UNITED STATES OF AMERICA
BEFORE THE NATIONAL LABOR RELATIONS BOARD

CAESARS ENTERTAINMENT CORPORATION d/b/a RIO ALL-SUITES HOTEL AND CASINO and INTERNATIONAL UNION OF PAINTERS AND ALLIED TRADES, DISTRICT COUNCIL 15, LOCAL 159, AFL-CIO	)	Case 28-CA-060841

BRIEF OF *AMICI CURIAE* AMERICAN HOSPITAL ASSOCIATION AND FEDERATION OF AMERICAN HOSPITALS IN SUPPORT OF RESPONDENT

F. Curt Kirschner, Jr.
JONES DAY
555 California Street, 26th Floor
San Francisco, CA 94104
Telephone: (415) 626-3939
Facsimile: (415) 875-5700

Joanne R. Bush
JONES DAY
717 Texas, Suite 3300
Houston, TX 77002
Telephone: (832) 239-3939
Facsimile: (832) 239-3600

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In response to the Board's Notice and Invitation to File Briefs dated August 1, 2018, the American Hospital Association ("AHA") and the Federation of American Hospitals ("FAH") respectfully submit this brief as *amici curiae* in support of Respondent.

STATEMENT OF INTEREST

The AHA is a national not-for-profit association that represents the interests of more than 5,000 hospitals, health care systems, networks, and other health care providers, as well as 43,000 individual members. It is the largest organization representing the interests of the Nation's hospitals. The members of the AHA are committed to finding innovative and effective ways of improving the health of the communities they serve. The AHA educates its members on health care issues and trends, and it advocates on their behalf in legislative, regulatory, and judicial fora to ensure that their perspectives and needs are understood and addressed.

The FAH is the national representative of more than 1,000 investor-owned or managed community hospitals and health systems throughout the United States. Members include teaching and non-teaching hospitals in urban and rural parts of America, as well as inpatient rehabilitation, psychiatric, long-term acute care, and cancer hospitals. Dedicated to a market-based philosophy, the Federation provides representation and advocacy on behalf of its members to Congress, the Executive Branch, the judiciary, media, academia, accrediting organizations, and the public.

Most of the hospitals that belong to the AHA and the FAH are employers subject to the National Labor Relations Act (the "Act"). Many member hospitals interact frequently with organized labor, in circumstances that range from long-standing collective bargaining relationships to initial organizing campaigns.

The AHA, the FAH (together, the "*Amici*"), and their members share the same general interest that all employers have in protecting their property rights, but hospitals also have a special concern with legal developments that may interfere with the delivery of patient care or may result

in disruptions in the workplace. The mission of hospitals is to provide quality patient care at the highest level and in the most efficient manner. In addition, hospitals are focused on fostering a tranquil environment that promotes healing by patients. Disruptions to that tranquility affect patients and may upset the patients' families and visitors. Thus, America's hospitals are especially interested in the Board's interpretations of the Act that may require hospitals to open up patient care-focused communication platforms to non-patient care uses that could result in increased disruptions in the workplace.

SUMMARY OF ARGUMENT

The *Amici* strongly support the return to the *Register Guard,* 351 NLRB 1110 (2007), standard for accessing employer-provided email systems and applying that standard to all employer-owned communication systems. *Register Guard* adequately protects employee Section 7 rights and is consistent with the Board's longstanding rules regarding employee use of employer property. Under *Register Guard*, an employer is permitted to limit employee use of employer-provided work email systems unless the employer engages in "disparate treatment of activities or communications of a similar character because of their union or other Section 7-protected status." *Id*. at 1119. Thus, an employer would not be prohibited "from drawing lines on a non-Section 7 basis" that regulate access by employees. *Id*. at 1118. *Purple Communications*, 361 NLRB 1050 (2014), on the other hand, upended this framework and was wrongly decided for the reasons discussed in the *amici curiae* brief of the Coalition for a Democratic Workforce and the Retail Industry Leaders Association.[1] The AHA and the FAH joins those *amici* briefs and will not repeat those arguments here.

[1] The *amici curiae* brief of the Coalition for a Democratic Workforce and the Retail Industry Leaders Association is filed with the Chamber of Commerce of the United States of America, the Independent Electrical Contractors, Inc., the International Foodservice Distributors Association, the National Association of Wholesaler-Distributors, the National Retail Federation, the

The AHA and the FAH write separately to underscore the unique issues and concerns that these decisions implicate in America's hospitals. More than forty years ago, the Board and the Supreme Court recognized that a hospital's critical mission allows it to prohibit solicitation and distribution in patient care areas. The *Purple Communications* standard, as the Board has applied it in health care, *UPMC*, 362 NLRB No. 191 (2015), essentially nullifies these special considerations in a hospital setting. The *Purple Communications* standard applied in a hospital setting disregards employees' alternative means of communication – contrary to Supreme Court precedent – and also creates an unjustified and unnecessary extra burden on hospitals to conclusively prove that employees' use of hospital email for Section 7 communications will have a "significant" impact on patient care. For these reasons and more, the AHA and the FAH wholeheartedly support a return to the *Register Guard* standard.

The AHA and the FAH also write in response to Question #4 in the Board's Notice and Invitation to File Briefs in this case, specifically with respect to electronic communication systems used in America's hospitals for patient care.[2] Hospital electronic communication systems include a broad range of tools from email to platforms that transmit electronic health records to systems that allow electronic ordering of tests and medication. Regardless of the particular form, hospital electronic communication systems share a common function: promoting efficient communication to advance the delivery of patient care.

Restaurant Law Center, the American Hotel & Lodging Association, and Associated Builders and Contractors.

[2] Question No. 4 states, "The policy at issue in this case applies to employees' use of the Respondent's '[c]omputer resources.' Until now, the Board has limited its holdings to employer email systems. Should the Board apply a different standard to the use of computer resources other than email? If so, what should that standard be? Or should it apply whatever standard the Board adopts for the use of employer email systems to other types of electronic communications (*e.g.*, instant messages, texts, postings on social media) when made by employees using employer-owned equipment?"

Like with email, allowing employees to use hospital electronic communication systems for Section 7 communications during nonwork time in non-patient care areas is tantamount to allowing it in patient care areas, interfering with hospitals' fundamental purpose of delivering patient care and contradicting Supreme Court authority. It also would create an increased risk that protected health information will be inadvertently disclosed, a risk that federal and state laws mandating protection of such information do not permit. Accordingly, in addition to the arguments set forth in the *amici curiae* brief of the Coalition for a Democratic Workforce and the Retail Industry Leaders Association that the *Register Guard* standard should be extended to all employer-owned electronic communication systems, that standard is particularly important with respect to the electronic communication systems used for patient care.

To the extent the Board adopts a new standard, the Board should respect the longstanding precedent that establishes the "unique considerations [for hospitals] that do not apply in the industrial settings." *Beth Israel Hosp. v. N.L.R.B.*, 437 U.S. 483, 508 (1978). As the Supreme Court advised long ago: "In discharging its responsibility for administration of the Act, the Board must frame its rules and administer them with careful attention to the wide variety of activities within the modern hospital." *N.L.R.B. v. Baptist Hosp.*, 442 U.S. 773, 789 fn. 16 (1979). It is imperative that any new standard does not create unnecessary risks to patient care and safety, thwart the development of critically important technological advances to the delivery of patient care, or threaten the confidentiality of protected health information that is maintained within hospital electronic communication systems.

ARGUMENT

Amici AHA and FAH join the arguments contained in the *amici curiae* brief of the Coalition for a Democratic Workforce and the Retail Industry Leaders Association that *Purple Communications* was wrongly decided, the Board should return to the *Register Guard* standard,

and the *Register Guard* standard should be extended to all employer-owned communication systems.

AHA and FAH write separately to highlight a significant point of concern for America's hospitals, *i.e.*, the need to protect the purpose, privacy, and functionality of the growing number of electronic communication systems used in hospitals that are designed to promote safe and effective patient care.

I. Electronic Communication Systems in Hospitals Are Key Drivers of High-Quality and Cost-Effective Patient Care.

Hospitals are adopting a broad range of electronic communication systems ("ECS") to improve the quality, safety, and efficiency of care delivered to patients. Within hospitals, email systems are used for more than relaying general work-related communications among employees. Subject to the restrictions of the Health Insurance Portability and Accountability Act of 1996 ("HIPAA")[3] and other privacy laws and regulations, caregivers use email for a variety of patient care-related purposes, such as alerting other caregivers about the status of a patient and communications with patients and their families.

[3] HIPAA requires that health care providers and their employees maintain reasonable safeguards when communicating electronically regarding PHI, 45 CFR § 164.530(c), including policies and procedures that restrict access to, protect the integrity of, and guard against unauthorized access to electronic health information. *See, e.g.*, 45 CFR § 164.312(a) (access control standards); 45 CFR § 164.312(c)(1) (integrity standards); 45 CFR § 164.312(e)(1) (transmission security standards). For example, the Office for Civil Rights of the Department of Health and Human Services has advised that "certain precautions may need to be taken when using e-mail to avoid unintentional disclosures, such as checking the e-mail address for accuracy before sending, or sending an e-mail alert to the patient for address confirmation prior to sending the message. Further, . . . other safeguards should be applied to reasonably protect privacy, such as limiting the amount or type of information disclosed through the unencrypted e-mail." *Does the HIPAA Privacy Rule permit health care providers to use e-mail to discuss health issues and treatment with their patients?,* The Off. for C.R. of the Dept. of Health and Hum. Servs. (Dec. 15, 2008), https://www.hhs.gov/hipaa/for-professionals/faq/570/does-hipaa-permit-health-care-providers-to-use-email-to-discuss-health-issues-with-patients/index.html.

In part due to the restrictions imposed by HIPAA, hospitals have adopted numerous other electronic communication systems that act as secure portals among caregivers related to the transmission of protected health information ("PHI"). For example, hospitals have implemented electronic health records ("EHRs"), which are real-time, patient-centered records that make information available instantly and securely to authorized users. With EHRs, health information can be created and managed in a digital format capable of being shared with other providers across more than one health care organization, such as laboratories, specialists, medical imaging facilities, pharmacies, emergency facilities, and school and workplace clinics.[4] EHR systems vary in functionality, with some providing for secure text messaging, social media style platforms, cloud-based technology, and/or access on a range of devices, including tablets and smartphones. EHR technology includes computerized provider order entry ("CPOE") programs through which caregivers order prescriptions, tests and procedures; portals that allow patients access to their health information; and tools that facilitate electronic communication between providers and their patients to, for instance, answer questions, deliver self-care instructions, and offer reminders for follow-up care.

Even beyond EHRs, other forms of ECS are transforming the delivery of health care within hospitals. For example, a wearable device – the Vocera Badge – allows for hands-free communication through a voice transmitter that can be worn around the user's neck.[5] Caregivers use the Vocera Badge to receive secure text messages, alarm and alert notifications, and scheduled

[4] Through the Office of the National Coordinator for Health Information Technology, the U.S. government promotes the development and implementation of such technology. The Off. of the Nat'l Coordinator for Health Info. Tech., https://www.healthit.gov (last visited Aug. 21, 2018).
[5] *See* https://www.vocera.com/product/vocera-badge (last visited Aug. 21, 2018).

reminders. Like a pager or overhead public address system, the Vocera Badge can reach the wearer anywhere in the hospital.

ECS in hospitals is essentially a virtual patient care area. Discussions among patients and caregivers that were traditionally only in person or by phone now may take place electronically; a nurse who manually pulled a patient record from a shelf and physically delivered it to a doctor 10 years ago now does it electronically through his or her hand-held device; and a provider who used to write prescriptions with a pen and paper now does it electronically through secure messaging or another technological tool. Patient care activities that traditionally took place only in a patient's room or at a nurses' station now occur through hospital electronic communication systems.

As with the growth of technology in other fields, it is virtually impossible to predict how technological advances in communication systems will affect patient care. It is all but certain, however, that this technology will continue to develop and transform the delivery of patient care, both within hospitals and in non-acute care settings. These innovations are essential to providing efficient and cost-effective health care, and hospitals should be encouraged to promote their development without fear that these communication tools will be usurped for non-patient care purposes.

II. Notwithstanding the Benefits of ECS in Hospitals, Unnecessary or Inappropriate Use Can Have Harmful Effects.

Numerous published articles and studies indicate that distractions and interruptions are a significant cause of medical errors. *See*, *e.g.*, Westbrook, J.I. et al., *Association of Interruptions with an Increased Risk and Severity of Mediation Administration Errors*, Archives of Internal Medicine, Vol. 170, No. 8, pp. 683-690, at 688 (2010) (concluding that "[t]he more interruptions nurses receive, the greater the number of errors."), attached as Appendix. Ex. A; Dumo, A.M.B, *Factors Affecting Medication Errors Among Staff Nurses: Basis in the Formulation of Medication*

Info. Guide, IAMURE Int'l. Journal. of Health Educ., Vol. 1, pp. 88-149, at 139 (2012) ("Distractions and interruptions can disrupt the clinician's focus, leading to serious mistakes"), attached as Appendix Ex. B.

The correlation of distractions and medical errors is not surprising. As one researcher noted, "[e]xperimental studies suggest that interruptions produce negative impacts on memory by requiring individuals to switch attention from one task to another. Returning to a disrupted task requires completion of the interrupting task and then regaining the context of the original task." Appx. Ex. A, Westbrook, *supra*, at 683.

Computers, email, and other electronic communication systems are one source of distraction in hospitals. The Pennsylvania Patient Safety Authority observed that:

> New technologies have increased the number and types of distractions present in [healthcare] settings. . . . Anything that diverts attention away from the primary task is a source of distraction. Sources of distraction can be broadly attributed to individuals (e.g., patients, family members) or to technology (e.g., medical equipment, computers, communication devices). "Distracted doctoring" is a term recently coined in the media to describe the interruptions to workflow caused by the introduction of new technological devices in the clinical setting. This has been elevated to new levels of concern within the healthcare community and the general public due to the widespread implementation of computerized provider order entry (CPOE) systems and electronic medical records, along with the growing use of cell phones and smartphones.

Feil, M., *Distractions and Their Impact on Patient Safety 2013*, Pennsylvania Patient Safety Advisory, Vol. 10, No. 1, pp. 1-10 at 1, 6 (2013), attached as Appendix Ex. C; *see also* Beyea, S.C., *Distractions, Interruptions, and Patient Safety*, AORN Journal, Vol. 86, No. 1, pp. 109-12 at 109 (2007) (common distractions and interruptions that occur in clinical environments include the computer signaling that new mail has arrived), attached as Appendix Ex. D.

The risk that use of ECS will cause medical errors is not speculative.[6] One study that reviewed reported incidents in Pennsylvania in 2010 and 2011 found 3.9% specifically identified distractions from phones, computers, or other technological devices as contributing to errors, while noting that the majority of reports did not even identify the source of the distraction. Appx. Ex. C, Feil, *supra*, at 2.

These risks have led to a discussion and further study within the medical community regarding strategies to reduce unnecessary interruptions. Appx. Ex. A, Westbrook, *supra*, at 688-89. Although it is not possible to eliminate all distractions and interruptions in a hospital environment, hospitals should be permitted to eliminate avoidable risks incurred by unnecessary, nonwork-related electronic communications.

Electronic communication systems certainly benefit patients by, for example, facilitating patient care coordination among practitioners. On the other hand, any system that allows electronic file sharing and communications regarding PHI comes with some risk of improper disclosure. Accordingly, federal and state laws require hospitals to take numerous steps to minimize that risk by adopting and implementing policies and procedures to protect PHI from any intentional or unintentional use or disclosure. *See, e.g.*, HIPAA Privacy Rule, 45 CFR § 164.530(c)(2)(i)(ii); Cal. Civ. Code § 56.101; Va. Code § 32.1-127.1:03. For instance, the

[6] For example, the Agency for Healthcare Research and Quality's WebM&M described an incident when a resident was interrupted by a text message from a friend while entering an order to discontinue a patient's warfarin (a blood thinner) on the hospital's order entry system through her smartphone. John Halamka, *Order Interrupted by Text: Multitasking Mishap*, Agency for Healthcare Research and Quality (2011), https://psnet.ahrq.gov/webmm/case/257/order-interrupted-by-text-multitasking-mishap. The resident got distracted and forgot to complete the stop order. The patient continued receiving warfarin for three more days, developing a hemopericardium (blood filling the sack around the heart) that required open heart surgery. While a personal text message caused the distraction in this case, the nonwork text message is a potent example of real harm that such communications can cause in the hospital setting and why it is imperative that hospitals restrict nonwork communications whenever possible.

federal HIPAA Privacy Rule requires that hospitals implement "appropriate administrative, technical, and physical safeguards to protect the privacy of [PHI]." 45 CFR § 164.530(c)(1). Hospitals must also keep disclosure, use and access to PHI to the "minimum necessary" to carry out a purpose permitted by the HIPAA Privacy Rule. 45 CFR §§ 164.502(b), 164.514(d). Thus, hospitals must restrict use of its electronic communication systems for patient care purposes to protect PHI.

III. Special Considerations Apply to Section 7 Activity in Hospitals.

As a threshold matter when evaluating the appropriate rules of access to ECS within hospitals, the *Amici* urge the Board to remain mindful of the special considerations that apply in a hospital setting due to its unique environment. For more than forty years, the U.S. Supreme Court, other federal courts, and the Board itself have recognized that hospitals have a compelling interest in providing patients and their visiting families and friends with a peaceful healing environment conducive to the delivery of high quality patient care. *See Beth Israel Hosp. v. NLRB*, 437 U.S. 483, 495 (1978) ("the primary function of a hospital is patient care" and "a tranquil atmosphere is essential to the carrying out of that function") (internal quotation omitted).

In *Beth Israel*, the Supreme Court concluded that hospitals' focus on patient care justifies a unique set of rules for employee solicitation and distribution policies in healthcare settings. *Id.* Under these rules, a hospital may ban *all* solicitation at *any time* in patient care areas – even employee-to-employee communications – because any solicitation or distribution in those areas is presumptively unsettling to patients. *Id*; s*ee also, e.g.*, *USC University Hosp.*, 358 NLRB 1205, 1222 (2012) ("A hospital's prohibition of the wearing of insignia . . . on working and even on nonworking time in immediate patient care areas is presumptively valid.") (quoting *Mesa Vista Hosp.*, 280 NLRB 298, 299 (1986)); *St. John's Health Center*, 357 NLRB 2078 (2011) ("[i]n healthcare facilities, … restrictions on wearing insignia in immediate patient care areas are

presumptively valid"); *Carney Hosp.*, 350 NLRB 627, 643 (2007) ("A hospital may prohibit solicitation and distribution at any time in immediate patient care areas (such as patients' rooms, operating rooms, X-ray areas, therapy areas), even during nonworking time.").

In other areas, a hospital may not ban solicitation and distribution during nonworking time in nonworking areas where it has not justified the restriction as necessary to "avoid disruption of health-care operations or disturbance of patients." *Beth Israel*, 437 U.S. at 507. The Court later explained that:

> Solicitation may disrupt patient care if it *interferes with the health-care activities of doctors, nurses, and staff, even though not conducted in the presence of patients*. And solicitation that does not impede the efforts of those charged with the responsibility of caring for patients nonetheless may disturb patients exposed to it.

Baptist Hosp., 442 U.S. at 781 fn 11 (emphasis added).

The Supreme Court has instructed the Board to consider the unique concerns that arise in a hospital setting. In *Beth Israel*, the Court warned that the "Board bears a heavy continuing responsibility to review its policies concerning organizational activities in various parts of hospitals. Hospitals carry on a public function of the utmost seriousness and importance. They give rise to unique considerations that do not apply in the industrial settings with which the Board is more familiar." *Beth Israel*, 437 U.S. at 508, quoted in *Baptist Hosp.*, 442 U.S. at 790.

The following year in *Baptist Hospital*, the Court directed the Board to "frame its rules and administer them with careful attention to the wide variety of activities within the modern hospital." 442 U.S. at 789-90 fn. 16. In particular, the "Board, in reviewing the scope and application of its presumption, should take into account that a modem hospital houses a complex array of facilities and techniques for patient care and therapy that defy simple classification." *Id.*

IV. The Board's Application of *Purple Communications* in a Hospital Setting Interferes With Hospitals' Fundamental Purpose, Conflicts with Supreme Court and Other Board Authority, and Demonstrates that Standard is Unworkable in Healthcare.

The Board's decision in *UPMC*, 362 NLRB No. 191 (2015), demonstrates that applying the *Purple Communications* standard in a hospital setting is unworkable. In that case, the Board found a hospital's policy that prohibited use of its electronic messaging systems to engage in solicitation was unlawful pursuant to *Purple Communications*. The Board held that the Respondent hospital's policy was presumptively invalid and, despite the hospital's submission of several studies that find distractions of hospital staff lead to medical errors and that electronic communications are a source of such distractions, that the hospital did not demonstrate there were "special circumstances" that justify its prohibition against using hospital electronic communication systems to engage in solicitation.

The *UPMC* decision – and applying the *Purple Communications* standard at a hospital generally – conflicts with Supreme Court and longstanding Board cases that establish the special rights of hospital employers in light of the unique considerations in a hospital setting. As discussed in Section III above, a hospital's prohibition of solicitation and distribution *at any time* in immediate patient care areas is presumptively lawful because such activities can be unsettling to patients, who need quiet and peace of mind.

The same concerns that the Supreme Court recognized in *Beth Israel* and *Baptist Hospital* apply to email solicitations that are received in patient care areas. The *potential* threat that union solicitation may disturb patients or negatively impact patient care is sufficient to support a ban on solicitation in immediate patient care areas. Similarly, solicitation in patient care areas can interfere with patient care even if not conducted in the presence of patients. *Baptist Hosp.*, 442 U.S. at 781 fn. 11 ("Solicitation may disrupt patient care if it interferes with the health-care activities of doctors, nurses, and staff, even though not conducted in the presence of patients.").

A ban on nonwork solicitations in patient care areas is lawful and necessary in an acute care environment. Section 7 communications are often emotionally charged and could divert the attention of working nurses who need to be focused on their patients' care. Furthermore, as discussed in Section II above, distractions and interruptions caused by electronic communications lead to medical errors. *See* Appx. Ex. C, Feil, *supra,* at 2 (identifying distractions from phones, computers, and other technological devices as contributing to medical errors); Appx. Ex. D, Beyea, *supra*, at 109 ("Common distractions and interruptions that occur in clinical environments include…the computer signaling that new mail has arrived.").

Faced with evidence that use of a hospital's email system during working time or in patient care areas is distracting and that such distractions cause medical errors, the Board majority offered two solutions: the hospital could fashion a policy that applies solely to working time or it could deny employees access to its email system altogether. *UPMC*, 362 NLRB No. 191, slip. op. at *4. Neither option is feasible.

The nature of email precludes a hospital from allowing employees to use its email to engage in Section 7 communications on nonwork time on one hand, while prohibiting solicitation and distribution in immediate patient care areas on the other.[7] The sender of an email cannot ensure that the recipient does not receive it during working time,[8] and a hospital cannot control when its

[7] The Board majority in *UPMC* ignored this critical point, and its response in *Purple Communications* to a similar point (361 NLRB at 1064 fn. 72) is inapposite because it does not address the unique issues that arise in a hospital setting. A hospital's concern with its employees reading nonwork emails during working time is not one of "productivity" (*id.*), but rather that it could disrupt and compromise its delivery of health services. The Board's suggestion in *Purple Communications* that "employers can monitor for misuse and reduced productivity" (*id.*) is wholly inadequate in a hospital setting where the consequence of inattention and distraction could be life threatening.

[8] Notably, the Hospital operates around-the-clock, effectively ensuring that an email sent to a work group or a distribution list, such as all RNs working in a particular patient care unit, is likely to be received by someone during their work time.

staff reads emails, nor does it want to. Indeed, staff that has been issued work email addresses is generally expected to read their work emails during each shift because any email could relate to a work matter. In short, because of the way email works, it is not feasible to allow employees to use hospital email for Section 7 communications during nonwork time outside of patient care areas while also prohibiting solicitation in immediate patient care areas.

The Board's second suggestion – that a hospital can address its concerns by denying employees access to its email system altogether (*UPMC*, slip. op. at *4) – is unreasonable and discounts the benefits of technological advances in modern health care. As explained in Section I above, hospitals use email and other forms of ECS to efficiently deliver information related to patient care. For instance, through such tools, a doctor in a remote location can give instructions to onsite staff, or a nurse working an overnight shift can respond to a patient's family member when she has time, even if it is in the middle of the night. Simply put, ECS allows caregivers to efficiently communicate with each other regarding patient care and also directly with patients, irrespective of their location or the time of day.

Put differently, the Board's decision in *UPMC* puts hospitals in a Catch-22; *UPMC* requires that hospitals choose between (1) the risk that receiving nonwork emails during working time and/or in patient care areas will cause otherwise preventable medical errors and (2) eliminating NLRA-covered employees access to hospital email completely and thus take steps backward in technological innovations that advance patient care.

The Board's conclusion that UPMC did not establish "special circumstances" justifying the ban on using UPMC's email system for solicitation (*UPMC*, slip op. at *3-4) is also troubling. Although "using a hospital's email system during working time may be distracting, and that when nurses and others responsible for patient care are distracted, errors may result that may affect

patient safety," *Id.*, slip op. at *4, the Board found that such concerns were merely "speculative contentions about possible harm" and thus the hospital did not make the required showing that the ban is necessary to avoid disruption of healthcare operations or disturbance of patients.[9] *Id*., slip op. at * 4 fn. 13. Declining to link Section 7 email communications with medical errors, the Board explained that even if "a fraction" of all medical mistakes were caused by Section 7 email communications, that is insufficient to have a "significant" effect on patient care to justify UPMC's limitation. *Id.* But this should not be the level of proof required in a hospital setting, where human lives are at risk.[10] Besides, whatever doubts there may be regarding the adverse effects of nonwork email communications on patient care should be resolved in favor of patient safety.

The Board's failure to consider employees' alternative means of communication (*UPMC*, slip op. at *4-5 fn. 13),[11] particularly in light of the concerns regarding employees' use of hospital email for Section 7 communication, contravenes Supreme Court precedent. *See Beth Israel*, 437

[9] Notably, the UPMC case was tried before an ALJ and UPMC submitted its post-hearing brief before the Board issued *Purple Communications*. After *Purple Communications* issued, the Board denied UPMC's request to submit additional evidence regarding the "special circumstances" exception deemed relevant in *Purple Communications*.

[10] Discussing the Board's presumption regarding prohibitions of solicitation and distribution during nonwork time in areas other than immediate patient care areas, the Supreme Court explained that "[t]he Board's presumption, of course, does no more than place on the Hospital the burden of proving, with respect to areas to which it applies, that union solicitation *may* adversely affect patients." *Baptist Hosp.*, 442 U.S. at 781, 784 (hospital justified solicitation ban in corridors and sitting rooms on patients' floors where witnesses' testimony "that union solicitation in the presence or within the hearing of patients *may* have adverse effects on their recovery") (emphasis added). More recently, the Board has explained that it does not require actual harm or a disturbance to patients in order to establish special circumstances. *Healthbridge Management*, 360 NLRB 937, 939 (2014).

[11] In addition to employees' personal cell phones and personal email, the two UPMC subsidiary hospitals at issue in that case both provided several employee-only, nonwork areas in which employees could engage in Section 7 communications, such as 13 break rooms at one of the subsidiary hospitals and 95 locker rooms or staff lounges at the other subsidiary hospital. *UPMC*, slip. op. at *10 (Member Johnson, dissent).

U.S. at 505 (referring to availability of alternative means of communication as a necessary inquiry in assessing hospital restrictions on solicitation).

All told, the Board's application of *Purple Communications* in a hospital setting conflicts with longstanding Supreme Court and Board authority that establishes the special rights of hospital employers based on the unique concerns associated with patient care. In *UPMC*, the Board's holding essentially provides – against well-settled precedent – that employees' right to engage in Section 7 communications on nonwork time in nonpatient care areas *outweighs* a hospital's right to exclude such communications from patient care areas, given that a hospital cannot realistically reconcile both interests with respect to ECS. *See Baptist Hosp.*, 442 U.S. at 778 ("Because its usual presumption that rules against solicitation on nonwork time are invalid gives too little weight to the need to avoid disruption of patient care and disturbance of patients in the hospital setting, the Board has indicated that it will not regard as presumptively invalid proscriptions on solicitation in immediate patient-care areas."); *see also Beth Israel*, 437 U.S. at 505 ("in the context of health-care facilities, the importance of the employer's interest in protecting patients from disturbance cannot be gainsaid"). The Board in *UPMC* also failed to consider the employees' alternative means of Section 7 communications[12] (*UPMC*, slip op. at 4-5 fn. 13) and placed an excessive burden on hospitals to establish special circumstances to justify a restriction on employees' use of hospital email for nonwork purposes. In other words, by applying the *Purple Communications* standard without exception in a hospital environment, the Board effectively nullified the longstanding special considerations given to hospital settings by the Supreme Court and the Board.

[12] *See Beth Israel*, 437 U.S. at 505 (referring to availability of alternative means of communication as a necessary inquiry in assessing hospital restrictions on solicitation because "it may be that the importance of [a hospital's interest] demands use of a more finely calibrated scale" than outside of the healthcare context).

Unlike the *Purple Communications*' standard, the *Register Guard* standard provides the surest means of protecting the integrity of hospital ECS and furthering the efficient delivery of safe patient care. The *Register Guard* standard establishes the appropriate balance of the unique considerations in a hospital setting, does not require that hospitals incur risk of preventable medical mistakes caused by distractions from nonwork related communications, and is consistent with established Supreme Court and Board authority.

V. The *Register Guard* Standard Should Apply to All ECS Used in Hospitals for Patient Care Purposes.

In response to the Board's question # 4, the *Register Guard* standard should apply to all ECS used in hospitals for patient care purposes.[13] The concerns associated with employees' use of hospital email systems to engage in union activity become even more alarming when considering employees' use of other types of hospital ECS for nonwork purposes. Allowing employees to use hospital ECS for Section 7 communications would interfere with hospitals' mission and unnecessarily risk disclosure of PHI in violation of federal and state laws.

A. Providing Employees a Right to Use Hospital ECS to Engage in Section 7 Activity Interferes with its Fundamental Purpose.

The purpose of hospital-provided ECS, especially EHR, is to promote the safe and efficient delivery of patient care, and maintaining this primary objective is vital to the effective use of these tools. A legal standard that gives employees a right to use patient care-focused ECS in order to communicate about non-patient care matters, such as solicitations for union organizing, would interfere with the fundamental mission of any hospital. ECS designed and implemented for the

[13] Significantly, some hospital electronic communication systems are accessed by employees through their personal device (*e.g.*, smartphone). Thus, the *Register Guard* standard – or any new standard the Board adopts – should apply to employer electronic communication *systems* rather than employer-owned *equipment*, at least with respect to hospital employers. *See* Board's Notice and Invitation to File Briefs, Question No. 4 (seeking comment on appropriate standard for the use of electronic communications "when made by employees using employer-owned equipment").

purposes of improving the delivery of patient care should not be allowed to be hijacked for other purposes.

Hospital ECS tools were not designed or intended to be used as general purpose communication vehicles, but rather solely for patient care purposes. Such tools are not a "natural gathering place for employees on nonworking time," like the cafeteria in *Beth Israel* that the Board in *Purple Communications* found analogous to the "virtual space" email occupies in an office setting. *See Purple Communications*, 361 NLRB at 1088. Hospital ECS is actually the opposite; if anything, such tools are themselves virtual patient care areas. Although patients are not physically located within electronic communication systems, that is where caregivers communicate regarding patient care and conduct activities for the purpose of patient treatment.[14] Therefore, hospital ECS is itself a "patient care area" in which a hospital can ban Section 7 communications.

Moreover, a hospital cannot effectively prohibit Section 7 communications in immediate patient care areas (at any time) and in other areas (during nonwork time) while allowing such communications during nonwork time outside of patient care areas through hospital ECS. For example, tools such as a wearable voice transmitting badges are becoming increasingly common in hospitals. This tool is used like an overhead public address system or a pager to, among other things, summon help in case of an emergency. The recipient could be in any location – an immediate patient care area or a breakroom – when they receive a message; indeed, that is the purpose of the tool. And, because the tool is used to summon staff for patient care purposes, employees must pay attention to every message the moment it is received. As such, allowing

[14] The Supreme Court cautioned the Board to take into account "that a modern hospital houses a complex array of facilities and techniques for patient care and therapy that defy simple classification." *Baptist Hosp.*, 442 U.S. at 789, fn. 16.

employees to use such hospital tools outside of patient areas and during nonwork time essentially allows such use in patient care areas and during work time for at least some of the employees receiving the message, which contradicts the rights of hospital employers to exclude organizing activities in immediate patient care areas. *Beth Israel*, 437 U.S. at 494-495 (quoting *St. John's Hosp.*, 222 NLRB at 1150) (hospitals can forbid employees from soliciting or distributing to other employees in patient-care areas).

B. Providing Employees a Right to Use Hospital ECS to Engage in Section 7 Activity Risks Statutorily-Protected Confidential Patient Care Information.

Allowing employees to use hospital ECS for purposes other than patient care would violate patients' legitimate privacy expectations and run counter to federal and state laws that protect the privacy of patient care information. Although the *Purple Communications* standard itself does not require that a hospital provide employees access to its ECS, if the *Purple Communications* standard were to apply to all ECS, any employees who have access to such tools (which often contain PHI) as part of their job duties would be permitted to use it for Section 7 communications.

The use of such tools for communication purposes carries some risk that PHI will be improperly disclosed, even inadvertently. For this reason, HIPAA and other federal and state laws require that hospitals implement reasonable safeguards to protect PHI from any intentional or unintentional use or disclosure. 45 CFR §§ 164.530(c)(2). Hospitals must also keep disclosure, use and access to PHI to the "minimum necessary" to carry out a purpose permitted by the HIPAA Privacy Rule. *See, e.g.*, 164.502(b), 164.514(d). Using hospital ECS for Section 7 communications creates an unnecessary risk that PHI will be inadvertently disclosed and is thus contrary to HIPAA.

The Board should extend the *Register Guard* standard to all ECS that hospitals use for patient care purposes. The *Register Guard* standard provides the surest means of protecting the

integrity and intended purpose of hospital ECS and furthering the efficient delivery of safe patient care.

VI. Regardless Whether the Board Reverts to the *Register Guard* Standard, Any New Standard Should Be Extremely Protective of the Patient-Care Environment.

As discussed above, the Board should return to the *Register Guard* standard for employees' use of employers' email systems and extend that standard to other employer computer resources. The *Register Guard* standard is consistent with Supreme Court authority, appropriately safeguards patient care, and does not jeopardize the hospitals' important public function.

If, however, the Board declines to return to *Register Guard* and instead adopts a new standard, it should be extremely protective of the patient-care environment. We urge the Board not to overrule (through inadvertence or otherwise) its many prior decisions recognizing special considerations for solicitation and distribution in hospitals. As discussed above, the Supreme Court's *Beth Israel* and *Baptist Hospital* cases laid out significantly different rules for solicitation and distribution in hospitals than are permitted in virtually any other workplace.

These cases demonstrate that the Board has previously shown special sensitivity to the unique mission and setting of a hospital. We urge the Board to ensure that any test it adopts regarding employees' use of employer email and/or communications through other employer-owned systems will not undermine this precedent. As the Supreme Court instructed forty years ago, "[t]he Board bears a heavy continuing responsibility to review its policies concerning organizational activities in various parts of hospitals" because "[h]ospitals carry on a public function of the utmost seriousness and importance." *Beth Israel*, 437 U.S. at 508 (internal quotation omitted).

CONCLUSION

For the reasons stated above, as well as those stated in the *amici curiae* brief of the Coalition for a Democratic Workforce and the Retail Industry Leaders Association, the AHA and the FAH respectfully request that the Board overrule *Purple Communications*, return to the holding set forth in *Register Guard* that employees do not have a statutory right to use their employers' email system for Section 7 activity, and extend the *Register Guard* standard to other employer-owned communication systems.

Dated: October 4, 2018

Respectfully submitted,

F. Curt Kirschner, Jr.
Joanne R. Bush
JONES DAY

Counsel for *Amici Curiae*
American Hospital Association and
Federation of American Hospitals

CERTIFICATE OF SERVICE

I hereby certify that on this 4th day of October 2018, a copy of the Brief of *Amici Curiae* American Hospital Association and Federation of American Hospitals was filed electronically.

True and correct copies of the brief were served by overnight mail to the following:

David Rosenfeld
Caren Sencer
WEINBERG ROGER & ROSENFELD
1001 Marina Village Pkwy, Suite 200
Alameda, CA 94501-1091
(510) 337-1001

David Dornak
Mark Ricciardi
FISHER & PHILLIPS LLP
300 South 4th Street, Suite 1500
Las Vegas, NV 89101
(702) 252-3131

Elizabeth Cyr
James Crowley
John Koerner
Lawrence Levien
AKIN GUMP STRAUSS HAUER & FELD LLP
1333 New Hampshire Avenue NW
Washington, DC 20036
(202) 887-4000

John McLachlan
FISHER & PHILLIPS LLP
1 Embarcadero Center
Suite 2050
San Francisco, CA 94111-3709
(415) 490-9017

International Union of Painters and Allied Trades, District Council 15
1701 Whitney Mesa Drive, Suite 105
Henderson, NV 89014-2046
(702) 452-2140

Jim Walters
FISHER & PHILLIPS LLP
1075 Peachtree Street, NE, Suite 3500
Atlanta, GA 30309-3900
(404) 240-4230

Caesars Entertainment Corporation d/b/a Rio All-Suites Hotel and Casino
3700 West Flamingo Road
Las Vegas, NV 89103-4046
(702) 777-7777

Joanne Bush

Appendix to Brief of *Amici Curiae* American Hospital Association and Federation of American Hospitals

EXHIBIT A

ORIGINAL INVESTIGATION

Association of Interruptions With an Increased Risk and Severity of Medication Administration Errors

Johanna I. Westbrook, PhD; *Amanda Woods, RN, MEd; Marilyn I. Rob, PhD;* William T. M. Dunsmuir, *PhD;* Richard *O. Day, MD*

Background: Interruptions have been implicated as a cause of clinical errors, yet, to our knowledge, no empirical studies of this relationship exist. We tested the hypo thesis that interruptions during medication administration increase errors,

Metho ds: We performed an observational study of nurses preparing and administering medications in 6 wards at 2 major teaching hospitals in Sydney, Australia. Procedural failures and interruptions were recorded during direct observation. Clinical errors were identifi ed_by comparing observational data with patients' medication charts. A volunteer sample of 98 nurses (representing a participation rate of 82%) were observed preparing and administering 4271 medications to 720 patients over 505 hours from September 2006 through March 2008. Associations between procedural failures (10 indicators; eg, aseptic technique) and clinical errors (12 indicators; eg, wrong dose) and interruptions, and between interruptions and potential severity of failures and errors, were the main outcome measures.

Results: Each interruption was associated with a 12,1% increase in procedural failures and a 12.7% increase in clinical errors. The association between interruptions and clinical errors was independent of hospital and nurse characteristics. Interruptions occurred in 53,1% of administrations (95% confidence interval [CIl , 51.6%-54.6%). Of total drug administrations, 74.4% (n=3177) had at least I procedural failure (95% CI, 73.1%-75.7%). Administrations with no interruptions (n=2005) had a procedural failure rate of 69.6% (n.1395; 95% CI, 67.6%-71.6%), which increased to 84.6% (n=148; 95% CI, 79.2%-89,9%) with 3 interruptions, Overall, 25,0% (n =1067; 95% CI, 23.7%-26.3%) of administrations had at least 1 clinical error. Those with no interruptions had a rate of 25.3% (n=507; 95% CI, 23.4%-27,2%), whereas those with 3 interruptions had a rate of 38.9% (n =68; 95% CI, 31,6%-46.1%), Nurse experience provided no protection against making a clinical error and was associated with higher procedural failure rates. Error severity increased with interruption frequency. Without interruption, the estimated risk of a major error was 2.3%; with 4 interruptions this risk doubled to 4.7% (95% CI, 2.9%-7.4%; *P C* .001).

Conclusion: Among nurses at 2 hospitals, the occurrence and frequency of interruptions were significantly associated with the incidence of procedural failures and clinical errors,

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THE ARGUMENT THAT INTERruptions lead to errors is persuasive, Controlled laboratory studies of task interruptions have clearly demonstrated their contribution to task inefficiency and errors.[1-3] Experimental studies suggest that interruptions produce negative impacts on memory by requiring individuals to switch attention from one task to another. Returning to a disrupted task requires completion of the interrupting task and then regaining the context of the original task.[2,4] In surveys and retrospective accounts of adverse incidents, interruptions have been implicated,' yet real-world evidence of the relationship between interruptions and clinical errors is scarce.'

Clinical environments are highly interruptive, with studies of emergency departments reporting rates of 6 to 15 interruptions per physician per hour,[r9] Hospital ward clinicians experience lower, yet still noteworthy, rates,[9]

Interruptions have been suspected to be a potentially important contributor to hospital medication errors based largely on self-reports, surveys, and retrospective analyses of voluntary reports,[500 ,1] The incidence of medication errors is considerable, with estimates as high as 1 per patient per day

CME available online at wwwianiaarchivesone. cont and questions on page 665

See Invited Commentary at end of article

in some settings.[5] The lack of multisite and comprehensive data suggests that the full magnitude of the problem is still u nknown.[5,12] Although most errors do not result in patient harm, poor data about the incidence and nature of errors, particularly factors that contribute to the more se-

Author Affiliations: Health Informatics Research and Evaluation Unit, Faculty of Health Sciences, University of Sydney (Drs Westbrook and Rob and Ms Woods); School Of Mathematics and Statistics, Faculty of Science (Dr Dunsmuir), and School of Medical Sciences, Faculty of Medicine (Dr Day), University of New South Wales, Sydney, Australia; and St Vincent's Hospital, Darlinghurst, Sydney (Dr Day).

rious errors, limit the development and testing of effective prevention strategies.°

One-third of all medication errors that cause harm to patients arise during medication administration.[14] The medication administration process is governed by standards and legal mandate. At the core of these standards are the "5 rights" (right patient, right drug, right dose, right time, and right route). Despite these being art essential part of nurses' education, medication administration errors are frequent. A study[15] of 36 US health care organizations found that 19% of medications administered were associated with some form of error,

To our knowledge, empirical evidence to substantiate the importance or impact of interruptions on medication error rates does not exist. We undertook a prospective observational study to test the hypothesis that interruptions increase the risk of medication administration errors in hospitals.

METI-IC3DS

SETTING AND SAMPLE

The study was undertaken at 2. major teaching hospitals in Sydney, Australia, Hospital A has 400 beds and hospital B, 326. They are geographically distant From each other, located approximately 40 miles apart. We undertook direct observation of 98 nurses (63 nurses across 4 wards in hospital A and 35 nurses across 2 wards at hospital B) as they prepared and administered medications to 720 adult patients.

The study wards had an average of 28 beds and included the specialty areas of geriatrics, respiratory medicine, renal/vascular medicine, orthopedics, and neurology and had both surgical and medical patients. Data collection at hospital A was conducted fromSeptember 2006 through February 2007 (340,0 hours of direct observation) and at hospital B from November 2007 through March 2008 (164.75 hours), Human research ethics approval was received from both hospitals and the University of Sydney. Both hospitals have individual patient distribution systems in which medications for patients are stored in locked bedside cabinets. Some medications, such as "drugs of addiction" (eg, opiolds), are stored as ward stock in the ward medication room because they are listed as controlled substances (and are also known as "dangerous drugs") according to legislation and regulations, All injectable medications are stored and prepared in the ward medication room.

PROCEDURES

Nurses on the study wards were invited to participate during information sessions followed by a direct approach from the researchers prior to commencement of any observational sessions. At the 2 hospitals, 98 of 120 nurses participated in the study (a participation rate of 82%). We had access to details of nonparticipants through staff rosters and thus were able to establish that participants were representative of the total nurse population in terms of experience and classification (eg, enrolled endorsed nurse; registered nurse, new graduate with <1 year of experience; registered nurse with 2-4 years of experience; registered nurse withyears of experience; clinical nurse specialist; clinical worse educator). Nurses were informed that one of the aims of the study was to identify errors in the administration and preparation of medications, including procedural failures and clinical errors. During the information sessions, the data collection tool was shown to the nurses. On each day of the study, researchers arrived on the study wards at the peak medication administration tunes during the day (7;00 Am-9;30 PM) and closely shadowed individual nurses who had provided written consent to participate. Observers were instructed in following a "serious error" protocol that allowed them to intervene if they witnessed an administration that was potentially dangerous to a patient. This occurred on 1 occasion during the training sessions and 9 times during the formal data collection periods.

A structured observational tool' was developed and incorporated into software on a handheld computer (a personal digital assistant [PDA]). During observation sessions, researchers recorded (1) nursing procedures related to medication administration; (2) details of the medications administered, such as medication name, dose, and route (researchers did not view the patient's medication chart during observation sessions); and (3) number of interruptions that the nurse experienced. Details of each nurse's work status (full time, part time, or on a casual basis), classification, and number of years of nursing experience were recorded at the time of obtaining written consent.

Initial pilot field observations revealed that the drug administration process is not linear. Nurses frequently move between drug preparation and administration as well as among patients during a medication round, For example, a nurse may commence the preparation of an intravenous (IV) drug and prior to its administration give the patient an oral drug and then subsequently return to the IV drug, The PDA software was thus designed to allow for this nonlinear process. The observer was able to collect information on multiple drugs via different tabs on the PDA and also in relation to multiple patients, Data items are time stamped, permitting interruptions to be linked to specific administrations and medication rounds. Interruptions were defined as situations in which a nurse ceased the preparation or administration task in order to attend to an external stimulus.

All observers (n=3, including one of us LA,W.D were registered nurses or physicians and were trained in the use of the PDA and data definitions to gain acceptable levels of accuracy and speed of recording, Interrater reliability was calculated by 2 researchers independently observing the same nurse and then comparing agreement between captured data elements. We undertook interrater reliability tests for 16 observation sessions (7 prior to data collection and 9 sessions during the data collection phase), in which a total of 528 drug administrations were observed by 2 researchers at the same time and results compared. The κ scores" ranged from 0,94 to 0,96, showing very high levels of agreement among observers. Observers were required to be physically close to the study participants, and thus establishing good rapport and trust was essential. This was achieved by observers undertaking many practice sessions involving over 30 hours over several weeks with nurses prior to formal data collection so that they became comfortable with the observers' presence and accustomed to being studied, Direct observation was selected because it allowed identification of medication administration errors at higher rates than medication chart review or incident report review.'

CLASSIFICATION OF ERROR TYPE AND SEVERITY

Medication administration procedural failures were identified at the. time of observation. The identification of clinical errors required comparison of the observational data with each patient's medication chart to determine whether the medication administered differed from that ordered. Comparisons between observational data and medication charts involved a clinical pharmacist as well as an experienced nurse, both of whom were members of the research team and independent of the hospitals being studied. Failures and errors were classified as follows:

Procedural Failures
Failure to read medication label
Failure to check patient identification
Temporary storage of medication In unsecured environment (Ie, nurses' station)
Failure to record medication administration on medication chart
Nonaseptic technique
Failure to check pulse/blend pressure before administration (when applicable)
Failure to check blood glucose level prior to administering insulin
If "dangerous drug" or IV medication:
Failure of 2 nurses to check preparation
Failure of 2 nurses to witness administration
Failure of 2 nurses to check Infusion pump settings (applicable for IV drugs)
Failure of 2 nurses to sign the dangerous drug register (applicable for dangerous drugs)
Failure of 2 nurses to sign medication chart
Clinical Errors
Wrong drug
Wrong dose
Wrong formulation
Wrong route
Wrong strength
Wrong timing: medication was administered >30 minutes before or after a meal when order specified the drug be taken with meals; or If I hour before or after the time ordered on the patient's medication chart,
Unordered drug administered: a patient was given a drug not listed on the medication chart, These are likely to represent drugs being administered to the wrong patient,
Extra dose administered
For hie stable Medications
Wrong solvent/diluent or additive
Wrong solvent/dituent/addlUve volume
Incompatible solvent/diluent/additive
Wrong Infusion rale or bolus delivery time (IV medications)

Procedural failures and errors were further classified according to their potential severity on a 5-paint Severity Assessment code° scale (Table 1). Two researchers rated the actual or potential severity. Disagreement was settled by consensus, and a clinical pharmacologist was consulted for additional advice when required, A panel was established to review all the most serious errors and a random selection of other errors.

STATISTICAL ANALYSIS

Several definitions were applied in the study to facilitate the reporting of results. For single drug administrations, total numbers and proportions of procedural failures and clinical errors and interruptions were calculated with 95% confidence intervals (CIs), Generalized estimating equations (PRO C GENMOD in SAS software [SAS Inc, Cary, North Carolina]) were used to control for patient repeated measures specifying the distribution as Poisson with an exchangeable working correlation. The analyses were performed with total interruptions per administration as the primary independent variable and total procedural failures and total clinical errors, respectively, as dependent variables, Our initial models tested the influence of interruptions as well as hospital, age, and sex of the patient, nurse classification, years of experience, and employment status on errors. Variables were excluded if they did not attain significance at P<,01, Interactions between these variables and interruptions were includedin the models and were found to be nonsignificant in all cases,

We also examined the associa tionbenveen interruptions and procedural failures and between interruptions and clinical errors occurring in individual patients during a medication round. The rate of interruptions in a round was calculated as the mean interruptions for each patient per medication round derived by summing total interruptions and dividing by the total number of drugs administered to an individualpatient during thatmedication round. Medication rounds were classified as being error free or containing at least 1 error or failure,

Logistic regression was then performed to obtain the risk of at least 1 failure or error occurring as a function of interruptions, using the equation 1(x) = logitP(x) + 13 (number of interruptions), and evaluated as P(x)=1/11 , where x=mean interruptions.

Among single drug administrations, the mean number of failures and errors in each administration was calculated for each severity category (Table 1), and grouped as minor (severity levels 1 and 2) or major (severity levels 3-5),

Logistic regression was used to model binary outcomes for major errors (ie, the influence of interruptions on the risk of a major error). Generalizing estimating equations were also applied to control for the possibility of intrapatient correlation effects in the binary responses but resulted hi very minor changes because the ineraclass correlation was not significant.

Table 1. Potential Severity Assessment°

Severity Rating Level	Description	Categories Used In Analyses
1	Incident Is likely to have little or no effect — on the patient	
2	Incident is likely to lead to an Increase in level of care (eg, review, investigations, or referral to another clinician)	Minor errors
3	Incident Is likely Io lead to permanent — reduction in bodily functioning leading to, eg, increased length of stay; surgical intervention	Maier errors
4	Incident Is likely to lead to a major permanent loss of function	
6	Incident Is likely to lead to death	

'New South Wales Health Department· s

Table 2. Comparison 01 Medication Administration Errors and Interruptions at the 2 Hospital Sites°

Category of Drug Administrations With Interruptions and/or Errors	Drug Administrations		
	Hospital A (1.42592)	Hospital e. (n=1670)	Total (n=4271)
Drug administrations with Interruptions	1025 (39.5) (37.7-41.4)	1241 (73.9) (71.8-76,0)	2266 (63.1) (51.6-64.6)
Interruptions per drug administration, median	0.40 (0.38-0.41)	0,74 (0.71-0.76)	0.53 (0,51-0.54)
Drug administrations with procedural failures and/or errors	2001 (77.2) (75,6-78,8)	1425 (84,9) (83.2-0.6)	3426 (80.2) (70.0.81.4)
Drug administrations with procedure! failures	1816 (70.1) (68,3-71.8)	1361 (81.1) (70.2-82.9)	3177 (74,4) (73.1-76.7)
Drug administrations with clinical errors	679 (26,2) (24.5-27.9)	388 (23.1) (21,1-25,1)	1067 (25.0) (23.7-26.3)

al Inlesa otherwise Indicated, data are given as number (percentage) (95% confidence Interval),

We observed a total of 4271 drug administrations for 720 patients: 2592 administrations for 514 patients at. hospital A and 1679 for 206 patients at hospital B. The mean age of patients differed by hospital: 72,6 years (95% CI, 71.1-74.0) For hospital A and 67,5 years (95% CI, 65,0-70.0) for hospital B,

Table 3. Compliance With Specific Medication Administration Procedures

procedure	Administrations Complying, No.	*Administrations* In Which This Procedure *Was* Required, No.	Compliance With the Procedure, % (96% CI)
Read medication label	4115	4271	96.3 (95.8-96.9)
Checked patient's identification	1762	4271	41,3 (39.8-42.7)
Used an aseptic technique	3527	4271	82,6 (81.4-83,7)
Recorded medication administration	4063	4271	95.6 (95.0-96,2)
No temporary storage of medication prior to administration	3244	4271	76.0 (74.7-77.2)
Checked patient's pulse or blood pressure as per protocol	45	62	86.5 (77.3-95.8)
2 Nurses checked an IV administration device where control device was used	15	70	21.4 (11.8.31.1)
2 Nurses checked the preparation of a dangerous drug	317	319	99,4 (98.5-100)
2 Nurses witnessed the administration of a dangerous drug	164	319	51.4 (45.9-56.9)
2 Nurses signed the dangerous drug register	299	319	93.7 (91,1-96.4)
All of the relevant procedures complied with	1094	4271	25,0 (24.3-26S)

Abbreviations: CI, confidence interval; IV, intravenous.

Table 4. Frequency of Clinical Errors by Type and Percentage Rated as Level 3 or 4 Severity "Major" Errors

Clinical Error	No,0	All Medication Administrations, % (95% CI) (n.4271)	Errors Rated as Level 3 or 4 Severity In Each Error Category, 9'.
Wrong timing	688	15.1 (15.0-17.2)	4.1
Wrong IV administration rate	207	4.8 (4.2-5.5)	35.7
Wrong dose	112	2.6 (2.1-3.1)	24.1
Wrong volume, solvent, or diluent	88	2.1(1.6-2.6)	13.6
Wrong formulation	24	0.6 (0.3-0.8)	4.2
Wrong additive, solvent, or diluent	21	0.5 (0.3-0.7)	23.8
Wrong route	19	0.4 (0.2-0.6)	
Wrong drug	13	0.3 (0.1-0.5)	48.2
Wrong strength	8	0.2 (0.1.0.3)	12.5
Extra dose	7	0,2 (0-0.3)	57.1
Unordered drug (most likely representing administrations to the wrong patient)	6	0.1 (0-0,3)	50.0
Incompatible solvent/diluent/ additive	3	9.1 (0-0.1)	0
Administrations with of the above clinical errors	1067	25.0 (23.7-26.3)	10.8

Abbreviations: CI, confidence interval; IV, intravenous,
a Some medication administrations had more than 1 clinical error.

Only 19,8% of administrations were free of procedural failures or clinical errors, At least 1 procedural failure occurred in 74.4% of adminis tra tio ns , and 25,0% had at least 1 clinical error **(Table 2).** Procedural failures and clinical errors by type are shown in **Table 3 andTable 4.** Not checking the patient's identification against their medication chart was the most frequent procedural failure. In only 41.3% (n=1762) of administrations was the identifica don procedure undertaken. Wrong dining of medication administration was the most frequent clinical error (n=688 administrations), but only 4.1% were rated as being of major severity. Wrong IV administration rate was the second most frequent clinical error = 207 administrations), with 35.7% of these errors rated as being of major severity.

Interruptions occurred en 53.1% of all administrations. Hospital B had significantly higher rates of interruptions and procedural failures than did hospital A (see Table 2 for 95% Cis),

RELATIONSHIP BETWEEN INTERRUPTIONS AND PROCEDURAL FAILURES AND CLINICAL ERRORS

Proportions of procedural failures increased with interruptions, commencing at a baseline procedural failure rate of 69.6% (95% CI, 67.6%-71.6%) for administrations with no interruptions (n=2005 administrations) to 76.7% (95% CI, 74.0%-78.9%) for those with 1 (n =1333), 78.7% (95% CI, 75.5%-81.9%) for those with 2 (n.643), 84.6% (95% CI, 79.2%-89.9%) for those with 3 (n=175), and 92,2% (95% CI, 87.3%-97.1%) for those with 4 or more interruptions (n=115). This relationship was assessed using logistic linear regression with a significant trend coefficient of 0.41 (SE, 0.08; $P < .001$). The proportion of clinical errors did not increase monotonically, as for procedural failures, However, overall, there was an increase in clinical errors with increasing interruptions (coefficient, 0.18; SE, 0.05; P <.001). For administrations with no interruptions, 25,3% (95% CI, 23.4%-27.2%) experienced clinical errors. Those with 1 interruption had a clinical error rate of 22.5% (95% CI, 20.3%-24.7%); those with 2, 24.4% (95% Cl, 21.1%-27.7%); those with 3, 38.9% (95% CI, 31.6%-46.1%), and those with 4 or more, 30.4% (95% CI, 22,0%-38.8%).

Procedural failures were modeled in terms of a number of factors using generalized estimating equations to fit a Poisson regression. Variables found to be nonsignificant were dropped from the model (patient age = .27] , sex *[P*=.05] , the 6 categories of nurse classification used (enrolled endorsed nurse [P= .36] ; registered nurse, new graduate IP= .831; registered nurse with 2-4 years of experience *(1' = ,03];* registered nurse with years of experience *[P*=.54]; clinical nurse specialist IP = .051 ; and not applicable). The final model is reported in **Table 5** and shows that every interruption was associated with an increase of 12,1% in mean procedural failures. This effect of interruptions remained, regardless of the other factors, namely, hospital, nurse employment status, and years of experience. Although these 3 factors were associated with procedural failures, they were not associated with interruptions.

Table 5. Modeled Effect of Interruptions on Procedural Failures and Clinical Errors, Controlling for Hospital, Nurse Employment Status, and Years of Experience

	Estimate (SE)	z Score	*P* Value	Effect on Mean Failures, % (95% CI)
		Procedural Failures		
Intercept	0,13 (0,04)	-3,21	.001	
Interruptions	0.11 (0.01)	7.84	<,001	12.1 (8,9-15.3) higher per interruption
Hospital				
B	0.16 (0.05)	3.53	<001	17.5 (7,4-213.4) higher than Hospital A
A	0			
Employment status of nurse	-0.36 (0,08)			
Part time/casual		-4.73	<,001	30.1 (16.9-39.8) lower than full time
Full time	0			
Nurse experience				
Years of experience	0.01 (0.05)	4,73	<,001	1.0 (0.6-1.4) higher per year of experience
		Clinical Errors		
Intercept	-1.21 (0.07)	-16.54	<.001	
interruptions	0.12 (0.03)	3.46	<.001	12.7 (5,3-20,5) higher per interruption
Hospital				
	-0.33 (0,10)	-3.39	<,001	28.0 (13.0-40.4) tower than Hospital A
A	0			
Employment status of nurse				
Part time/casual	0,12 (0.13)	0.66	.34	No effect
Full time	0			
Nurse experience				
Years of experience	0.00 (0.00)	-0.01	.99	No effect

Abbreviations: CI, confidence Interval; SE, standard error.

Table 6. Risk of at Least 1 Procedure Failure or Clinical Error per Patient per Medication Round as a Function of Interruptions

Mean Interruptions (*x*), No.	Administrations, No.	Estimated Risk of Procedural Failure Pfx}z1/f1 +OM, %	Observed Procedural Failure, % (95% CI)	Estimated Risk of Clinical Error P(x)=1/11 O^41, %	Observed Clinical Error Rate, % (95%/. CI)
0	700	74.5	72.3 (69,0-75.6)	39.2	36,1 (32,5-39.7)
>0 to wl	632	81.4	82.1 (70.1-B5.1)	43.6	43.5 (39.6-47.4)
>1 to	237	86.8	85.2 (80.7-69.7)	48.1	52.7 (46.3-59.1)
>2 to	50	90.8	100	52,5	59.3 (46.8-71.13)
>3 to w4	28	93.6	85.7 (72.7-98.7)	57,0	60.7 (42.6-78.6)
>4 to	10	95,7	100	61,3	70,0 (41.6-98.4)
>5 to 6	3	97.1	100	65,4	33.3 (0.0-86.6)

Abbreviation: CI, confidence Interval,

The number of clinical errors was also positively associated with the occurrence of interruptions (Table 5), Again, nonsignificant variables were dropped from the model (patient age *[P=.731,* sex *[P=*.054], nurse classification 'enrolled endorsed nurse, P=.02; registered nurse, new graduate, *P=* .08; registered nurse with 2-4 years of experience, *P =* .24; registered nurse with years of experience, *P=*.19; clinical nurse specialist, *P=*.08; and not applicable)), The nonsignificant variables, nurse employment and years of experience, are also displayed in the "clinical errors" section of Table 5 to maintain consistency. Each interruption was associated with an increase of 12.7% in mean clinical errors per drug administration. "Hospital" was also associated with clinical errors, but nurse employment status and years of experience were not. The baseline estimates of mean clinical errors were 0.21 in hospital B, and 0.30 in hospital A.

There were 720 unique patients in the study. On average, each patient was observed receiving drugs in 2.3 separate medication rounds over the course of the study (le, on a total 1671 occasions). Procedural failure and clinical error rates and mean interruptions per patient per medication round were calculated. Logistic regression showed that the risk of at least 1 failure or error per patient in a medication round increased significantly with interruptions, shown in **Table 6,** which also shows that, if there were 5 interruptions during a medication round for an individual patient, it was almost certain that a procedural failure would occur, Similarly, the risk of at least 1 clinical error occurring during a medication round to. *a* single patient also increased with interruptions, from 39% with 0 interruptions to 61% with 5 interruptions.

SEVERITY OF DRUG ADMINISTRATION ERRORS AND THEIR RELATIONSHIP TO INTERRUPTIONS

The mean severity rating of drug administration failures and errors was 1.13. Most errors (79.3%) were rated as

Table 7. Risk of a Major Clinical Error by Number of Interruptions for a Single Drug Administration

Interruptions (x), No.	Estimated Molar Error 1(x)	% (95% CI)[a] Estimated Risk of a Major Error P(x)=11E1 4- rim	Observed Major Errors	Administrations, No. 01 Total
0	3,77	2.3 (1.8-2,9)	2.1 (1.5-2,8)	43 of 2005
1	3.58	2.7 (23-3,2)	2.8 (1.9-3.7)	37 of 1333
2	3,39	3.2 (2,6-4.1)	3.4 (2.0-4.8)	22 of 643
3	3,20	3.9 (2.8-5.4)	5.7 (2.3-9.2)	10 of 175
4	3.02	4,7 (2,9-7.4)	2.6	2 of 78
5	2,83	5.6 (3.1-10.0)	0.0	0 of 29
6	2,69	6.7 (3.2-13.4)	12.5	1 of B

Abbreviation: CI, confidence Interval.
[a] Confidence intervals were calculated only where there were sufficient data.

insignificant (severity level 1), Only 115 (2.7%) were rated as major (106 at level 3 and 9 at level 4) (Table 4), None were rated at level 5.

Of the 115 errors rated as major, all were clinical errors. The effect of interruptions on the risk of a major error was determined using logistic regression, and the outcome was 1(x) = logit *P* (Major Error) =3.7679 —0,1877 x Interruptions where xmmean interruptions. When evaluated, these results show that the estimated risk of a major clinical error occurring in a single drug administration doubled from 2.3% with 0 interruptions to 4.7% with 4 interruptions **(Table 7).**

COMMENT

We found a significant dose-response relationship between interruptions and procedural failures and clinical errors in medication administration a tbo th study hospitals. The more interruptions nurses received, the greater the number of errors. Furthermore, we found that, as interruptions increased within a single drug administration , the greater the severity of error, The risk of a patient experiencing a major clinical error doubled in the presence of 4 or more interruptions. Although interruptions to clinical work h ave been hypothesized[3,5,6,8,9] as a potential contributor to errors for both physicians and nurses, to our knowledge, this is the first substantial study that has demonstrated a direct association between interruptions and clinical error in hospitals. Flynn et a1[26] showed that interruptions and distractions during drug dispensing in an ambulatory setting were associated with errors, most frequently incorrect drug label information (80% of errors). To date, that study has been used as the basis for recommending strategies to reduce interruptions in clinical environments.[27]

A particular strength of our study is the consistency of the findings regarding the effect of interruptions on procedural failures and clinical errors at both hospitals, Although these hospitals had different nurse profiles, which affected their baseline rates of procedural failures, the association between interruptions and procedural failures and clinical error rates at each hospital was consistent. This demonstrates that the association between interruptions and error rates was independent of the hospitals' baseline error rate and adds to the possible generalizability of the findings to other hospitals.

There are few observational studies of medication administration errors against which to compare our results. Where comparative studies are available, our rate of clinical errors is similar. For example, Haw et al," in a study of 2 psychiatric wards in the United Kingdom, reported a medication administration en-or rate of 25.9% of 1423 administrations. This rate is very similar to ours (25.0%). Also, they applied a definition of clinical errors similar to that used in our study. An observational study" in a surgical ward of a hospital in the United Kingdom reported a clinical error rate of 7% in 1344 administrations but excluded timing errors, Removal of timing errors from our study would have yielded a clinical error rate of 11.9%, A study[15] of 3316 administrations across 36 US hospitals reported a clinical error rate of 19%. That study applied fewer error categories and measured interrater reliability on test cases before data collection but not during the study, which may explain their lower rate.

Failure to check a patient's identification significantly contributed to our high procedural failure rate, However, Franklin et al" found that nurses checked the identification of patients prior to drug administration in only 17.4% of 1344 administrations, a considerably lower rate than the 41% observed in our study,

A recent review[30] identified 21 studies that included measurement of interruptions to nurses' work, none of which evaluated the association between interruptions and medication errors, These studies focused on counting interruptions, rarely reporting a denominator of total tasks (interrupted and not interrupted). Two studies provide some indication that our high rate of interruptions (53%) during medication tasks is consistent with other hospital populations, Both found that of all interruptions to nurses' work, the highest proportion occurred during medication tasks: 24% of all interruptions in an Australian study of 52 nurses[31] and 30% in a Swedish study of 6 nurses.[31] An observational study[33] of 151 nurses in the United States found that there was a risk of an interruption or distraction on each medication round.

The converging evidence of the high rate of interruptions occurring during medication preparation and administration adds impetus to the need to develop and implement strategies to improve communication practices and to reduce unnecessary interruptions within ward envi-

moments. While it is clear that sonic interruptions are central to providing safe care, there is a need to better understand the reasons for such high interruption rates. A study" of over 5325 interruptions to nurses in 4 units in a Canadian pediatric hospital revealed that the most frequent sources of interruption were from the external environment (eg, monitor alarms), accounting for 37% of interruptions, followed by other nurses (25%), patients (9%), family members (8%), and physicians (5%). Only 11% of interruptions were judged to have a positive outcome.

Simple strategies, such as providing easy access to core information resources (eg, using whiteboards), canbe effective in reducing interruptions.' The use of interruption vests, which have written on them "Do not interrupt medication round in progress," or something similar, is another strategy," Recent reports of hospitals in the United Sta tesl[6]introducing such vests have been published, but, to our knowledge, there has been no robust published evidence of their effectiveness in the scientific literature, While new information technologies, such as electronic medication management systems, show promise in reducing medication errors, they are also a potential new source of interruption. Collins et al[37]showed that when such a system was used during ward rounds, system users were interrupted and were required to interrupt others in order to use the system effectively. However, it is also possible that, if well designed, system features could reduce some of the negative effects of interruptions and support memory recall of interrupted tasks.'

Future research is needed both to better understand why interruptions occur and to develop strategies[6]that allow staff to make judgments about when it is safe to interrupt, and how to manage interruptions generated by others, in essence making the environment "interrupt resilient."[63]HSome clinical tasks are more likely to he interrupted than others." Possible reasons for this may be perceived "interruptability" of individuals[36]dining sonic tasks, which may also coincide with activities inwhich clinicians are highly visible andphysically easily accessible, such as at a patient's bedside, Thus, solutions to the high rate of interruptions may also lie in reexamination of the ways in which physical spaces inclinical areas are configured, as well as redesign of work practices. Simulating clinical situations in which a variety of interruptions to the prescribing and administering of medicines need to be dealt with, and performance can be measured, may be a useful educational approach.

We did not observe nurses during the night or atweekends, and thus the applicability of the results for work at these times is unknown. It is possible that nurses changed their behaviors when observed because they were generally aware that they were being observed to identify problems in the preparation and administration of medicines. The effect of this possible bias would be to lead to an underestimation of the error rates. However, the length of the study, which involved researchers being on the wards for many months, reduces the likelihood of sustained behavior change by nurses on busy hospital wards. Furthermore, observational studies of clinicians a t work have suggested that the extent of behavior change is minimal,'

Interruptions, while identified as a consistent andMdependent source of error at our sites, are. clearly only 1 contributor to errors, We demonstrated a mean baseline clinical error rate of 0.3 for drug administrations in which no interruptions occurred. We controlled for nurses' experience and work status and surprisingly found that nurse experience did not reduce the risk of making a clinical error, and status also had no impact. These results suggest that a range of external, rather than nurse-specific, factors may be important contributors to clinical error production on hospital wards and should he the focus of intervention efforts. Such external, contextual factors may have an equal impact on the safety of clinical work for physicians.

Part-time and less experienced nurses had lower rates of procedural failures, We found the most frequent procedural failure was not checking the patient's identification prior to drug adminis tratiort .[16]Full-time, experienced nurses may believe that they can easily visibly identify patients and thus a formal identification process is not necessary. However, recognizing a patient does not ensure that you have the correct medication chart. Franklin et al[29]reported that the introduction of bar-coding for medication administration increased patient identification procedural compliance from 17.4%to 82,4%.

Our data confirm conclusions from a review published recently by the US Agency for Healthcare Research and Quality that the rate of medication administration errors is "truly s taggering."cP[52]A priority is to build the very limited evidence on which to base interventions.' Our results elevate the importance of interruptions as a contributor to medication errors in hospitals and provide a direction for prevention strategies and further research.

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Correspondence: Johanna I. Westbrook, PhD, Health Informatics Research and Evaluation Unit, Faculty of Health Sciences, University of Sydney, PO Box 170, Lidcombe 1825, NSW, Australia (J.Westbrook@usyd,edu.at).
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INVITED COMMENTARY

Giving Medication Administration the Respect It Is Due

Over the past decade, the health care industry has directed an increasing amount of attention to the problem of patient safety errors. A major area of focus has been medication errors, which are among the most common and costly of clinical errors in US hospitals, Conservatively, 450 000 medication errors occur every year, and annual hospital costs due to errors are estimated at $15 to $29 billion.[1-6]

The process of providing a new medication to a hospital patient is complex; 50 to 100 steps occur from the

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Factors Affecting Medication Errors among Staff Nurses: Basis in the Formulation of Medication Information Guide

ANNDRA MARGARETH B. DUMO
durno_anndra@yahoo.coni
Don Mariano Marcos Memorial State University
La Union, Philippines

Abstract - Medication errors seriously affect patient safety, hospital costs and integrity of nursing profession. Proper understanding of the contributing factors that increase medication errors is the first step toward preventing them. The study is quantitative-descriptive type using researcher-made questionnaire. Total enumeration was used involving 210 nurses participated in the study. The data were statistically treated using frequency, percentages, average weighted mean, one way ANOVA, and Pearson r-correlation. Based on the key findings of the study, it found out that professional factors is the number one cause of medication errors, followed by managerial factors, work-related factors, and lastly personal factors. Furthermore, there were identified significant differences between the respondents profile, competency level, and factors affecting medication errors. There was a very-low correlation between respondent competency level and factors affecting medication errors. In conclusion, the longer the hospital experience and the proficient a nurse is in the standards of care on medication management, the higher is the ability of the nurse to handle factors affecting medication errors. The researcher recommended utilization of medication information guide for nurses, self-report logbook, and enhanced course syllabus in Nursing Pharmacology.

Keywords - Medication, medication errors, factors, patient safety, self-report, nurse, competency, cause

INTRODUCTION

Medication administration is often referred to as the "sharp edge" in the medication-use process. Errors introduced at the prescribing, dispensing, or transcribing step, if not intercepted, will result in adverse drug reactions and some can lead to patient's death (Kozier, 2008).

It has been claimed that nurses spend up to 40% of their time administering medications. The administration of medications consists of a series of complex, problem-prone processes and its domain is primarily the responsibility of nurses. Nurses cannot just depend on what the doctors say; they have to know if the doctor's orders are correct.

Hospital medication error rates can be as high as 1.9 % per patient per day. According to Mayo, A. M. & Duncan, D. (2004) in their study on, *Nurse Perceptions of Medication Errors What We Need to Know for Patient Safety,* physicians, pharmacists, unit clerks, and nurses can be involved in the occurrence of medication errors. A single patient can receive up to 18 doses of medication per day, and a nurse can administer as many as 50 medications per shift. This places the nurse at the front line when it comes to drug administration accountability. Medication errors negatively affect nurses. The psychological trauma caused by committing a medication error can be overwhelming to a nurse. First, nurses worry about the patient. Nurses may feel upset, guilty, and terrified about making a medication error. In addition, they can experience a loss of confidence in their clinical practice abilities. Finally, they can feel angry at themselves as well as the system.

A statistical study of hospital deaths in the United States conducted at the University of Toronto in 2007 revealed that pharmaceutical drugs kill more people every year than those killed in traffic accidents. In the study, 38% of preventable medication errors occurred at the administration step. The frequency of administration errors ranges from 2.4% to 47.5%, depending on the drug distribution system in place. Medication errors were estimated to account for more than 7,000

deaths annually in the United States alone.

In the United Kingdom (2010), a recent report by the National Patient Safety Agency (NPSA) indicated that 56.5% of reported errors associated with severe harm or death occurred at the administration step.

The Institute of Medicine's (TOM) first Quality Chasm report in 2007, *To Err Is Human: Building a Safer Health System,* stated that medication-related errors were significant causes of morbidity and mortality; they accounted "for one out of every 131 outpatient deaths, and one out of 854 inpatient deaths".

In the Philippines, medication errors are rampant. Unfortunately, statistics regarding the medication error incidence in the country is not an open book unlike to other countries. A cross-sectional study on drug administration errors in 2010 conducted by medical students of Ateneo de Manila University, Health Sciences Department stated that the Philippines has not yet strongly implemented a reporting system for medication errors and the data remained undocumented and overlooked. This situation is believed to contribute on reasons why staff nurses are prone in committing medication errors and not ready on its consequences.

An article in the Philippine Nurses Forum (2006) showed how staff nurses were treated after committing a medication error. It was disclosed that nurses who gave wrong medications were terminated.

Flor, N., et al (2010), in their study on "Drug Administration Errors: A Study of Its Prevalence and Exposure Factors in a Government Hospital in the Philippines", found that among 1,136 respondents, 79% had at least one type of drug administration error — wrong time of administration being the most common error occurrence followed by wrong technique of administration and wrong strength of solutions, while all drugs were administered to the right patients. Other medication errors that were identified in the study are omission, wrong drug, wrong prescription, wrong amount, and wrong route of administration.

Like any other professions, a professional nurse has many legal responsibilities to assume in the practice of the profession. These legal responsibilities are entwined in every service they render to their patients especially when questions raise involving negligence in the

performance of duties, or in the care or supervision of patients, or in the fulfilment of contractual obligations. It is therefore important to know the factors affecting medication errors so that nurses may be properly guided in the discharge of their functions.

Medication errors made unintentionally by nurses continue to be a major concern in hospitals, medical centers and other health care facilities not only in the Philippines but worldwide. The purpose of the study is to determine the contributing factors that advertently prompt medication errors among staff nurses in tertiary hospitals in La Union which will be the basis for the researcher in formulating a medication information guide for nurses. The formulated medication information guide will be posted in the different wards of the hospitals particularly in areas where staff nurses prepare medications that will serve as a reference on standards of care on medication management. The study further support advocacy on self-reporting of medication errors made and decreasing incidence of medication errors in the clinical area; hence the study was conducted.

FRAMEWORK

The study is guided by Patricia Benner's (2001) Model of Skill Acquisition in Nursing and Betty Neuman's (2002) System Model.

Patricia Benner's Model of Skill Acquisition in Nursing outlines five stages of skill acquisition: novice, advanced beginner, competent, proficient, and expert. Benner noted that in application of the model to nursing skill acquisition based on experience, is safer if it is grounded in a sound educational base as well as a multitude of experiences. Expertise develops when the clinician tests and refines propositions, hypotheses and principle-based expectations in actual practice situations (Benner, 2001).

The implication of Benner's model lies on her conclusion that "a nurse's clinical knowledge is relevant to the extent to which its manifestation in nursing skill makes a difference in patient care and patient outcome". As such, the study make use of Benner's theory as the basis for determining the level of competence of the respondents on the standards of care on medication management and its relationship to the different factors that contribute in medication errors.

Betty Neuman's System Model was also used in the study to determine the extent of influence of the following factors on the level of competency of the respondents in terms of medication administration: personal factors, professional factors, managerial factors, and work-related factors.

Neuman defines stressors as stimuli that produce tensions and have the potential for causing system instability. The system may need to deal with one or more stressors at any given time.

Likewise, nurses who commit errors in medication are faced with various stressors which may either be positive or negative, As caregivers, they are part of the vulnerable population as they are subject to many stressors that may adversely result to medication errors which greatly affect outcomes for their patients, families, and themselves.

The Neuman systems model has two major components which are the stress and the reaction to stress. A person is viewed as an open system and there are various factors that seek to disrupt it. Neuman labeled these forces as stressors and views them as capable of having either positive or negative effect and the reactions to the stressors may be possible or actual, with identifiable responses and symptoms.

The influence of the individual on the environment and the environment on the individual may be positive or negative at any time. Variations in both the system and the environment can affect the direction of the reaction. The internal environment exists within the system. All forces and interactive influences that are solely within the boundaries of the client system make up this environment. The external environment exists outside the client system. Those forces and interactive influences that are outside the system boundaries are identified as external.

Intrapersonal stressors occur within the client system boundary and correlate with the internal environment; interpersonal stressors outside the client system boundary, are proximal to the system, and have an impact on the system; extra personal stressors also occur outside the system boundaries but are at greater distances from the system than are interpersonal stressors.

Medication errors are a significant issue affecting patient safety and costs in hospitals often posing dangerous consequences for patients,

It is important to understand that an analysis of factors affecting the occurrence of medication errors can help healthcare professionals and managers identify why medication errors occur and provide insights into how to make improvements to prevent or reduce them.

There are several types of medication errors such as wrong dosage, wrong patient, wrong route, wrong time, or wrong medication. The assumption of the study is that causes of medication errors vary in different factors such as inexperienced or insufficient staff, or perhaps procedure or protocol not being followed. The study will explore the relationship between the level of competency of staff nurses and the factors affecting medication errors. In determining the relationship between these possible contributing factors on medication errors, the safety of patients could be greatly enhanced and costs of healthcare can be reduced.

Every step in patient care for a nursing professional involves a potential for error and some degree of risk to patient safety. This is especially true in regards to medication errors. A proper understanding of the contributing factors that increase medication errors is the first step toward preventing them. There are many factors, such as training deficiencies, undue time pressure, and nursing shortages that may contribute to medication errors.

The amount of nursing education and the years of nursing experience are two factors that may have a relationship to medication errors. Due to the fact that nursing staff is a large cost to hospitals, these organizations are constantly trying to manage expenses. This is supported by Yang (2003) who stated that "nursing professionals typically represent the largest employee group in hospitals, and have become a primary target for redesign measures". Consequently, medication errors are costly and seem to be proportional to the staffing of nurses. Since nurses make up such a large portion of the staff population, it is important to understand how they may contribute to these medication errors.

The framework for this study is the belief that it is important to evaluate nurses' medication errors including why they make them, how they are made, and what preventive measures can be taken to decrease the risk of making additional mistakes.

The researcher assumes that staff nurses though knowledgably equipped with all the theories and principles of medication administration are still vulnerable in committing unintentional medication errors because of the different factors that may alter their work efficiency. For example, the physical arrangement on nursing units often require nurses to walk long distances to get supplies, equipment, and medications needed to provide patient care; illegible handwritings of prescribing physicians; poorly lighted preparation area which increases the risk of misreading labels and dosages of medication; being bombarded with personal conflicts; under intense stress and pressure; lack of sleep prior to the day of duty in the hospital area, physical discomforts such as physical pain while on duty (headache, stomach ache and toothache), nasal congestion and allergies; noisy environment which may affect the concentration in medication preparation, heavy workloads, and so on.

In like manner, medication errors which may be due to lack of knowledge on medication, poor interpretation of medical terminologies and lack of technological competence causes demoralization in the professional life of a nurse.

Figure 1 presents a schematic diagram on the conduct of the study.

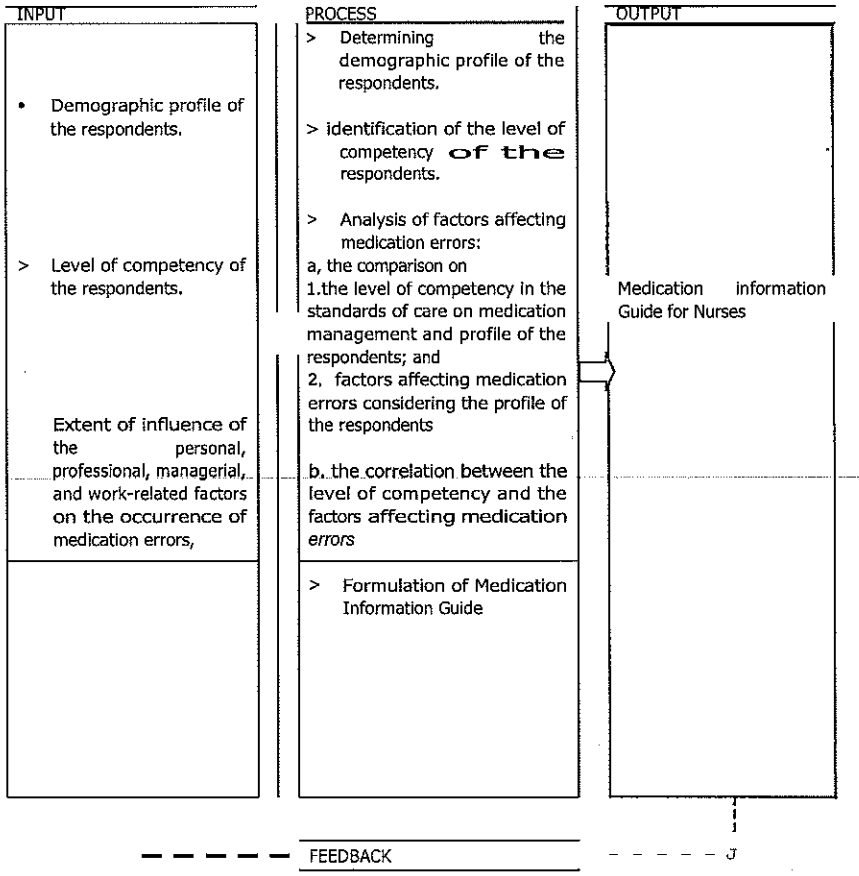

Figure 1. The Paradigm of the Study

OBJECTIVES OF THE STUDY

1. Determine the factors affecting medication errors among staff nurses in tertiary hospitals of La Union which shall serve as a basis in the formulation of medication information bulletin guide.

2. Determine significant differences in the
   a. level of competency in standards of care on medication management based on the respondents' profile; and
   b.factors affecting medication errors based on the profile of the respondents.
3. Determine the significant relationships in the level of competency and the factors affecting medication errors.

MATERIALS AND METHODS

Research Design

The study is a quantitative type of research that made use of the descriptive research design. The study specifically depicts the profile of the respondents as to age, sex, civil status, highest educational attainment, work-related experiences and work setting. It determined the level of competency of the respondents along the standards of care on medication management among staff nurses of tertiary hospitals in La Union. It also determined the extent of influence of the following factors: personal, professional, managerial, and work-related factors in the occurrence of medication errors.

The study also determined the significant differences in the level of competency in medication administration as well as the factors affecting medication errors when respondents were grouped according to their profile. Likewise, it determined the significant relationship between the level of competency and the factors affecting medication errors.

Locale and Population

The study was conducted in two tertiary hospitals of La Union, specifically Hospital A, and Hospital B.

Hospital A is a training institution for practitioners and those involved in the allied medical field located in San Fernando City, La Union It was founded on 1945 and approved by Congress to be a 300 bed teaching and training medical center by virtue of R.A. 8411. It is a DOH designated Heart—Lung—Kidney Collaborating Center for Northern and Central Luzon with 24 full-time consultants of

varied subspecialties. The hospital is affiliated with 24 medical and 2 paramedical schools for post-graduate training/rotations in the clinical departments and internship for medical technologists, physical therapists, nurses and midwives,

Hospital B is an 80-bed tertiary hospital, licensed by the Department of Health and accredited by the Philippine Health Insurance Corporation. It is the first mission hospital outside of Metro Manila, It was established in 1921 through an anonymous donor from the USA and from contributions gathered both from the Catholic and Protestant communities in the area. It provides private hospital care, private clinics, with complete nurses, doctors, medicines. Also, the hospital is Philhealth - accredited and accepts different kinds of health card members,

The respondents were the 196 staff nurses, 10 senior nurses, and 4 nurse supervisors working in the different wards and specialized areas of the two tertiary hospitals of La Union. While total enumeration was aimed at in the study consisting of 308 nurses, only 210 actually participated in the study, which accounted to 68.18%.

Instrumentation

To provide the study with sufficient and relevant data, a questionnaire was used as the main tool in gathering data from the respondents.

The researcher used a Likert - scale style of questionnaire. The questionnaire was specifically designed to meet the objectives of the research endeavour and was formulated by the researcher after series of consultation with the hospital personnel and six experts. It was further substantiated through library research to establish the relevance of the content to the research objectives, The questionnaire was subjected to validity and reliability testing to ensure that the data collected were valid and substantial,

Treatment of Data

The data were statistically treated using frequency and percentages, average weighted mean, one way ANOVA, and Pearson r-correlation.

RESULTS AND DISCUSSION

Demographic Profile of the Respondents

The respondents of this study were the staff nurses, senior nurses and nurse supervisors who are working in tertiary hospitals in La Union. The demographic profile considered included the respondents' age, sex, civil status, highest educational attainment, work-related experience, number of years in work-related experience, current position, workplace and work-setting.

Age

Age has a great impact in working performance, Elder staff nurses may suffer from chronic diseases which may contribute in the alteration of their job-performance. Newly registered nurses on the other hand do not have enough hospital experience which may contribute to the higher risk of medication errors.

The age of the respondents is categorized into three groups. Based on Erik Erikson's Psychological Theory, age 18-35 years old is under young adulthood, 35-54 years old is under middle adulthood, and 55 years old and above is under late adulthood.

Table 1. shows that most of the respondents were 20-34 years old followed by 35-54 years then 55 and above. The youngest nurse respondent was 20 years old while the oldest was 59years old. It further shows that eight out of ten staff nurses are young adults and only few are middle and late adults.

The mean age of staff nurses is now well over 40 and many aging nurses have concerns about their own health and safety as well as the health and safety of their patients (Yox, 2004). Numerous reports point to a deepening nursing shortage, which is unlikely to reverse as other shortages have in the past. As such, new and younger nurses have to join the workforce to backstop the older, more experienced nurses in the field, Statistics, however, show that many nurses leave the workforce entirely between the ages of 50 to 55, The demands of shift work, high patient-to-nurse ratios, increasing patient acuity, and flat wage structures that fail to reward years of experience have

left older nurses with little reason to stay in the nursing work-force. It is not unusual to hear aging nurses talk about being overworked, underpaid, and underappreciated (Yox, 2004). To stem the tide of nurses who retire "before their time," it is crucial to recognize the importance of these clinical experts and give consideration to their age and their longevity in the profession when assigning them to patient care. For instance, providing nursing staff positions that require less on-call, shift, weekend, and holiday work and reduced patient care loads could be viewed as incentives for remaining in the profession and be used effectively to retain aging nurses.

Many nursing staff positions require on-call scheduling, especially in areas with unpredictable patient loads such as labor and delivery, the operating room, and post-anesthesia units. As one ages, it is difficult to work on a 12-hour shift and then be called back to work a few hours later for an emergency case. Conditions such as this may create high levels of emotional and physical exhaustion; particularly for older nurses who may not be able to physically recover from this experience as quickly as when they were younger. Nurses who experience emotional exhaustion generally have less job satisfaction and higher levels of burnout (Nursing Executive Center, 2000).

As individuals age, most will experience a progressive decline in aerobic power, reaction speed, and acuity of senses. Shift work poses additional risks for older nurses. Aging decreases the speed of circadian adaptation to night work, increasing the risk of sleep disorders and therefore impaired job performance and other negative health effects (Institute of Medicine, 2004). Our work environments are designed for younger "average" employees; as Blakeney explains, "Employers need to hire RNs for their brains and not brawn" (Yox, 2004).

Sex

Nursing profession has become identified as a profession deeply embedded in the gender based power relations of society (Meadus, 2000). Florence Nightingale considered nursing as a suitable job for women because it was an extension of their domestic roles. Nightingale's image of nurse as a subordinate, nurturing, domestic, humble, self - sacrificing as well as not too educated became prevalent

in society.

Table 1. shows that majority of the respondents were females. It depicts that one-third of the respondents were males and nearly seven out of ten staff nurses were females.

Although number of males in nursing is increasing recently, feminization of nursing is still an issue (Harloyd, 2002). Nursing continues to be seen as a fit position for females. The social construction of what it means to be a nurse has typically meant a caring, hard working woman. Roles like nurturing, caring, dependency, submission given to her are opposite from the ones that are attributed to men in society. Over all, men who enter nursing typically face questions about their masculinity or sexuality.

Men's position in taking care of patients and being in health care industry all around, the world is not new and goes far back to medieval times and there is recorded evidence of males' skill and care.

Sociologists describe the sex role socialization as "instrumental" for men and "expressive" for women. The characteristics of instrumental socialization include the ability to compete, aggressiveness and ability to lead and to wield a power to accomplish tasks. Expressive socialization includes learning to nurture, to be affiliative and to be sensitive to the needs of others. In patriarchical cultures the value given to women and her place in society is naturally reflected to the nursing profession. This also presents particular problems to the image of nursing as a career (Girard, 2003; Muldoon & Reilly, 2003; Yagmur & Ozerdogan, 2001).

Although, a negative image is not anything new to nurses for they have battled a negative image since the profession began, several writers believe that women came a long way by themselves in the last century without any help from men.

Ozdernir and et. al. (2008) in their study entitled, Gender and Career: Female and Male Nursing Students' Perceptions of Male Nursing Role in Turkey, they found out that close to half of the female nursing students (45.3 %) want to see males as staff nurses while most of the male nursing students wanted to occupy administrative or administrative/instructor positions after graduation. Female and male students' perceptions about effects of males on image and status of nursing ($p<0.01$), both gender's perceptions about 'nursing being

only a female profession" ($p<0.001$) was statistically significant. Even male students who study in nursing have role tension about nursing, Male students' desire to occupy mostly administrative positions in health care settings after their graduation shows their intentions to distinguish themselves from female colleagues.

In the study some of the male students (47.8 %) saw physical power as solution for better patient care and 30.4% of the male students also reported that men will also improve negative perceptions of health care teams about nursing. Men are typically seen as better leaders than women. Characteristics like dependency and nurturing are always thought to be perfectly fit roles for women. On the other hand characteristics like aggressiveness, dominant and being ambitious look like a fit for men (Evans, 1997 & Evans, 2002).

In the study of Harloyd and et. al. (2002), nursing students in China expressed that an ideal nurse posed moderately high levels of extraversion and assertiveness, traits which are stereotypic of males in China. While there are difficulties for men working in female dominated professions, men who enter the nursing profession tend to have a faster and more straightforward career progression than is the case for women (Boyd & Hewlett 2001).

Since the men are always in different and special groups in a patriarchical society, they are likely to enter in the nursing profession to benefit from their minority but powerful position. However, it has always been thought that, males in nursing profession will gather power and they will improve the status of nursing professions. It is always thought that men entering hi nursing professions will make a difference and the nursing profession will be improved (Ozdemir, A. et. al., 2008; Eksen, 1997; Karadakovan, 1993; Oktay & Gurel, 1986; Savaser, 1993).

Civil Status

Table 1. shows that 75.7% of the respondents were single, followed by married (22,9%) and 1.4% were widow/widower. Likewise, majority of the respondents are young adult.

The developmental task of a young adult according to Erik Erikson is intimacy and solidarity vs. isolation. In this stage an individual

seek one or more companions and love. As they try to find mutually satisfying relationships, primarily through marriage and friends, they generally also begin to start a family, though this age has been pushed back for many couples who today don't start their families until their late thirties.

The table further represent that three-fourths of the respondents are single and only one out of five staff nurses are married.

Nurses leaving the country to work abroad are predominantly female, young (in their early twenties), single, and come from middle income backgrounds. While a few of the migrant nurses have acquired their master's degree, majority have only basic university education. Many, however, have specialization in ICU, ER, and OR, and they have rendered between 1 and 10 years of service before they migrated (Lorenzo, 2005).

Migration was perceived to impact nursing in the Philippines negatively by depleting the pool of skilled and experienced health workers thus compromising the quality of care in the health care system. One concern among health service managers is that the loss of more senior nurses requires a continual investment in the training of staff replacements and negatively affects the quality of care. Human resources also become more expensive (Lorenzo, et. al, 2005).

Highest Educational Attainment

Continuing education positively affects nursing practice. Anderson (2010) in her article on "Medication Errors: Don't Let Them Happen to You", stated that continuing education of the nursing staff can help reduce medication errors. Medications that are new to the facility should receive high teaching priority. Staff should receive updates on both internal and external medication errors, as an error that has occurred in one health facility is likely to occur in another.

Table 1, reveals that most of the respondents were graduates of Bachelor of Science in Nursing, only three respondents were holders of Master of Arts in Nursing, and only 9% were into a continuing education program.

Bailey's (2008) study on the relationship of medication errors to education and years of nursing experience found that there is a

relationship between the number of medication errors and nurses with varying education levels. The study indicates that a BSN RN generally makes the most errors, which could be useful information in structuring future BSN programs to increase clinical focus in the preparation of their students.

Work-Related Experience

Table 1. shows that majority of the respondents worked as Contractual Staff Nurses (54.8%), followed by full time staff nurses (41.9%), nurse volunteer/trainee (1.9%), and clinical instructor (1.4%). The Philippines is facing an oversupply of nurses reaching to the point where newly registered nurses in the country landed in call center agents.

To address this alarming rate of newly registered nurses every year, the government launches a program to train and hone the school learned skills in nursing (DOH, 2011). The project will deploy nurses in rural and underserved communities for a period of one year, Nurses under this project will undergo learning and development in accordance with the roles and functions required by this project. A certificate of competency and employment will be given to those who have satisfactorily completed their engagement with the project. While on deployment, nurses will be given an allowance to cover for their meals, transportation and other incidental expenses. Competencies gained by the nurses upon completion of the training on community deployment project shall cover both clinical and public health.

Eventually, these nurses will be part of the pool of competent nurses for later employment or absorption in health facilities, thus addressing the inadequate supply of skilled nurses and increasing the nurses' employment rate.

Years of Work-Related Experience

The years of work-related experience of the respondents are categorized according to Patricia Benner's theory of skills acquisition. She described 5 levels of nursing experience as: novice (less 1 year), advanced beginner (1-2 years), competent (2-3 years), proficient (3-5

years), and expert (above 5 years).

Dr Patricia Benner introduced the concept that expert nurses develop skills and understanding of patient care over time through a sound educational base as well as a multitude of experiences. She proposed that one could gain knowledge and skills ("knowing how") without even learning the theory ("knowing that"), She further explained that the development of knowledge in applied disciplines such as medicine and nursing is composed of the extension of practical knowledge (know how) through research and the characterization and understanding of the "know how" of clinical experience. She conceptualized in her writing about nursing skills as experience is a prerequisite for becoming an expert.

Table I. depicts that majority of the respondents were novice having a work experience of less than one year. It further shows that few of the respondents went beyond one year working experience. Advanced beginners have almost the same number with nurse experts. Minority of the respondents are competent and proficient.

Novice is a beginner in the profession with no experience. They are taught general rules to help perform tasks. Rules are context-free, independent of specific cases, and applied universally. Rule-governed behavior is limited and inflexible, just like, "Tell me what I need to do and I'll do it."

An advanced beginner demonstrates acceptable performance, has gained prior experience in actual situations to recognize recurring meaningful components, principles, based on experiences, and begin to formulate new ones to guide actions.

Competent nurses are typically nurses with 2-3 years experience on the job in the same area or in similar day-to-day situations. They are more aware of long-term goals, gains perspective from planning own actions based on conscious, abstract, and analytical thinking and help to achieve greater efficiency in the organization.

A proficient nurse perceives and understands situations as a whole including its parts. They have more holistic understanding, improved decision-making, and learned from experiences what to expect in certain situations and how to modify plans when necessary.

Nurse experts no longer rely on principles, rules, or guidelines to connect situations and determine actions. They have much more

background of experience, have intuitive grasp of clinical situations and their levels of performance are now fluid, flexible, and highly-proficient.

Recent studies identify a need for nursing schools to produce 30 000 new graduates each year to keep up with the nursing shortage. Novice nurses may be at greater risk for errors than experienced nurses. As the novice nurse moves into practice, it is imperative to recognize potential mistakes in order to prevent errors (Saintsing, D. et. al., 2011). In addition, the primary types of errors committed by the novice nurses include medication errors, patient falls and delay in treatment. The causes of such errors are complex. Improved patient outcomes, reduced liability and higher retention/satisfaction are all potential benefits of reducing the errors made by novice nurses. Simply being aware of the type of problems may be an important first step in improving the care by novice nurses.

Work Setting

Registered nurses (RNs) constitute the largest healthcare occupation, with 2.6 million jobs. About 60 percent of RN jobs are in hospitals. Registered nurses (RNs), regardless of specialty or work setting, treat patients, educate patients and the public about various medical conditions, and provide advice and emotional support to patients> family members. RNs record patients> medical histories and symptoms help perform diagnostic tests and analyze results, operate medical machinery, administer treatment and medications, and help with patient follow-up and rehabilitation. Specific work responsibilities will vary from one RN to the next. Table 7, summarizes the work assignments of the respondents in the hospital working areas.

The RN's duties and title are often determined by their work setting or patient population served. RNs can specialize in one or more areas of patient care.

Table 1. Demographic profile of the respondents (N=210)

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1. Age in years	20-34 .	178	84.8
	35-54	25	11.9
	55 and above	7	3.3
2. Sex	Female	141	32.9
	Male	69	67.1
3. Civil Status	Single	159	75.7
	Married	48	22.9
	Widow/Widower	3	14.0
4. Highest	BSN	188	89.5
Educational	MAN with units	19	9.0
Attainment	MAN	3	1.4
	Full-time Staff Nurse	88	41.9
5. Work-Related	Contractual Staff Nurse	115	54.8
Experience	Nurse Volunteer	4	1,9
	Clinical Instructor	3	1.4
	<1	120	57,1
6. Years of Work-	1-2	30	14.3
Related Experience	2-3	9	4.3
	3-5	15	7.1
	>5	36	17.1
	Paediatric Ward.	17	8,1
7. Work Setting	Surgery Ward	11	5.2
	Medical Ward	26	12.4
	Orthopaedics Ward	10	4,8
	Optha-BNT Ward	7	3.3
	Delivery/Labor Room	12	5.7
	Operating Room	15	7.1
	Neonatal ICU	3	1.4
	Medical ICU	14	6.7
	ER	24	11.4
	OPD	15	7.1
	General Ward	9	4.3
	Post Anaesthesia Care Unit	6	2.9
	Private Ward	37	17.6
	Supervisory Work	4	1.9

Level of Competency of Staff Nurses along the 10 Standards of Care on Medication Management

Another aspect looked into the study is on the respondents' level of competency along standards of care on medication management which include the following: Carrying out doctor's order; Transcribing; Endorsing; Preparing; Labelling; Administering; Documenting;

Monitoring; Educating/ Health Teachings; and Evaluating.

Table 2 depicts the level of competency of the staff nurses in the clinical areas along the 10 standards of care onmedication management in general which was high with a mean score of 2.64. Specifically, the indicator with the highest mean was on administering medication. On the other hand, the indicator with the lowest mean was carrying out doctor's order.

The result of the study is supported by Eslamian's (2010) study on assessing the nursing error rate and related factors which exposed that the highest rate of error reported was the lack of compiling and reviewing the medical history of the patient (31.75%) and also disregarding the appropriate time for prescription of the medicine (31.75%). This scenario can affect the staff nurses ability in carrying out doctor's order.

Another factor that may contribute to the ability of the staff nurses to carry out doctor's order is the handwriting of the prescribing physician. An Australian study (Deans, 2005) identified and described the incidence of medication errors among registered nurses, the type and causes of these errors and the impact that administration of medications has on the professional practice of registered nurses. Mostly, medication errors were attributed to documentation issues, including: illegible handwriting, misunderstanding abbreviations, misplaced decimal point, misreading and misinterpreting written orders.

It further shows that self-evaluation of the staff nurses were higher than the senior nurses' evaluation and nurse supervisors' evaluation. Nurse supervisors rate the staff nurses moderately competent on the following competencies: carrying out doctor's order, educating/health teaching, and evaluating.

Anderson's (2010) in her article on "Medication Errors: Don't Let Them Happen to You", stated that continuing education of the nursing staff can help reduce medication errors. Medications that are new to the facility should receive high teaching priority. Staff should receive updates on both internal and external medication errors, for an error that has occurred at one facility is likely to occur at another.

Moreover, Bailey (2008) in his study showed that nurses made the most medication errors either in their first five years of nursing

experience or after twenty years of nursing practice. The results showed that nurses within the first five years of work experience had an average of 2.2 errors within the last twelve months.

Another conspicuous finding is that nurse supervisors gave a perfect score of 3.00 in staff nurses competency on administering while senior nurses evaluation and self-evaluation was lower. This tends to show a possibility that not all medication errors incurred under administering medications are reported. This finding runs parallel to the findings of Moyen (2008) that most medication errors occur during the administration stage (median of 53% of all errors), followed by prescription (17%), preparation (14%), and transcription (11%).

Wolf Z. (2011) in her secondary analysis study where she examined the reported actions of supervisors and administrators following disclosure of medication errors made by health care providers found that attending physicians and nurse managers or coordinators were notified of the drug error more often than pharmacists, resident physicians, directors of nursing, risk managers, clinical nurse specialists, or nurse practitioners. Superiors acted disapprovingly and aggressively toward the provider and interrogated them. A few physicians changed their story about the order, thus violating the trust of subjects. Subjects reported that they were reprimanded and humiliated. Mandatory re-education served to further humiliate health care providers. Superiors cautioned or warned them, instructed them about policies and procedures, discussed the incident formally and informally with them, or voiced their concern about the incident.

Duthie, E., et. al. (2000) in their study on "Quantitative and Qualitative Analysis of Medication Errors: The New York Experience", found that mandatory medication error reporting can provide useful information about systems contributing to errors, strategies for prevention, and evidence-based information about patient safety concepts. This information is important for hospitals to consider both when analyzing medication errors and when implementing systems to improve safety. This report is intended to help guide public policy and provide guidance to other states interested in establishing mandatory reporting systems.

Carrying out doctor's order

It can be seen in Table 2 that the level of competency of the staff nurses specifically on carrying out doctor's order was high with a general weighted mean of 146. Specifically, the indicator with the highest mean was "nurses carefully verify physician's written prescriptions that are not clear" (2.82). On the other hand, the indicator with the lowest mean was "determining solution and medication incompatibilities" (1.84).

Correspondingly, nurse supervisors evaluate the staff nurses as incompetent (1.25) in determining solution and medication incompatibilities while staff and senior nurses' ratings were categorized to be moderately competent.

In addition, staff nurses were evaluated by their superiors as moderately competent in checking relevant results, finding out if patient has any drug allergies and taking a complete drug history.

The findings imply that nurses have to be updated and familiar on the different solutions and medication incompatibilities. Neglect in this role can lead to drug/food interaction leading to adverse reactions in patients.

The findings corroborate that of Flor, N. et al (2010), in their study on "Drug Administration Errors: A Study of its Prevalence and Exposure Factors in a Government Hospital in the Philippines", where they found out that among 1136 respondents, 79% had at least one type of drug administration error - wrong time of administration being the most error occurrence followed by wrong technique of administration and wrong strength of solutions, while all drugs where administered to right patient,

Transcribing

The level of competency of the staff nurses along transcribing of medications was high considering a mean rating of 2.69 (Table 2,B.), Specifically, the indicator with the highest mean was on nurses transmit doctor's order accurately and completely in the medication sheet, kardex, and endorsement sheet (2.80). On the other hand, the indicator garnering the lowest mean was on interpreting and transcribing doctor's orders legibly (2.58).

Respectively, nurse supervisors rated staff nurses as moderately competent in interpreting and transcribing doctor's orders legibly while their self-evaluation as well as the senior nurses' evaluations both resulted to highly competent.

Transcription errors according to Moyen (2008) are usually attributed to handwriting, abbreviation use, unit misinterpretation, and mistakes in reading.

The findings indicate the primordial role of nurses to be cautious in reading the doctors' handwritings, also to avoid confusion about decimal points for these can lead to catastrophic results.

Endorsing

Table 1 shows that respondents were rated to be highly competent (2.57) along the standards in endorsing medications. Specifically, the indicators with the highest means were on "endorse documented adverse effects/ events related to medication administration", and "endorse any missed dose of patient's medication and interventions" which were both given 2.59. On the contrary, the indicator "identify high alert medications and endorse special precautions required with these drugs" registered the lowest rating (2.53).

Nurse supervisors rated staff nurses as moderately competent in identifying high alert medications and endorsing special precautions required with these drugs whereas they and the senior nurses gave ratings which were categorized as highly competent.

High alert medications according to the Institute for Safe Medication Practices (2011), are drugs that bear a heightened risk of causing significant patient harm when they are used erroneously. Although mistakes may or may not be more common whith this drugs, the consequences of an error are clearly more devastating to patients,

The following are responsibilities which the nurses must be aware of whenever they administer drugs (Kozier, 2008), As professionals, nurses are duty bound to carry out these responsibilities.

Medications must be kept in an orderly manner in a place where they are not freely accessible to patients or to the public and where they are protected from air, moisture & light. Only medicines that are properly labelled must be retained. Instructions regarding storage, refrigeration & expiration dates should be carefully observed.

Controlled substances (narcotics) should be kept under lock and keys and appropriate records should be kept regarding their use.

Special precautions must be observed for certain drugs. Most agencies requires that two qualified nurse double-check the dosages of anticoagulants, insulin, digitalis preparations and certain IV medications. Check agency policies.

Preparing

Table 2. points out that the staff nurses were highly competent on preparing medications (2.66). Topping the list of indicators was on nurses' uses appropriate medication syringes, needles, dropper, and caps base on the amount, consistency, and route of the drug (2.84), described that nurses were highly competent. On the other hand, the indicator rated the lowest was on nurses are moderately competent in using aids such as magnifying lenses to identify small ampules/ vials (2.17).

Apparently, these findings are still favourable in as much as most of the nurses are in their prime years and that they still can manage to read the labels of medicines/ampoules/vials even without a magnifying aid. Though Momtahan, et. al. (2008) have stressed that nearly 30% of the fatalities reported, labelling or packaging was cited as a contributing factor to the medication error that led to the fatality of patients. One of the problems listed is small size and poor readability of printed information.

Labelling

Along labelling standards in care management, the nurses were found out to be highly competent (2.64) as revealed in Table 2.e. It is observed that "nurses' correctly labels IV solution with patient's name, IV additives, rate of administration, bottle sequence and due date/ time", which registered a rating of 2.68, described the respondents to be highly competent. It is obvious that nurses correctly labels medication boxes with patient's name, age, address, and diagnosis was given the lowest mean of 2.57, Appropriate labelling of medication boxes with patient's name, age, address, and diagnosis can be a contributing factor to medication errors leading to adverse effects thus, it has also be given

preferential attention by the nurses.

Cohen, M. R., & Smetzer, J. L. (2008) in their article on "Errors With Injectable Medications: Unlabeled Syringes are Surprisingly Common Unintended Consequences of High-Alert Stickers Easily Misread Abbreviations", stated that unlabeled syringes are a significant risk associated with preparation of injectable products in clinical areas and the most common abbreviation resulting in a medication error was "qd" for "once daily," which accounts for 43.1% of all abbreviation-related errors.

Administering

As provided in Table 2 the staff nurses were highly competent on medication administration. Seemingly, the indicators with the highest mean were on nurses administer the right drug, administer the right drug to the right patient, and administer the right dose and do necessary actions if a dose is missed by patient (2.94). While all the indicators along this standard were all point to high level of competency for the nurses, it is noticeable that ability of staff nurses to administer the right drug at the right time was rated last (2.86).

The findings are in support to the findings of Flor, N. et al (2010) in their study on "Drug Administration Errors: A study of its Prevalence and Exposure Factors in a Government Hospital in the Philippines", that among 1136 respondents, 79% had at least one type of drug administration error — wrong time of administration being the most error occurrence followed by wrong technique of administration and wrong strength of solutions, while all drugs where administered to right patient. Other medication errors that were identified in the study are omission, wrong drug, wrong prescription, wrong amount, and wrong route of administration.

Another literature that strongly supports the findings of the study is the study of Bailey (2008). The study indicated that giving medication at the wrong time was the most common type of medication error made by the staff nurses. The shift that reported having the most medication errors was 7am - 7pm, when most medications are administered. The most common route for medications errors was PO or "by mouth".

Documenting

Along documenting medications, staff nurses were highly competent as reported in Table 2, where all items were rated high. This reveals that the nurses can proficiently manage to do proper documentation in their medication management. The nurses documented each drug administered in patient's chart according to agency policy got the highest (2.89) while a bit lower rating was given to documenting and reporting results, side-effects and adverse effects of medications (2.64).

The findings are similar to the results of the study of Farooq, M. et. al. (2006) into documentation of drug allergy in preoperative patients charts who were presenting for elective surgery to enhance patient safety, found that thirty percent charts were not documented for drug allergy.

Monitoring

It is seen in Table 2 that nurses have high level of competency in monitoring medications to their patients. The nurses' ability to observe and assess the side-effects, adverse reactions and effectiveness of administered drugs and initiate appropriate nursing interventions (2.79), their ability to monitor patients for potential drug-to-drug or drug-to-food interactions (2.47) were both rated high, These findings suggest the presence of highly proficient nurses providing health care services to the people in the two health care facilities.

Gabe, M. E., et. al. (2011) stated that nurses are well-placed to monitor and reduce drug-related morbidity, and builds upon previous work which prioritizes the monitoring of prescribed medicine in a nurse-led adverse drug reaction profile. However, in the Philippines, the nurse-patient ratio is beyond the ideal set-up causing staff nurses inability to monitor patients for potential drug-to-drug or drug-to-food interactions,

The Department of Health Hospital Administrators Manual 2009 says that the ideal nurse-patient ratio is 1:12 to achieve satisfactory level of care in a hospital's general ward; the reality is one nurse takes charge of at least 30 patients in a shift. In big specialty hospitals like the National Center for Mental Health, a nurse is in charge of a ward

with up to 200 patients. Often because of the heavy patient load, the nurse is forced to go on extended time for recording and endorsement purposes. And as hospitals are usually understaffed, the nurse is also often made to work 16 hours straight. These result to nurses at high risk of committing medication errors.

Educating/Health Teachings

Table 2 shows that the nurses' level of competency on educating/ health teaching was rated high as ascertained by a general mean rating of 2.55. Specifically, the indicators with the highest mean are ability of staff nurses to explain procedure to patient and significant others and answers patient's questions appropriately, and provide special instructions to patient e.g. taking medicine with food or water etc. (2.68). However, the indicator with the lowest mean is the ability of staff nurses to disclose medication error to the patient and discuss interventions to avoid its occurrence (2.28).

Staff nurses are moderately competent when it comes to disclosure of medication errors. Some staff members have difficulty admitting their mistakes for a variety of reasons.

Wolf, Z. (2011) in her secondary analysis study where she examined the reported actions of supervisors and administrators following disclosure of medication errors made by health care providers found that attending physicians and nurse managers or coordinators were notified of the drug error more often than pharmacists, resident physicians, directors of nursing, risk managers, clinical nurse specialists, or nurse practitioners. Superiors acted disapprovingly and aggressively toward the provider and interrogated them. A few physicians changed their story about the order, thus violating the trust of subjects. Subjects reported that they were reprimanded and humiliated. Mandatory re-education served to further humiliate health care providers. Superiors cautioned or warned them, instructed them about policies and procedures, discussed the incident formally and informally with them, or voiced their concern about the incident.

Duthie, E., et. al. (2000) in their study on "Quantitative and Qualitative Analysis of Medication Errors: The New York Experience", found that mandatory medication error reporting can provide useful information about systems contributing to errors, strategies for

prevention, and evidence-based information about patient safety concepts. This information is important for hospitals to consider both when analyzing medication errors and when implementing systems to improve safety, This report is intended to help guide public policy and provide guidance to other states interested in establishing mandatory reporting systems.

This implies that nurses must be encouraged to report and participate in the correction of the processes that caused the error. Staff nurses must understand the potential for medication errors and the importance of the health care facility processes/ procedures in place to prevent the errors. Nurse managers should encouraged their staff members to report problems and make suggestions for improvement. In addition, nurse managers must take the fear out of reporting errors by making the system non-punitive and removing the detterent for not reporting errors. If errors go unreported then facilities have no means of correcting a situation that created the error.

Evaluating

It can be gleaned in Table 2 that the level of competency of the staff nurses on evaluating administered medications was high as shown by the general weighted mean of 2.49. Specifically, the indicator with the highest mean is does proficient technical ability in the use, care, maintenance and evaluation of medication-related devices/ equipment (2.51). However, the indicator with the lowest mean is evaluates patients understanding regarding the medication regimen. (2.45).

Nurse supervisors evaluate staff nurses as moderately competent in medication evaluation, while self-evaluation and senior nurses rating is highly competent

In 2009, Sha.ne in her study on current status of administration of medicines found that verifying the absence of drug allergies before medication administration is essential in order to prevent patient harm. In the Australian evaluation, it was noted that previous allergies were not recorded over 75% of the time. National Patient Safety Association reported that 5.4% of errors leading to harm or death were associated with an allergy.

Administering medications involves more than just the technical task (Domm, 2007). Competent medication administration requires the

ability to assess the appropriateness of the medication for a particular client. Evaluation of the appropriateness of a medication requires knowledge of the actions, interactions, side effects (including allergic reactions), usual dose, route and approved use, basic pharmacokinetics of the drug and the client's response to it. Competent medication administration also includes preparing the medication according to directions, monitoring the client while administering the medication, appropriately intervening as necessary, evaluating the outcome of the medication on the client's health status and documenting the process. Assessment and evaluation of the appropriateness of the medication is done in collaboration with the client.

Table 2. Level of competency of staff nurses along standards of care on medication management

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		-014	M	PE				
A. Carrying out doctor's order	2.61	HC	2,51	HC	25	MC	2.46	He
a. Interprets and administer drug/ medications accurately per doctor's order.	2.84	HC	2.73	HC	2.75	RC	2.77	HC
b. Carefully verifies physician's written prescriptions that are not clear.	2.89	HC	2.82	HC	2.75	MC	2.82	HC
c. Checks relevant laboratory results, finds out if patient has any drug allergies and take a complete drug history.	2.52	HC	2.45	HC	ZOO	MC	2.33	MC
6. Use appropriate drug resources as necessary. When unsure of the indication, action, side *effect*, or appropriate dose of a drug, the nurse checks drug reference materials.	2.63	HC	2.45	MC	2.50	RC	2.53	HC
e. Determine solution and medication incompatibilities,	2.19	MC	2.09	MC	1.25	IC	1.84	MC
B. Transcribing	2.73	HC	2.75	HC	2.25	MC	2.69	HC
a. Transmit doctor's order accurately and completely in the medication sheet, kardex, and endorsement sheet.	2.82	HC	2.62	HC	2.75	HC	2.80	HC
b. Interprets and transcribe doctor's orders legibly.	2.77	HC	2.73	He	2.25	MC	2.58	HC
c. Comply with the standard/universal acceptable abbreviations as well as • institution's acceptable abbreviations,	2.78	HC	291	HC	2.50	HC	2.73	HC
d. Update new medications ordered in therapeutic sheet, kardex, and endorsement sheet.	2,72	He	2.64	1-IC	2.50	14C	2.62	He
e, Writes/ prepare medication cards correctly, spell out strange/ general instructions and include special instructions e.g. as taking medicine with food or water.	2.82	RC	2,64	HC	2,75	He	2.73	HC

C.	Endorsing	2.69	NC	2.61	HC	2.42 •	HC	2.57	HC
	a. Endorse documented adverse effects/ events related to medication administration.	2.64	HO	2.64	HO	2.50	HC	2.59	HC
	b. Endorse any missed dose of patient's medication and Interventions given.	2.72	HC	2.55	HC	2.50	He	2.59	HC
	c. identify high alert medications and endorse special precautions required with these drugs.	2.69	HC	2.64	HC	2.25	MC	2.53	BC
D.	Preparing	2.75	HC	2.64	HC	2.61	HC	2,66	HC
	a. Verifies medication cards in therapeutic sheet against doctor's order	2.80	He	2.55	HO	2.75	HC	2.70	He
	b. Adhere infection control practices in handling medications	2.77	HC	2.73	NC	275	HC	2.75	HC
	r. Computes prescribed drug dose accurately.	2.87	He	2.36	NC	3.00	HO	2.74	HC
	d. Sets up appropriate medication devices/equipment correctly.	276	HC	2.64	HC	2.50	HC	2.63	HC
	e. Uses aids such as magnifying lenses to identify smell ampules/ vials.	2.32	HC	2.45	He	1.75	MC	2.17	MC
	1. Uses appropriate medication syringes, needles, dropper, caps base on the amount, consistency, and route of the drag.	2.85	HC	2.91	HC	2.75	HC	2.84	NC
	g Disposes waste materials as per Health Care Waste Management.	2.88	HC	2.82	HC	2,75	HC	2.82	NC
B.	Labelling	2.77	HC	2,59	HC	2.56	1-IC	2,64	HC
	a. Emergency drugs in carts/boxes contain correct generic labels.	2.81	He	2.64	HC	2.53	NC	2.65	HC
	b. Uses acceptable/standard medical abbreviations in labelling.	2.76	HC	2.73	HC	2.50	HC	2.66	HC
	c. Correctly labels medication hoses with patient's name, age, address, and diagnosis.	2.74	He	2.45	HC	2.50	NC	2.57	HC
	d. Correctly labels 1V solution with patient's name, IV additives, rate of administration, bottle sequence and due date/ time	2.74	BC	2.55	HC	2,75	1-IC	2,68	BC
P.	Administering	2.91	NC	2,85	NC	3.00	HC	2.92	NC
	a. Administer the right drug.	2.92	He	2.91	TIC	3.00	NC	2.94	BC
	is Administer the right drug to the right patient.	2.92	HC	2.91	HC	3.00	He	2.94	HC
	c. Administer the right dose and does necessary actions If a dose is missed by patient	2.91	HC	2.91	FIC	3.00	HC	2.94	HC
	d. Administer the right drug by the right route	2.92	HC	2.82	HC	3.00	HC	2.91	HC
	e. Administer the right drug at the right time.	187	HO	2,73	HC	3.00	HC	2.86	HC
G.	Documenting	2,76	HC	2,75	HC	2.88	lie	2.80	He
	a. Does appropriate documentation relevant to the preparation, administration and termination of medication therapy.	2.77	MC	2.82	He	3.00	HC	226	HC
	b. Document each drug administered in patient's chart according to agency policy	2.85	EC	2,82	HC	3.00	NC	2.89	NC
	e. Document and report results, side-effects and adverse effects of medications.								
	d. Follows accordingly hospital protocols in writing incident report once a medication error occur in the unit,	2,68	HO	2.73	HC	7.50	He	2.64	HC
		2.75	HC	2.64	HC	3.00	HO	1.80	He

H. Monitoring	2.61	HC	2.55	HC	2.63	HC	2,59	HC
a. Observe and asses for side-effects, . adverse reactions and effectiveness of administered drugs and initiate appropriate nursing interventions.	2.67	HC	2.73	HC	2.75	HC	2.72	HC
Is Monitors the patient for potential drug-to-drug or drug-to-food Interactions.	2.55	NC	2.36	HC	2.50	HC	2.47	11C
I. Educating/Health Teachings	2,73	HC	261	HC	2.30	MC	2,55	HC
a. Established rapport with patients.	2.77	HC	2.82	HC	2.25	MC	2.61	HC
b. Explains procedure to patient and significant others and answers patient's questions appropriately.	2.75	1-IC	2.55	HC	2.75	HC	2.68	HC
c. Teach patient about the drug he/she is receiving	2,76	HC	2.55	HC	2.25	MC	2.52	HC
d. Provide special instructions to patient e.g. taking medicine with food or water etc.	2.80	HC	2.73	HC	2.50	HC	2.68	HC
e. Disclose medication error to the patient and discuss interventions to avoid its occurrence.	2.55	HC	2.55	HC	1.75	MC	2.28	MC
3, Evaluating	2.67	HC	2.55	HC	2.25	MC	2.49	MC
a. Evaluatc/ assess patient's reactions to medication,	2.70	HC	2.55	HC	2.25	MC	2.50	HC
b. Evaluates patients understanding regarding the medication regimen.	2.65	1-IC	2.95	FIC	2.25	MC	2.95	13C
c. Does proficient technical ability in the use, care, maintenance and evaluation of medication-related devices/equipment.	2.65	HC	2.64	HC	2.25	MC	2.51	HC
WEIGHTED MEAN	2.73	HC	2.64	HC	2.54	HC	2.64	HC

LEGEND M-Mean, WM - Weighted Mean, DER - Descriptive Equivalent Rating, He - Highly Competent, MC Moderately Competent, IC - Incompetent

Extent of Influence of Factors Affecting Medication Errors

Medication errors are a significant issue affecting patient safety and costs in hospitals often posing dangerous consequences for patients. It is important to understand that an analysis of factors leading medication errors can help healthcare professionals and managers identify why medication errors occur and provide insight into how to make improvements to prevent or reduce them.

Table 3 shows that the extent of influence of personal, professional, managerial and work-related factors on medication errors is moderate, professional factors being the number one cause of medication errors, followed by managerial factors, work-related factors, and lastly personal factors.

The result is influenced by the profile of the respondents. Majority are newly registered nurses and lacks hospital experience. Furthermore, the subject nursing pharmacology in the nursing curriculum only has three units of lecture which is believe to be a factor why the respondents rank professional factors as number one.

Specifically, the indicator with the lowest score in personal factors is skipped meals/having empty stomach during duty while, the indicator with the highest rank is, in physical discomforts such as physical pain while on duty (head ache, stomach ache and tooth ache), nasal congestion and allergies. The result of the study is supported by Arakawa (2011). In his study, he found that nurses who were being under treatment experienced 1.20 times more medical incidents/errors than healthy nurses, and nurses reporting an absence due to sickness during in the past 6 months experienced 1.50 times more medical incidents/errors than healthy nurses.

In addition, the professional factor with the lowest score under knowledge is lack of training on parenteral medication administration (IV Therapy, etc.) while, the indicator with the highest rank is miscalculation of drug dosages and IV fluid rate. Furthermore, the indicator with the lowest rank under skills is lack of communication skills training while, the indicator with the highest rank is lack of hospital experience. Lastly, the indicator with the lowest rank under attitude is performing drug administration for the sake of just accomplishing a task while, the indicator with the highest rank is lack of initiative in clarifying doubts regarding the medicine to be given.

The result of the study is supported by the following studies. Shane's (2009) in her study found that more than 1 in 6 medication errors involve a calculation error. A simulated study in a pediatric stabilization unit in England found that 14.2% of 150 orders were converted from milligrams to milliliters incorrectly, with a maximum dose deviation of 40%. Furthermore, 32.7% of drug doses drawn up in a syringe were incorrect. One study demonstrated that 81% of nurses were unable to correctly calculate medications 90% of the time and that 43.5% of test scores requiring calculations were below 70% accuracy. In the United States, a nationwide study conducted to assess practices to validate mathematical skills indicated a required passing rate of 80%; no respondent institutions required 100% accuracy.

In the Philippines, it was found that liquid drugs have the highest incidence of error (Flor, N. et. al., 2010). Medications that require mixing diluents and calculation have a higher risk for error. In general, these drugs require multistep preparation and administration, therefore takes more time.

In 2010, Ouchi in his analysis on the factors of medical errors perceived by nurses found out that there is a significant difference between nurses with less than five years and nurses with five years or more of experience. With less than five years of experience working as a nurse, five factors of poor physical condition, unable to concentrate, inferior working environment, tasks which easily lead to confusion, and looking-back were extracted from nurses, while the four factors of management of health, variant services, difficult judgement, and demotivation were extracted from nurses with five years or more of experience working.

Locally, the study of Flux, N. et. al. (2010) found that another factor that affects general medication errors is the length of working experience of nurses. Nurses who have worked more years are less prone to having wrong time errors as compared to nurses who have less working experience.

Fierce Medical News (2011, January 17) reported that survey found differing views of how doctors treat nurses. According to 42 percent of nurse leaders, physician abuse or disrespect of nurses was common, whereas only 13 percent of physician leaders said it was common. Fifty-eight percent of nurse leaders considered disrespect for nurses uncommon, while 88 percent of physician leaders said it was uncommon at their healthcare organizations.

In *The New England Journal of Medicine* called "The Doctor-Nurse Game Revisited." Written by three physicians, it described a rigid hierarchy that placed physicians firmly in charge. Even though nurses regularly offered expert advice about patient care, they were expected to defer to physicians. By engaging in this characteristic behavior, nurses and physicians prevented open conflict-but they also avoided direct communication with each other. Nurses consistently reported feeling frustrated and dissatisfied with working relationships that devalue their professional worth.

In light of the ongoing nursing shortage, poor nurse/physician relationships have far-reaching implications within health care settings, Research shows that disruptive behavior by physicians significantly contributes to nurse burnout, decreased job satisfaction, and decisions to leave the profession. In one study, 31% of respondents said they knew of nurses leaving the hospital as a result of disruptive physician

behavior.

Nurses have always reported difficulty dealing with physicians who are rude, unpleasant, dismissive, belittling, or intimidating. This kind of behavior is reported to be more prevalent among older physicians than among younger ones who were reared in a more egalitarian social climate. Nurses report that these negative behaviors appear to be related to gender issues, power gaps, hierarchical traditions, or an attitude that nurses are their handmaidens rather than valued professional collaborators.

Physicians who engage in negative behavior with nurses tend to do so because of deeply ingrained personality characteristics related to a need for coercive power and self- glorification. These physicians probably treat others outside of the health care setting the same way. Some physicians get away with the behavior because many nurses feel intimidated by it and are afraid to address it or carat figure out how to deal with it. Consequently, the behavior continues unchecked.

Nurses report that physicians may take them for granted, donut know or understand what nurses actually do, donut listen to what nurses have to say about patients, donut take nurses> assessments seriously, fail to incorporate nurses> assessments into care plans, or are difficult to contact. These problems may have less to do with the physicians) personality characteristics than their lack of knowledge about nursing responsibilities.

Another consideration is the difference in how nurses and physicians approach patient care. Nurses are educated to see the broader health care picture; they tend to focus on holistic issues and the more human aspects of care. Physicians have been educated to focus on «the case»; they>re concerned more with strategies for medical cure or management and may not focus on emotional issues, discharge planning, social and cultural concerns, and helping patients live with their disease and treatment. Most physicians aren't taught communication skills as part of their general medical education, and some may also wish to avoid dealing with intense emotional states in their patients. Nurses report that physicians don't spend enough time discussing care options with patients and families.

Many nurses still feel that physicians don>t understand, respect, or care to listen to nursing perspectives on patient care. Different

perceptions of the patient and the patient>s needs often result in misunderstanding and conflict between nurses and physicians and can become a breeding ground for anger and dissatisfaction.

Gender-related power issues still create problems, especially for female nurses in their working relationships with both male and female physicians. Some physicians, especially older ones, tend to see themselves as being in complete control, with nurses serving as subordinates present to do their bidding. Nurses report that male physicians continue to exercise control over the largely female nurse group. In this traditional model, being male automatically confers superior power.

The old «doctor-nurse game,» first described by Stein in 1967, continues to exist. Many female nurses, despite believing their expertise to be more appropriate in a particular situation, still feel the need to defer to physicians. Some nurses have learned and still choose, consciously or unconsciously, to preserve and protect the physicians' traditionally "superior" professional status by deferring to them at all times. However, male nurses have reported that physicians treat them more respectfully and with greater collegiality.

Class issues can also be a factor: Traditionally, most nurses came from lower social classes than most physicians. However, class backgrounds of those entering nursing and medicine tend to be more equal now than in the past.

A difference in educational level between most nurses and the physicians with whom they work is another factor affecting the balance of power. Current reports attest to a mild «acceptance» by some nurses that the power level between nurses and physicians will always be unequal because physicians generally have more education than most nurses.

Nurses who have this attitude may be confusing differences in educational levels with differences in professional philosophy, roles, functions, professional knowledge, and clinical focus and experience between the two professions. The roles, functions, and kinds of expertise nurses and physicians have may be different, but they>re equally important to patient care.

The managerial factors with the lowest score is lack of supervision of staff nurses, while the indicator with the highest rank is lack of

communication among staff nurse, doctors, and other members of the team.

Poor communication between nurses and physicians was the most important factor causing dissatisfaction with nurse/physician working relationships in the *Nursing91* survey, and it continues to be cited as the most significant issue in the current literature. The JCAHO reported that communication failures among professionals caused 70% of 2,455 reported sentinel events, with about 75% of the patients dying as a result.

Communication problems stem from all the factors affecting nurse/physician interaction Poor communication persists as long as physicians view their roles and functions as fundamentally superior to those of nurses. When physicians don>t understand or appreciate the value of nurses) observations and judgments, they>re slow to respond when nurses try to contact them-a common nursing complaint.

If nurses feel disrespected, misunderstood, or devalued by physicians, they may feel angry and helpless and avoid communicating. Poor communication leads to misunderstandings, errors, and ongoing conflict between nurses and physicians.

Rosenstein showed that nurses see a strong association between disruptive physician behavior and adverse events, errors, and poor patient outcomes. One nurse commented, <Most nurses are afraid to call Dr. X when they need to and frequently won't call. Their patients) medical safety is always in jeopardy because of this.)› Asked if they were aware of any potential adverse events that could have occurred from disruptive behavior, 60% of 1,487 respondents to the question said yes.

The good news is that when nurses and physicians work closely together in small, high-acuity areas such as intensive care units, they tend to work in a climate of mutual respect, good communication, and nurse/physician. collaboration.

Lastly, the managerial factor with the lowest score is poor ventilation in the preparation area, while the indicator with the highest rank is unavailability of equipments (i.e. absence of insulin syringes, infusion pumps etc.).

The 2011 health budget of roughly Php 33 billion comprises of measly 2.2% of the total national budget that translates to less than a

peso allocation per day per Filipino. This, according to IBON Primer Series (2008), is way below the WHO recommendation for health spending of 5% of the country's Gross Domestic Product. And with subsidies significantly reduced for 12 major DOH hospitals and 55 public hospitals nationwide (IBON Facts & Figures, 2010), the latter are forced to resort to income generation and revenue enhancement.

As a result, hospitals are not able to purchase equipment that will be used in drug administration such as insulin syringes, infusion pumps and so on that may decrease incidence of underdosage or overdosage of medications, these now increases the risk of committing medication errors. For instance, the unavailability of insulin syringes in government hospitals in the Philippines leads to medication errors. The use of Ice tuberculin syringe instead of insulin syringe when administering insulin drugs lead staff nurses at risk in giving the wrong dose. These two are different in terms of measure, labeling and calibration. There is a great risk of overdos age because there are similarities between the two. Some may interpret the 1.0 in a tuberculin syringe as 10 units.

Table 3. Extent of influence of factors affecting medication. errors

FAC_TQ S		WM	DER	It MK
P ersonal Factors		1.95	Moderately Influential	4
a. Being bombarded with personal conflicts.	1.82			
la. Under intense stress and pressure. Anxious while preparing and administering the drug,	1.93			
c. Lack of sleep prior to the day of duty in the hospital area.	1.98			
cr. In physical discomforts such as physical pain while on duty (head ache, stomach ache and tooth ache), nasal congestion and allergies.	2.07			
e. Skipped meals/having empty stomach during duty.	1.90			
f. Forgetting and memory lapses.	2.03			

2. Professional Factors				
Knowledge		2.19	Moderately Influential	1
a. Lack of knowledge on the different principles in the administration of medication,	2.26			
b. Miscalculation of drug dosages and IV fluid rate.	2.25			
c- Lack of knowledge of basic drugs and their effects to the patient's body	2,26			
d. Poor interpretation of medical terminologies,	2.15			
e. Lads of knowledge in operating infusion pumps, syringe pumps and other devices use for administering medications,	2,22			
1 Lack of training on parenteral medication administration (IV Therapy, etc.)	2.17			
Skills				
g. Inability to follow the 10 golden rules of medication administration.	2,22			
h. Inability to practice the "three time check" of the medication's label before administration.	2.20			
I Lack of hospital experience.	2,21			
j, Lack of skills in documentation.	2.16			
k. Lack of communication skills training.	2.12			
Attitude				
l Lack of confidence.	2.10			
mlack of initiative in clarifying doubts regarding the medicine tube given.	2.14			
n. Performing drug administration for the sake of just accomplishing a task.	2.15			
o. Prepares medication under the influence of alcohol while on duty.	2.28			
p. Lack of initiative in checking the label of the medication by basing it to the color and packaging of the commonly used drugs.	2.24			
q, Lack of information about the patient,	2.20			
3. Managerial Factors		2,18	Moderately Influential	2
a. Beyond the ideal nurse-patient ratio.	2.25			
b. Lack of nursing personnel.	2.27			
c. Lack of communication among staff nurse, doctors, and other members of the team.	2.25			
d, Lack of training among staff nurses on medication safety,	2.17			
e. Lack of knowledge on the written policies, procedures and guidelines on medication management of the health care facility.	2.16			
f, Poor implementation of hospitals policies regarding reports on—medication effects/ adverse reactions, medication error and near-miss.	2,14			
g. Lack of supervision of staff nurses.	2,04			
4. Work-Related Factors		2,12	Moderately Influential	3
a. Poorly lighted preparation area.	2.07			
b. Crowded and noisy environment,	1.98			
c. Poor ventilation in the preparation area.	1,99			
d, Unavailability of equipments (i.e. absence of insulin syringes, infusion pumps etc.)	2.25			
e. Hard to decipher hand writing of the prescribing physicians.	2.30			
WEIGHTED MEAN	1	2.14	Moderately Influential	

Comparison in the Nurses' Level of Competency on the Standards of Care in Medication Management According to their Profile

Table 4 shows that there is a significant difference between the age of respondents and level of competency specifically, carrying out doctor's order, monitoring, educating/health teaching and evaluating. To identify which pairs are significantly different, the Tukey test was utilized with ,05 margin of error. It was found out that late adult age 55 and above have higher level of competency compare to young adults (20-34 years old) on the following areas: carrying out doctor's order, educating/health teachings, and evaluating. On the other hand, middle adults (35-54 years old) have higher level of competency on monitoring compare to young adults,

The findings of the study is supported by the study of Flor, N. (2010) where she found that one factor that affects generalmedication errors is the length of working experience of nurses. Nurses who have worked more years are less prone to having wrong time errors as compared to nurses who have less working experience. In addition, Bailey (2008) in his study showed that nurses made the most medication errors either in their first five years of nursing experience or after twenty years of nursing,

The results showed that nurses within the first five years of work experience had an average of 22 errors within the last twelve months. During the first six months of employment a newly graduated registered nurse is in transition, learning the role as a registered nurse in a particular setting (Duchscher, 2008; Ferguson & Day, 2007). They learn this new role by observing other registered nurses in the specific practice setting and within the social network of their workplace. Time is required to consolidate professional relationships, learn practice norms in that practice setting, and gain depth in their nursing practice knowledge and judgement. As they develop confidence in their new role they assume higher levels of responsibility and manage complex clinical situations. They also recognize more subtle nuances of situations and patterns with increased ease as they move to a more complex way of thinking and doing.

Table 4 shows that there is no significant difference between the respondent's sex and level of competency. Meaning, both sexes have

the same level of competency on the standards of care of medication management. Regardless of being male or female nurses, they are equally prone to medication error. The result of the study is supported by Mayo & Duncan's (2004) study on "Nurse Perceptions of Medication Errors What We Need to Know for Patient Safety", where they confirmed that there is no strong relationship between nurse characteristics (e.i. age, sex, years of practice, and education) and number of medication errors.

Furthermore, it shows that there is no significant difference between the respondent's civil status and level of competency. Meaning, being single, married, widow/widower have the same level of competency. In contrast with the result of the study of Zencirci (2008) which states that having children, being single parent, having a family, and many other factors, errors and near errors at work are more likely to occur.

Also, there is no significant difference between the highest educational attainment and level of competency, In contrary to Bailey's (2008) study on the relationship of medication errors to education where there is a relationship between the number of medication errors and nurses with varying education levels. The study indicates that a BSN RN generally makes the most errors, which could be useful information in structuring future BSN programs to increase clinical focus in the preparation of their students. The result of the study indicates that the quality of nursing education in the Philippines has increased. However, Anderson's (2010) study stated that continuing education of the nursing staff can help reduce medication errors. Medications that are new to the facility should receive high teaching priority. Staff should receive updates on both internal and external medication errors, as an error that has occurred at one facility is likely to occur at another. Hence, nurses must sustain the quality of nursing education by updating their selves through continuing education programs.

Another significant finding is that there is a significant difference between the work-related experience and level of competency specifically, educating/health teaching. Staff nurses who are previous clinical instructors have a better ability in conducting medications health teachings/education to their patients than staff nurses who are previously nurse volunteer/trainee and RN HEALS. Likewise

Bailey's (2008) study indicates little difference between the number or medication errors and work experience. The present study shows that the nature of work-related experiences before becoming a staff nurse affects the level of competency. The job task and duties of Clinical Instructors is to initiate, facilitate, and moderate classroom discussions. They demonstrates and teaches patient care in classroom and clinical units to nursing students and instructs students in principles and application of physical, biological, and psychological subjects related to nursing. This is an advantage for clinical instructors who become staff nurses.

Moreover, there is a significant difference between the years of experience and level of competency specifically, educating/health teaching and evaluating. Using the Tukey test with .05 margin of error, the difference lies between experts, proficient, and advance beginners. Nurses whose years of experience is 5 and above have better skills in educating patients medication compare to staff nurses whose experience is 2 years and below. Likewise, experts have better evaluation skills compare to nurses whose experience is below 5 years. This depicts that the higher the years of experience, the better the performance on medication education and evaluation.

The finding of the study is supported by Bailey's (2008) study on the relationship of medication errors to education and years of nursing experience which states that there is a relationship between the number of medication errors and nurses with varying education levels. The study indicates that a BSN EN generally makes the most errors, which could be useful information in structuring future BSN programs to increase clinical focus in the preparation of their students. It showed that nurses made the most medication errors either in their first five years of nursing experience or after twenty years of nursing. The results showed that nurses within the first five years of work experience had an average of 2.2 errors within the last twelve months. The nurses with more than 20 years of nursing experience made an average of 2 errors per nurse within the last twelve months. The three other work experience groups with 6-20 years of experience, varied within 0.5 errors of each other.

Lastly, there is a significant difference between work setting and level of competency specifically, transcribing, preparing, and educating/

health teaching. In transcribing medications, operating-room nurses have better skills than nurses who are deployed in general wards. In preparing medications, Optha-ENT nurses have better skills than nurses whose work setting are Medicine Ward, Intensive Care Units, and Private Wards. In educating/health teaching, staff nurses who are in Surgery Ward, Operating Room, and Out-Patient Department have better skills than those who are working in the Optha-ENT ward. Moyen (2008), in his clinical review on medication errors in critical care, errors are common in most health care systems and are reported to be the seventh most common cause of death overall. In the intensive care unit (ICU), on average, patients experience 1.7 errors per day and nearly all suffer a potentially life-threatening error at some point during their stay. Medication errors account for 78% of serious medical errors in the ICU. Providing a single hospitalized patient with a single dose of a single medication requires correctly executing 80 to 200 individual steps.

Table 4. Comparison in the Nurses' level of competency on the standards of care in medication management according to their profile

ENO	etof.Coinprrieri	P'valtje	Iritapretal
1. Age	a. Carrying out doctor's order	.028	Significant
	b. Transcribing	.559	Not Significant
	c. Endorsing	.060	Not Significant
	d. Preparing	.062	Not Significant
	e. Labelling	.173	Not Significant
	f. Administering	.419	Not Significant
	g. Documenting	.721	Not Significant
	h. Monitoring	.048	Significant
	i. Educating/Health Teachings	.008	Significant
	j. Evaluating	.009	Significant
2. Sex	a. Carrying out doctor's order	.130	Not Significant
	b. Transcribing	.864	Not Significant
	c. Endorsing	.425	Not Significant
	d, Preparing	.307	Not Significant
	e. Labelling	.730	Not Significant
	f. Administering	.568	Not Significant
	g. Documenting	.347	Not Significant
	h. Monitoring	.151	Not Significant
	i. Educating/Health Teachings	.873	Not Significant
	j. Evaluating	.336	Not Significant

3.	Civil Status	a. Carrying out doctor's order	.194	Not Significant
		b. Transcribing	.616	Not Significant
		c. Endorsing	.303	Not Significant
		d. Preparing	.795	Not Significant
		e. Labelling	.562	Not Significant
		f Administering	.744	Not Significant
		g. Documenting	.233	Not Significant
		h. Monitoring	.368	Not Significant
		i EducatinglHealth Teachings	.250	Not Significant
		j. Evaluating	.345	Not Significant
	Highest Educational Attainment	a. Carrying out doctor's order	.307	Not Significant
		b. Transcribing	.589	Not Significant
		c. Endorsing	.704	Not Significant
		d. Preparing	.337	Not Significant
		e. Labelling	.169	Not Significant
		E Administering	.736	Not Significant
		g Documenting	.373	Not Significant
		h. Monitoring	.936	Not Significant
		Educaling/Health Teachthgs	.443	Not Significant
		j. Evaluating	.802	Not Significant
	Work-related Experience	a. Carrying out doctor's order	.618	Not Significant
		b. Transcribing	.161	Not Significant
		c. Endorsing	.285	Not Significant
		d. Preparing	.240	Not Significant
		e. Labelling	.240	Not Significant
		f. Administering	.766	Not Significant
		g. Documenting	.382	Not Significant
		h. Monitoring	.798	Not Significant
		I. Educating/Health Teachings	.014	Significant
		j. Evaluating	.538	Not Significant
	Years of Experience	a. Carrying out doctor's order	.235	Not Significant
		b. Transcribing	.893	Not Significant
		c. Endorsing	.405	Not Significant
		d. Preparing	.111	Not Significant
		e. Labelling	.461	Not Significant
		f. Administering	.310	Not Significant
		g. Documenting	.134	Not Significant
		h. Monitoring	.181	Not Significant
		I. Educating/Health Teachings	.007	Significant
		j. Evaluating	.010	Significant
7.	Work Setting	a. Carrying out doctor's order	.117	Not Significant
		b. Transcribing	.008	Significant
		c. Endorsing	.860	Not Significant
		d. Preparing	.003	Significant
		e. Labelling	.292	Not Significant
		f. Administering	.138	Not Significant
		g. Documenting	.653	Not Significant
		h. Monitoring	.406	Not Significant
		1. Educating/Health Teachings	.000	Significant
		. Evaluating	.106	Not Significant

Comparison in the Factors Affecting Medication Errors Considering the Profile Variables

Table 5 shows that there were no significant differences in the factors affecting medication errors considering different age groups as revealed by the very small F-values. It has to be recalled that the null hypotheses were tested at the 0.05 level of significance and that looking at the p-values generated in the statistical analyses, these were all higher than .05, thus the null hypotheses were rejected. These tend to show that factors influencing medication errors are comparable in the different age groups. This means that nurses of all ages are vulnerable to experience distractions be it along personal, professional, managerial or even work-related factors. As such nurses have to be very careful in administering medication to patients so as to minimize if not to entirely control the occurrence of errors.

On the other hand, the results of the comparative analyses on the factors affecting medication errors when the respondents are grouped by sex were presented in Table 5. In as much as there were only two categories for sex, the t test for independent samples was used in the analyses. It can be gleaned in the table that two of the six factors resulted in significant differences. These were along the professional factors particularly on the skills and attitudes of the nurses as ascertained by the computed t-values of with

Men's position in taking care of patients and being in health care industry all around the world is not new and goes far back to medieval times and there is recorded evidence of males' skill and care.

The study of Ozdemir, A. et. al. (2008) indicated that ICU, operating room and emergency departments were seen as proper places for males to work after graduation by both genders. On the other hand maternity and pediatric clinics were not seen as fit places for males to work. It is hard for the male nurse to be in a role that was traditionally perceived as a female role which brings up a role tension. Therefore, male nurses prefer to work in places like emergency departments, intensive care units and psychiatry where they can feel more accepted by other health care workers. The places males choose to work in hospitals are psychiatry which is identified with physical power, ICU and ER which are identified with technical skills and autonomy (Evans

2002).

Sociologists describe the sex role socialization as "instrumental" for men and "expressive" for women. The characteristics of instrumental socialization include the ability to compete, aggressiveness and ability to lead and to wield a power to accomplish tasks. Expressive socialization includes learning to nurture, to be affiliative and to be sensitive to needs of others. In patriarchical cultures the value given to women and her place in society is naturally reflected to the nursing profession. This also presents particular problems to the image of nursing as a career (Girard 2003, Muldoon& Reilly 2003, Yagmur & Ozerdogan 2001).

Since the men are always in different and special groups in a patriarchical society, they are likely to enter in nursing profession to benefit from their minority but powerful position. However, it has always been thought that, males in nursing profession will gather a power and they will improve the status of nursing professions. It is always thought that men entering in nursing profession will make a difference and nursing profession will be improved (Ozdemir, A. et. al. 2008, Eksen 1997, Karadakovan 1993, Oktay& Gurel 1986, Savaser 1993).

Table 5 further shows that there is no significant difference between civil status and factors affecting medication errors. This means that all nurses regardless of being single, married, or widow are equally vulnerable to experience distractions from the above variables. Also, shows that there is no significant difference between highest educational attainment and factors affecting medication errors. This means that all nurses are equally vulnerable to experience distractions from the above variables.

One of the key findings of the study is that there is a significant difference between work-related experience and professional factors. Using the Tukeys test, the difference lies on the following: Nurse Volunteer have higher chance to be distracted from the above factors compare to staff nurses, clinical instructors and contractual staff nurses. This means that nurse experience may protect staff nurses from incurring medication errors.

Bailey (2008) in his study showed that nurses made the most medication errors either in their first five years of nursing experience

or after twenty years of nursing. The results showed that nurses within the first five years of work experience had an average of 2.2 errors within the last twelve months. The nurses with more than 20 years of nursing experience made an average of 2 errors per nurse within the last twelve months. The three other work experience groups with 6-20 years of experience, varied within 0.5 errors of each other. The study also indicated that giving medication at the wrong time was the most common type of medication error made by the participants. The shift that reported having the most medication errors was 7am-7pm, when most medications are administered. The most common route for medications errors was PO or "by mouth",

In 2010, Chichi in his analysis on the factors of medical errors perceived by nurses found out that there is a significant difference between nurses with less than five years and nurses with five years or more of experience. With less than five years of experience working as a nurse, five factors of poor physical condition, unable to concentrate, inferior working environment, tasks which easily lead to confusion, and looking-back were extracted from nurses, while the four factors of management of health, variant services, difficult judgement, and demotivation were extracted from nurses with five years or more of experience working.

On the other hand, it shows that there is no significant difference between years of experience and factors affecting medication errors. This means that all nurses are equally vulnerable to experience distractions from the above variables regardless on how long staff nurses are employed. It also shows that there is no significant difference between work setting and factors affecting medication errors. This means that all nurses are equally vulnerable to experience distractions from the above variables regardless of hospital unit or area.

Table 5. Comparison in the factors affecting medication errors considering the profile variables

		14 ! roi*t*oweienc		. Vatc	;Iit r a]16t
1.	Age	a.	Personal Factors	.514	Not Significant
		b.	Professional Factors		
			i, Knowledge	.936	Not Significant
			ii. Skills	.B30	Not Significant
			iii. Attitude	.870	Not Significant
			Managerial Factors	.424	Not Significant
		.	Work Related Factors	.554	Not Significant
	Sex	a.	Personal Factors	.207	Not Significant
		b.	Professional Factors		
			s. Knowledge	.097	Not Significant
			it. Skills	.049	Significant
			ill. Attitude	.015	Significant
			Managerial Factors	.106	Not Significant
		d.	Work Related Factors	.954	Not Significant
3.	Civil Status	a.	Personal Factors	.456	Not Significant
			Professional Factors		
			i. Knowledge	.293	Not Significant
			ii. Skills	.095	Not Significant
			iii, Attitude	.541	Not Significant
		c.	Managerial Factors	.501	Not Significant
		d.	Work Related Factors	.428	Not Significant
4.	Highest Educational Attainment	a.	Personal Factors	.770	Not Significant
		b.	Professional Factors		
			I. Knowledge	.525	Not Significant
			ii. Skills	.377	Not Significant
			iii. Attitude	.256	Not Significant
		c.	Managerial Factors	.740	Not Significant
		d.	Work Related Factors	.510	Not Significant
5.	Work-related Experience	a.	Personal Factors	.015	Significant
		b.	Professional Factors		
			i. Knowledge	.009	Significant
			ii, Skills	.032	Significant
			iii. Attitude	.052	Significant
		c.	Managerial Factors	.006	Significant
		d.	**Work** Related Factors	.003	Significant
6.	Years of Experience	a.	Personal Factors	.849	Not Significant
		b,	Professional Factors		
			I. Knowledge	.307	Not Significant
			ii. Skills	.505	Not Significant
			fit. Attitude	.762	Not Significant
		c.	Managerial Factors	.726	Not Significant
		d.	Work Related Factors	.944	Not Significant
7.	Work Setting	a.	Personal Factors	.104	Not Significant
			Professional Factors		
			i. Knowledge	.077	Not Significant
			ii. Skills	.2131	Not Significant
			Ili. Attitude	.051	Not Significant
		c.	Managerial Factors	989	Not Significant
		d,	Work Related Factors	.094	Not Significant

Correlation between the Level of Competency and the Factors Affecting Medication Errors

Table 6 shows that there were very low correlations in the respondents' levels of competency along standards of care on medication management and the factors affecting medication errors. It means that the better the level of competency a nurse is the lesser the chance the she is affected by factors leading to medication errors. However, there is only a little relationship between the two variables, this indicate that any nurse is potentially at risk for making a medication error.

To improve patient safety it is important to take into account several complex mechanisms, and the results have highlighted the need for strengthening nurses' basic knowledge particularly in drug management. Verifying nurses' competencies on medication administration, preceptors can ensure the basic safety practices of the staff nurses.

It shows that medication error should not be solely blamed to staff nurses. Administrators must also consider other factors and other areas in medication process which leads to an incident of medication error. By thorough assessment and evaluation in the medication process, this may guide hospital administrators in developing or enhancing their current policies regarding medication error. For example, if hospital administrators found out that medication error is greatly affected by illegible handwriting of prescribing doctors, the hospital administrators may implement a policy which will address this issue.

The finding of the study is supported by the following studies. In 2011, Simonsen and colleagues in their cross-sectional study on medication knowledge, certainty, and risk of errors in health care in Norway found that medication knowledge was found to be unsatisfactory among practicing nurses, with a significant risk for medication errors. The study revealed a need to improve the nurses' basic knowledge, especially when referring to drug management.

Anderson's (2010) stated that continuing education of the nursing staff can help reduce medication errors. Medications that are new to the facility should receive high teaching priority Staff should receive updates on both internal and external medication errors, as

an error that has occurred at one facility is likely to occur at another. As medication-related policies, procedures, and protocols are updated, this information guides staff nurses on medication safety implementation.

Bailey's (2008) found that there is a relationship between the number of medication errors and nurses with varying education levels. The study indicates that a BSN RN generally makes the most errors, which could be useful information in structuring future BSN programs to increase clinical focus in the preparation of their students.

Brady's et. al. (2009) article on a literature review of the individual and systems factors that contribute to medication errors in nursing practice stated that the contributory factors to nursing medication errors are manifold, and include both individual and systems issues. These include medication reconciliation, the types of drug distribution system, the quality of prescriptions, and deviation from procedures including distractions during administration, excessive workloads, and nurse's knowledge of medications. The authors conclude that systematic approaches to medication reconciliation can reduce medication error significantly. Promoting consistency between health care professionals as to what constitutes medication error will contribute to increased accuracy and compliance in reporting of medication errors, thereby informing health care policies aimed at reducing the occurrence of medication errors. In addition, acquisition and maintenance of mathematical competency for nurses in practice is an important issue in the prevention of medication error.

In the Philippines, it was found that liquid drugs have the highest incidence of error (Floc, N. et. al., 2010). Medications that require mixing diluents and calculation have a higher risk for error. In general, these drugs require multistep preparation and administration, therefore takes more time.

According to Moyen (2008), nurses played particularly important roles in patient safety because they are the health care providers with whom patients are likely to spend the greatest amount of time. This has two important implications. One, decreasing nurse-to- patient staffing ratios may be associated with an increased risk of medical errors Nurse-to-patient ratios of 1:1 or 1:2 appear to be safest in the ICU. Second, nursing experience may have an important influence on

patient safety. Experienced nurses are more likely to intercept errors compared with less experienced nurses.

Anderson's (2010) stated that heavier workloads also are associated with medication errors. The nursing shortage has increased workloads by increasing the number of patients for which a nurse is responsible. Also, nurses perform many tasks that take them away from the patient's bedside, such as answering the telephone, cleaning patients' rooms, and delivering meal trays, Absence of nurses from the bedside is directly linked to compromised patient care.

Medication administration errors can threaten patient outcomes and are a dimension of patient safety directly linked to nursing care. Staffing ratio issue may affect the quality of care rendered by staff nurses to their patient. Heavier workloads are associated with medication errors. The nursing shortage has increased workloads by increasing the number of patients for which a nurse is responsible. Also, nurses perform many tasks that take them away from the patient's bedside, such as answering the telephone, cleaning patients' rooms, and delivering meal trays. Absence of nurses from the bedside is directly linked to compromised patient care.

Inadequate nursing staffing results in nurses working multiple shifts; under-staffed; over-worked; and suffering the consequences of job-related stress. As a result, patients' needs are not met. Grave concerns surround the future of the nursing profession as it influence the performance of nurses and may result to higher incident of medication error.

Heavy workload greatly influence the quality of care being rendered by a staff nurse. This implies that staff nurses are at risk of committing medication errors since they do not have enough time to follow the ten rights when administering medications at the same time they don't have enough time to go back to their patients in order for them evaluate the effectiveness of the medications or to perceive earlier any signs and symptoms of adverse effects.

Philippine Journal of Nursing (2010), in an article stated that nurses are facing starvation wages and inhumane work conditions, notwithstanding, many nurses are even in danger of losing their jobs when government hospitals are integrated and consolidated like what reportedly will happen to the four government-owned and controlled

corporations (GOCC) namely Philippine Children's Medical Center, Lung Center of the Philippines, National Kidney Transplant Institute, and Philippine Heart Center. Long time casuals, contractual, job-order employees may have served for years yet they do not have security of tenure and do not enjoy standard benefits afforded permanent personnel.

Lack of income implies that staff nurses were not able to support their selves in pursuing a continuing education program like masters degree or doctorate degree, and also incapable to attend seminars and workshops to update self to the latest trend in the nursing profession.

According to data from PNA-DOLE-PRC (2010), nursing manpower pegged at more than 200,000 registered nurses but most hospitals in both private and public sectors are unable to absorb such huge manpower because of budgetary constraints. The 2011 health budget of roughly Php 33 billion comprises of measly 2.2% of the total national budget that translates to less than a peso allocation per day per Filipino. This, according to IBON Primer Series (2008), is way below the WHO recommendation for health spending of 5% of the country's Gross Domestic Product. And with subsidies significantly reduced for 12 major DOH hospitals and 55 public hospitals nationwide (IBON Facts & Figures, 2010), the latter are forced to resort to income generation and revenue enhancement.

The article has bearing to the present study because it implies that hospitals will not be able to purchase equipments that will be used in drug administration such as insulin syringes, infusion pumps and so on that may decrease incidence of underdosage or overdos age of medications, these now increases the risk of committing medication errors. For instance, the unavailability of insulin syringes in government hospitals in the Philippines leads to medication errors. The use of 1cc tuberculin syringe instead of insulin syringe when administering insulin drugs lead staff nurses at risk in giving the wrong dose. These two are different in terms of measure, labeling and calibration. There is a great risk of overdosage because there are similarities between the two. Some may interpret the 1.0 in a tuberculin syringe as 10 units,

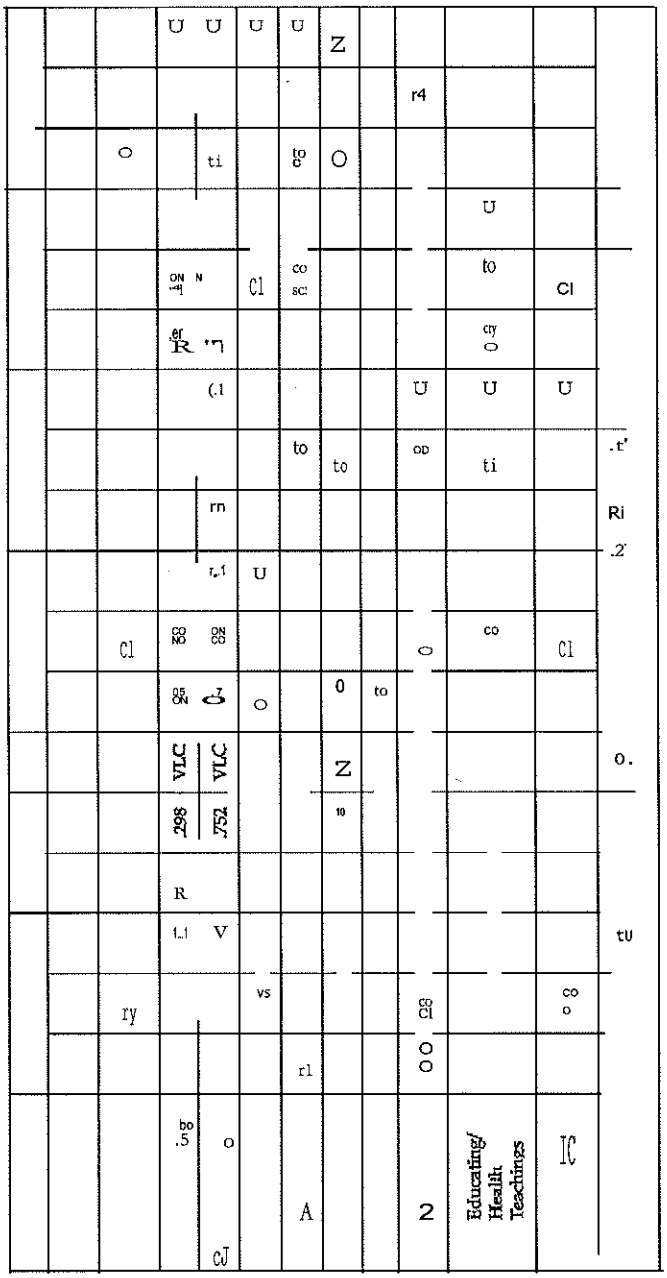
According to the results of an observational study reported in the April 26, 2010 issue of the Archives of Internal Medicine, nurses who are interrupted while administering medications may have an

increased risk of making medication errors. Experimental studies suggest that interruptions produce negative impacts on memory by requiring individuals to switch attention from one task to another," write Johanna I. Westbrook, PhD, from the University of Sydney in Sydney, Australia, and colleagues. "Returning to a disrupted task requires completion of the interrupting task and then regaining the context of the original task" The primary study outcomes were associations between procedural failures (10 indicators, such as aseptic technique) and clinical errors (12 indicators, such as wrong dose) and interruptions and between interruptions and potential severity of failures and errors.

Nurse experience did not protect against clinical errors and was actually associated with a higher rate of procedural failure. The frequency of the interruptions was associated with increased, severity of the error.

Anderson's (2010) stated that environmental factors that can promote medication errors include inadequate lighting, cluttered work environments, increased patient acuity, distractions during drug preparation or administration, and caregiver fatigue. Distractions and interruptions can disrupt the clinician's focus, leading to serious mistakes.

Thus, to be able to create an environment that reduces errors and ensures improved safety in medical institutions, it is necessary to examine the factors associated with the nurses themselves and their work environment.


Educating/
Health
Teachings

Medication Information Guide (MIG) for Nurses

Based from the results of the study, the following outputs are foth.tulated.:

1. Medication Information Guide For Nurses. This is a reference tool for nurses based on the areas of weaknesses of the respondents.
2. Logbook for near-missed/medication error self-report. This a monitoring tool adopted in U.S. Department of Health and Human Sciences FDA Form for near missed and medication errors to be used in the clinical area.
3. Enhanced Course Syllabus on Pharmacology: A Prototype. This is an improved course syllabus that will address the issue on the level of competencies of newly registered nurse& This consists of an additional 51 RLE hours on the subject matter and checklist in evaluating student nurses.
4. 10 Standards of Care on Medication Management Poster. This are bullets that will be posted in the different wards of the hospitals particularly in areas where staff nurses prepare medications that will serve *as* a reference on standards of care on medication management.

CONCLUSIONS

Most of the staff nurses working in tertiary hospitals in La Union, Philippines are aged young adults, female, single, BSN graduate, novice, staff nurses, in government hospital, and distributed to different hospitals units. Staff nurses should be highly competent in all aspects of the standards of care of medication management. Staff nurses are vulnerable in having an error in medication management. Age, work-related experience, years of experience, and work setting affects the level of competency of the respondents on the standards of care on medication management, while sex and civil status, highest educational attainment does not affect the level of competency of the respondents. Sex and work-related experiences affect the extent of influence of factors on medication errors. The more proficient a nurse

is in the standards of care on medication management, the higher is the ability of nurse to handle factors affecting medication errors, hence reducing the occurrence of medication errors in the clinical area.

RECOMMENDATIONS

Based from the results of the study, the researcher recommends the following: provision of continuing education opportunities for registered nurses to further develop their competencies related to pharmacology, utilization of the Near-Missed/Medication Error Self-Reporting Logbook, implementation of the enhanced course syllabus on nursing pharmacology in the academe which consists of an additional 1 unit of related learning experience hours, dissemination of the result of the study to staff nurses, nurse managers and administrators, utilization of the 10 standards of care on medication management in the clinical area as a reference, and further research or replication of the study about factors affecting medications errors in larger population.

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EXHIBIT C

Distractions and Their Impact on Patient Safety

Michelle Feil, MSN, RN
Senior Patient Safety Analyst
Pennsylvania Patient *Safety At ithoyity*

ABSTRACT

Distraction is a common source of *potential* error *that* is well *established within the* fields of *human factors* research and cognitive psychology. *High levels* of *distraction* in healthcare *settings* pose a constant threat to patient safety. New *technologies* have increased the number and types of *distractions* present in these *settings.* Analysis of *reports submitted to* the *Pennsylvania* Patient *Safety* Authority in 2010 *and* 2011 containing relevant *terms,* namely "distract," 'interrupt," or "forgot," identified 1,015 reports that *could* be *attributed* to *distraction. The* majority of *events* were classified as medication errors (59.6%), followed *by* errors related to procedures, *treatments,* or *tests* (27.8%). *Thirteen* events were reported that resulted *in* patient harm, *A* total of 40 reports specifically mention distractions from phones, computers, or *other* technologic devices *contributing to* errors. *This* article *examines* the broader *issue* of distractions that cause *medical* errors and outlines strategies for *decreasing* the potential for *distraction and* harm, These *risk* reduction strategies *include* developing *systems and* processes that reduce or eliminate distractions and teaching effective *techniques* for *handling distractions.* (Pa *Patient* Sal *Advis* 2013 Mar;10[11:1-10.)

INTRODUCTION

The definition of "distract" is "to draw or direct (as one's attention) to a different object or in different directions at the same time,' Distraction is especially detrimental to human functioning in situations requiring cognitive processing of large amounts of complex and rapidly changing information. Such situations occur almost constantly in healthcare settings, When presented with new information, the mind of the healthcare worker must be able to focus attention and encode information to be retrieved at a later time. Diverting attention during these key points of information encoding or retrieval may result in human error.[2]

DISTRACTIONS IN PENNSYLVANIA

A query of the Pennsylvania Patient Safety Authority's Pennsylvania Patient Safety Reporting System (PA-PSRS) database for events reported in 2010_ or 2011 containing the terms "distract," "interrupt," or "forgot" produced 1,202 reports, of which analysts identified 1,015 reports describing events that could be attributed to distraction. The majority of these events were reported as medication errors or errors related to procedures, treatments, or tests (see Figure), Nearly all events were reported as Incidents (i.e., events resulting in no harm to patients). However, it is important to note that even in cases of no harm, additional costs may be incurred during follow-up. For example, nearly one in five events (17.7%, n = 180) were reported with a harm score of D, which is defined as an event that requires monitoring to confirm that it results in no harm and/or requires intervention to prevent harm.[3]

Of the 13 Serious Events (i,e., events resulting in harm to patients) reported, the majority were split equally between medication errors and errors related to procedures, treatments, or tests. See Table 1 for events reported according to event type and harm score.

Figure. Event Reports to the Pennsylvania Patient Safety Authority Attributed to Distraction, by Event Type, 2010 through 2011

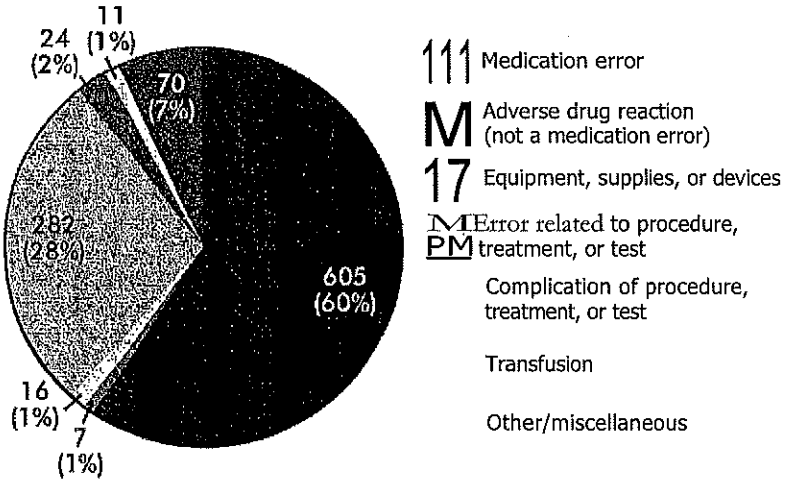

Table 1. Serious Event Reports to the Pennsylvania Patient Safety Authority Attributed to Distraction, by Event Type and Harm Score, 2010 through 2011

r. EV13\-Cf VYPE:14V1:141iiiM S034E	RORTS
Harm score E: An event occurred that contributed to or resulted in temporary harm and required treatment or intervention	**12**
Medication error	5
Extra dose	
Wrong dose (overdosage)	2
Wrong rate (intravenous)	2
Adverse drug reaction (not a medication error)	1
Error related to procedure/treatment/test	**4**
Surgery/invasive procedure problem—other	
Radiology/imaging test problem—wrong site	
Radiology/imaging test problem—other	
Other	
Complication of procedure/treatment/test	**2**
Complication following surgery or invasive procedure—other	1
Other	1
Harm score G: An event occurred that contributed to or resulted in permanent harm	**1**
Error related to procedure/treatment/test	1
Laboratory test ordered, not performed	
Total events with harm	**13**

Sixty-six percent (n — 672) of reports describe distraction of nurses as directly contributing to the events. Fewer reports identify the following individuals as the distracted parties: laboratory technician/ phlebotomist (7.9%, n = 80), patient (6.7%, n — 68), pharmacist (6.7%, n = 68), physician (5.3%, n — 54), radiology technician (2.3%, n = 23), secretary (1.4%, n =14), respiratory therapist (1.2%, n — 12), nursing assistant (0.9%, n = 9), nurse practitioner/nurse anesthetist/physician's assistant (0.6%, n 6), and "other" (4.0%, n = 41). Caution must be taken in interpreting these percentages, as nearly all events appear to have been reported by nurses. The role of the reporter is not identified within PA•PSRS, but analysis revealed the majority of narratives were written in the first- or third-person perspective of nurses.

The majority of events do not directly identify the source of distraction; however, the following key search terms appeared in the event reports (with their frequency provided in parentheses): forgot (80.8%, n = 820), distract (14.1%, n — 143), and interrupt (7.3%, n — 74). Together, these percentages total greater than 100% because, in a small number of reports, more than one of the key search terms was identified. In general, the narratives describe some element of patient care being forgotten without identification of the reason for the lapse in memory or attribute the reason for the memory lapse to a general cause, such as being "busy" (5.4%, n — 55). Use of this term may reflect multitasking, In fact, many of the report narratives describe this phenomenon using a variety of terms, Of note, 40 event reports (3.9%) specifically identify distractions from phones, computers, or other technologic devices as contributing to errors,

Event Reports

The following examples from PA•PSRS reports illustrate the variety of events attributed to distraction and the resulting influence on various clinicians.

Pharmacy

> I saw that unusual *custom traces were ordered. I* informed the technician to make the *special* dilutions (which *was* done without *incident). When I* entered the prescription into the *compounding computer, I forgot to "zero-out" the* neonatal *trace* mix, which *provides* the standard *traces.* Because of other unusual *events* in the *area, I did* not catch my error that *day,* and the *double-dose was dispensed. (Persons* were talking to *me while I was* entering and *while* I *was checking,* and *I was stressed due* to a *drug* shortage *and multiple new procedures* required, and I was striving to meet *delivery deadlines despite late.received* adult *orders.) I* am very sorry, In the future, if someone *is* talking *to* me while *I* am entering or *checking* a prescription, *I* will stop until I can fully concentrate. *I* caught my mistake when *I entered* the new prescription for *today.*

Anesthesia

> *Patient had* PCA *Ipatient-controlled* analgesia] and *nerve Mock.* Pumps were *side by side.* The anesthesiologist *identified the* nerve *block pump* and tubing to administer *a bolus* via

the route. *He was distracted and,* upon returning to *give* bolus, did not reidentify the pump. *He* programmed the wrong pump *for* the bolus. The patient *received HYDROmorphone PCA* bolus, *requiring* naloxone *rescue.*

Laboratory

While logged into this patient's report *screen, I* inadvertently *viewed* the *slide of* another patient and reported the *results* from that slide. *I* immediately realized my error *and notified* the nurse taking *care* of the patient. *I was distracted* and trying to *do* too much at the *same time.*

Nursing

{The night *before, the] patient was ordered* to *have a potassium* level drawn, with the results to *be called* to the attending [physician's *attention]. It was learned* the following morning that the *test* had not *been ordered, The* nurse *had* gotten distracted with *seven* admissions in eight hours *and missed* the order.

Surgeon

The assisting *surgeon was placing a central venous* catheter. The procedure *was* interrupted , . prior to getting started by a nurse asking when *the doctor would be* coining to the OR [operating room]. She informed him she would *be* there in 30 minutes. After *closing* the *door and* placing the "Do Not Enter" sign up, *the* anesthesiologist *came* into the room and again asked when *she* would *be* coming to the OR. She told him that *she* would be there *as soon as she* found *a vein, I* turned to *get* something *and* heard *the* doctor *yell "ouch." When* I turned *back* around, *I saw* that *she was pulling the scalpel out of her finger.*

Radiology

Patient *was* ordered *a stat chest* x-ray. *I began to* run the x-ray *and was distracted* by *a fellow technologist's question regarding another* patient, *I* returned *to* the workstation to *identify* the image. *I glanced* at the highlighted first name *of the* patient *I* had pulled up and assumed that I had the correct patient information. *I* sent *the image across.* The next *day it was* brought to my attention that the *image* was not in the computer *system, When looking* for the exam on the workstation, *the* patient was not *listed. I* thought through what *I* might *have done* and looked *for a* patient with a similar first *or last* name *close* to my *patient and discovered* that *I had entered the results* for the wrong patient and misidentified *the* results *as an* abdominal x-ray.

Medication Errors

More than half of the events reported (59.6%, n © 605) describe distractions during the medication administration process that were associated with medic cation errors (see Table 2). Within this category, the largest percentage of events involved dose omissions (46.8%, n 283), followed by errors with some aspect of medication. administration labeled as "wrong" (33.9%, n = 205). The two most frequently reported errors of this type were wrong time (n – 49) and wrong dose/overdosage (n = 47). Examples of distraction can be found impacting all disciplines and at every step involved in the medication administration. process.

Prescribing

Physician entered midazolam order incorrectly. *Physician* intended to write for 10 *mg but scrolled* to the bottom *of* the *electronic* list, ordering 15 mg. Child's *weight would indicate* maximum *standard dose of* 10 mg. *Physician was distracted* during entry by another *clinical question.*

Transcribing

Orders *were* written *for patient* A, *faxed to satellite* pharmacy, and *processed. The* pharmacist *began* entering *the orders and* was then interrupted by nurse taking *care* of patient B. The pharmacist pulled up the *profile of patient* B to *answer questions.* At that time, *he finished* processing *orders* but *entered* them on patient *B instead* of patient A. The error *was* found within one hour, *and the orders* were corrected. Unfortunately, the nurse taking care *of patient B* confirmed, charted, *and gave* the medications to patient *B.*

Preparation and Dispensing

The patient was *ordered* 1100 mg *of a* chemotherapy agent. The pharmacist *pulled two 1* gram vials to prepare the *dose,* then *realized* that we *carry* 500 mg *vials and* pulled *a* 500 mg vial. *also. He forgot* to put one of *the* gram *vials* back *and used* all three *vials* to *prepare* the *dose. The patient ended up receiving 2100 mg* of the drug, *The* pharmacist performing the double check, confirmed the calculation and verified that there *was a 1 gram vial* and a 500 mg *vial used* to prepare the *dose, He* did not notice *the* other vial and assumed that the other *vials were* sterile water *vials* for reconstitution. The next *day,* the pharmacist who prepared the *dose* went to reorder the drug and realized *his* error.

Administration

The patient *had* a heart rate in the *170s. The* physician *ordered metoprolol 2.5 mg* IV [intravenous] x 1 *dose.* The nurse *pulled* the *dose from the* automated dispensing cabinet *and scanned* it. *Before he* had *a chance to draw* up the medicine, *he was distracted* by another patient. When he came back *to* his workstation, he *ended* up drawing up 2,5 mL from an insulin *vial and giving it* to the

patient. *He realized* the error, and the doctor *was* notified; *dextrose was given* and *fingerstick blood glucose* testing *was ordered. The blood sugar dropped as low as* 52 but returned to normal *by* 2 p.m.

Errors Related to Procedures, Treatments, or Tests

The next most frequently reported event type associated with distraction was error related to procedures, treatments, or tests (see Table 2), with 27.8% (n = 282) of reports falling into this category. Within this category, laboratory test problems accounted for the largest percentage of events (45.0%, n = 127). The two most commonly reported laboratory test problems were test ordered and not performed (n = 36) and result missing or delayed (n 30).

Following laboratory test problems, the subcategory of "other" contained the second-highest number of reports in this category (22.7%, it = 64), Close examination revealed that most reports labeled "other" refer to errors surrounding procedures, treatments, or tests performed by nursing staff that were not medication-related, nor did they fit clearly into the existing subcategories. Examples are as follows:

> *Nurse* prepared infant's 17;00 *fteding* in syringe, then *was* interrupted *to* provide *care to* another infant. Nurse *overlooked* feeding and noted omission *at* 20:00 *feeding.* Doctor notified; *no adverse* outcome.

> *Patient with a* known history *of* SVT fsupraventricular *tachycardia] called* and left a message on *our clinic voice mail that she had to download* her *EKG (electrocardiogram]* tracings. *The pacemaker technologist* recorded the tracings into the database *and printed the tracings when he* noted that the *patient was* in rapid SVT *He then placed* the tracings in a folder to show the provider; *however,* he got *distracted* with other things and charts got *placed* on top *of* the *folder.* The folder *was* found two days later *and* the provider *was* notified. *The* patient *is to be scheduled* for an ablation procedure.

Following laboratory test problems and "other," the remaining subcategories represented in the reports consisted of problems relating to surgery or invasive procedures (15.6%, n = 44), radiology or imaging tests (11.0%, it = 31), respiratory care (3.5%, it – 10), referrals or consults (1,4%, n = 4), and dietary issues (0.7%, n= 2).

DISCUSSION

Distraction and Memory

Memory loss is common to all humans. A certain amount of information is expected to be lost over time (a phenomenon labeled "transience") with the rate of forgetting being highest immediately following the initial encoding of information, However, with more elaborate encoding of information, less information is lost over time. "Working memory" is a specific form of memory that holds on to small pieces of information, for *a* few seconds at a time, as people cognitively process them for encoding, Divided attention at the time new information is being encoded directly interferes with "working memory" and is the first point at which distraction interferes with memory.[1]

Distraction also creates problems during information retrieval. Divided attention at this point results in a failure to remember information that was either never encoded properly or is available in memory but overlooked.[1]

Distraction is of particular concern to "prospective memory," or remembering to do things in the future. This form of memory can be event-based (i.e., when X happens, do Y) or time-based (i.e., do Y at a specific time in the future), Event based

Table 2, Reports to the Pennsylvania Patient Safety Authority Attributed to Distraction for the Two Most Frequently Reported Event Types, 2010 through 2011

E'VENT:TYPE	
Medication error	**605**
Dose omission	**283**
Wrong (e.g., wrong drug, wrong rate, wrong route)	206
Extra dose	54
Monitoring error (includes contraindicated drugs)	23
Other	18
Prescription/refill delayed	11
Medication list incorrect	7
Unauthorized drug	3
Error related to procedure/treatment/test	282
Laboratory test problem	127
Other	64
Surgery/invasive procedure problem	44
Radiology/imaging test problem—wrong site	31
Respiratory care	10
Referral/consult problem	4
Dietary	

cues are less likely to be forgotten, but problems occur when attention is diverted at the time of the event, Time-based cues require self-initiated recall and are more likely to be forgotten without converting them to events (e.g., setting an alarm on a watch converts a time-based cue to an event-based cue—"turn off the Heparin infusion at 5 p.m." becomes "when the alarm sounds, turn off the Heparin infusion"). Of note, the event-based cue must contain sufficient information about what is to be done, and must be available at the time necessary, in order to be effective. Ideally, these events should also be distinct (e.g., infusion pump alarms are set with different tones to indicate the completion of an infusion versus indicating the battery charge is low and the pump needs to be plugged into a wall outlet).

Multitasking and Interruption

Balancing multiple tasks, also known as multitasking, is a universal and constant challenge in healthcare settings. Being able to continually process incoming information while balancing and responding to competing priorities and completing necessary tasks is an essential skill for healthcare workers. Multitasking creates a stream. of interruptions that may in fact be necessary and may increase efficiency. However, more research is needed on the optimal level of interruptions that minimize error and maximize efficiency.[4,5]

Unfortunately, there is a very real limit to the ability of the human brain to multitask. Cognitive neuroscientists have identified a specific region of the brain responsible for encoding and retrieving information, particularly in relation to working memory. This region of the brain is unable to process more than one task simultaneously, severely limiting human capacity for perception and decision making in multitasking situations.[6]

Observational studies of nurses and physicians have been conducted that have found multitasking to be highly prevalent—with interruptions occurring anywhere from 1.4 times per minute? to once every 14 minutes[8]—and observable multitasking occurring more often than perceived by the clinicians themselves.[9] Differences in frequency of interruptions and prevalence of multitasking found in the clinical literature are due to variation in study designs and definitions for these variables. The psychological literature on interruption as it correlates to patient safety is more consistent in this respect. The six experimental variables most often studied are working memory load, interruption similarity, interruption position, interruption modality, practice/experience, and interruption-handling strategies.[5] The implications for clinicians related to each of these experimental variables are shown in Table 3.

Sources of Distraction

Interruptions or distractions can be defined as self-initiated or other-initiated. Research. has shown the prevalence of self-initiated distraction ranges from 28%[78] to 38%,[7] while other-initiated distraction ranges from 34% to 69%.[10] In studies of distractions and medication errors, the majority of interruptions were found to be self-initiated by nurses or other members of

Table 3. Top Six Experimental Variables Identified in the Psychological Literature Investigating Interruptions and Their Implications for Clinicians

EXPERIMENTAVVARIABLE:	:impopknoN5 ,FOR.40NtaA
Working memory load	Interruption during times of high working memory load is associated with decreased performance of the primary task.
interruption similarity	Interruption that is similar to the primary task is more disruptive than a dissimilar interruption.
Interruption position	Interruption occurring during task performance is more detrimental to performance than interruption occurring between tasks.
Interruption modality	Interruption presenting through a modality different from the primary task (e.g, auditory versus visual) is less disruptive to performance than interruption presenting through the same modality.
Practice/experience	Practice of the primary task is important to procedural tasks because it increases association between steps in the primary task process, freeing up cognitive resources to be able to handle interruption.
	Practice of interruption-handling strategies is important to decision-making tasks because it improves performance of the primary task.
Interruption-handling strategies	Being able to control when to deal with interruption is less disruptive than having no control, Task performance and effective response to interruption are improved when clinicians have a repertoire of strategies for handling interruption.

Source: Li SY, Magrabi F, Calera E. A systematic review of the psychological literature on interruption and its patient safety implications. J Am Med Inform Assoc 2012 Jon-Feb,:19(11;6-12,

the nursing team., through face-to-face interaction, occurring for purposes of patient management, and of short duration.[11]

Self-initiated distraction may also be the by-product of increased intrinsic cognitive load, which is determined by the complexity of information being processed. In other words, the internal processing of complex information creates a distraction that interferes with. processing other information. Other-initiated distractions may be a source of increased extraneous cognitive load, determined by the kind and amount of new information being perceived and encoded. Decreasing the cognitive load required for either has been shown to free up cognitive resources necessary for the other[12] (i.e., decreasing the difficulty level of the primary task increases one's ability to handle interruptions or distractions without impairing performance, while decreasing interruptions and distractions increases one's ability to complete tasks that require more complex cognitive processing).

A common source of self or other-initiated distraction is communication of information irrelevant to the primary task at hand. In an observational study of distracting communications in the OR, psychologists observed for case-irrelevant communications (CICs). Half of all CICs consisted of "small talk," Although surgeons initiated and received the majority of CICs, visitors to the OR initiated CICs with the highest levels of distraction. Also, communications directed to nurses and anesthetists provided higher levels of distraction than communications directed to surgeons.[13]

Distraction Due to Technology

Anything that diverts attention away from the primary task is a source of distraction. Sources of distraction can be broadly attributed to individuals (e.g., patients, family members) or to technology (e.g., medical equipment, computers, communication devices). "Distracted doctoring" is a term recently coined in the media to describe the interruptions to workflow caused by the introduction of new technological devices in the clinical setting. This has been elevated to new levels of concern within the healthcare community and the general public due to the widespread implementation of computerized provider order entry (CPOE) systems and electronic medical records, along with the growing use of cell phones and smartpliones.• In fact, distractions from smartphones and other mobile devices have been identified for the first time as one of the top 10 health techno• ogy hazards for 2013 by ECRI Institute.[17]

A case study published in December 2011 by the Agency for Healthcare Research and Quality (AHRQ) highlights just how serious the impact of these distractions can be in the healthcare setting:

> During *rounds* with the attending, a *medical* resident was using *a* smartphone to *access* the CPOE to *discontinue an* order for warfarin. The resident was *distracted by" an* incoming *personal* text *message and failed* to complete her *primary task—discontinuing* the *warfarin order. The* patient con, tinted to *receive* warfarin for the next *three days.* As a *result, the* patient *developed* hemopericardium requiring *emergency* open heart surgery, is

In a large study of computer-related patient safety incidents, 55% of incidents were attributed to tedmical problems (i.e., hardware, software, or networking infrastructure problems), while 45% were due to human-computer interaction. The majority of technical problems resulted in delays or failures to complete clinical tasks. As described in the AHRQ case study, the majority of human-computer interaction problems were related to data entry (e.g., incorrect or missing data, failure to update data). High cognitive workload and multitasking were highlighted as contributing factors.[19]

Studies examining the impact of cell phone use on driving may inform research on the impact of cell phone and smartphone use in the clinical setting. These studies have shown cell phone use to be as detrimental to driving performance as operating a vehicle while intoxicated. This impact on driving ability appears to be due to the diversion of attention away from the primary task of driving, regardless of whether or not a hands-free device is used."

Investigation of this phenomenon is just beginning in healthcare, Surveys of clinicians are being published that show that cell phone and smartphone use is prevalent, with the majority of clinicians voicing concern over the significant potential safety risks they introduce. There is a generational difference found across surveys, with older clinicians reporting less trust of the new technology. Interestingly, clinicians report witnessing others being distracted or committing errors related to cell phone or smartphone use at rates higher than they report for themselves.[21,22] This mirrors the findings in studies of cell phone use and driving showing that drivers did not perceive the detrimental impact that cell phone use was observed to have on their driving performance,[23]

Lack of insight into the impact technology is having on performance and patient safety may explain the low number of reports in PA-PSRS that specifically mention these sources of distraction. Out of the 1,015 reports involving distractions, 10 identify phones as the source of distraction, 15 identify computers, and 15 identify other technologies (e.g., automated medication dispensing cabinets, infusion pumps).

RISK REDUCTION STRATEGIES

Effort should be made to limit distractions in healthcare settings whenever possible. However, total elimination of distractions is not an achievable goal.

Dr. Atul Gawande, author of The Checklist Manifesto, summarized the challenge facing modern. healthcare as follows: "Medicine has become the art of managing extreme complexity—and a test of whether such complexity can, in fact, be humanly mastered. . . Substantial parts of what hospitals do . are now too complex for clinicians to carry them out reliably from memory alone."[24] Checklists are just one of the strategies suggested to ameliorate the impact of distraction in healthcare settings. Mindfulness meditation training is another such strategy, one that has been found to improve focused attention and working memory while effectively managing distractions—particularly in multitasking situations.[25,26] These and other risk reduction strategies are suggested to avoid the detrimental effects of variables shown in Table 3 that contribute to increased distraction and decreased performance:

- Educate clinicians about distraction and its potential detrimental effect on patient safety.'"
- Raise awareness of the potential for distraction, and promote vigilance through sharing deidentified narratives of patient safety events and near misses that occurred due to distraction.n.[29]
- Teach clinical staff interruption-handling strategies' (e.g., teach staff how to forward calls to a colleague or voice mail when they are performing a procedure, show staff how to save documentation in the computer system so that it can be resumed after the distraction is addressed).
- Consider offering a course in mindfulness meditation for clinical staff's."
- Avoid communication of irrelevant information whenever possible, but especially when performing tasks with high cognitive loads .",[30] avoid small talk when performing safety-critical tasks such as the preoperative time-out or programming an infusion pump to deliver an intravenous anticoagulant).
- Designate routinely encountered tasks that are not to be interrupted, and develop a system to communicate when staff are engaged in these tasksE).[27,30,31] (e.g., close the door to the patient's room and post a sign instructing other staff to avoid interruptions when performing an invasive procedure at the bedside).
- Minimize interruptions during performance of any tasks that place high demands on working meinorys[27] (e.g., close the door to the patient's room and silence or forward any calls when performing an unfamiliar procedure for the first time, select and prepare medications in a dedicated medication room instead of at busy nurses' stations or in high-traffic hallways).
- Practice tasks, particularly those that are complicated or known to be distraction prone' (e.g., encourage preceptors to seek out opportunities during the orientation period for novice staff to perform tasks that are encountered infrequently in their clinical area, provide opportunities to role-play distraction-prone clinical scenarios in simulation training).
- Develop and utilize checklists for complex tasks that require multiple steps or are known to be distraction-prone[24] (e.g., central line insertion, ventilator-associated pneumonia prevention measures, continuous renal replacement therapy).
- Implement communication strategies that do not involve oral connunication,n especially in busy clinical areas with high noise levels (e.g., outline a protocol for sending and responding to text messages in facilities that provide text-pagers or smartphones to clinical staff).
- Use written reminders as event-based cues to complete future tasks. Ensure that written reminders contain sufficient information about what is to be done and that they are placed in a location that will be visible at the time the task needs to be completed' (e.g., write a note to call for more bags of bladder irrigation fluid and attach it to the second-to-last bag in the case that is currently being used).
- Batch communications to minimize distraction to the recipient"" (e.g., use a report sheet to communicate missing medications for a nursing unit to pharmacy rather than having each nurse call the pharmacist individually).
- Do not batch tasks for multiple patients concurrently' (e.g., do not prepare medication for more than one patient at a time, avoid switching back and forth between patient electronic records when entering new orders in a CPOE system).
- Provide environmental cues to assist in recovery from distraction in order to complete the primary tasks.",[31] (e.g., using checklists, building CPOE systems that alert prescribers when an order has been partially entered but abandoned after a period of inactivity).
- Use concepts from human factors engineering when evaluating and redesigning care processes and workspaces in order to decrease the potential for disttaction'.[7,32] (e.g., conduct observations of processes known to be distraction-prone in order to identify sources of distraction and develop a plan to minimize them, redesign medication preparation areas to limit outside distractions).

CONCLUSION

Distractions are encountered in healthcare settings on a nearly continuous basis. These distractions originate internally and externally to clinicians, There are many

and varied stimuli that divert attention away from primary tasks. With each new technology introduced to the healthcare setting, new sources of distraction are recognized, The relatively recent addition of computerized health information systems, cell phones, and smartphones has brought new attention to the study of distraction and its impact on patient safety.

The work of clinicians places high demands on working memory. This is due to the high complexity and large amounts of continuously changing information that must be processed, resulting in high intrinsic and extraneous cognitive loads. Under these circumstances, distractioncan be particularly detrimental to performance.

Most of the patient safety event reports to the Authority that were attributed to distraction by reporters involved medication errors or errors related to procedures, treatments, or tests. Multitasking is frequently the culprit in these patient safety events. In some cases, multitasking increases efficiency by eliminating downtime. But in many snore cases, efficiency is decreased because of the limited ability of the human brain to process more than one task at the same time.

Clinicians can take steps to reduce the impact of distraction by recognizing coin mon sources of distraction and situations that are distraction-prone, identifying clinical tasks or procedures that are most likely to result in medical error and patient harm as a result of distraction, and applying specific risk reduction strategies.

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LEARNING OBJECTIVES

- Assess sources of distraction present in healthcare settings and the means by which they can lead to error.
- Recall the predominant safety event types associated with distraction, according to reports submitted to the Pennsylvania Patient Safety Authority.
- Distinguish between interruptions that convey greater potential to disrupt performance of the primary task and those that convey less potential to disrupt performance of the primary task.

  Identify strategies for decreasing the potential for distraction and harm.

SELF-ASSESSMENT QUESTIONS

The following questions about this article may be useful for internal education and assessment, You may use the following examples or develop your own questions.

1. Assess the following scenarios and determine which one describes an interruption during information encoding?
   a. A physician is completing placement of a nasoduodenal feeding tube in a patient and is interrupted by a medical student asking a question about a prescription missing from the discharge instructions for another patient who is leaving the hospital. The physician forgets to order the x-ray to confirm placement of the feeding tube.
   b. A nurse is receiving critical blood gas results over the phone from the laboratory during a patient emergency situation. While writing down the results, the anesthesiologist asks the nurse to bring the respiratory emergency equipment box with her when she comes back to the room. When reading the blood gas results to the emergency response team, she discovers she did not write down the bicarbonate level.
   c. A pharmacy technician is about to restock an automated dispensing cabinet with HYDROcodone. A nurse interrupts to ask if the technician has brought the HYDROmorphone that had been ordered from the pharmacy 30 minutes ago for a patient in. severe pain. The technician checks the stock of HYDROmorphone, finds the drawer empty, and tells the nurse to call back down to the main pharmacy. The technician proceeds to place the HYDROcodone tablets in the HYDROmorphone drawer.
   d. A patient asks the nutrition hostess for extra sugar and ketchup. On the way to the kitchenette, another patient stops the hostess and asks for their lunch to be reheated. The hostess takes the tray to the kitchenette, and when she arrives, she grabs some salt and pepper and ketchup packets to take back to the first patient.
2. Which of the following event types associated with distraction were reported most frequently to the Authority from 2010 through 2011?
   a. Medication error; dose omission
   b. Medication error: overdosage
   c. Medication error: wrong patient
   d. Medication error: unauthorized drug

SELF-ASSESSMENT QUESTIONS (CONTINUED)

A nursing assistant set an *alarm on her* watch to *remind* her to return *to a* patient's room to perform a repeat fingerstick *blood sugar* test. When the alarm *sounded half* an hour later, *she was unable to recall which* patient *needed the* fingerstick.

3. The nursing assistant was using the alarm to support prospective memory, or remembering to do something in the future. The alarm failed to achieve its desired result in this instance because of which of the following?
   a, The alarm provided a time-based cue that did not offer information about what was to be done.
   b. The use of alarms to aid prospective memory has been found ineffective in multitasking environments, such as hospitals,
   c. The alarm provided an event-based cue that did not offer information about what was to be done.
   d. The nursing assistant was suffering from alarm fatigue.

4. Each of the following statements regarding interruptions are true except:
   a. Interruptions similar to the primary task are more disruptive than interrup' tions that are dissimilar,
   b. Interruptions during task performance by novice practitioners are more disrup- tive than interruptions during task performance by experienced practitioners.
   c. Interruptions occurring during performance of tasks requiring high working memory load are more disruptive than interruptions occurring during tasks requiring low working memory load.
   d. Interruptions presenting through a different modality than the primary task (e.g., auditory versus visual) are more disruptive than interruptions presenting through the same modality.

5. All of the following statements regarding multitasking are false *except:*
   a. Multitasking can increase efficiency for healthcare professionals by eliminating downtime.
   b. Multitasking is not a highly valued skill for healthcare professionals.
   c. Multitasking is only a contributor to errors in high•acuity care areas, such as critical care areas and the operating room,
   d. There is no limit to the human brain's ability to multitask, given enough simu' lation training.

6. All of the following are risk reduction strategies that a hospital can use to decrease the potential for distraction and harm excepts
   a. Move the automated medication dispensing cabinet and medication carts to an area away from high traffic flow and clinical alarms, preferably behind closed doors,
   b. Implement a strict no "small talk" policy for all staff working in clinical areas, except during meal breaks.
   c. Have novice staff practice clinical tasks in a simulation lab setting using *sce-* narios designed to include multiple interruptions.
   d. Require staff to forward all calls to another staff member when entering a patient room to perform an invasive procedure.

PENNSYLVANIA PATIENT SAFETY ADVISORY

THE PENNSYLVANIA PATIENT SAFETY AUTHORITY AND ITS CONTRACTORS

The Pennsylvania Patient Safety Authority is an. independent state agency created by Act 13 of 2002, the Medical Care Availability and Reduction of Error (Mcare) Act, Consistent with Act 13, ECRI Institute, as contractor for the Authority, is issuing this publication to advise medical facilities of immediate changes that can be instituted to reduce Serious Events and Incidents, For more information about the Pennsylvania Patient Safety Authority, see the Authority's website at http://www.patientsafetyauthority.org.

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EXHIBIT D

PATIENT SAFETY FIRST

Distractions, Interruptions, and Patient Safety

SUZANNE C. BEYEA, PHD, RN, PAAN

The circulating nurse is preparing for a procedure in the OR and is busy mixing a medication to be delivered to the sterile field. After adding the required epinephrine to the medication, the nurse hears a loud "pop" and sees a puff of smoke in another part of the room. She stops mixing the medication so she can investigate the cause of the disruption. After discovering that a loose plug in the wall was responsible for the event and correcting the situation, the nurse returns to mixing the medication. She cannot remember whether the epinephrine was added, so to be "safe" she adds the epinephrine again. Because of the interruption, the nurse inadvertently doubles the amount of epinephrine ordered in the solution.

Distractions and interruptions often beset clinicians as they try to provide safe patient care. When an interruption occurs, it can negatively influence a clinician's ability to stay focused on an activity or procedure. Some clinicians just expect to be distracted and interrupted, believing that this is a natural part of their work day. Interruptions of all types occur in everyday life, but when they take place in the clinical environment, the results can he serious or deadly. There may be helpful strategies, however, that a clinician can implement to minimize interruptions while increasing his or her ability to manage them. By adopting a strategy to decrease or avoid distractions, a clinician will stay more focused, which can help promote patient safety.

TYPES OF DISTRACTIONS AND INTERRUPTIONS

Merriam-Webster's definition of *distract* is "to draw or direct (as one's attention) to a different object or in different directions at the same time,"[1] and the definition of *interrupt is* "to stop or hinder by breaking in."[2] A distraction often will redirect a clinician's attention away from an important task. Common distractions and interruptions that occur in clinical environments include

- the telephone ringing,
- people talking loudly or interrupting someone's train of thought, or
- the computer signaling that new mail has arrived,

TIMING. The timing of a distraction may be equally important as the type of distraction. The timing of an interruption can result in a clinician missing a critical activity or thought; and delays or omissions in treatment can result in negative outcomes for the patient. For example, if a nonsignificant issue interrupts a nurse when he or she is performing a complex task such as programming a patient-controlled analgesia device, he or she might forget to verify the rate or concentration of the medication and subsequently make a serious error.

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For health care clinicians, however, there is little opportunity to say "no" or "not now" to distractions or interruptions. There may even be an unspoken expectation that part of a health care clinician's job is to handle all types of interruptions effectively and to do so without appearing stressed or flustered. The reality is that humans have a limited capacity to manage distractions

Most nurses cannot imagMe an OR that is quiet when medications are being prepared or during the critical steps of a-surgrcal procedure:

and interruptions in a safe manner.

EXPECTATIONS. Too often clinicians accept distractions as integral to the way work is performed in health care settings. Thus, unlike the environment in an airline cockpit, which is strictly governed by regulations that prohibit crew members from performing nonessential duties or activities when an aircraft is involved in taxi, takeoff, and landing, and during all other flight operations conducted below 10,000 feet, the health care environment is significantly less controlled. For most perioperative personnel, it is difficult to imagine an OR that is quiet when someone is preparing medications or performing highly technical or critical steps of a surgical procedure.

RESEARCH ON DISTRACTIONS AND INTERRUPTIONS

Several researchers have studied the types and effects of distractions in the nursing environment. Coiera and Tombs[4] found that health care clinicians often are required to conduct multiple communications at the same time. In a subsequent study, researchers found that a span of as few as 10 seconds between an intention and an interruption can result in an individual forgetting to carry out a task.[5]

Moss and Xiao[6] reported that charge nurses in an OR engage in frequent communication episodes ranging from 32 to 74 episodes per hour. It is difficult to imagine staying on task while managing numerous communication episodes throughout the work day. In this particular study, the charge nurse communicated most often with other perioperative nurses. The charge nurse's most frequent mode of communication was face-to-face, and the communication episodes ranged in length from 10 seconds to almost 10 minutes with a mean duration of 40 seconds. These researchers reported that the most common reason for communications in the OR involved the securing of equipment.[6]

In a study of an emergency department in a large teaching facility, Brixey et al[3] found that RNs experienced an average of three interruptions per hour. These researchers reported that the most frequent interruptions involved communication episodes, including telephone calls, being paged, or face-to-face discussions.[3] The researchers suggested that interruptions may occur as a result of a department's design or the lack of human and physical resources.

Ebright[7] reported that nurses experienced numerous interruptions while providing care on surgical units. In a three-hour block of time, the number of interruptions ranged from seven to 31 with a mean of 19. Interruptions were caused by various individuals, including clinicians and patients, and often occurred while nurses primarily were focused on other activities.[7]

Tucker and Spear[8] concluded that

> *given that nursing work is fragmented and unpredictable, designing processes that are robust to interruption_ can prevent erro•s.[8])*

Observing nurses, these researchers found 8.4 "operational failures," such as medication problems, missing or incorrect supplies, and problems with staffing, during each eight-hour shift.[8] They also found that nurses encountered many interruptions related to either patient care or system issues, The nurses in this study reported that many errors can be caused by interruptions, and because of the interruptions, the nurses experienced increased difficulty in completing their work responsibilities."

CONTROLLING DISTRACTIONS

It can be inferred from these studies that interruptions and distractions are highly prevalent in nursing work. Regardless of their specific duties, nurses should monitor the number and nature of the distractions and interruptions that they experience while performing their responsibilities, noting when, where, and why they occur. It is certain that some improvements could be made to minimize the number of interruptions that nurses experience as well as the effect these

distractions have on a nurse's ability to provide safe patient care.

Perioperative nurses also need to learn more about the types of interruptions that are unique to the surgical setting, Without a deeper understanding of the types of distractions that are common to the OR, it will be difficult to develop and implement strategies to minimize their occurrence or to improve systems of care. A nurse should consider how interruptions influence his or her work and clinical care throughout the course of the day. Only then will it be possible to determine whether interruptions can be eliminated at certain times or during specific processes to ensure safety.

Unfortunately, multitasking is common in the perioperative environment. To ensure patient safety, certain activities may require a "sterile" environment, similar to that required by the airline industry of pilots and crew members during critical flight maneuvers. Nurses also need to develop specific strategies to increase their resilience to interruptions and distractions.

To date, little is known about how to most effectively manage interruptions and distractions. Researchers, educators, and clinicians must work together to develop and test strategies to increase a nurse's ability to manage the distractions of the work environment, The first step in this process may be simply staying alert to interruptions and becoming aware of how these distractions influence patient care. To understand the nature of the problem it is crucial to learn more about it. — —

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SUZANNE C. BEYEA
PHD, RN, FAAN
DIRECTOR or NURSING RESEARCH
DARTMOUTH-HITCHCOCK MEDICAL CENTER
LEBANON, N

Intake of Vitamin D and Calcium May Affect Breast Cancer

premenopausal women who consume higher levels of vitamin D and calcium may have reduced incidence of aggressive breast cancer, according to a June 5, 2007, article in *the New York Times.* Researchers studied the survey responses of 10,578 premenopausal and 20,909 postmenopausal women, focusing specifically on their dietary intake of vitamin D and calcium.

After an average of 10 years, 276 premenopausal and 743 postmenopausal women were found to have invasive breast cancer. Data also showed that the 20% of premenopausal women who consumed the highest levels of vitamin D and calcium (eg, more than 948 units of vitamin D and 1,366 mg of calcium daily) had a 33% reduced risk of developing breast cancer than the premenopausal women who consumed the least amount of these nutrients. This association was particularly evident for the most malignant and aggressive kinds of breast cancer tumors. The researchers suggested that women take at least the recommended daily amount of vitamin D (ie, 200 units to 600 units) and calcium (ie, 1,000 mg) to maintain overall health and possibly to help prevent breast cancer.

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