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What's New in the Patient Safety World

November 2022

- **Nurse Staffing Composition and Patient Mortality**
- **Reading Too Many Images**
- **Forced-air Warming and Surgical Site Infections**
- **Timing Is Everything**

Nurse Staffing Composition and Patient Mortality

We've done lots of columns on the impact of nursing staffing levels on patient mortality and other quality outcomes (see list below). A new study from the UK confirms that better nurse staffing ratios are associated with lower inpatient mortality rates. But it also shows that the composition of that nursing staffing is important.

Zaranko et al. (Zaranko 2022) studied inpatient mortality and nursing staffing patterns at three NHS hospitals. On average, an extra 12-hour shift by an RN was associated with a reduction in the odds of a patient death of 9.6%. Moreover, an additional senior RN had 2.2 times the impact of an additional less senior RN. There was no association for healthcare support workers (HCSW's) or agency workers. The authors suggest that the lack of association for HCSW's and agency nurses indicates they are not effective substitutes for RN's who regularly work on the ward.

The authors note that this study is the first to show the differential impacts of RN's by seniority. They state that their results "demonstrate the value of ensuring and retaining an adequate number of regularly employed RN's, show the significant value of senior, more experienced nurses who provide team leadership and, ultimately, highlight areas to target when mobilizing extra resources."

Retention of nurses is an important goal for all healthcare organizations. We put considerable resources into the training of our nurses and then sometimes lose them to other organizations that offer them better pay or better working environments. It is important for hospital administrators to recognize the "return on investment" in retaining our nurses. Particularly during this era where we predict an impending nationwide

shortage of nurses, we need to focus on improving working conditions for our nurses to prevent burnout.

Some of our other columns on nursing workload and missed nursing care/care left undone:

November 26, 2013	"Missed Care: New Opportunities?"
May 9, 2017	"Missed Nursing Care and Mortality Risk"
March 6, 2018	"Nurse Workload and Mortality"
May 29, 2018	"More on Nursing Workload and Patient Safety"
October 2018	"Nurse Staffing Legislative Efforts"
February 2019	"Nurse Staffing, Workload, Missed Care, Mortality"
July 2019	"HAI's and Nurse Staffing"
September 1, 2020	"NY State and Nurse Staffing Issues"
February 9, 2021	"Nursing Burnout"
August 2021	"The New NY State Law on Nursing Staffing"
January 2022	"Another Striking Nurse Staffing Study"

References:

Zaranko B, Sanford NJ, Kelly E, et. Nurse staffing and inpatient mortality in the English National Health Service: a retrospective longitudinal study. BMJ Quality & Safety 2022; Published Online First: 27 September 2022
https://qualitysafety.bmj.com/content/early/2022/09/27/bmjqs-2022-015291

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Reading Too Many Images

It might sound like stating the obvious. But a new study (Ivanovic 2022) from a large academic medical center showed that diagnostic errors on reading neuroradiology studies increased with increasing volume during shifts.

The researchers looked at attending physician errors in CT and MRI reports from their Neuroradiology Quality Assurance database for the years 2014-2020. The found 654 reports with diagnostic errors. There was a significant difference between mean volume of interpreted studies on shifts when an error was made compared with shifts in which no error was documented (46.58 vs 34.09). 59.6% of errors occurred in the emergency or inpatient setting. 84% were "perceptual" errors (where a finding was missed), as opposed to "interpretive" errors (where an abnormality was identified but misinterpreted). Moreover, 91.1% of the errors were clinically significant.

Errors were detected most often on brain MRI (25.4%), head CT (18.7%), head/neck CTA (13.8%), and spine MRI (13.7%). Categories of errors were: vascular 25.8%, brain 23.4%, skull base 13.8%, spine 12.4%, head/neck 11.3%, fractures 10.2%, other 3.1%.

The authors conclude there is a need for national guidelines establishing a range of what is a safe number of interpreted cross-sectional studies per day. They note that it would be useful to understand how factors like shift length, interruptions, staffing levels, etc. contribute to higher error rates. They also question how cognitive biases contribute to these errors.

References:

Ivanovic V, Paydar A, Chang Y-M, et al. Impact of Shift Volume on Neuroradiology Diagnostic Errors at a Large Tertiary Academic Center. Academic Radiology 2022; Published September 27, 2022
https://www.academicradiology.org/article/S1076-6332(22)00490-1/fulltext

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Forced-air Warming and Surgical Site Infections

We've done many columns on how opening OR doors affects airflow and can potentially lead to surgical site infections (SSI's). But how about an internal disturbance in air flow? Forced-air warming is commonly utilized in many surgical procedures. Hypothermia is a known risk factor for SSI's in several types of surgical procedure, so we use forced-air

warming to maintain normothermia. A recent study, however, has raised a potential unintended consequence of use of forced-air warming (FAW) devices.

Lange (Lange 2021) noted a study conducted in 2018 revealed that FAW contamination occurs more than expected in the surgical environment. The study demonstrated that 42.5 percent of the 320 samples collected were higher than the minimum accepted pathogen levels. His subsequent retrospective review of surgical cases suggested that the risk for SSI's is present when FAW is used.

He discussed the findings in an interview with Anesthesiology News (Kronemyer 2022). In that it was noted that "Raising awareness that FAW systems lead to increased risk for contamination should encourage surgical departments to review their disinfection protocols and to identify alternative devices for patient warming, such as blankets, fluid-warming devices and conductive-fiber warming blankets."

The numbers in the Lange study were small and this was not a randomized controlled trial, so we consider the this to be a pilot finding. And a systematic review in 2018 (Ackermann 2018) found no robust evidence to support that FAW can increase SSI's.

Nevertheless, we agree that increased surveillance for SSI's when FAW is used makes sense and attention should be given to disinfection protocols for such devise.

Of course, the other significant unintended consequence of forced-air warming is the potential for burns (Augustine 2002, Chung 2012, Mehta 2013). We also discussed such thermal injuries in several of our prior columns on iatrogenic burns, including our Patient Safety Tips of the Week for December 23, 2014 "Iatrogenic Burns in the News Again" and May 3, 2022 "Iatrogenic Burns Again". Proper use of the devices is essential.

Our prior columns on iatrogenic burns:

- March 2009 "Risk of Burns during MRI Scans from Transdermal Drug Patches"
- June 1, 2010 "Iatrogenic Burns"
- October 5, 2010 "More Iatrogenic Burns"
- December 23, 2014 "Iatrogenic Burns in the News Again"
- March 2015 "Another Source of Iatrogenic Burns"
- September 5, 2017 "Another Iatrogenic Burn"
- June 5, 2018 "Pennsylvania Patient Safety Authority on Iatrogenic Burns"
- July 28, 2020 "Electrosurgical Safety"
- January 2021 "New MRI Risk: Face Masks"
- May 3, 2022 "Iatrogenic Burns Again"

References:

Lange VR. Forced air contamination risk in the OR. Ann Med Surg (Lond). 2021 Nov 6; 73: 102976
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Kronemyer B. Forced-Air Warming Systems Linked to Increased Risk For Surgical Site Infections. Anesthesiology News 2022; September 22, 2022
https://www.anesthesiologynews.com/Medical-Monitor/Article/09-22/Forced-Air-Warming-Systems-Linked-to-Increased-Risk-For-Surgical-Site-Infections/67879

Ackermann W, Fan Q, Parekh AJ, et al. Forced-Air Warming and Resistive Heating Devices. Updated Perspectives on Safety and Surgical Site Infections. Frontiers in Surgery 2018;
https://www.frontiersin.org/articles/10.3389/fsurg.2018.00064/full

Augustine S. Misuse of Forced-Air Warming Devices Causes Burns. APSF Newsletter 2002; 17(1):
https://www.apsf.org/article/misuse-of-forced-air-warming-devices-causes-burns/

Chung K, Lee S, Oh SC, Choi J, Cho HS. Thermal burn injury associated with a forced-air warming device. Korean J Anesthesiol 2012; 62(4): 391-392
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3337390/

Mehta SP. Burn Injuries From Warming Devices in the Operating Room. ASA Newsletter 2013; 77(2): 16-17
https://pubs.asahq.org/monitor/article-abstract/77/2/16/5162/Burn-Injuries-From-Warming-Devices-in-the?redirectedFrom=fulltext

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Timing Is Everything

We've done lots of columns on the effect of time of day on your surgery and impact of day of the week on patient outcomes. But another important example was just published.

Diestre and colleagues (Diestre 2022) reported on "**The Friday Effect**". They found that safety alerts issued by health regulators about new drug-related side effects are not equally effective. Safety alerts announced on Fridays are less broadly diffused: they are shared 34% less on social media, mentioned in 23% to 66% fewer news articles, and are 12% to 51% less likely to receive any news coverage at all. They found that moving a Friday alert to any other weekday would reduce all drug-related side effects by 9% to 12%, serious drug-related complications by 6% to 15%, and drug-related deaths by 22% to 36%.

They note that this problem is particularly important because Friday was the most frequent weekday for safety alert announcements from 1999 to 2016. And that is probably not a random phenomenon. They go on to show that firms that lobbied the U.S. Food and Drug Administration in the past are 49% to 56% more likely to have safety alerts announced on Fridays. For companies that did not lobby the FDA, alerts were more evenly spread throughout the work week, with Thursdays equally as likely as Fridays, and Tuesdays and Wednesdays close behind.

Sound familiar? Politicians typically release bad news on Friday evenings, knowing it will get less attention over the weekend and might disappear from the news cycle. Sounds like Big Pharma has the same media consultants!

Some of our previous columns on the "weekend effect":

- February 26, 2008 "Nightmares….The Hospital at Night"
- December 15, 2009 "The Weekend Effect"
- July 20, 2010 "More on the Weekend Effect/After-Hours Effect"
- October 2008 "Hospital at Night Project"
- September 2009 "After-Hours Surgery – Is There a Downside?"
- December 21, 2010 "More Bad News About Off-Hours Care"
- June 2011 "Another Study on Dangers of Weekend Admissions"
- September 2011 "Add COPD to Perilous Weekends"
- August 2012 "More on the Weekend Effect"
- June 2013 "Oh No! Not Fridays Too!"
- November 2013 "The Weekend Effect: Not One Simple Answer"
- August 2014 "The Weekend Effect in Pediatric Surgery"
- October 2014 "What Time of Day Do You Want Your Surgery?"
- December 2014 "Another Procedure to Avoid Late in the Day or on Weekends"
- January 2015 "Emergency Surgery Also Very Costly"
- May 2015 "HAC's and the Weekend Effect"
- August 2015 "More Stats on the Weekend Effect"
- September 2015 "Surgery Previous Night Does Not Impact Attending Surgeon Next Day"
- February 23, 2016 "Weekend Effect Solutions?"

- June 2016 "Weekend Effect Challenged"
- October 4, 2016 "More on After-Hours Surgery"
- July 25, 2017 "Can We Influence the "Weekend Effect"?"
- August 15, 2017 "Delayed Emergency Surgery and Mortality Risk"
- September 2020 "Care Processes and the Weekend Effect"
- October 13, 2020 "Night-Time Surgery"
- December 15, 2020 "Our Perennial Pre-Holiday Warning: "Be Careful Out There!""
- May 2022 "Another Weekend Effect Phenomenon"

Some of our previous columns on "after-hours" surgery:

- September 2009 "After-Hours Surgery – Is There a Downside?"
- October 2014 "What Time of Day Do You Want Your Surgery?"
- January 2015 "Emergency Surgery Also Very Costly"
- September 2015 "Surgery Previous Night Does Not Impact Attending Surgeon Next Day"
- October 4, 2016 "More on After-Hours Surgery"
- August 15, 2017 "Delayed Emergency Surgery and Mortality Risk"
- October 24, 2017 "Neurosurgery and Time of Day"
- December 2019 "Surgeon On-Call Shifts"
- October 13, 2020 "Night-Time Surgery"

References:

Diestre L, Barber B, Santaló J. The Friday Effect: Firm Lobbying, the Timing of Drug Safety Alerts, and Drug Side Effects. Management Science 2020; 66(8): 3677-3698 https://pubsonline.informs.org/doi/10.1287/mnsc.2019.3386

Print "November 2022 Timing Is Everything"

Print "November 2022 What's New in the Patient Safety World (full column)"
Print "November 2022 Nurse Staffing Composition and Patient Mortality"
Print "November 2022 Reading Too Many Images"
Print "November 2022 Forced-air Warming and Surgical Site Infections"
Print "November 2022 Timing Is Everything"

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Home

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