

Patient Safety Tip of the Week

February 13, 2018 Interruptions in the ED

Our March 8, 2011 Patient Safety Tip of the Week “[Yes, Physicians Get Interrupted Too!](#)” included reference to several studies addressing the impact of interruptions and distractions on emergency physicians. Those showed that ED physicians are interrupted more often than primary care physicians ([Chisholm 2001](#)) and that interruptions occur more often during certain activities than others ([Jeanmonod 2010](#)).

Chisholm and colleagues ([Chisholm 2011](#)) found that emergency physicians in academic sites experienced a median of 12 interruptions per 2-hour observation period and those at community sites a median of 6 interruptions per period. Of the interruptions, almost half resulted in breaks in task. These are interruptions that result in changing tasks. The authors note that both the times spent in direct and indirect patient care and the frequency of interruptions have changed little since they did similar surveys a decade ago ([Chisholm 2000](#)). That previous work had also shown that both the number of interruptions and breaks in task increased with the average number of patients being managed simultaneously.

Another study of emergency physicians ([Friedman 2005](#)) showed emergency physicians at Toronto General Hospital were interrupted every 13.8 minutes on average (4.4 interruptions per hour) and that the rate of interruptions increased with increasing shift intensity. Half the interruptions were from nurses and a third from other physicians. While most interruptions did not require the physician to move to a new location, about 10% did require a move.

In an Australian study ([Westbrook 2010](#)) emergency department physicians were interrupted 6.6 times/h. 11% of all tasks were interrupted, 3.3% more than once. Doctors multitasked for 12.8% of time. The mean TOT (time on task) was 1:26 min. Interruptions were associated with a significant increase in TOT. However, when length-biased sampling was accounted for, interrupted tasks were unexpectedly completed in a shorter time than uninterrupted tasks. Doctors failed to return to 18.5% of interrupted tasks.

Another study ([Jeanmonod 2010](#)) showed that emergency physicians are interrupted more often in certain activities than others. For example, they were interrupted during charting or reviewing data about 50% of the time. Bedside interruptions were less common (26%) but had a negative impact on patient satisfaction. The majority of interruptions were initiated by another physician or nurse. Unlike the above studies, these authors found physicians rarely changed tasks after an interruption.

Breaks in task are especially important because one may never return appropriately to the previous task. Even when using checklists (whether in healthcare or aviation or other

industry) breaks in task may result in steps of a sequence being skipped or overlooked. That is one of the reasons that during critical activities pilots use the “sterile cockpit” concept and nurses or pharmacists use a similar concept wherein they flag themselves in some manner to prevent interruptions.

In the Westbrook study, 11% of tasks were interrupted (and 3.5% were interrupted more than once). The total time for tasks increased with interruptions. But, interestingly, when the authors corrected for a length of time of observation bias, they found that interrupted tasks were actually completed in shorter times! They speculated that physicians may be “catching up for lost time”. We would anticipate that such shortened duration tasks, rather than being examples of improved efficiency, might actually be especially prone to errors and omissions.

Another new study from Johanna Westbrook and colleagues in Australia looked at the impact of several factors on performance of emergency department physicians ([Westbrook 2018](#)). The researchers shadowed 36 emergency physicians over 120 hours. All tasks, interruptions and instances of multitasking were recorded. The task assessed for errors was physician prescribing (assessed by a pharmacist, unaware of physician status, reviewing all medication orders entered by physicians during the study period).

Medication orders were assessed for legal/procedural errors (eg, unapproved abbreviations, missing drug units) and clinical errors (eg, wrong drug due to a drug–disease interaction). Physicians’ working memory capacity (WMC) was measured via the OSPAN test. “Polychronicity” (ie, preference for multitasking and a belief that this is efficient) was assessed using the adapted version of the Inventory of Polychronic Values (IPVs).

They found that physicians experienced 7.9 interruptions/hour on average but while prescribing clinicians experienced 9.4 interruptions/hour. Those rates are comparable to those demonstrated in previous studies of ED physicians.

It’s no surprise: **error rates increased almost three-fold when physicians were interrupted** while prescribing (RR 2.82). But multitasking was also clearly related to more frequent errors (RR 1.86).

As you’d expect, **lack of sleep** was associated with more frequent prescribing errors. But the magnitude of the increase was eye-opening. Having below-average sleep in the previous 24 hours was associated with a **>15-fold increase in clinical error rate** (RR 16.44). Our focus today is on the impact of interruptions rather than fatigue but we’ve listed our numerous columns on fatigue in healthcare at the end of today’s column.

Error rates also increased with each year of patient age (RR 1.05) and physician age (RR 1.07). The implication is that increasing age is associated with decreasing working memory capacity (WMC), as other studies have shown WMC to decrease with increasing age. Other studies have also shown that individuals with lower WMC scores may exhibit increased task times and more errors when interrupted. Physicians’ working memory

capacity (WMC) in this study was protective against errors; for every 10-point increase on the 75-point OSPAN, a 19% decrease in prescribing errors was observed.

But clinical error rates were inversely related to doctor seniority with residents having the highest error rate relative to consultants. There was no effect of polychronicity, workload, physician gender or above-average sleep on error rates.

Multitasking merits specific comment. We often pride ourselves in our ability to multitask. But you've often heard us say that such pride is probably misplaced. Indeed, in the Westbrook study multitasking was related to an almost 2-fold increase in errors (RR 1.86). Interestingly, though, multitasking was significantly associated with legal/procedural errors (eg, unapproved abbreviations, missing drug units), but not clinical errors (eg, wrong drug due to a drug-disease interaction).

The Westbrook study demonstrated that the medication prescribing process is particularly prone to errors when interruptions occur and drew the analogy to nursing, where the medication administration process is also prone to errors when interruptions occur.

Keep in mind that **not all interruptions are detrimental** and many are necessary. Particularly in an ED setting, where physicians are caring for multiple patients at a time, an interruption may be critical to alert a physician to an urgent need for one of those patients. We've also stated before that, in such healthcare settings, focusing on just one outcome parameter (such as prescribing errors) may not accurately reflect the "big picture". For example, if physicians were to focus on prescribing to the detriment of maintaining situational awareness for all their patients, the prescribing error rate might decline while the overall adverse event rate goes up.

So what are we to do? We doubt anyone is likely to increase their working memory capacity (regardless of all those TV commercials you see to take product X to improve your brain function!). You might be able to impact the fatigue factor through judicious scheduling practices (and even some of the practices such as "power naps" that we've described in our many columns on the 12-hour shift for nurses). So we're left largely with focusing on interruptions. Westbrook and colleagues admit that "blanket interventions aimed at reducing all interruptions are likely to be ineffective, inefficient and at times unsafe." But they do recommend the following "targeted" interventions:

- limiting unnecessary interruptions through greater training about their potential effects
- identifying reasons, and reducing the need, for interruptions, for example, by making required information easily available
- redesigning work spaces to allow clinicians to perform more demanding cognitive tasks in areas less open to interruption
- introducing tools, including information technology, which can provide cues to allow more effective recovery from interruptions

They also note that the application of cognitive systems engineering to ED information systems shows promise.

And, lest we forget, we physicians are also probably the most frequent cause for interruptions to other healthcare professionals, particularly nurses.

Prior Patient Safety Tips of the Week dealing with interruptions and distractions:

- August 25, 2009 [“Interruptions, Distractions, Inattention...Oops!”](#)
- November 3, 2009 [“Medication Safety: Frontline to the Rescue Again!”](#)
- December 15, 2009 [“The Weekend Effect”](#)
- May 4, 2010 [“More on the Impact of Interruptions”](#)
- October 12, 2010 [“Slowing Down in the OR”](#)
- March 8, 2011 [“Yes, Physicians Get Interrupted Too!”](#)
- July 31, 2012 [“Surgical Case Duration and Miscommunications”](#)
- August 28, 2012 [“New Care Model Copes with Interruptions Better”](#)
- November 27, 2012 [“Dealing with Distractions”](#)
- April 16, 2013 [“Distracted While Texting”](#)
- May 21, 2013 [“Perioperative Distractions”](#)
- July 1, 2014 [“Interruptions and Radiologists”](#)
- November 2014 [“More Radiologist Interruptions”](#)
- March 17, 2015 [“Distractions in the OR”](#)
- July 21, 2015 [“Avoiding Distractions in the OR”](#)
- August 30, 2016 [“Can You Really Limit Interruptions?”](#)
- November 8, 2016 [“Managing Distractions and Interruptions”](#)
- March 7, 2017 [“Nested Interruptions”](#)
- April 11, 2017 [“Interruptions: The Ones We Forget About”](#)

Some of our other columns on the role of fatigue in Patient Safety:

- November 9, 2010 [“12-Hour Nursing Shifts and Patient Safety”](#)
- April 26, 2011 [“Sleeping Air Traffic Controllers: What About Healthcare?”](#)
- February 2011 [“Update on 12-hour Nursing Shifts”](#)
- September 2011 [“Shiftwork and Patient Safety”](#)
- November 2011 [“Restricted Housestaff Work Hours and Patient Handoffs”](#)
- January 2012 [“Joint Commission Sentinel Event Alert: Healthcare Worker Fatigue and Patient Safety”](#)
- January 3, 2012 [“Unintended Consequences of Restricted Housestaff Hours”](#)
- June 2012 [“June 2012 Surgeon Fatigue”](#)
- November 2012 [“The Mid-Day Nap”](#)
- November 13, 2012 [“The 12-Hour Nursing Shift: More Downsides”](#)

July 29, 2014	“The 12-Hour Nursing Shift: Debate Continues”
October 2014	“Another Rap on the 12-Hour Nursing Shift”
December 2, 2014	“ANA Position Statement on Nurse Fatigue”
August 2015	“Surgical Resident Duty Reform and Postoperative Outcomes”
September 2015	“Surgery Previous Night Does Not Impact Attending Surgeon Next Day”
September 6, 2016	“Napping Debate Rekindled”
April 18, 2017	“Alarm Response and Nurse Shift Duration”
July 11, 2017	“The 12-Hour Shift Takes More Hits”

Some of our other columns on housestaff workhour restrictions:

December 2008	“IOM Report on Resident Work Hours”
February 26, 2008	“Nightmares: The Hospital at Night”
January 2010	“Joint Commission Sentinel Event Alert: Healthcare Worker Fatigue and Patient Safety”
January 2011	“No Improvement in Patient Safety: Why Not?”
November 2011	“Restricted Housestaff Work Hours and Patient Handoffs”
January 3, 2012	“Unintended Consequences of Restricted Housestaff Hours”
June 2012	“Surgeon Fatigue”
November 2012	“The Mid-Day Nap”
December 10, 2013	“Better Handoffs, Better Results”
April 22, 2014	“Impact of Resident Workhour Restrictions”
January 2015	“More Data on Effect of Resident Workhour Restrictions”
August 2015	“Surgical Resident Duty Reform and Postoperative Outcomes”
September 2015	“Surgery Previous Night Does Not Impact Attending Surgeon Next Day”
March 2016	“Does the Surgical Resident Hours Study Answer Anything?”

Our previous columns on the 12-hour nursing shift:

November 9, 2010	“12-Hour Nursing Shifts and Patient Safety”
February 2011	“Update on 12-hour Nursing Shifts”
November 13, 2012	“The 12-Hour Nursing Shift: More Downsides”
July 29, 2014	“The 12-Hour Nursing Shift: Debate Continues”
October 2014	“Another Rap on the 12-Hour Nursing Shift”
December 2, 2014	“ANA Position Statement on Nurse Fatigue”
September 29, 2015	“More on the 12-Hour Nursing Shift”
July 11, 2017	“The 12-Hour Shift Takes More Hits”

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