

# Patient Safety Tip of the Week

November 24, 2015

## Door Opening and Foot Traffic in the OR

We've done several previous columns that have discussed the potential negative impact of increased OR foot traffic.

In some of our prior articles on the relationship between surgical duration and SSI rates (see our March 10, 2010 Patient Safety Tip of the Week "[Prolonged Surgical Duration and Time Awareness](#)" and our January 2010 What's New in the Patient Safety World column "[Operative Duration and Infection](#)"), we have noted that OR traffic typically increases in longer duration cases. That likely increases the risk of bacterial transmission as well. As cases go on longer, foot traffic in and out of the OR increases, both as staff go on breaks or change shifts and as interruptions for questions, etc. begin to affect the surgeons and anesthesiologists. Long duration of surgery has long been known to be a factor associated with increased risk of surgical site infection and increased foot traffic may be one factor that increases the likelihood of surgical site infections ([Lynch 2009](#)).

Then in our March 17, 2015 Patient Safety Tip of the Week "[Distractions in the OR](#)" we discussed a study on distractions in the OR ([Wheelock 2015](#)). Not surprisingly, distractions occurred in 98% of cases. They occurred at a rate of 10.94 distractions per case or one distraction every 10 minutes. The most frequent types of distraction were those initiated by external staff entering the operating room. The researchers note that such distractions were unnecessary in 81% of cases! While those researchers actually attributed less significance to their major outcome variables (like teamwork, stress, etc.), they do acknowledge the potential impact on surgical infection rates, which they did not monitor. In several Patient Safety Tips of the Week ("[HAI's: Looking in All the Wrong Places](#)", "[Prolonged Surgical Duration and Time Awareness](#)", "[Operative Duration and Infection](#)") we've noted the risk of infection increases each time the OR door is opened and foot traffic in and out of the OR increases.

Now a new study from Johns Hopkins has formally studied how often OR doors are opened during joint arthroplasty surgeries and the impact on OR air flow ([Mears 2015](#)). The researchers measured how often and for how long OR doors were opened during 191 hip and knee arthroplasty procedures. They also measured air pressures in the OR and adjacent corridors. They found that, on average, OR doors were open 9.5 minutes per case and the average time between door openings was 2.5 minutes. As you'd expect the number and duration of door openings correlated with the length of surgery. In 77 of the 191 cases positive pressure within the OR was defeated.

The implications are obvious. While they found only one surgical infection in the 191 cases, the effects of the door opening on OR pressure and air flow theoretically would predispose to surgical infections. OR's have positive pressure to avoid flow of air and airborne pathogens from nonsterile adjacent areas.

Unfortunately, the Hopkins study did not assess the reasons for frequent door opening (the study was done in a manner that the OR staff was unaware such observations were being made). But if we extrapolate from the Wheelock study ([Wheelock 2015](#)) we'd expect a large percentage of the door openings may be from external staff and that most of these may not be necessary.

Mears and colleagues in the Hopkins study note that such frequent door openings are often a sign of OR inefficiencies pertaining to equipment, logistics, and personnel management. They note that the Lynch study correlated the number of door openings with the number of people in the OR. Mears et al. did not record that number. However, we would suspect that number may well be higher in teaching institutions than in community hospitals.

The next step would be to find out the reasons for such frequent OR door openings. Based on those results, possible interventions could be planned and piloted. In our March 17, 2015 Patient Safety Tip of the Week "[Distractions in the OR](#)" we noted that, anecdotally, simply having everyone attempting to enter the OR fill out a log entry with the reason for entering substantially reduces the number of people entering.

We agree with Mears et al. that proper planning for surgery and ensuring that all equipment and supplies that will be needed for the procedures are available in the OR is very important. In that regard, appropriate use of pre-op huddles/briefings and post-op debriefings are useful in reducing equipment issues.

The impact of such excessive foot traffic in and out of the OR and the impact of door opening on air flow into the OR is likely of importance from an infection control perspective. But the distractions and interruptions associated with such traffic are likely to have an adverse impact on other efficiencies in the OR. Door openings are probably a good proxy for OR inefficiencies and OR distractions and would be an easily measured parameter that might find use in multiple quality improvement projects.

Note that we have often recommended organizations use video recordings of OR cases that are then reviewed in a constructive manner to assess how well the OR team communicates and works together. While we've never looked at OR door openings during such reviews, that would be another valuable opportunity to determine reasons for door openings. Note also that those centers which have implemented RFID (or similar) tracking systems should be able to determine what personnel and equipment are moving in and out of the OR during cases and use that to get a better idea of the reasons for such movement.

Mears and colleagues have done a good job of raising awareness of a potential patient safety vulnerability that needs further research. Our bet is that looking at those vulnerabilities will also provide organizations with opportunities to improve their efficiencies – a win win situation.

## References:

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