds
- 6% of the time, the "time out" was interrupted for a safety concern
  - 40% due to Medication discrepancy (e.g. incorrect antibiotic)
  - 40% related to procedural clarification (e.g. consent not matching the stated procedure)
  - 20% due to postoperative plan discussion (e.g. patient going home, ICU, floor)
- 10% of the time, at least one member of the operating room team was actively distracted during the time out
- 1.3% of the time, the timeout was performed AFTER the surgical incision had been made

Freundlich et al, "Prospective Investigation of the Operating Room Time-out Process", Anesth Analg, 2020 Mar; 130(3): 725-728.

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SURGICAL TEAM WORKLOAD

- Perception of workload in the operating room is not divided equally!
- Study by Totonchilar et al (2023) evaluated 346 surgical team members over 76 cases (a total of 409 questionnaires) on the different types of demands in the OR:
  - **Mental demands** – how mentally fatiguing was the procedure? (endo or cancer cases)
  - **Physical demands** – how physically fatiguing was the procedure? (large fibroid uterus)
  - **Temporal demands** – how hurried or rushed was the pace of the procedure? (crash c-section)
  - **Task complexity** – how complex was the procedure? (difficult laparoscopy)
  - **Situational stress** – how anxious did you feel while performing the procedure? (working with a difficult attending)
  - **Distractions** – how distracting was the operating room environment? (getting paged from the PACU)

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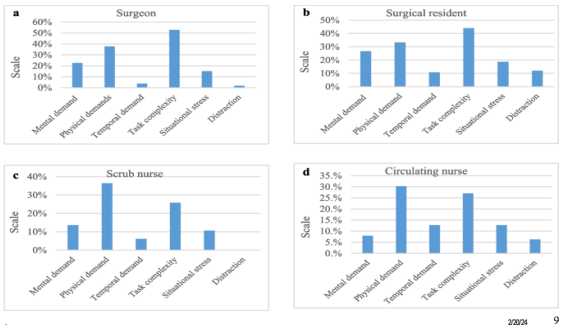

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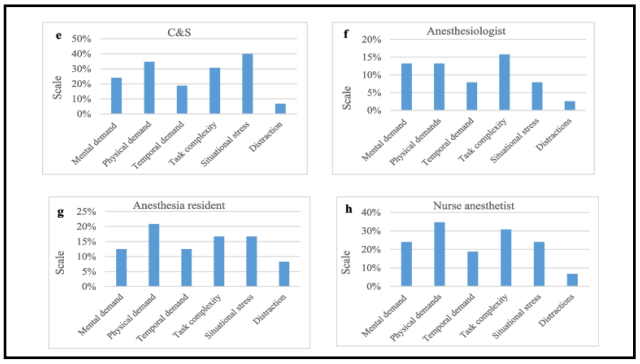

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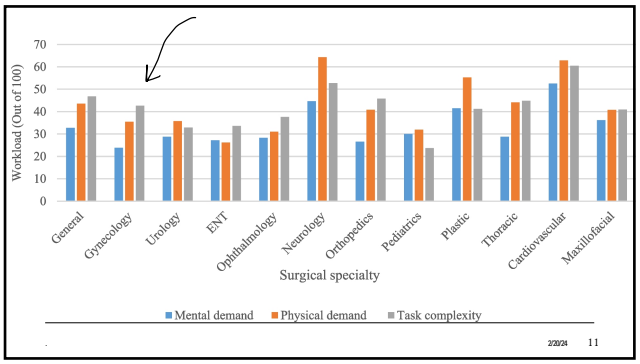

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Technique	Cases	Mental demand (Mean±sd)	Physical demand (Mean±sd)	Temporal demand (Mean±sd)	Task complexity (Mean±sd)	Situational stress (Mean±sd)	Distraction (Mean±sd)	Total workload (Mean±sd)
Open	300	34.46 ± 25.50	45.58 ± 26.89	24.31 ± 22.89	45.50 ± 26.46	30.86 ± 24.34	24.68 ± 16.61	34.23 ± 16.91
MIS	96	26.61 ± 22.63	28.17 ± 23.77	21.45 ± 22.05	31.61 ± 25.79	25.62 ± 27.14	26.82 ± 18.56	26.71 ± 17.28
Combined	13	40.76 ± 17.77	38.84 ± 23.81	20 ± 17.91	40.76 ± 28.27	24.23 ± 15.39	30 ± 24.57	32.43 ± 15.42
Total surgeries	409	32.82 ± 24.86	41.28 ± 27.06	23.50 ± 22.50	42.09 ± 26.94	29.42 ± 24.87	25.35 ± 17.37	32.41 ± 17.21

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SURGICAL TEAM WORKLOAD

- The "workload" of different members of the surgical team is influenced by specialty, technique (open, MIS), role and surgical duration.
- Ob/Gyn surgeons' workload was most influenced by **TASK COMPLEXITY**, **PHYSICAL DEMAND** and **MENTAL DEMAND.**
- Open surgery was both **physically demanding** with **high task complexity** for surgeons.
- MIS surgery had **high task complexity** for surgeons.
- Circulating nurse and scrub nurse may be more distress by **TIME** and **SITUATIONAL STRESS.**
- Trainees in the OR may be distressed by **DISTRACTIONS**, even when not perceived by more experienced members of the team.

Totonchilar et al ,"Exmraning workload variations among different surgical team roles, specialties, and techniques: a multicenter cross-sectional descriptive study." Periop Med 2024;2/20/24 13

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HOW CAN WE REDUCE THE STRESS FOR EACH OF THESE TEAM MEMBERS?

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STRATEGIES TO IMPROVE SURGICAL TEAM WORKLOAD

- **Surgeon**:
  - Improve ergonomics to **reduce physical stress**
    - Lower the laparoscopy screen to eye level and directly across the table
    - Remain seated (for hysteroscopy, robotic and vaginal surgery)
    - Make everybody the same height (stepstool, lower or raise the table)
    - Use a "princess pad" (padded mat) underfoot to reduce strain from standing
  - Recognize when the **mental demand** of a case is overwhelming
    - Ask your circulating nurse to let you know when a certain time is reached
    - Take a biobreak
    - Call consultant
    - Move focus to another area

TASK COMPLEXITY
MENTAL DEMAND
PHYSICAL DEMAND

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STRATEGIES TO IMPROVE SURGICAL TEAM WORKLOAD

- **Scrub nurse**:
  - Technological and organization advancements (voice-activated call for equipment)
  - Optimize preference card (reduce amount of instrumentation needed)
  - Take breaks at non-urgent parts of the case.

PHYSICAL DEMAND

TASK COMPLEXITY

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STRATEGIES TO IMPROVE SURGICAL TEAM WORKLOAD

PHYSICAL DEMAND

TASK COMPLEXITY

SITUATIONAL STRESS

- **Circulating nurse**:
  - Streamline protocols (reduce situational stress)
    - Send every pathology specimen separately labeled
    - Decide as an institution what you are going to use as a prep solution
    - Always place the foley on the sterile field
  - Prepopulate EMR (reduce time consuming documentation and potential for medical errors)
    - Link the diagnosis/indication for surgery with the pathology specimen so it appears on the specimen request
  - Respect the time-out and debrief (reduce stress and specimen/procedural errors)
    - Make it the culture in the OR that everyone stops and participates when the circulator leads the time-out

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STRATEGIES TO IMPROVE SURGICAL TEAM WORKLOAD

- **Trainee**:
  - Turn off the music (reduce distractions)
  - Develop a system for coverage when scrubbed in (who covers consults and floor calls, reduce distractions)
  - Set goals and agree on communication of when to take over (allow trainee to operate to their potential without overwhelming their mental stress)
  - Encourage simulation/practice (build confidence)

TASK COMPLEXITY

SITUATIONAL STRESS

DISTRACTIONS

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THE "DEBRIEF"

- Similar to the "time-out" but at the completion of the case before the Attending surgeon has left the room.
- Surgical pause involving all members of the team.
- Review the **procedure performed.**
- Review the **specimens** in detail (fresh or permanent, need for frozen, what you'd like them called.)
- Review any case-related issues and **complications.**
- Review any **drains** left in place.
- Review if the **surgical count** was correct.
- Empower any member of the team to speak up if there is a safety issue during the case.

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SURGICAL SITE INFECTION

- Surgical complications are a major source of medical harm and cost in the United States with an estimated yearly cost of $25 billion per year.
- 25% of all hospital acquired infections in the US are surgical site infections.
- SSI's contribute to increase length of hospital stay, decreased quality of life, increased readmissions, increased repeat procedures, excess morbidity and mortality.
- CDC reports hysterectomy-associated SSI rates of 0.9-1.7% including:
  - Superficial skin infections (e.g. cellulitis)
  - Deep skin infections (e.g. wound abscess)
  - Organ space infections (e.g. peritoneal or vaginal cuff abscess)

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SSI PREVENTION

- Study of patients undergoing cytoreductive surgery for ovarian cancer from 2014-2016 at JHU.
- Identified a 20-33% risk of infection in these cases.
- Implemented a 5-point SSI reduction bundle.
- **Reduced the overall SSI rate from 20% pre-bundle to 3% post-bundle** (odds ratio 0.13, 95% CI 0.037-0.53, P<.001)
- **Reduced the colon resection SSI rate from 33% to 7%.**
- **Reduced the SSI-related hospital readmission from 13% to 3%.**

Original Research

Outcomes Associated With a Five-Point Surgical Site Infection Prevention Bundle in Women Undergoing Surgery for Ovarian Cancer

Melissa H. Lippitt, MD, Melissa Gerardi Fairbairn, PA-C, Rayna Matsuno, PhD, Rebecca L. Stone, MD, Edward J. Tanner III, MD, Elizabeth C. Wick, MD, Ana C. Angarita, MD, Kara Long Roche, MD, MS, Kimberly L. Levinson, MD, MPH, Jennifer E. Bergstrom, MD, Abdulrahman K. Sinno, MD, Melanie S. Curless, RN, MPH, Stephanie Wethington, MD, Sarah M. Temkin, MD, Jonathan Efron, MD, Deborah Hobson, RN, and Amanda N. Fader, MD

OBJECTIVE: To identify risk factors for surgical site infection and to define rates associated with cytoreductive surgery before and after implementation of an infection prevention bundle.

METHODS: We conducted a prospective quality improvement study. Patients who underwent ovarian, fallopian tube, or peritoneal cancer cytoreductive surgery at an academic tertiary care center from April 2014 to April 2016 were prospectively enrolled. Patient demographics, surgical variables, and surgical site infection rates were compared with a historical cohort after introduction of a 5-point infection prevention bundle, including: 1) preoperative and intraoperative skin preparation with 2% chlorhexidine and intraoperative control of oral antibiotics and mechanical bowel preparation; 3) appropriate timing of intraoperative antibiotics; 4) adoption of enhanced sterile surgical techniques for colon procedures and incisional closure; and 5) perioperative incision management.

RESULTS: During the study period, 219 women underwent surgery: 93 prebundle and 126 treated in the postbundle period. Stage, body mass index, proportion of patients undergoing colon or upper abdominal surgery, and estimated blood loss were not different between the cohorts. Overall, the surgical site infection rate prebundle was 18 (20%); this was reduced to four (3%) postbundle (odds ratio [OR] 0.13, 95% CI 0.037–0.53; P<.001). Patients who underwent colon resection

Fader et al, "Outcomes associated with a five-point surgical site infection prevention bundle in women undergoing surgery for ovarian cancer", Obstet Gynecol, v130, n4, October 2017

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SSI PREVENTION BUNDLE

1. Preoperative and intraoperative skin preparation with 4% chlorhexidine (abdominal and vaginal)
2. Oral antibiotics in patients undergoing mechanical bowel prep
3. Appropriate timing of antibiotics
4. Enhanced sterile surgical techniques for colon procedures and incisional closure
5. Perioperative incision management

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CHG VAGINAL PREP

- 2-4% CHG vaginal prep substantially lowers the bacterial count after vaginal preparation when compared to iodine.
- Some increase in vaginal irritation.
- Consider vaginal cuff irrigation at completion of case.
- ACOG recommends either CHG or iodine.

Chlorhexidine Versus Iodine for Vaginal Preparation Before Hysterectomy: A Randomized Clinical Trial

Austin M Hill [1], Rachel N Pauls [1], Jack Basil [2], Tiffanie Tam [1], Eunsun Yook [2], Abigail Shatkin-Margolis [1], Steven Kleeman [1], Jennifer Yeung [1], Emily Aldrich [1], Catrina C Crisp [1]

Affiliations + expand

PMID: 34333502 DOI: 10.1097/SPV.0000000000001066

Abstract

Objective: The American College of Obstetricians and Gynecologists does not provide a recommendation regarding the preferred vaginal preparation solution. We intended to compare the effectiveness of chlorhexidine versus iodine in decreasing vaginal bacterial counts.

Methods: In this institutional review board-approved study, participants undergoing total hysterectomy via vaginal or laparoscopic approach were randomized to 4% chlorhexidine or 10% iodine for presurgical vaginal preparation. Swabs were collected from the vaginal mucosa before, then 30, 60, and 90 minutes after preparation. Our primary outcome was the number of positive cultures (≥5,000 bacteria) at 90 minutes. The secondary outcomes included the presence of selected pathogens, postoperative complications, and infections. The sample size of 71 per arm was calculated using $\alpha P = 0.05$, 80% power, and anticipating a 22% difference in positive cultures.

Results: Between May 2018 and August 2019, 85 participants were randomized. The average age was

Hill et al, "Chlorhexidine versus iodine for vaginal preparation before hysterectomy: a randomized clinical trial." Female Pelvic Med Reconstr Surg, 2022 Feb 1;28(2):77-84.

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ORAL ANTIBIOTICS WITH BOWEL PREP

- Commonly used for endometriosis or cancer cases
- One bottle "MiraLax" powder (238 g) and four tablets bisacodyl "Docolax" (5 mg tablets)
- Nine tablets Neomycin sulfate (500 mg tablets)
- Twelve tablets Erythromycin (250 mg tablets)
- Begin 24 hours before surgery with a clear liquid diet

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INTRAOPERATIVE ANTIBIOTICS

- IV Cephazolin 1-3 g (weight based)
- IV Metronidazole 500 mg
- Administer within 30 minutes of procedure start
- Re-dose cephazolin when indicated (every 3 hours, blood loss >1500 cc, or both)
- Skin and vaginal CHG prep

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ENHANCED STERILE TECHNIQUE FOR INTESTINAL RESECTION AND WOUND CLOSURE

- Gown and glove change by surgical team after intestinal surgery or bowel resection
- "Clean closure tray" for wound closure
  - New suction and bovie cautery
  - Gown and glove change
  - Separate instruments for wound closure (switch just before closing the fascia)

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POSTOPERATIVE WOUND CARE

- Remove surgical dressing on postoperative day #1
- Enhanced attention to wound care by physician and nursing staff
  - Daily cleaning of wound and surrounding skin
  - Daily shower if possible
- Strict glycemic control (blood glucose <180 mg/dL)

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UNIVERSITY OF COLORADO EXPERIENCE WITH SSI REDUCTION BUNDLE

1. Defined "Perfect Care" for hysterectomy perioperative care (input from surgeons, nursing, anesthesia, infection control team, hospital admin and quality)
2. Head-to-toe CHG wipe in the pre-operative area
3. CHG skin and vaginal preparation intraoperative
4. Oral Antibiotics with mechanical bowel prep
5. Added Metronidazole to pre-op antibiotics
6. Clean Closure tray

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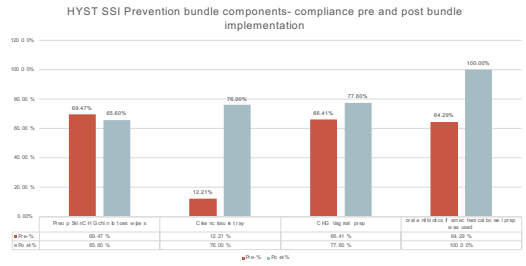

Pre-implementation data collection period: 4/2021 through 9/2021
Post-implementation data collection period: 7/2022 through 12/2022

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Actions/Tactics

1. Defined Perfect Care (May 2020)
2. Collaborative case review launched (March 2021)
3. Clean closure tray implementation (July 2021)
4. Real-time chart review for perfect care element fallouts (October 2021)
5. Transitioned to CHG solution for vaginal prep (November 2021)
6. Add Metronidazole to preoperative IV antibiotics for hysterectomy patients (March 2022)

Source:

Timeline: 7-2021 through 9/2023

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HOW DO WE GIVE QUALITY FEEDBACK TO SURGEONS?

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SURGEON FEEDBACK – GRANULAR SCOPE

- We maintain a **surgical quality dashboard** with individual surgeon and department quality metrics.
  - Data is confidential.
  - Data access is at the discretion of the surgeon or their division leader.
  - Compliance with the elements of the SSI prevention bundle, time-out, debrief, etc.
  - Quality nurse who investigates each SSI and performs a chart review for bundle element fallouts (ie. Was the patient allergic to CHG and thus received an iodine-based prep? Was it an error in nursing documentation?)
  - Developing an app for surgeons to access their own data as well as departmental metrics.

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QUALITY FEEDBACK – LARGER SCOPE

- Present the SSI bundle compliance and SSI rates (whole department) to the Hospital and System Quality meetings quarterly.
- Celebrate the improvements - other departments have adopted the Ob/Gyn SSI bundle elements.
- Ongoing education to surgeons (faculty, APPs and residents), nurses and OR staff to keep momentum going.
- Make changes in the SSI bundle as new data emerges to continue to improve care.
- Support from the department and the hospital is integral to making this a success.

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CONCLUSIONS

- Surgeons can and do have a significant role in improved communication with operating room staff.
- Operating room team behaviors (such as "time out" and "debrief") can have an impact on patient safety outcomes.
- Initiation of components of a surgical site infection bundle can reduce SSI and re-admission rates.
- Sharing the quality data with surgeons and staff (in a non-putative way) can impact compliance and success of safety interventions.

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