View as "PDF version"

Patient Safety Tip of the Week

June 3, 2025

More on OR Traffic and Surgical Site Infections

OR traffic, with frequent opening and closing of doors leading to the OR, is a potential risk factor for SSI's (surgical site infections). Seidelman et al. (Seidelman 2023), in their review of surgical site infection prevention, discussed risk factors for SSI's. Among the modifiable operation–related factors associated with SSI's, they noted that airborne contamination (raising the amount of microorganisms in the operating room environment) provides an additional opportunity for surgical site infection. And they acknowledge that most of the airborne pathogens are generated by persons in the operating room and their movements.

Kuehl and colleagues (Kuehl 2025) recently studies the influence of OR traffic on airborne microbial counts during 2 types of abdominal surgery that tend to have the highest SSI rates – colon surgery and abdominal hysterectomy. They did microbial counts during those procedures in 16 OR's in 4 facilities in an integrated healthcare system in the Midwest.

Sterile agar "settle" plates were placed in strategic sites. The set-up plate was positioned on the OR bed where a patient would be positioned during the procedure. This plate was opened during setup, closed when the patient was transported into the OR, and set aside until the end of the procedure. Two wound zone plates were inserted into custom surgical steel plate holders and clipped to the drape. To gather deposits on the sterile back table, two back table zone plates were positioned on opposite corners of the back table within the laminar airflow curtain.

The median total door-opening count was 74 per procedure (range 42.0 to 168.0), with significantly more openings during colon surgeries when compared to abdominal hysterectomies. The median door-opening rate for all procedures was 20 per hour (0.33 per minute).

The microbial deposits for all locations and operative phases were weakly correlated with the total door-opening counts and increased personnel counts during procedures,

suggesting that deposits increase when the number of door openings and personnel increases. That relationship was slightly stronger when evaluated for case phase only (as opposed to the setup phase). There was only 1 SSI during the study, though the total number of cases (n = 60) limited the statistical power to correlate OR traffic with actual SSI's.

Perhaps the best takeaway from the Kuehl article is the example of the tracking tool they used to monitor OR traffic (Figure 1 in the Kuehl article). If you plan to track OR traffic in your facility, you may want to use a tool like that. Supply management, staffing changes, and communication were the most frequent reasons for door opening in both the setup and operative phases. On average, nurses were responsible for 38% of door openings, with approximately one third of those openings occurring during room setup. Scrub personnel contributed to 19% of door openings, and anesthesia professionals were responsible for 15%. Those statistics are similar to those from most other studies that have measured OR traffic.

Your OR staff probably significantly underestimates how often those OR doors open and close. The first step is getting an accurate estimate and identifying the common reasons for such. Increasing awareness and understanding why it is important to reduce unnecessary OR traffic is just a first step. You then need to tailor your interventions to address the specific reasons at your facility.

Unless you have a good understanding of why the OR door is opening, you are unlikely to have a successful intervention. The method used by Kuehl et al. was good, but labor intensive (they had trained observers collecting the data). In several of our columns we've advocated keeping a log where staff are required to log in every time they leave and enter the OR for each case. To counter your staff's objections that this might be time consuming, use a voice assistant like Amazon's "Alexa" to simply add each reason to a list. We've often mentioned that "black box" video monitoring in the OR, which has multiple applications, can also provide estimates of OR traffic.

Low-cost interventions like placing a noticeable sign on the door prohibiting nonessential traffic, along with retractable tape that creates a small barrier to opening the door, may increase awareness. Perhaps the most effective intervention is ensuring that necessary equipment and supplies are in the OR before the start of the procedure. That requires proper planning and knowledge of needs for individual surgeons and/or anesthesiology staff. That's where pre-op huddles may be very important. And post-op debriefings can identify supplies or equipment that can be incorporated for future cases. Proper planning to schedule staff breaks should also help reduce unnecessary door opening.

Alternative means of communication, such as using phones or the intercom, has also been suggested as a way to reduce OR door opening. However, we would caution that such audible means could also create distractions or interruptions that could be detrimental. Perhaps more directed silent methods (like texting) would be less likely to distract multiple members of the OR team. Keep in mind we have also written frequently about

the dangers of cell phones and texting in the OR (see our June 2025 What's New in the Patient Safety World column "Cellphones and the Surgical Timeout").

Of course, OR traffic has another potentially adverse effect: it increases distractions and interruptions that can lead to errors. Several of our prior columns on OR traffic listed below address that impact in addition to the impact of OR traffic on SSI's.

Our prior columns focusing on surgical OR foot traffic and door opening:

- March 10, 2009 "Prolonged Surgical Duration and Time Awareness"
- January 2010 "Operative Duration and Infection"
- August 26, 2014 "Surgeons' Perception of Intraoperative Time"
- December 30, 2014 "Data Accumulates on Impact of Long Surgical Duration"
- November 24, 2015 "Door Opening and Foot Traffic in the OR"
- July 26, 2016 "Confirmed: Keep Your OR Doors Closed"
- December 2017 "A Fix for OR Foot Traffic?"
- April 23, 2019 "In and Out the Door and Other OR Flow Disruptions"
- June 8, 2021 "Cut OR Traffic to Cut Surgical Site Infections"
- January 11, 2022 "Documenting Distractions in the OR"
- October 4, 2022 "Successfully Reducing OR Traffic"
- August 20, 2024 "Air Traffic Control for the OR?"
- January 28, 2025 "Reducing Traffic in the OR"

References:

Seidelman JL, Mantyh CR, Anderson DJ. Surgical site infection prevention: a review. JAMA 2023; 329(3): 244-252
https://jamanetwork.com/journals/jama/article-abstract/2800424

Kuehl M., Mitchell K., Crucero M., et al. The Association Between OR Traffic and Airborne Microbial Counts During Two Types of Abdominal Surgeries. AORN J 2025; 121(5): 344-360
https://aornjournal.onlinelibrary.wiley.com/doi/10.1002/aorn.14335

http://www.patientsafetysolutions.com/

Home

Tip of the Week Archive

What's New in the Patient Safety World Archive