

## Patient Safety Tip of the Week

November 18, 2014

# Handwashing Fades at End of Shift

## ?Smartwatch to the Rescue

We've done a lot of columns on procedures done less well at the end of the day or end of the shift. Now a new study shows that **compliance with handwashing also fades late in the day or toward the end of a shift**. Dai and colleagues ([Dai 2014](#)) monitored handwashing by using RFID technology to determine how often and how soon healthcare workers washed their hands after entering or leaving patient rooms. Analyzing data over a 3-year period, they found that handwashing rates dropped 8.7% from the beginning to the end of a 12-hour shift. The decline was also magnified by increased work intensity and increased as individuals accumulated more total work hours the preceding week.

So are there solutions to the handwashing problem? Intermountain Healthcare may have a technological solution to this problem: the smartwatch ([Terry 2014](#)). The watch has a color-based alarm that triggers as the healthcare worker changes rooms. If the worker moves to another room it changes from green to either red or yellow to alert the worker he/she needs to wash his/her hands. Use of the watch has been associated with a reduction in infections. Commentaries from representatives of The Advisory Board and the Institute for Healthcare Improvement note that there are multiple other technological devices doing similar alerts but that there still is a need for accountability. The smartwatch and other technologies also send data back to managers so not only are there real-time reminders to wash hands but managers and medical directors can use the aggregate data for discussion with each individual healthcare worker.

**Poor performance later in the day** has now been noted **for many procedures**. In October 2014 we noted problems with laparoscopic cholecystectomies done after hours (“[What Time of Day Do You Want Your Surgery?](#)”) and in September 2009 we noted many orthopedic procedures that were problematic after-hours (September 2009 “[After-Hours Surgery – Is There a Downside?](#)”). In an upcoming column (“[Another Procedure to Avoid Late in the Day or on Weekends](#)”) we note that implantable cardioverter-defibrillator (ICD) recipients implanted in the afternoon/evening and on weekends or holidays more often experienced adverse events. We've also previously noted that the

rate of incomplete colonoscopies increases late in the day and fewer adenomas are detected with colonoscopies later in the day (see our May 3, 2011 Patient Safety Tip of the Week "[It's All in the Timing](#)"). And in our July 31, 2012 Patient Safety Tip of the Week "[Surgical Case Duration and Miscommunications](#)" we noted in a study of simulated surgery ([Feuerbacher 2012](#)) that residents made more errors when distracted or interrupted but all the errors occurred after 1 PM. A similar phenomenon has been reported in radiology. One study ([Krupinski 2010](#)) showed a significant reduction in diagnostic accuracy of radiologists after a day of clinical reading (average 8 hours), as measured by reduced ability to detect fractures.

So should it really come as a surprise to you that handwashing rates fall off later in the shift?

Is it fatigue that is responsible for deterioration in performance later in the day? That's the most obvious factor. Fatigue clearly impairs cognitive processes and may lead to errors (see all our previous columns on the impact of fatigue listed at the end of today's column). But there are other issues that might be involved. In fact, in the study by Feuerbacher ([Feuerbacher 2012](#)) fatigue was measured by several parameters and did not appear to be the primary issue.

Trying to get everything done in a condensed time period is probably one of the biggest contributing factors. When tasks are compressed into a shortened time period we have to prioritize them. While we like to think we always prioritize the most important ones first, that's not always the case. In our November 26, 2013 Patient Safety Tip of the Week "[Missed Care Opportunities](#)" we noted that tasks which have the most immediate consequences tend to get top priority and ones that have delayed consequences are often deferred or omitted. Handwashing is an activity in which the adverse consequences (infection, etc.) are typically delayed so it's not surprising it may get lower priorities.

Think about yourself near the end of a day or shift at work. You may be quite alert and not fatigued but lots of other things begin to pop into your consciousness and compete with your tasks at hand. You may be thinking about all the things you still need to do today before you leave. Or getting ready for tomorrow morning's meeting. Or what you are going to do once you get home tonight. Or packing for your weekend trip.

Hunger also can be distracting. Watch your audience the next time you give an 11AM lecture!

And though it's unlikely to contribute to the handwashing issue, **monotony** may contribute to some of the late-in-the-day or end-of-shift errors. In our May 3, 2011 Patient Safety Tip of the Week "[It's All in the Timing](#)" we noted that fewer abnormalities are found by pathologists or cytology techs looking at slides for long periods (hence the interest in automated procedures to screen specimens for abnormalities). Nurses or technicians monitoring telemetry screens are also less likely to detect abnormalities when watching monitors for long periods. Errors related to monotony have been seen in other

industries such as trucking, banking, inspecting goods, measuring parts, lifeguard surveillance, railway transportation, etc.

So what are the take-home lessons from all this? First, there is obvious utility in looking at various outcome measures not just in the aggregate but also by time of day (and maybe day of the week as well). Developing flexible scheduling for surgeries and procedures may reduce the late-in-the-day add-on cases. Limiting the workload in some circumstances may make sense. The colonoscopy issue was addressed by imposing a cap of 3-hours per session for individual colonoscopists. Breaking up routines can address the issue of monotony in a whole variety of processes.

Unfortunately, none of these really help the handwashing issue. Maybe that smartwatch really is the one thing that will make me take 15 seconds to wash my hands. Uh-oh! That smart sink the hospital installed just let me know that 15 seconds is not long enough for handwashing!

**Some of our previous columns on the “weekend” and “after hours” effects:**

- 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](#)”
- May 3, 2011 “[It’s All in the Timing](#)”
- 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](#)”

**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 2010           “[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](#)”

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