

# EVIDENCE FOR DESIGN OF EMERGENCY DEPARTMENTS

## RELEVANT CADRE RESEARCH:

Title: **Environmental Correlates of Efficiency and Safety in Emergency Departments**

Funds: Academy of Architecture for Health Foundation (AAHF) Research Grant and Herman Miller Grant

Period: January 2010 to October 2012

Collaborators: Herman Miller, Synurgy Healthcare Solutions

Location: Four emergency departments in large US hospitals

Findings: 16 domains of physical design decisions influence safety, efficiency, or both in the ED: 1) entrance and patient waiting, 2) traffic management, 3) sub-waiting or internal waiting areas, 4) triage, 5) exam/ treatment area configuration, 6) exam/ treatment area centralization versus decentralization, 7) exam/ treatment room standardization, 8) adequate space, 9) nurse work space, 10) physician work space, 11) adjacencies and access, 12) equipment room, 13) psych room, 14) staff de-stressing room, 15) hallway width, and 16) results waiting area.

Title: **Membrane Ceilings in Healthcare Environments Study**

Funds: HHH Grant – 6 HFPEP070012-01-02

Period: October 2008 to June 2009

Collaborators: Washington Hospital Center, CCRD Partners, Fluid Dynamics Solutions, Inc.

Findings: A membrane diffuser directed airflow ventilation strategy occupying approximately 40% to 60% of the ceiling surface and placed over the patient in a contemporary sized exam room provides a less turbulent airflow pattern and less mixing of the air between the patient and others in the room.

## RESEARCH ARTICLES

### CADRE Publications

Pati, D., Harvey, T.E. Jr., and Pati, S. (2014). "Physical Design Correlates of Efficiency and Safety in Emergency Departments: A Qualitative Examination." *Critical Care Nursing Quarterly*, 37(3), 299-316.

The objective of this study was to explore and identify physical design correlates of safety and efficiency in emergency department (ED) operations. This study adopted an exploratory, multi-measure approach to: (1) examine the interactions between ED operations and physical design at 4 sites and (2) identify domains of physical design decision-making that potentially influence efficiency and safety. Multi-disciplinary gaming and semi-structured interviews were conducted with stakeholders at each site. Study data suggest that 16 domains of physical design decisions influence safety, efficiency, or both. These include (1) entrance and patient waiting, (2) traffic management, (3) sub-waiting or internal waiting areas, (4) triage, (5) exam/ treatment area configuration, (6) exam/ treatment area centralization versus decentralization, (7) exam/ treatment room standardization, (8) adequate space, (9) nurse work space, (10) physician work space, (11) adjacencies and access, (12) equipment room, (13) psych room, (14) staff de-stressing room, (15) hallway width, and (16) results waiting area. Safety and efficiency from a physical environment perspective in ED design are mutually reinforcing concepts – enhancing efficiency bears positive implications for safety. Further, safety and security emerged as correlated concepts, with security issues bearing implications for safety, thereby suggesting important associations between safety, security and efficiency.

Pati, D., Pietrzak, M., Duthu, D., Lei, T-K.G., Vincent, D.,..., Randsell, T. (2010). "Airborne Contamination Control through Directed Airflow in the Exam Room: A Pilot Study Using a Membrane Diffuser." *Journal of Healthcare Engineering* 1(4): 655-674.

Airborne infections have been documented as a major source of hospital acquired infection – one of the major concerns in healthcare delivery. An important factor contributing to airborne infection is cross contamination through air particulate dispersion as affected by the ventilation system design. Clean room technology (with membrane ceiling) has been successfully used in technology and pharmaceutical industries to control airborne contamination. This study examined the performance of membrane ceiling technology in controlling air particulate dispersion in a mock-up exam room. It included both performance tests in a mock-up room and a simulation study of six different ventilation system designs using Computational Fluid Dynamics (CFD) analysis. Findings suggest that a membrane diffuser directed airflow ventilation strategy occupying approximately 20% to 30% of the ceiling surface and placed over the patient in a contemporary sized exam room provides a less turbulent airflow pattern and less mixing of the air between the patient and others in the room.

## INDUSTRY PUBLICATIONS

### CADRE Publications

Kittredge, F. D. J., Dias, Ashley N. and Miller, Martin J. (2011). Hospital operations planning, simulation and architecture. *Health Facilities Management*.

Architecture and operations are inherently linked. What happens inside a building is influenced by space, and space is influenced by what goes on inside of it. This is especially important in health care architecture and design. Health care programmers, planners and designers have always regarded operations planning in some capacity during the architectural process – but how this is done has evolved.

# RESEARCH AND INDUSTRY PUBLICATIONS

## Non-CADRE Publications

### **DESIGN**

Welch, S. J. (2012). "Using data to drive emergency department design: a metasynthesis." [Health Environments Research and Design](#), **5**(3): 26-45.

**OBJECTIVE:** There has been an uptick in the field of emergency department (ED) operations research and data gathering, both published and unpublished. This new information has implications for ED design. The specialty suffers from an inability to have these innovations reach frontline practitioners, let alone design professionals and architects. This paper is an attempt to synthesize for design professionals the growing data regarding ED operations.

**METHODS:** The following sources were used to capture and summarize the research and data collections available regarding ED operations: the Emergency Department Benchmarking Alliance database; a literature search using both PubMed and Google Scholar search engines; and data presented at conferences and proceedings.

**RESULTS:** Critical information that affects ED design strategies is summarized, organized, and presented. Data suggest an optimal size for ED functional units. The now-recognized arrival and census curves for the ED suggest a department that expands and contracts in response to changing census. Operational improvements have been clearly identified and are grouped into three categories: input, throughput, and outflow. Applications of this information are suggested.

**CONCLUSION:** The sentinel premise of this meta-synthesis is that data derived from improvement work in the area of ED operations has applications for ED design. EDs can optimize their functioning by marrying good processes and operations to good design. This review paper is an attempt to bring this new information to the attention of the multidisciplinary team of architects, designers, and clinicians.

Welch, S. J. (2011). "Quality matters: Data drove design of University of Kentucky ED." [Emergency Medicine News](#) **33**(8): 22-23.

Zilm, F. (2010). "Designing for emergencies. Integrating operations and adverse-event planning." [Health Facilities Management](#) **23**(11): 39-42.

Zilm, F., et al. (2008). "Integrating Disaster Preparedness and Surge Capacity in Emergency Facility Planning." [The Journal of Ambulatory Care Management](#) **31**(4): 377-385.

The ability to adapt and utilize emergency facilities is a critical element in responding to surges resulting from man-made and natural events. The current stresses on emergency services throughout the country find few adequately prepared to effectively absorb a sudden increase in patients along with some of the potential special requirements, such as quarantining of epidemic patients and mass decontamination. This article reviews major findings of the federally funded ER One project, a research initiative that has described a number of facility strategies, which should be considered in planning new emergency facilities. An early case study in the application of these principles at the recently completed Tampa General Hospital emergency service is provided, illustrating how, when integrated into the early planning and design, many of the ER One recommendations can be implemented at modest capital cost increases.

Zilm, F. (2007). "A New Era of Emergency Care: Planning and Design Consideration." [The Journal of Ambulatory Care Management](#) **30**(3): 259-263.

Emergency care is one of the most complex, rapidly growing areas of ambulatory care. Providers need to consider new issues related to management of low-acuity patients, capacity for surge events, and the need to integrate patient focused care into the emergency department environment. This article explores these issues and discusses basic organizational topologies for facilities.

## **EFFICIENCY**

Robeznieks, A. (2012). Built-in efficiencies. Modern Healthcare.

Hwang, T. G., et al. (2011). "Structure-oriented versus process-oriented approach to enhance efficiency for emergency room operations: what lessons can we learn?" Journal of Healthcare Management, **56**(4): 255-267; discussion 267-258.

The efficiency and quality of a healthcare system can be defined as interactions among the system structure, processes, and outcome. This article examines the effect of structural adjustment (change in floor plan or layout) and process improvement (critical pathway implementation) on performance of emergency room (ER) operations for acute cerebral infarction patients. Two large teaching hospitals participated in this study: Korea University (KU) Guro Hospital and KU Anam Hospital. The administration of Guro adopted a structure-oriented approach in improving its ER operations while the administration of Anam employed a process-oriented approach, facilitating critical pathways and protocols. To calibrate improvements, the data for time interval, length of stay, and hospital charges were collected, before and after the planned changes were implemented at each hospital. In particular, time interval is the most essential measure for handling acute stroke patients because patients' survival and recovery are affected by the promptness of diagnosis and treatment. Statistical analyses indicated that both redesign of layout at Guro and implementation of critical pathways at Anam had a positive influence on most of the performance measures. However, reduction in time interval was not consistent at Guro, demonstrating delays in processing time for a few processes. The adoption of critical pathways at Anam appeared more effective in reducing time intervals than the structural rearrangement at Guro, mainly as a result of the extensive employee training required for a critical pathway implementation. Thus, hospital managers should combine structure-oriented and process-oriented strategies to maximize effectiveness of improvement efforts.

Mutter, R. L., et al. (2008). "Measuring hospital inefficiency: the effects of controlling for quality and patient burden of illness." Health Services Research, **43**(6): 1992-2013.

OBJECTIVE: To assess the impact of employing a variety of controls for hospital quality and patient burden of illness on the mean estimated inefficiency and relative ranking of hospitals generated by stochastic frontier analysis (SFA).

STUDY SETTING: This study included urban U.S. hospitals in 20 states operating in 2001.

DATA DESIGN/DATA COLLECTION: We took hospital data for 1,290 hospitals from the American Hospital Association Annual Survey and the Medicare Cost Reports. We employed a variety of controls for hospital quality and patient burden of illness. Among the variables we used were a subset of the quality indicators generated from the application of the Patient Safety Indicator and Inpatient Quality Indicator modules of the Agency for Healthcare Research and Quality, Quality Indicator software to the Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases. Measures of a component of patient burden of illness came from the application of the Comorbidity Software to HCUP data.

DATA ANALYSIS: We used SFA to estimate hospital cost-inefficiency. We tested key assumptions of the SFA model with likelihood ratio tests.

PRINCIPAL FINDINGS: The measures produced by the Comorbidity Software appear to account for variations in patient burden of illness that had previously been masquerading as inefficiency. Outcome measures of quality can provide useful insight into a hospital's operations but may have little impact on estimated inefficiency once controls for structural quality and patient burden of illness have been employed.

CONCLUSIONS: Choices about controlling for quality and patient burden of illness can have a nontrivial impact on mean estimated hospital inefficiency and the relative ranking of hospitals generated by SFA.

Storrow, A. B., et al. (2008). "Decreasing lab turnaround time improves emergency department throughput and decreases emergency medical services diversion: a simulation model." Academic Emergency Medicine, **15**(11): 1130-1135.

BACKGROUND: The effect of decreasing lab turnaround times on emergency department (ED) efficiency can be estimated through system-level simulation models and help identify important outcome measures to study prospectively. Furthermore, such models may suggest the advantage of bedside or point-of-care testing and how they might affect efficiency measures.

OBJECTIVES: The authors used a sophisticated simulation model in place at an adult urban ED with an annual census of 55,000 patient visits. The effect of decreasing turnaround times on emergency

medical services (EMS) diversion, ED patient throughput, and total ED length of stay (LOS) was determined.

**METHODS:** Data were generated by using system dynamics analytic modeling and simulation approach on 90 separate days from December 2, 2007, through February 29, 2008. The model was a continuous simulation of ED flow, driven by real-time actual patient data, and had intrinsic error checking to assume reasonable goodness-of-fit. A return of complete laboratory results incrementally at 120, 100, 80, 60, 40, 20, and 10 minutes was compared. Diversion calculation assumed EMS closure when more than 10 patients were in the waiting room and 100% ED bed occupancy had been reached for longer than 30 minutes, as per local practice. LOS was generated from data insertion into the patient flow stream and calculation of time to specific predefined gates. The average accuracy of four separate measurement channels (waiting room volume, ED census, inpatient admit stream, and ED discharge stream), all across 24 hours, was measured by comparing the area under the simulated curve against the area under the measured curve. Each channel's accuracy was summed and averaged for an overall accuracy rating.

**RESULTS:** As lab turnaround time decreased from 120 to 10 minutes, the total number of diversion days (maximum 57 at 120 minutes, minimum 29 at 10 minutes), average diversion hours per day (10.8 hours vs. 6.0 hours), percentage of days with diversion (63% vs. 32%), and average ED LOS (2.77 hours vs. 2.17 hours) incrementally decreased, while average daily throughput (104 patients vs. 120 patients) increased. All runs were at least 85% accurate.

**CONCLUSIONS:** This simulation model suggests compelling improvement in ED efficiency with decreasing lab turnaround time. Outcomes such as time on EMS diversion, ED LOS, and ED throughput represent important but understudied areas that should be evaluated prospectively. EDs should consider processes that will improve turnaround time, such as point-of-care testing, to obtain these goals.

Venugopal, R., et al. (2008). "A workshop to improve workflow efficiency in emergency medicine." Canadian Journal of Emergency Medicine, **10**(6): 525-531.

**OBJECTIVE:** The emergency department (ED) environment requires physicians to focus on workflow efficiency (WFE) and manage ED throughput. We sought to determine whether an interactive workshop could be designed and favourably perceived by emergency physicians and residents as a means to improve their self-assessed WFE skills.

**METHODS:** The authors designed a 4-station workshop to simulate key components of ED throughput. These included resource management in 1) acute care, 2) minor care, 3) charting and 4) communication skills and patient sign-overs. Anonymous surveys were completed after each workshop using 5-point Likert scales and qualitative responses. Qualitative data encompassed participants' past WFE training experiences and perspectives on the current workshop. Data were analyzed using descriptive statistics. The workshops were administered on 2 separate occasions to different groups of physicians. The first occasion was primarily for residents and the second session was only for practising physicians.

**RESULTS:** A total of 22 residents and 24 practising physicians participated. Evaluations were completed by 45 of 46 participants. Ratings of "definitely helpful" or "helpful" as noted for each station were received by 37 of 44 respondents for the sign-over and communication station, by 37 of 44 for the minor care station, by 41 of 44 for the acute care station and by 33 of 43 for the effective charting station. Among all participants, 42 of 45 reported that they felt the overall workshop experience was "helpful" or "definitely helpful."

**CONCLUSION:** ED management "flow skills" are valued yet undertaught. A flow workshop designed to improve self-perceived WFE skills yields positive evaluations. Teaching this competency in a workshop setting is both feasible and appreciated by participants. Similar efforts should be considered for inclusion in both graduate and continuing medical education curricula.

Scalise, D. (2006). Improving patient throughput. Hospitals & Health Networks, AHA. **8**: 49-54.

Sennett, C. and K. Starkey (2006). Measuring and Improving Efficiency in Health Care: Report from an ABIM Foundation/IOM meeting. ABIM Foundation

Subash, F., et al. (2004). "Team triage improves emergency department efficiency." Emergency Medicine Journal, **21**(5): 542-544.

**OBJECTIVE:** To see whether three hours of combined doctor and nurse triage would lead to earlier medical assessment and treatment and whether this benefit would carry on for the rest of the day when normal triage had resumed.

**METHOD:** Eight days were randomly selected; four for team triage and four for the normal nurse led triage. Team triage was coordinated by a middle grade or consultant from 9 am to 12 noon. Times to triage, to see a doctor, radiology, admission, and discharge were recorded. No additional medical or nursing staff were used and staffing levels were similar each day. All patients including blue light emergencies and minor injuries were included.

**RESULTS:** Median times were significantly reduced ( $p < 0.05$ ) during the intervention to triage (2 min v 7 min,  $p = 0.029$ ), to see a doctor (2 min v 32 min,  $p = 0.029$ ), and to radiology (11.5 min v 44.5 min,  $p = 0.029$ ). Waiting times at midday were longer for patients in the non-intervention group. More patients were seen and discharged within 20 minutes in the intervention group (18 of 95 (19%) v 2 of 69 (3%)  $p = 0.0043$ ). No significant knock on effect was demonstrable for the remaining 21 hours after the intervention ceased.

**CONCLUSION:** Three hours of combined doctor and nurse triage significantly reduces the time to medical assessment, radiology, and to discharge during the intervention period. Waiting times at midday were shorter in the triage group. There was no significant knock on effect the rest of the day.

Nelson, R. (1998). "Computerized patient records improve practice efficiency and patient care." Healthcare Finance Management **52**(4): 86, 88.

Paper patient records are proving increasingly inadequate to meet the modern information needs of group practices. Computerizing patient records can improve physician access to patient information and thereby also improve patient care and outcomes management. By investing in a computerized patient record system, practices can optimize revenues by saving labor costs associated with record retrieval, photocopying, filing, and other processes. Computerizing patient records requires careful planning and selection of a system that meets the practice's needs.

## **ERRORS**

Patanwala, A. E., et al. (2012). "A prospective, multicenter study of pharmacist activities resulting in medication error interception in the emergency department." Annals of Emergency Medicine, **59**(5): 369-373.

**STUDY OBJECTIVE:** The primary objective of this study is to determine the activities of pharmacists that lead to medication error interception in the emergency department (ED).

**METHODS:** This was a prospective, multicenter cohort study conducted in 4 geographically diverse academic and community EDs in the United States. Each site had clinical pharmacy services. Pharmacists at each site recorded their medication error interceptions for 250 hours of cumulative time when present in the ED (1,000 hours total for all 4 sites). Items recorded included the activities of the pharmacist that led to medication error interception, type of orders, phase of medication use process, and type of error. Independent evaluators reviewed all medication errors. Descriptive analyses were performed for all variables.

**RESULTS:** A total of 16,446 patients presented to the EDs during the study, resulting in 364 confirmed medication error interceptions by pharmacists. The pharmacists' activities that led to medication error interception were as follows: involvement in consultative activities ( $n=187$ ; 51.4%), review of medication orders ( $n=127$ ; 34.9%), and other ( $n=50$ ; 13.7%). The types of orders resulting in medication error interceptions were written or computerized orders ( $n=198$ ; 54.4%), verbal orders ( $n=119$ ; 32.7%), and other ( $n=47$ ; 12.9%). Most medication error interceptions occurred during the prescribing phase of the medication use process ( $n=300$ ; 82.4%) and the most common type of error was wrong dose ( $n=161$ ; 44.2%).

**CONCLUSION:** Pharmacists' review of written or computerized medication orders accounts for only a third of medication error interceptions. Most medication error interceptions occur during consultative activities.

Mills, P. R. and A. C. McGuffie (2010). "Formal medicine reconciliation within the emergency department reduces the medication error rates for emergency admissions." Emergency Medicine Journal, **27**(12): 911-915.

**AIM:** To improve medication history accuracy and reduce prescribing errors for unscheduled patients admitted via the emergency department (ED).



**DESIGN:** A prospective observational study of 100 adult unscheduled admissions with 50 patients in both pre and post-intervention groups. One investigator completed the required information including patient demographics, admitting speciality, number and types of any medication errors detected. In the post-intervention group, the investigator (a pharmacist independent prescriber) completed systematic medicine reconciliation in the ED before patient transfer and initiated the original inpatient prescription chart, as appropriate.

**BACKGROUND AND SETTING:** The ED in a busy district general hospital with an emergency admission rate of 24,000 patients per annum.

**KEY MEASURES FOR IMPROVEMENT:** An increase in medicine reconciliation and initial prescribing within the ED with a reduction in prescribing error rates. Strategies for Improvement Change needed to be communicated to all staff involved in process: ED medical and nursing staff; appropriate clinical directors; pharmacy staff.

**EFFECTS OF CHANGE:** Medicine reconciliation completed within 24 h of admission increased from 50% to 100% and prescription chart initiation in the ED increased from 6% to 80%. The prescribing error rate was reduced from 3.3 errors to 0.04 errors per patient (difference 95% CI 2.5 to 5.1).

**LESSONS LEARNT:** Streamlining the admission process for unscheduled patients leads to improvement in care, decreases prescribing errors and reduces either potential or actual harm. Moving pharmacists' work to the ED better aligns their input to the patient journey and utilises their knowledge and skills to the patient's benefit.

Weant, K. A., et al. (2010). "Effect of emergency medicine pharmacists on medication-error reporting in an emergency department." *American Journal of Health Systems Pharmacy* **67**(21): 1851-1855.

**PURPOSE:** The effect of an emergency medicine (EM) clinical pharmacist on medication-error reporting in an emergency department (ED) was studied.

**METHODS:** The medication-error reports for patients seen at a university's ED between September 1, 2005, and February 28, 2009, were retrospectively reviewed. Errors reported before the addition of an EM pharmacist (from September 1, 2005, through February 28, 2006) were compared with those reported after the addition of two EM pharmacists (from September 1, 2008, through February 28, 2009). The severity of errors and the provider who reported the errors were characterized.

**RESULTS:** A total of 402 medication errors were reported over the two time periods. Pharmacy personnel captured significantly more errors than did other health care personnel (94.5% versus 5.7%,  $p < 0.001$ ). The addition of two EM pharmacists resulted in 14.8 times as many medication-error reports as were made when no EM pharmacist was in the ED. More errors that actually occurred were captured with two pharmacists providing care (95.7% versus 4.3%,  $p < 0.001$ ). A majority of the errors documented were ordering errors (79.8%). Of these, 73.7% were captured after the addition of two EM pharmacists. Performance (40.0%) and knowledge (27.9%) deficits were the most common contributing factors to medication errors.

**CONCLUSION:** During the study period after the addition of two EM pharmacists in the ED, 371 medication-error reports were completed, compared with 31 reports during the study period before the addition of the pharmacists. Pharmacy personnel reported the majority of medication errors during both study periods.

Schmidt, C. E. and T. Bottoni (2003). "Improving medication safety and patient care in the emergency department." *Journal of Emergency Nursing* **29**(1): 12-16.

**INTRODUCTION:** Medication errors are well documented in medical literature and the lay press. Through participation in a nationwide institute for healthcare improvement initiative, our emergency department performance improvement group focused on human and system factors that contributed to potential medication errors.

**METHODS:** A survey conducted of ED staff examined barriers to reporting medication errors and potential "near misses." members of the emergency department performance improvement group examined contents of the ED Pyxis machines, assessing medications that physically resembled one another, similar sounding medications located in close proximity, and medications available in differing doses.

**RESULTS:** Fifty-eight members participated in a 4-question survey. Half reported they would be likely to self-report a "near miss" if the patient was not harmed. About half would report the medication error of a colleague under certain circumstances. Fifty-one percent believed there would be repercussions for reporting medication error, but most believed they would receive support from supervisors for

addressing other safety problems. Nearly one quarter of the 278 medications identified in the Pyxis survey were similar in appearance or name or existed in multi-dose formulations.

DISCUSSION: Measures to decrease the potential of medication errors include: (1) a workplace environment that promotes reporting of medication errors or "close calls" by staff, with counseling events utilized as learning opportunities versus punitive incidents; (2) increased frequency of medication safety in-service sessions; and (3) periodic monitoring of Pyxis machine inventories to survey contents for optimum patient safety.

Morey, J. C., et al. (2002). "Error reduction and performance improvement in the emergency department through formal teamwork training: evaluation results of the MedTeams project." *Health Service Research*, **37**(6): 1553-1581.

OBJECTIVE: To evaluate the effectiveness of training and institutionalizing teamwork behaviors, drawn from aviation crew resource management (CRM) programs, on emergency department (ED) staff organized into caregiver teams.

STUDY SETTING: Nine teaching and community hospital EDs.

STUDY DESIGN: A prospective multicenter evaluation using a quasi-experimental, untreated control group design with one pretest and two posttests of the Emergency Team Coordination Course (ETCC). The experimental group comprised of 684 physicians, nurses, and technicians, received the ETCC and implemented formal teamwork structures and processes. Assessments occurred prior to training, and at intervals of four and eight months after training. Three outcome constructs were evaluated: team behavior, ED performance, and attitudes and opinions. Trained observers rated ED staff team behaviors and made observations of clinical errors, a measure of ED performance. Staff and patients in the EDs completed surveys measuring attitudes and opinions.

DATA COLLECTION: Hospital EDs were the units of analysis for the seven outcome measures. Prior to aggregating data at the hospital level, scale properties of surveys and event-related observations were evaluated at the respondent or case level.

PRINCIPAL FINDINGS: A statistically significant improvement in quality of team behaviors was shown between the experimental and control groups following training ( $p=.012$ ). Subjective workload was not affected by the intervention ( $p=.668$ ). The clinical error rate significantly decreased from 30.9 percent to 4.4 percent in the experimental group ( $p=.039$ ). In the experimental group, the ED staffs' attitudes toward teamwork increased ( $p=.047$ ) and staff assessments of institutional support showed a significant increase ( $p=.040$ ).

CONCLUSION: Our findings point to the effectiveness of formal teamwork training for improving team behaviors, reducing errors, and improving staff attitudes among the ETCC-trained hospitals.

Schenkel, S. (2000). "Promoting patient safety and preventing medical error in emergency departments." *Academic Emergency Medicine*, **7**(11): 1204-1222.

An estimated 108,000 people die each year from potentially preventable iatrogenic injury. One in 50 hospitalized patient's experiences a preventable adverse event. Up to 3% of these injuries and events take place in emergency departments. With long and detailed training, morbidity and mortality conferences, and an emphasis on practitioner responsibility, medicine has traditionally faced the challenges of medical error and patient safety through an approach focused almost exclusively on individual practitioners. Yet no matter how well trained and how careful health care providers are, individuals will make mistakes because they are human. In general medicine, the study of adverse drug events has led the way to new methods of error detection and error prevention. A combination of chart reviews, incident logs, observation, and peer solicitation has provided a quantitative tool to demonstrate the effectiveness of interventions such as computer order entry and pharmacist order review. In emergency medicine (EM), error detection has focused on subjects of high liability: missed myocardial infarctions, missed appendicitis, and misreading of radiographs. Some system-level efforts in error prevention have focused on teamwork, on strengthening communication between pharmacists and emergency physicians, on automating drug dosing and distribution, and on rationalizing shifts. This article reviews the definitions, detection, and presentation of error in medicine and EM. Based on review of the current literature, recommendations are offered to enhance the likelihood of reduction of error in EM practice.



## **FURNITURE**

Gardner-Bonneau, D. J. and J. I. Kailes (2010). "Accessible Health Care: More than Just Getting Through the Door." Ergonomics in Design: The Quarterly of Human Factors Applications **18**(1): 5-10.

FEATURE AT A GLANCE: Access to health care requires more than mere access to a health care facility. It requires access to medical equipment and devices. Currently, many older adults and people with disabilities have difficulty accessing medical equipment, including examination chairs and tables, weight scales, and exercise and rehabilitation equipment. This article outlines the problem and its consequences for patients and describes the ergonomics requirements that must be met to ensure accessibility of this equipment for all patients.

## **INFECTION CONTROL**

Venkatesh, A. K., et al. (2011). "Predictors of hand hygiene in the emergency department." Infection Control and Hospital Epidemiology, **32**(11): 1120-1123.

We conducted an observational study to identify predictors of hand hygiene (HH) in the emergency department. Compliance with HH was 89.7% over 5,865 opportunities. Observation unit, hallway or high-visibility location, glove use, and worker type predicted worse HH. Hallway location was the strongest predictor (relative risk, 88.9% [95% confidence interval, 85.9%-92.1%]).

Francoise, M. B., et al. (2009). "Measurement of Airborne Influenza Virus in a Hospital Emergency Department." Clinical Infectious Diseases **48**(4): 438.

Size ... fractionated aerosol particles were collected in a hospital emergency department to test for airborne influenza virus. Using real ... time polymerase chain reaction, we confirmed the presence of airborne influenza virus and found that 53% of detectable influenza virus particles were within the respirable aerosol fraction. Our results provide evidence that influenza virus may spread through the airborne route. (ProQuest: ... denotes formulae/symbols omitted.)

Dantas, S. and L. Moretti-Branchini (2003). "Impact of antibiotic-resistant pathogens colonizing the respiratory secretions of patients in an extended-care area of the emergency department." Infection Control and Hospital Epidemiology **24**(5): 351-355.

OBJECTIVE: To determine the incidence of acquired infection, and the incidence, risk factors, and molecular typing of multidrug-resistant bacterial organisms (MROs) colonizing respiratory secretions or the oropharynx of patients in an extended-care area of the emergency department (ED) in a tertiary-care university hospital.

METHODS: A case-control study was conducted regarding risk factors for colonization with MROs in ED patients from July 1996 to August 1998. The most prevalent MRO strains were determined using plasmid and genomic analysis with PFGE.

RESULTS: MROs colonized 59 (25.4%) of 232 ED patients and 173 controls. The mean ED length of stay for the 59 cases was 13.9 days versus 9.8 days for the 173 controls. The mean length of stay prior to the first isolation of MROs was 9.9 days. MRO species included *Acinetobacter baumannii*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*. The rate of hospital-acquired infection was 32.7 per 1,000 ED patient-days. The case fatality rate was significantly higher for cases. Univariate analysis identified mechanical ventilation, nebulization, nasogastric intubation, urinary catheterization, antibiotic therapy, and number of antibiotics as risk factors for MRO colonization. Multivariate regression analysis found that mechanical ventilation and nasogastric intubation independently predicted MRO colonization. Endemic clones were identified by PFGE in ED patients and were also found in patients in other parts of the hospital.

CONCLUSIONS: Prolonged stay in the ED posed a risk for colonization with MROs and for contracting nosocomial infections, both of which were associated with increased mortality. Patients colonized with antibiotic-resistant *A. baumannii* may serve as a reservoir for spread in this hospital.

Dorsey, S. T., et al. (1996). "Is handwashing teachable? Failure to improve handwashing behavior in an urban emergency department." Academy of Emergency Medicine **3**(4): 360-365.

OBJECTIVES: To assess handwashing frequency according to CDC recommendations; and to test a simple intervention to increase handwashing compliance, designed for the unique setting of the ED.

**METHODS:** A prospective, observational, before-and-after study design with a convenience sampling technique was used to assess handwashing compliance in the ED of a 742-bed urban, university-affiliated medical center with 65,000 visits annually. Emergency physicians (EPs), registered nurses (RNs), and nurse practitioners (NPs) were informed that their patient encounters were being monitored, but the nature of the study was kept confidential. A single observer evaluated individual EPs, RNs, and NPs in one-, two-, or three-hour blocks, recording compliance with CDC handwashing recommendations. After two weeks, brightly colored signs with CDC recommendations for handwashing were posted at all sinks and a copy of a related publication on handwashing by medical personnel was distributed to all staff. Handwashing behaviors were again observed.

**RESULTS:** A total of 252 situations requiring handwashing were observed, 132 pre-intervention and 120 post-intervention. Total handwashing, handwashing by each staff designation, and handwashing in each CDC recommendation category--except handwashing between contacts with different patients--all showed tendencies toward improvement, though none was significant ( $p > 0.05$ ). Both the NPs and RNs demonstrated significantly higher adherence to recommended handwashing between patients after the intervention than did the EPs (85% vs 71% vs 31%,  $p < 0.01$  and  $p < 0.05$ , respectively).

**CONCLUSION:** Despite a trend in improvement of compliance with CDC recommendations, handwashing among ED personnel remained unacceptably low.

Meengs, M. R., et al. (1994). "Hand washing frequency in an emergency department." *Journal of Emergency Nursing*, **20**(3): 183-188.

**Objectives:** Previous studies, conducted mainly in ICUs, have shown low compliance with hand-washing recommendations, with failure rates approaching 60%. Hand washing in the emergency department has not been studied. We examined the frequency and duration of hand washing in one emergency department and the effects of three variables: level of training, type of patient contact (clean, dirty, or gloved), and years of staff clinical experience.

**Design:** Observational.

**Setting:** ED of a 1100-bed tertiary referral, central city, private teaching hospital.

**Participants:** Emergency nurses, faculty, and resident physicians. Participants were informed that their activities were being monitored but were unaware of the exact nature of the study.

**Interventions:** An observer recorded the number of patient contacts and activities for each participant during 3-hour observation periods. Activities were categorized as either clean or dirty according to a scale devised by Fulkerson. The use of gloves was noted and hand-washing technique and duration were recorded. A hand-washing break in technique was defined as failure to wash hands after a patient contact and before proceeding to another patient or activity.

**Results:** Eleven faculty, 11 resident physicians, and 13 emergency nurses were observed. Of 409 total contacts, 272 were clean, 46 were dirty, and 91 were gloved. Hand washing occurred after 32.3% of total contacts (SD, 2.31%). Nurses washed after 58.2% of 146 contacts (SD, 4.1%), residents after 18.6% of 129 contacts (SD, 3.4%), and faculty after 17.2% of 134 contacts (SD, 3.3%). Nurses had a significantly higher hand washing frequency than either faculty ( $p < 0.0001$ ) or resident physicians ( $p < 0.0001$ ). (ABSTRACT TRUNCATED AT 250 WORDS)

## **LEAN**

Mazzocato, P., et al. (2012). "How does lean work in emergency care? A case study of a lean-inspired intervention at the Astrid Lindgren Children's hospital, Stockholm, Sweden." *BMC Health Services Research*, **12**: 28.

**BACKGROUND:** There is growing interest in applying lean thinking in healthcare, yet, there is still limited knowledge of how and why lean interventions succeed (or fail). To address this gap, this in-depth case study examines a lean-inspired intervention in a Swedish pediatric Accident and Emergency department.

**METHODS:** We used a mixed methods explanatory single case study design. Hospital performance data were analyzed using analysis of variance (ANOVA) and statistical process control techniques to assess changes in performance one year before and two years after the intervention. We collected qualitative data through non-participant observations, semi-structured interviews, and internal documents to describe the process and content of the lean intervention. We then analyzed empirical findings using four theoretical lean principles (Spear and Bowen 1999) to understand how and why the intervention worked in its local context as well as to identify its strengths and weaknesses.

RESULTS: Improvements in waiting and lead times (19-24%) were achieved and sustained in the two years following lean-inspired changes to employee roles, staffing and scheduling, communication and coordination, expertise, workspace layout, and problem solving. These changes resulted in improvement because they: (a) standardized work and reduced ambiguity, (b) connected people who were dependent on one another, (c) enhanced seamless, uninterrupted flow through the process, and (d) empowered staff to investigate problems and to develop countermeasures using a "scientific method". Contextual factors that may explain why not even greater improvement was achieved included: a mismatch between job tasks, licensing constraints, and competence; a perception of being monitored, and discomfort with inter-professional collaboration.

CONCLUSIONS: Drawing on Spear and Bowen's theoretical propositions, this study explains how a package of lean-like changes translated into better care process management. It adds new knowledge regarding how lean principles can be beneficially applied in healthcare and identifies changes to professional roles as a potential challenge when introducing lean thinking there. This knowledge may enable health care organizations and managers in other settings to configure their own lean program and to better understand the reasons behind lean's success (or failure).

Peck, R. L. (2011). Emergency Departments: Getting leaner all the time. [Healthcare Design](#).

Piggott, Z., et al. (2011). "Application of Lean principles to improve early cardiac care in the emergency department." [Canadian Journal of Emergency Medicine](#), **13**(5): 325-332.

OBJECTIVE: To achieve our goal of excellent emergency cardiac care, our institution embarked on a Lean process improvement initiative. We sought to examine and quantify the outcome of this project on the care of suspected acute coronary syndrome (ACS) patients in our emergency department (ED).

METHODS: Front-line ED staff participated in several rapid improvement events, using Lean principles and techniques such as waste elimination, supply chain streamlining, and standard work to increase the value of the early care provided to patients with suspected ACS. A chart review was also conducted. To evaluate our success, proportions of care milestones (first electrocardiogram [ECG], ECG interpretation, physician assessment, and acetylsalicylic acid [ASA] administration) meeting target times were chosen as outcome metrics in this before-and-after study.

RESULTS: The proportion of cases with 12-lead ECGs completed within 10 minutes of patient triage increased by 37.4% ( $p < 0.0001$ ). The proportion of cases with physician assessment initiated within 60 minutes increased by 12.1% ( $p = 0.0251$ ). Times to ECG, physician assessment, and ASA administration also continued to improve significantly over time ( $p$  values  $< 0.0001$ ). Post-Learn, the median time from ECG performance to physician interpretation was 3 minutes. All of these improvements were achieved using existing staff and resources.

CONCLUSIONS: The application of Lean principles can significantly improve attainment of early diagnostic and therapeutic milestones of emergency cardiac care in the ED.

Zilm, F., et al. (2010). "New Directions in Emergency Service Operations and Planning." [The Journal of Ambulatory Care Management](#) **33**(4): 296-306.

Emergency services continue to evolve new operational and facility concepts in response to increasing demand for care and pressures for efficient, and safe, patient management. This article describes new models for "intake" of patients and for responding to peak demand that are radically changing the traditional emergency service. Application of Six Sigma and "Lean" analysis techniques are demonstrating dramatic improvements in throughput times and in the utilization of treatment spaces. This article provides an overview of the application of Lean concepts to emergency services. Case studies of Mary Washington Hospital and Banner Health Corporation illustrate the result of application of these tools. Implication for the required patient care areas and design concepts are also discussed.

## **NOISE**

Orellana, D., et al. (2007). "Noise in the adult emergency department of Johns Hopkins Hospital." [Journal of Acoustical Society of America](#), **121**(4): 1996-1999.

While hospitals are generally noisy environments, nowhere is the pandemonium greater than in an emergency department, where there is constant flow of patients, doctors, nurses, and moving equipment. In this noise study we collected 24 h measurements throughout the adult emergency department of Johns Hopkins Hospital, the top ranked hospital in the U.S. for 16 years running. The

equivalent sound pressure level (Leq) throughout the emergency department is about 5 dB(A) higher than that measured previously at a variety of in-patient units of the same hospital. Within the emergency department the triage area at the entrance to the department has the highest Leq, ranging from 65 to 73 dB(A). Sound levels in the emergency department are sufficiently high [on average between 61 and 69 dB(A)] to raise concerns regarding the communication of speech without errors--an important issue everywhere in a hospital and a critical issue in emergency departments because doctors and nurses frequently need to work at an urgent pace and to rely on oral communication.

Zun, L. S. and L. Downey (2005). "The effect of noise in the emergency department." Academic Emergency Medicine **12**(7): 663-666.

Background: It is hypothesized that high ambient noise in the emergency department (ED) adversely affects the ability of the examiner to hear heart and lung sounds.

Objective: To determine the ability of various examiners to hear heart tones and lung sounds at the high end of loudness typically found in the ED setting.

Methods: The study was divided into two parts. First, sound levels in the ED were measured over various times during the months of January through June 2001, using a sound level monitor. The second part of the study was the determination of the ability to hear heart and lung sounds on a young healthy volunteer using the same Littmann lightweight stethoscope at a predetermined ambient noise level of 90 dB. The results were entered into a database and analyzed using SPSS version 10 (Chicago, IL). Descriptive statistics, analysis of variance, frequencies, and correlation were Calculated using this program.

Results: Two hundred five sound measurements were taken in the ED during the study period in three locations at various hours. The mean noise level at the nursing station was 57.60 dB, with a minimum of 45.00 dB and a maximum of 70.00 dB. Four of the 104 test subjects (3.8%) were unable to hear the heart tones, and nine of the 104 (8.7%) were unable to hear the lung sounds. Fifty percent (27 of 54) of the test subjects reported diminished lung sounds and eight of 15 (53.3%) reported diminished heart sounds. No significant difference was found between hearing heart sounds and years of experience, age, professional position, and quality of the sound. Significant differences were found between hearing lung sounds and years of experience and professional position, but not with age, gender, and sound quality.

Conclusions: This study demonstrated that most of the tested examiners have the ability to hear heart and lung sounds at the extreme of loudness found in one ED.

Buelow, M. (2001). "Noise level measurements in four Phoenix emergency departments." Journal of Emergency Nursing **27**: 23-26.

## **OVERCROWDING**

Advisory Board Company (2012). "Hospitals' efforts to prevent ED crowding may actually be making it worse." from <http://www.advisory.com/Daily-Briefing/2012/06/22/Hospitals-efforts-to%20prevent-ED-crowding-may-actually-be-making-it-worse>.

Barrett, L., et al. (2012). "A bed management strategy for overcrowding in the emergency department." Nursing Economics, **30**(2): 82-85, 116.

In 2006, the Institute of Medicine cited growing visit volumes, hospital closures, financial pressures, and operational inefficiencies as the principal reasons for emergency department (ED) overcrowding and called for regulatory measures to resolve the problem. A Midwest medical center with 59,000 annual ED visits instituted a bed management strategy to decrease the need to board, or hold, admitted hospital patients in the ED awaiting transfer to an inpatient care unit. This strategy was successful in improving the hold time from an average of 216 minutes to 103 minutes, or by 52%. This allowed the staff at the hospital to care for an additional 2,936 patients. During this same time, the overall hospital mortality decreased by 0.07% and patient satisfaction scores improved 1%. The greatest outcome from this intervention was realized in the potential revenue increase of over \$2 million.

Johnson, K. D. and C. Winkelman (2011). "The effect of emergency department crowding on patient outcomes: a literature review." Advanced Emergency Nursing Journal, **33**(1): 39-54.

The purpose of this review was to summarize the findings of published reports that investigated quality-related outcomes and emergency department (ED) crowding. Of 276 data-based articles, 23 reported associations between patient outcomes and crowding. These articles were grouped into 3 categories: delay in treatment, decreased satisfaction, and increased mortality. Although these studies suggest that crowding results in poor outcomes, it is possible that other factors such as nursing care contribute to these adverse outcomes. Nursing care has been shown to contribute to both positive and negative patient outcomes in other settings. Building an understanding of how ED crowding affects the practice of the emergency nurse is essential to examining how nursing care, surveillance, and communication impact outcomes of emergency patients. Investigation into nurse-sensitive quality indicators in the ED has potential to develop strategies that deliver high quality of care, regardless of crowded conditions.

Ovens, H. (2011). "ED Overcrowding: The Ontario Approach." *Academic Emergency Medicine* **18**(12): 1242-1245.  
Ontario is Canada's most populous province, with approximately 12 million people and 130 emergency departments (EDs). Canada has a national single-payer universal health care system, but provinces are responsible for administration. After years of problems and failed attempts to address chronic ED overcrowding, in April 2008 Ontario embarked on an ambitious program to improve system performance through targeted investments (initially CAN\$500 million over 3 years) and realigned incentives. Supporting the program were requirements for hospitals to submit timely data and targets for length of stay (LOS) and annual improvements; results are publicly reported. The program has been continued this year. While not all our provincial level targets have been met as yet, major improvements have been made, especially in access to care and LOS in the ED for patients eventually discharged home. The greatest improvements were made among the cohort of mainly urban, high-volume EDs that had the worst performance at baseline. This presentation will highlight some of the controversies and challenges and key lessons learned. Overall, the Ontario experience suggests ED overcrowding is a soluble problem, but requires a system-level intervention.

Henneman, P. L., et al. (2010). "Emergency department patients who take more than 6 hours contribute to crowding." *Journal of Emergency Medicine*, **39**(1): 105-112.

Exadaktylos, A. K., et al. (2008). "Strategic emergency department design: An approach to capacity planning in healthcare provision in overcrowded emergency rooms." *Journal of Trauma Management and Outcomes* **2**(1): 11.  
Healthcare professionals and the public have increasing concerns about the ability of emergency departments to meet current demands. Increased demand for emergency services, mainly caused by a growing number of minor and moderate injuries has reached crisis proportions, especially in the United Kingdom. Numerous efforts have been made to explore the complex causes because it is becoming more and more important to provide adequate healthcare within tight budgets. Optimisation of patient pathways in the emergency department is therefore an important factor. This paper explores the possibilities offered by dynamic simulation tools to improve patient pathways using the emergency department of a busy university teaching hospital in Switzerland as an example.

Howell, E., et al. (2008). "Active bed management by hospitalists and emergency department throughput." *Annals of Internal Medicine*, **149**(11): 804-811.

BACKGROUND: When emergency departments are overcrowded, ambulances are diverted. Interventions focused primarily on emergency departments have had limited success.

OBJECTIVE: To discover whether an active bed management, quality improvement initiative could reduce ambulance diversion hours and emergency department throughput times.

DESIGN: Pre-post study that compared institutional data from November 2006 to February 2007 (intervention period) with data from November 2005 to February 2006 (control period).

SETTING: Johns Hopkins Bayview Medical Center, Baltimore, Maryland.

PATIENTS: All adult patients registered in the emergency department during the study periods.

INTERVENTION: Active bed management is a hospitalist-led, multifaceted intervention that consists of proactive management of hospital and departmental resources, including twice-daily bed management rounds in the intensive care unit and regular visits to the emergency department to assess congestion and flow; assignment of all admissions to the department of medicine and facilitating transfer from the emergency department to the appropriate care setting; and support from the "bed director," who can mobilize additional resources in real time to augment hospital capacity to address emergency department throughput problems.

MEASUREMENTS: Emergency department throughput times and ambulance diversion hours.



**RESULTS:** The emergency department census was 8.8% higher during the intervention period than in the control period (17 573 patients vs. 16 148 patients). Throughput for patients who were admitted decreased by 98 minutes (SD, 10) (from 458 minutes in the control period to 360 minutes during the intervention period). Throughput for patients who were not admitted did not change (274 minutes vs. 269 minutes). The percentage of hours that the emergency department was on "yellow alert" (ambulance diversion because of emergency department crowding) decreased 6%, and the percentage of hours on "red alert" (ambulance diversion due to lack of intensive care unit beds in the hospital) decreased 27%. Staffing, length of stay, case-mix index, intensive care unit transfer rates, and mortality rates were stable across the 2 periods.

**LIMITATIONS:** Pre-post designs are less effective than randomized, controlled trials on the study design hierarchy, and unidentified external forces may have influenced the results. The study was done at a single hospital, and the findings may not be generalizable to other institutions.

**CONCLUSION:** Emergency department throughput and diversion status improved with the implementation of an active bed management process coordinated by hospitalists.

Falvo, T., et al. (2007). "The opportunity loss of boarding admitted patients in the emergency department." Academic Emergency Medicine, **14**(4): 332-337.

**OBJECTIVES:** Boarding admitted patients in emergency department (ED) treatment beds has been recognized as a major cause of ED crowding and ambulance diversions. When process delays impede the transfer of admitted patients from the ED to inpatient units, the department's capacity to accept new arrivals and to generate revenue from additional patient services is restricted. The objective of this study was to determine the amount of functional ED treatment capacity that was used to board inpatients during 12 months of operations at a community hospital and to estimate the value of that lost treatment capacity.

**METHODS:** Historical data from 62,588 patient visits to the ED of a 450-bed nonprofit community teaching hospital in south central Pennsylvania between July 2004 and June 2005 were used to determine the amount of treatment bed occupancy lost to inpatient holding and the revenue potential of utilizing that blocked production capacity for additional patient visits.

**RESULTS:** Transferring admitted patients from the ED to an inpatient unit within 120 minutes would have increased the functional treatment capacity of the ED by 10,397 hours during the 12 months of this study. By reducing admission process delays, the hospital could potentially have accommodated another 3,175 patient encounters in its existing treatment spaces. Providing emergency services to new patients in ED beds formerly used to board inpatients could have generated \$3,960,264 in additional net revenue for the hospital.

**CONCLUSIONS:** Significantly higher operational revenues could be generated by reducing output delays that restrict optimal utilization of existing ED treatment capacity.

Falvo, T., et al. (2007). "The financial impact of ambulance diversions and patient elopements." Academic Emergency Medicine, **14**(1): 58-62.

**OBJECTIVES:** Admission process delays and other throughput inefficiencies are a leading cause of emergency department (ED) overcrowding, ambulance diversion, and patient elopements. Hospital capacity constraints reduce the number of treatment beds available to provide revenue-generating patient services. The objective of this study was to develop a practical method for quantifying the revenues that are potentially lost as a result of patient elopements and ambulance diversion.

**METHODS:** Historical data from 62,588 patient visits to the ED of a 450-bed nonprofit community teaching hospital in central Pennsylvania between July 2004 and June 2005 were used to estimate the value of potential patient visits foregone as a result of ambulance diversion and patients leaving the ED without treatment.

**RESULTS:** The study hospital may have lost 3,881,506 dollars in net revenue as a result of ambulance diversions and patient elopements from the ED during a 12-month period.

**CONCLUSIONS:** Significant revenue may be foregone as a result of throughput delays that prevent the ED from utilizing its existing bed capacity for additional patient visits.

Holroyd, B. R., et al. (2007). "Impact of a triage liaison physician on emergency department overcrowding and throughput: a randomized controlled trial." Academic Emergency Medicine, **14**(8): 702-708.

**BACKGROUND:** Triage liaison physicians (TLPs) have been employed in overcrowded emergency departments (EDs); however, their effectiveness remains unclear.



**OBJECTIVES:** To evaluate the implementation of TLP shifts at an academic tertiary care adult ED using comprehensive outcome reporting.

**METHODS:** A six-week TLP clinical research project was conducted between December 9, 2005, and February 9, 2006. A TLP was deployed for nine hours (11 AM to 8 PM) daily to initiate patient management, assist triage nurses, answer all medical consult or transfer calls, and manage ED administrative matters. The study was divided into three two-week blocks; within each block, seven days were randomized to TLP shifts and the other seven to control shifts. Outcomes included patient length of stay, proportion of patients who left without complete assessment, staff satisfaction, and episodes of ambulance diversion.

**RESULTS:** TLPs assessed a median of 14 patients per shift (interquartile range, 13-17), received 15 telephone calls per shift (interquartile range, 14-20), and spent 17-81 minutes per shift consulting on the telephone. The number of patients and their age, gender, and triage score during the TLP and control shifts were similar. Overall, length of stay was decreased by 36 minutes compared with control days (4:21 vs. 4:57;  $p = 0.001$ ). Left without complete assessment cases decreased from 6.6% to 5.4% (a 20% relative decrease) during the TLP coverage. The ambulance wait time and number of episodes of ambulance diversion were similar on TLP and control days.

**CONCLUSIONS:** A TLP improved important outcomes in an overcrowded ED and could improve delivery of emergency medical care in similar tertiary care EDs.

Cowan, R. M. and S. Trzeciak (2005). "Clinical review: Emergency department overcrowding and the potential impact on the critically ill." Critical Care, **9**(3): 291-295.

Critical care constitutes a significant and growing proportion of the practice of emergency medicine. Emergency department (ED) overcrowding in the USA represents an emerging threat to patient safety and could have a significant impact on the critically ill. This review describes the causes and effects of ED overcrowding; explores the potential impact that ED overcrowding has on care of the critically ill ED patient; and identifies possible solutions, focusing on ED based critical care.

Ardagh, M. and S. Richardson (2004). "Emergency department overcrowding--can we fix it?" New Zealand Medical Journal, **117**(1189): U774.

Boudreaux, E. and E. O'Hea (2004). "Patient Satisfaction in the Emergency Department: A Review of the Literature and Implications for Practice." Journal of Emergency Medicine **26**(1): 13-26.

This article reviews the empirical literature on patient satisfaction in the Emergency Department (ED). It explores the implications for clinical practice, discusses limitations and weaknesses of the literature, and provides direction for future research. Articles resulting from a comprehensive electronic search were obtained, their references examined, and all other relevant articles not already discovered via the electronic search were acquired and reviewed. Articles were included if: 1) the stated goal of the study was to investigate satisfaction with at least one aspect of ED care, 2) the study was conducted in the United States, 3) it provided enough information on the study methods, design, and statistical analyses to conduct a critical review, and 4) it used quantitative methods. Fifty studies met the above criteria. Based on the multivariate predictive studies, the most robust predictor of global satisfaction is the quality of Interpersonal interactions with the ED provider. Perceived waiting times are more closely associated with satisfaction than actual waiting times. Several methods for improving satisfaction have shown promise, but none has garnered sufficient support to recommend unequivocally. Promising interventions include: providing information on how the ED functions through visual media, improving ED processes through performance improvement methodologies, and improving the interpersonal skills of providers. Interventions designed to reduce actual waiting times have not been sufficiently studied, but results from several well-designed studies suggest that such a strategy is unlikely to have as great an impact as those targeting perceived waiting times. To advance this area of research, investigators must use: 1) larger, more representative samples; 2) reliable and valid assessment instruments; 3) theory-driven hypothesis testing; and 4) randomized, controlled trials.

Schneider, S. M., et al. (2003). "Emergency department crowding: a point in time." Annals of Emergency Medicine **42**(2): 167-172.

**STUDY OBJECTIVE:** This is a pilot study designed to assess the feasibility of a point prevalence study to assess the degree of crowding in hospital emergency departments (EDs). In addition, we sought to measure the degree of physical crowding and personnel shortage in our sample.

**METHODS:** A mail survey was sent to a random sample of 250 EDs chosen from a database compiled by the American College of Emergency Physicians of 5,064 EDs in the United States. In addition to demographic information, respondents were asked to count the patients and staff in their EDs at 7 PM local time on Monday, March 12, 2001 (index time).

**RESULTS:** The response rate was 36%. At the index time, there was an average of 1.1 patients per treatment space, and 52% of EDs reported more than 1 patient per treatment space. There was also evidence of personnel shortage, with a mean of 4.2 patients per registered nurse and 49% of EDs having each registered nurse caring for more than 4 patients. There was a mean of 9.7 patients per physician. Sixty-eight percent of EDs had each physician caring for more than 6 patients. There was crowding present in all geographic areas and all hospital types (teaching-nonteaching status of the hospital). Consistent with the crowded conditions, 11% of institutions were on ambulance diversion and not accepting new acute patients. Delays in transfer of admitted patients out of the ED contributed to the physical crowding. Twenty-two percent of patients in the ED were already admitted and were awaiting transfer to an inpatient bed; 73% of EDs were boarding 2 or more inpatients. The amount of crowding quantified by this point prevalence study was confirmed by the amount of crowding reported for the previous week: 48% of EDs were boarding inpatients during the previous week for a mean of 8.9 hours, 4.2 days per week; 31% had been on diversion; 59% had been routinely using their halls for patients; 38% had been doubling their rooms; and 47% had been using nonclinical space for patient care.

**CONCLUSION:** Our low response rate limits this pilot study. Nonetheless, this study, as well as others, demonstrates that EDs throughout the United States are severely crowded. Such crowding raises concerns about the ability of EDs to respond to mass casualty or volume surges.

Trzeciak, S. and E. P. Rivers (2003). "Emergency department overcrowding in the United States: an emerging threat to patient safety and public health." *Emergency Medical Journal*, **20**(5): 402-405.

Numerous reports have questioned the ability of United States emergency departments to handle the increasing demand for emergency services. Emergency department (ED) overcrowding is widespread in US cities and has reportedly reached crisis proportions. The purpose of this review is to describe how ED overcrowding threatens patient safety and public health, and to explore the complex causes and potential solutions for the overcrowding crisis. A review of the literature from 1990 to 2002 identified by a search of the Medline database was performed. Additional sources were selected from the references of the articles identified. There were four key findings. (1) The ED is a vital component of America's health care "safety net". (2) Overcrowding in ED treatment areas threatens public health by compromising patient safety and jeopardising the reliability of the entire US emergency care system. (3) Although the causes of ED overcrowding are complex, the main cause is inadequate inpatient capacity for a patient population with an increasing severity of illness. (4) Potential solutions for ED overcrowding will require multidisciplinary system-wide support.

Derlet, R. W. and J. R. Richards (2002). "Emergency department overcrowding in Florida, New York, and Texas." *Southern Medical Journal*, **95**(8): 846-849.

**BACKGROUND:** This study was done to determine the incidence, causes, and effects of overcrowding in emergency departments (EDs) in Florida, New York, and Texas.

**METHODS:** Surveys were mailed to a random sample of EDs in Florida, New York, and Texas. Questions included census, area population, frequency and causes of overcrowding, and impact. Causes of overcrowding were ranked on a 5-point scale.

**RESULTS:** A total of 300 surveys were sent, and 210 (70%) were returned. Overcrowding was reported in 194 EDs (92%): New York (90%), Florida, (92%), and Texas (95%). Causes of ED overcrowding included hospital bed shortage, high medical acuity of patients, increasing patient volume, too few examination spaces, and shortage of RN staff. Overcrowding resulted in death, permanent disability, additional procedures, and increased length of hospitalization.

**CONCLUSION:** In this survey of EDs, overcrowding was pervasive. Many factors contribute to ED overcrowding. Poor medical outcomes may occur because of overcrowding.

Derlet, R. W. and J. R. Richards (2000). "Overcrowding in the Nation's Emergency Departments: Complex Causes and Disturbing Effects." *Annals of Emergency Medicine* **35**(1): 63-68.

## **PATIENT EXPERIENCE**

Gordon, J., et al. (2010). "The patient experience in the emergency department: A systematic synthesis of qualitative research." *International Emergency Nursing* **18**: 80-88.

The aim of this study was to systematically review qualitative literature published between 1990 and 2006 exploring the patient experience within the emergency department (ED) with the intent of describing what factors influence the patient experience. Twelve articles were retrieved following combination of key words using five databases. The overarching categories developed from this integration of literature were; emotional impact of emergency, staff-patient interactions, waiting, family in the emergency department, and emergency environment. The patient experience issue given most emphasis by the articles under review was the caring or lack of caring regarding the patients' psychosocial and emotional needs. This was in contrast to the culture of the ED which emphasised "medical-technical" skill and efficiency. Satisfaction studies need to understand many factors and influences, qualitative methodologies have the ability to do so.

Nairn, S., et al. (2004). "The patient experience in emergency departments: a review of the literature." *Accident and Emergency Nursing*, **12**(3): 159-165.

This paper analyses the literature on the patient experience within emergency departments. We identify six themes within the literature: waiting times, communication, cultural aspects of care, pain, the environment and dilemmas in accessing the patient experience. Overall, the literature has a North American bias and is largely quantitative in approach. Although levels of patient satisfaction are high, a number of issues arise within the review, which suggest areas where quality of care could improve. We also identify the problematic nature of accessing the patient experience and suggest future areas for researchers to explore.

Holden, D. and D. Smart (1999). "Adding Value to the Patient Experience in Emergency Medicine: What features of the emergency department visit are most important to patients?" *Emergency Medicine* **11**: 3-8.

Objectives: To identify the features of the emergency department visit most important to patients, and to compare emergency staff ranking of the same features.

Setting: The Royal Hobart Hospital, Tasmania is a 520-bed public hospital with an annual department of emergency medicine census of 33 000.

Methods: Five hundred and fifty-five emergency patients, and 60 emergency department medical and nursing staff were surveyed, asking each to rank 10 features of the emergency department visit in order of importance to patients. Analysis was by Chi-squared test and Mann-Whitney U-test to compare survey responses between the patient and staff populations.

Results: Response rates were 36% for patients and 78% for staff. Patients ranked waiting time as most important, followed by symptom relief, a caring and concerned attitude from staff and diagnosis of the presenting complaint. Staff identified the same four factors as important but ranked waiting time fourth. Waiting times during the survey week were within Australian College for Emergency Medicine performance benchmarks of 84% of the emergency department census.

Conclusions: This survey identified a mismatch between patient concerns and emergency staff perceptions, particularly with regard to waiting times. The results justify the use of waiting times as a performance indicator for emergency medicine.

## **PATIENT FLOW**

Johnson, M. and V. Capasso (2012). "Improving patient flow through the emergency department." *Journal of Healthcare Management* **57**(4): 236-243.

King, D. L., et al. (2006). "Redesigning emergency department patient flows: application of Lean Thinking to health care." *Emergency Medicine of Australasia*, **18**(4): 391-397.

OBJECTIVE: To describe in some detail the methods used and outcome of an application of concepts from Lean Thinking in establishing streams for patient flows in a teaching general hospital ED.

METHODS: Detailed understanding was gained through process mapping with staff followed by the identification of value streams (those patients likely to be discharged from the ED, those who were likely to be admitted) and the implementation of a process of seeing those patients that minimized complex queuing in the ED.

**RESULTS:** Streaming had a significant impact on waiting times and total durations of stay in the ED. There was a general flattening of the waiting time across all groups. A slight increase in wait for Triage categories 2 and 3 patients was offset by reductions in wait for Triage category 4 patients. All groups of patients spent significantly less overall time in the department and the average number of patients in the ED at any time decreased. There was a significant reduction in number of patients who do not wait and a slight decrease in access block.

**CONCLUSIONS:** The streaming of patients into groups of patients cared for by a specific team of doctors and nurses, and the minimizing of complex queues in this ED by altering the practices in relation to the function of the Australasian Triage Scale improved patient flow, thereby decreasing potential for overcrowding.

Love, R. A., et al. (2012). "The effectiveness of a provider in triage in the emergency department: a quality improvement initiative to improve patient flow." *Advanced Emergency Nursing Journal*, **34**(1): 65-74.

Hospital emergency departments (EDs) throughout the United States are faced with overwhelming challenges due to the high demand for services, an increasing number of visits, overuse and misuse of services, and escalating healthcare costs. The result of this situation is that EDs are overcrowded, patients are experiencing long wait times, ambulances are being diverted, admitted patients are being boarded, and patients in need of emergency medical care are leaving without treatment. The purpose of this article is to present a quality improvement initiative designed and implemented to improve patient flow through an ED by redesigning the triage process to increase the efficiency and timeliness of initial patient contact with a licensed medical provider, increasing patient satisfaction, and decreasing the number of patients who leave without being seen. To accomplish these goals, a nurse practitioner/physician assistant medical provider was reallocated to the triage area to perform an initial assessment and initiate diagnostic studies. The results of this initiative have proven to be positive in goal attainment. The time from patient arrival to initial contact with a licensed medical provider has decreased from 75 to 25 min. The percentage of patients who leave without being seen has decreased from 3.6% to 0.9%.

Drazen, E. and J. Rhoads (2011). Using Tracking Tools to Improve Patient Flow in Hospitals. *California HealthCare Foundation*

Examines current technologies for improving patient flow, their benefits, decision factors for implementation, and best practices, such as setting performance targets and linking patient tracking to discharge planning. Includes case summaries.

Lyons, M., et al. (2007). "Factors that affect the flow of patients through triage." *Emergency Medicine Journal*, **24**(2): 78-85.

**OBJECTIVE:** To use observational methods to objectively evaluate the organisation of triage and what issues may affect the effectiveness of the process.

**DESIGN:** A two-phase study comprising observation of 16 h of triage in a London hospital emergency department and interviews with the triage staff to build a qualitative task analysis and study protocol for phase 2; observation and timing in triage for 1870 min including 257 patients and for 16 different members of the triage staff.

**RESULTS:** No significant difference was found between grades of staff for the average triage time or the fraction of time absent from triage. In all, 67% of the time spent absent from triage was due to escorting patients into the department. The average time a patient waited in the reception before triage was 13 min 34 s; the average length of time to triage for a patient was 4 min 17 s. A significant increase in triage time was found when patients were triaged to a specialty, expected by a specialty, or were actively "seen and treated" in triage. Protocols to prioritise patients with potentially serious conditions to the front of the queue had a significantly positive effect on their waiting time. Supplementary tasks and distractions had varying effects on the timely assessment and triage of patients.

**CONCLUSIONS:** The human factors method is applicable to the triage process and can identify key factors that affect the throughput at triage. Referring a patient to a specialty at triage affects significantly the triage workload; hence, alternative methods or management should be suggested. The decision to offer active treatment at triage increases the time taken, and should be based on clinical criteria and the workload determined by staffing levels. The proportion of time absent from triage could be markedly improved by support from porters or other non-qualified staff, as well as by proceduralised handovers from triage to the main clinical area. Triage productivity could be improved by all staff by becoming aware of the effect of the number of interruptions on the throughput of patients.

**PATIENT PRIVACY**

Karro, J., et al. (2005). "Patient perceptions of privacy infringements in an emergency department." Emergency Medicine Australasia: EMA **17**(2): 117-123.

OBJECTIVE: To identify the nature, severity, impact, frequency and risk factors for patient perceived privacy infringements in the ED of St Vincent's Health Melbourne with 32,000 emergency attendances per annum.

METHODS: Patients 18 years and older attending emergency over a 2-week period were offered a nine-item questionnaire using a Likert scale. A privacy incident was defined as: (i) overhearing medical or personal information; (ii) being overheard; (iii) having private body parts exposed or (iv) seeing others' body parts. Differences between demographic, emergency environment, length of stay and other factors suspected of affecting patient privacy were quantified.

RESULTS: From 1169 emergency presentations, 235 patients returned questionnaires, with 105 of these (45%) reporting a total of 159 privacy incidents. Seventy-eight patients (33%, 95% CI 28-36%) reported a definite privacy incident and 81 (35%, 95% CI 29-37%) reported a probable privacy incident. Ninety-six patients (41%, 95% CI 35-47%) reported overhearing other patient's conversations with the staff whereas 36 (15%, 95% CI 11-21%) felt their conversations with staff were overheard by others. Twenty-seven patients (11%, 95% CI 6-14%) experienced or observed inappropriate exposure of private body parts. Ten patients (4%, 95% CI 2-7%) changed or withheld information from staff because they felt others may overhear it and two refused part of their physical examination because they felt they may be seen by inappropriate people. Twenty-four patients (10%, 95% CI 6-14%) did not have their expectations of privacy met. The longer a patient was in emergency the greater the number of privacy incidents they experienced (Spearman correlation  $P < 0.01$ ). Patients in walled cubicles experienced fewer privacy incidents than those in curtained cubicles ( $P < 0.05$ ).

CONCLUSIONS: Patient privacy incidents occur frequently in an ED, risk factors being length of stay and absence of a walled cubicle. Patients who have their conversations overheard are more likely to withhold information from staff and less likely to have had their expectations of privacy met.

Olsen, J. C. and B. R. Sabin (2003). "Emergency Department patient perceptions of privacy and confidentiality." Journal of Emergency Medicine, **25**(3): 329.

The study objective was to determine if Emergency Department (ED) patients experience breaches of privacy and confidentiality during their ED stay and to determine if the type of room in which the patient is placed affects privacy. We surveyed a convenience sample of ED patients at the conclusion of their ED stay regarding their privacy and confidentiality. Overall, 36% of patients overheard conversations with similar frequencies in walled and curtained rooms. The location of conversations overheard varied depending on the type of patient room, as curtained rooms allowed conversations from adjacent rooms to be overheard and walled rooms allowed more conversations from the hallway or nursing station to be overheard. Patients felt more comfortable giving their history and having physical examinations performed in walled vs. curtained rooms. Inappropriate or unprofessional comments by staff were heard by 1.6% of patients. Health care providers in the ED need to be aware of breaches in confidentiality and privacy, as our patients deserve respect of their privacy and confidentiality during their ED visit. Copyright 2003 Elsevier Copyright of Journal of Emergency Medicine is the property of Pergamon Press Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use. This abstract may be abridged. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material for the full abstract. (Copyright applies to all Abstracts)

Mlinek, E. J. and J. Pierce (1997). "Confidentiality and privacy breaches in a university hospital emergency department." Academy of Emergency Medicine **4**(12): 1142-1146.

OBJECTIVE: To determine the frequency of visual and auditory confidentiality and privacy breaches in a university ED.

METHODS: A prospective, observational study of medical personnel behavior was performed using participant and direct observation techniques. Observations were made in a university tertiary referral and trauma center emergency facility. Observers recorded auditory and visual confidentiality and privacy breaches in various patient care areas during 1-hour periods. Information collected included patient name or room number, complaint/diagnosis, diagnostic tests, past medical history, and personal



information. It was then determined whether a clear identification of the patient's name or face and/or an association to his or her clinical course could be made.

RESULTS: All members of the health care team committed confidentiality and privacy breaches. Frequency of breaches was dependent on room location and design. Breaches in the triage/waiting area occurred for > 53% of the patients. Breaches near the physician/nursing station ranged from 3 to 24 per hour and 1.5 to 3.4 per patient hour. Other inappropriate comments also were noted. One hundred consecutive patients and family members were interviewed at ED release, with only 2/100 having noticed the status board, although neither could recall any specific details.

CONCLUSION: Confidentiality and privacy breaches occur in a university ED by all members of the health care team. The ED architecture and floor plan affect patient confidentiality and privacy.

## **PATIENT SATISFACTION**

Nanda, U., et al. (2012). "Impact of visual art on patient behavior in the emergency department waiting room." Journal of Emergency Medicine, **43**(1): 172-181.

BACKGROUND: Wait times have been reported to be one of the most important concerns for people visiting emergency departments (EDs). Affective states significantly impact perception of wait time. There is substantial evidence that art depicting nature reduces stress levels and anxiety, thus potentially impacting the waiting experience.

STUDY OBJECTIVES: To analyze the effect of visual art depicting nature (still and video) on patients' and visitors' behavior in the ED.

METHODS: A pre-post research design was implemented using systematic behavioral observation of patients and visitors in the ED waiting rooms of two hospitals over a period of 4 months. Thirty hours of data were collected before and after new still and video art was installed at each site. RESULTS: Significant reduction in restlessness, noise level, and people staring at other people in the room was found at both sites. A significant decrease in the number of queries made at the front desk and a significant increase in social interaction were found at one of the sites.

CONCLUSIONS: Visual art has positive effects on the ED waiting experience.

Walsh, M. and J. C. Knott (2010). "Satisfaction with the emergency department environment decreases with length of stay." Emergency Medical Journal, **27**(11): 821-828.

OBJECTIVE: To determine the emergency department (ED) environmental factors associated with patient satisfaction.

METHODS: A prospective, observational study in a university-affiliated tertiary-referral ED and associated observation unit (OU). The ED environment was evaluated with a structured questionnaire scored using a 100-mm visual analogue scale. Patients who stayed in the ED over 8 h (long-stay ED; LSED) were compared with those who stayed less than 4 h (short-stay ED; SSED) and with a control group admitted to the OU. RESULTS: A total of 233 patients was enrolled, overall satisfaction in SSED was 81% (95% CI 70.1 to 88.7), 69% in LSED (95% CI 57.4 to 78.7) and 84% in OU (95% CI 73.6 to 91.0). The most important environmental factors were cleanliness (median importance 95, interquartile range (IQR) 81-98) and communication with medical staff (94, IQR 80-98) and family (92, IQR 74-98). The least important factors were access to nature (38, IQR 19-65), a natural light source (50, IQR 24-74) and ability to sit out of bed (52, IQR 26-75). Factors rated high for importance but low for satisfaction were ED noise levels (median difference 40, IQR 3-70), ED trolley comfort (19, IQR 6-50) and food quality (12, IQR -4-29).

CONCLUSION: Patients who spend over 8&nbsp;h in the ED are less satisfied with their environment than either those who spend less than 4 h or patients in an OU. Importantly, distinct, amenable factors can be identified. These should be addressed to improve patients' overall ED management and satisfaction.

Welch, S. J. (2009). "Twenty years of patient satisfaction research applied to the emergency department: A qualitative review." American Journal of Medical Quality **25**(1): 64-72.

This clinical review article examines the patient satisfaction literature for the past 20 years. This literature is summarized for qualitative themes and general trends. Intended for the practicing clinician, these themes are then applied to the emergency department (ED) milieu. According to the Agency for Healthcare Research and Quality, the ED is the point of entry for more than half of all patients admitted to the hospital in the United States. Indeed, the ED is the "front door" to the hospital. According to Press



Ganey, satisfaction with ED care is at an all-time low. A review of the literature revealed 5 major elements of the ED experience that correlate with patient satisfaction: timeliness of care, empathy, technical competence, information dispensation, and pain management. The literature supporting these 5 elements is summarized and applications to the ED setting are suggested. Other minor correlates with patient satisfaction are also presented.

Chan, A., et al. (2008). "Causes of constraints to patient flow in emergency departments: a comparison between staff perceptions and findings from the Patient Flow Study." *Emergency Medicine of Australasia*, **20**(3): 234-240.  
OBJECTIVES: The objectives of the study were: (i) to survey staff perceptions of causes of delay in patients' journeys through the ED; (ii) to identify and analyse key constraints to patient flow using real-time diagnostic/decision support software (Patient Flow Study); and (iii) to assess the correlation between staff perceptions and data from the Patient Flow Study.  
METHODS: ED and non-ED staff were surveyed prior to the Patient Flow Study. The survey involved ranking the likely reasons for delay at three set points after triage (160, 320 and 480 min). Real-time data on delay in patients' journeys through the ED were collected over a period of 5 weeks. The correlation between staff perceptions and study data at the three time points was calculated using Spearman's rank correlation coefficient. Subgroup analysis was performed on the basis of staff position, years of experience at St George and whether they had previously attended training on constraints to flow.  
RESULTS: A total of 68 staff responded to the questionnaire (response rate 42%). During the study period, 4555 ED attendances (97% of all presentations) were analysed for causes of constraint. Strong correlation between staff perceptions and real-time data was only found among some subgroups at the point 160 min from triage.  
CONCLUSIONS: Overall, staff perceptions regarding causes of constraint to patient flow do not correlate well with data obtained from real-time analysis.

Papa, L., et al. (2008). "Does a waiting room video about what to expect during an emergency department visit improve patient satisfaction?" *Canadian Journal of Emergency Medicine*, **10**(4): 347-354.  
Objective: We created an instructional waiting room video that explained what patients should expect during their emergency department (ED) visit and sought to determine whether preparing patients using this video would 1) improve satisfaction, 2) decrease perceived waiting room times and 3) increase calls to an outpatient referral line in an ambulatory population.  
Methods: This serial cross-sectional study before (control) and 2 months after the introduction of an educational waiting room video that described a typical patient visit to our ED. We enrolled a convenience sample of adult patients or parents of pediatric patients who were triaged to the ED waiting room; a research assistant distributed and collected the surveys as patients were being discharged after treatment. Subjects were excluded if they were admitted. The primary outcome was overall satisfaction measured on a 5-point Likert scale, and secondary outcomes included perceived waiting room time, and the number of outpatient referral-line calls.  
Results: There were 1132 subjects surveyed: 551 pre-video and 581 post-video. The mean age was 38 years (standard deviation [SD] 18), 61% were female and the mean ED length of stay was 5.9 hours (SD 3.6). Satisfaction scores were significantly higher post-video, with 65% of participants ranking their visit as either "excellent" or "very good," compared with 58.1% in the pre-video group ( $p = 0.019$ ); however, perceived waiting room time was not significantly different between the groups ( $p = 0.24$ ). Patient calls to our specialty outpatient clinic referral line increased from 1.5 per month (95% confidence interval [CI] 0.58-2.42) to 4.5 per month (95% CI 1.19-7.18) ( $p = 0.032$ ). After adjusting for possible covariates, the most significant determinants of overall satisfaction were perceived waiting room time (odds ratio [OR] 0.41, 95% CI 0.34-0.48) and having seen the ED waiting room video (OR 1.41, 95% CI 1.06-1.86).  
Conclusion: Preparing patients for their ED experience by describing the ED process of care through a waiting room video can improve ED patient satisfaction and the knowledge of outpatient clinic resources in an ambulatory population. Future studies should research the implementation of this educational intervention in a randomized fashion.

Smith, G. D., et al. (2007). "Diagnosis and satisfaction scores in emergency department patients who return a mailed survey." *Journal of Emergency Medicine*, **32**(2): 131-135.  
Previous studies of patient satisfaction scores (PSS) have been of insufficient size to examine the influence of diagnosis on PSS. Our objective was to utilize a large database to determine if PSS for patients who return a widely used mailed proprietary survey differ with different diagnoses. We retrospectively analyzed a cohort at 11 hospital emergency departments of non-admitted patients who

returned a mailed satisfaction survey. We grouped patients according to International Classification of Diseases, 9(th) Revision (ICD9) diagnoses and calculated mean scores for each diagnostic group. We rank-ordered by mean scores all ICD diagnoses having at least 50 survey responses. Scores were compared using analysis of variance. We analyzed 14,098 surveys. Among all diagnoses, 65 had at least 50 responses. The analysis of variance for the scores showed significant differences ( $p < 0.0001$ ). Scores differ with respect to diagnosis. This could be used to choose interventions to improve scores of patients who return a mailed survey.

Bursch, B., et al. (1993). "Emergency department satisfaction: What matters most?" *Annals of Emergency Medicine* **22**(3): 586/593-591/597.

Study objective: To determine the relative importance of variables correlated with patient satisfaction with emergency department care and service Design: Retrospective telephone survey targeting all patients who visited the Panorama City Permanente ED from April 4 to April 17, 1991. Patients were contacted within one week of their discharge from the ED or hospital.

Participants: Two hundred fifty-eight ED patients completed telephone surveys. Fifty-one percent of the respondents were male and mean age was 53 years. The majority of the respondents were white (70%); the most common service received was medical (82%).

Measurements and results: Of the 14 variables that were found to be correlated with overall ED satisfaction, a multiple regression analysis revealed that the five most important variables were patient satisfaction with the amount of time it took before being cared for in the ED; patients' ratings of how caring the nurses were, how organized the ED staff was, and how caring the physicians were; and patient satisfaction With the amount of information the nurses gave them about what was happening to them.

Conclusion: The total time patients spend in the ED and patients' perceptions of their wait time for an ED bed are not as important to the patient's satisfaction as receiving prompt and caring service. The above service variables are key areas they may be targeted to improve ED services.

## **PEDIATRIC EMERGENCY DEPARTMENTS**

Ratnapalan, S., et al. (2011). "Physicians' perceptions of background noise in a pediatric emergency department." *Pediatric Emergency Care* **27**(9): 826-833.

OBJECTIVE: The objectives of this study were to measure noise levels in a tertiary care pediatric emergency department (ED) and to identify attending staff physicians' and first-year residents' perceptions of background noise levels and its impact on communication and teaching.

METHODS: A mixed methodology was used in this study. A sound level meter measuring 30 to 140 dB was placed in the ED for a week. All consenting staff physicians and first-year residents were surveyed using a semi-structured questionnaire during the study period to assess their perceptions of background noise and its impact. Descriptive statistics were used for quantitative analysis. Narrative answers were coded and analyzed using the method of meaning condensation to assess the impact of background noise on both communication and teaching.

RESULTS: The average noise level in the ED is 68.73 dB for a 24-hour period. The number sound peaks higher than 80 dB, with an average of 309 dB/d (minimum, 193 dB; maximum, 461 dB). Only 35% of staff physicians' surveys and 22% of residents' surveys identified the noise levels to be uncomfortable. However, background noise in the ED was perceived as stressful, affecting interaction, communication, and teaching between residents and staff physicians. Staff physicians and residents stated that they feel helpless when it is too noisy and did not have good strategies to reduce background noise in the ED.

CONCLUSIONS: The high background noise levels in a pediatric ED are perceived as stressful and interfering with communication and teaching. Noise levels in EDs should be measured, and noise reduction strategies should be implemented because physicians are not consistent in identifying excessive noise levels.

Krug, S. E., et al. (2006). "Patient- and family-centered care and the role of the emergency physician providing care to a child in the emergency department." *Pediatrics* **118**(5): 2242-2244.

Patient- and family-centered care is an approach to health care that recognizes the role of the family in providing medical care; encourages collaboration between the patient, family, and health care professionals; and honors individual and family strengths, cultures, traditions, and expertise. Although there are many opportunities for providing patient- and family-centered care in the emergency

department, there are also challenges to doing so. The American Academy of Pediatrics and the American College of Emergency Physicians support promoting patient dignity, comfort, and autonomy; recognizing the patient and family as key decision-makers in the patient's medical care; recognizing the patient's experience and perspective in a culturally sensitive manner; acknowledging the interdependence of child and parent as well as the pediatric patient's evolving independence; encouraging family-member presence; providing information to the family during interventions; encouraging collaboration with other health care professionals; acknowledging the importance of the patient's medical home; and encouraging institutional policies for patient- and family-centered care.

Mangurten, J., et al. (2006). "Effects of family presence during resuscitation and invasive procedures in a pediatric emergency department." *Journal of Emergency Nursing*, **32**(3): 225-233.

INTRODUCTION: No research exists evaluating family presence (FP) during resuscitation interventions (RIs) and invasive procedures (IPs) using ENA guidelines in a pediatric emergency department. The purpose of this study was to determine the effectiveness of an FP protocol in facilitating uninterrupted care and describe parents' and providers' experiences.

METHODS: FP was offered by a family facilitator to parents of children undergoing RIs or IPs. Data were collected during 64 FP events (28 RIs and 36 IPs). Following the event, 92 providers and 22 parents completed a survey about their experiences.

RESULTS: In 100% of FP cases, patient care was uninterrupted. Parents were positive about FP, believed it helped their child, and reported that it eased their fears. All parents described an active role during the event, and most believed they had a right to be present. Three months later, no parents reported traumatic memories. Providers also were positive about FP and reported that the presence of parents did not negatively affect care. Although most (70%) supported FP during RIs, more nurses (92%) and physicians (78%) supported it than did residents (35%,  $P < .05$ ).

DISCUSSION: The findings suggest the effectiveness of a pediatric emergency department FP protocol in facilitating uninterrupted patient care. The benefits identified for parents support implementation of FP programs.

Larson, E. L., et al. (2005). "Hand hygiene behavior in a pediatric emergency department and a pediatric intensive care unit: Comparison of use of 2 dispenser systems." *American Journal of Critical Care* **14**(4): 304-310.

BACKGROUND: Adherence to hand hygiene standards is poor. Approaches and systems to improve hand hygiene practices warrant testing.

OBJECTIVE: To compare the frequency of use of manually operated and touch-free dispensers of sanitizer for hand hygiene.

METHODS: Manual and touch-free dispensers of alcohol sanitizer were placed in the emergency department and an intensive care unit of a large pediatric hospital for two 2-month periods for each type of dispenser. Counting devices installed in each dispenser and direct observations were used to determine actual frequency of and indications for hand hygiene.

RESULTS: The touch-free dispensers were used significantly more often than were the manual dispensers. The means for the number of episodes of hand hygiene per hour were 4.42 for the touch-free dispensers and 3.33 for the manual dispensers ( $P = .04$ ); the means for the number of episodes per patient per hour were 2.22 and 1.79, respectively ( $P = .004$ ); and the means for the number of uses of the dispenser per day were 41.2 and 25.6, respectively ( $P = .02$ ). However the overall compliance rate was 38.4% (2136 episodes of hand hygiene per 5568 indications for hand hygiene).

CONCLUSIONS: The scope of dispensing system influenced hand hygiene behavior. Nevertheless, overall hand hygiene compliance remained low. In order for interventions to have a major effect on hand hygiene, multiple factors must be considered.

Kozer, E., et al. (2004). "Prospective observational study on the incidence of medication errors during simulated resuscitation in a paediatric emergency department." *British Medical Journal* **329**(7478): 1321.

OBJECTIVES: To characterise the incidence and nature of medication errors during paediatric resuscitations.

DESIGN: A prospective observational study of simulated emergencies.

SETTING: Emergency department of a tertiary paediatric hospital.

PARTICIPANTS: Teams that included a clinician who commonly leads "real" resuscitations, at least two assisting physicians, and two or three paediatric nurses.

INTERVENTIONS: The teams conducted eight mock resuscitations, including ordering medications. Exercises were videotaped and drugs ordered and administered during the resuscitation were recorded.

Syringes and drugs prepared during the resuscitation were collected and analysed for concentrations and actual amounts.

MAIN OUTCOME MEASURES: Number and type of drug errors.

RESULTS: Participants gave 125 orders for medications. In 21 (17%) of the orders the exact dose was not specified. Nine dosing errors occurred during the ordering phase. Of these errors, five were intercepted before the drug reached the patient. Four 10-fold errors were identified. In nine (16%) out of 58 syringes analysed, measured drug concentrations showed a deviation of at least 20% from the ordered dose. A large deviation (at least 50%) from the expected dose was found in four (7%) cases.

CONCLUSIONS: Medication errors commonly occur during all stages of paediatric resuscitation. Many errors could be detected only by analysing syringe content, suggesting that such errors may be a major source of morbidity and mortality in resuscitated children.

Judkins, S. (2003). "Paediatric emergency department design: Does it affect staff, patient and community satisfaction?" *Emergency Medicine (Fremantle)* **15**(1): 63-67.

OBJECTIVES: To assess the change in perception of the standard of paediatric care following the opening of a dedicated paediatric emergency area in an established tertiary hospital emergency department on patients and families, hospital staff and the general practitioners of the local community.

METHODS: A questionnaire was circulated to the relevant parties prior to and 6 months after the opening of the paediatric department. The surveys were circulated to the families/custodians of the paediatric attendees, general practitioners who refer paediatric patients and the medical and nursing staff both within the emergency department and the inpatient paediatric ward. The questions related to the physical environment, perceived level of care and the overall satisfaction with treatment.

RESULTS: The most striking change was in the patient family group who showed an increase in their level of satisfaction with the physical environment and their overall care. The general practitioner group showed only a slight improvement, while the inpatient staff showed no notable changes. The emergency department staff developed a higher level of confidence and satisfaction when dealing with this population group.

CONCLUSION: The change in the physical environment in which we treat our paediatric emergencies seemed to enhance the level of satisfaction of our attendees. Staff appear to be more confident when dealing with these patients in a dedicated paediatric area. The effect has not yet flowed on to the inpatient staff and general practitioners, perhaps reflecting a small exposure of these individuals to the survey subject matter.

Kozer, E., et al. (2002). "Variables associated with medication errors in pediatric emergency medicine." *Pediatrics* **110**(4): 737-742.

OBJECTIVE: Medication errors are a common cause of iatrogenic morbidity and mortality. The incidence of medication errors in pediatric emergency departments (EDs) has not been described. The objective of this study was to describe the incidence and type of drug errors in a pediatric ED and determine factors associated with risk of errors.

METHODS: A retrospective cohort study was conducted of the charts of 1532 children who were treated in the ED of a pediatric tertiary care hospital during 12 randomly selected days from the summer of 2000. Two pediatricians, blinded to other study variables, independently decided whether a medication error occurred and ranked it according to a severity score. Disagreement was resolved by consensus.

RESULTS: Prescribing errors were identified in 10.1% of the charts. The following variables were associated in univariate analysis with an increased proportion of errors: patients seen between 4 AM and 8 AM (odds ratio [OR]: 2.45; 95% confidence interval [CI]: 1.10-5.50), patients with severe disease (OR: 2.53; 95% CI: 1.18-5.41), medication ordered by a trainee (OR: 1.48; 95% CI: 1.03-2.11), and patients seen during weekends (OR: 1.48; 95% CI: 1.04-2.11). Among trainees, there was a higher rate of errors at the beginning of the academic year (OR: 1.67; 95% CI: 1.06-2.64). Logistic regression revealed increased risk for errors when a medication was ordered by a trainee (OR: 1.64; 95% CI: 1.06-2.52) and in seriously ill patients (OR: 1.55; 95% CI: 1.06-2.26).

CONCLUSIONS: In the pediatric ED, trainees are more likely to commit prescribing errors, and the most seriously ill patients are more likely to be subjected to prescribing errors.

Eckle, N. and S. MacLean (2001). "Assessment of family-centered care policies and practices for pediatric patients in nine US emergency departments." *Journal of Emergency Nursing* **27**(3): 238-245.

**INTRODUCTION:** Family-centered care recognizes the integral role of the family in the health and well-being of the pediatric patient. However, implementing a family-centered care approach often requires significant philosophical, practice, and environmental changes. A self-assessment inventory of family-centered practices can identify areas for change.

**METHODS:** ENA conducted a validation study on an instrument used to assess family-centered care in the emergency department. Nine emergency departments of varying demographics used the Family-centered Care Self-assessment Inventory to evaluate their family-centered care practices. The inventory is organized into 7 sections: (1) vision, mission, and philosophy of care; (2) family support; (3) information and decision making; (4) services coordination and continuity; (5) personnel practices; (6) quality improvement; and (7) community partnerships. Individual and group interviews were completed with a variety of staff in each emergency department.

**RESULTS:** All 9 emergency departments demonstrated some integration of family-centered care principles. However, staff knowledge about family-centered care varied. Support of family-centered care was most consistent in the departments with specific competencies, educational programs, and practices that were inclusive of the family.

**DISCUSSION:** The Family-centered Care Self-assessment Inventory tool was effective in evaluating family-centered care for pediatric patients in emergency departments. The assessment tool helped the departments to identify current family-centered care practices. Based on those assessments, the departments were able to identify areas of strength and opportunities for improvement in the care of children and their families.

## **STRESS**

Healy, S. and M. Tyrrell (2011). "Stress in emergency departments: experiences of nurses and doctors." Emerg Nurse **19**(4): 31-37.

The effects of stressful incidents on emergency department (ED) staff can be profound. Witnessing aggression, violence or the death of patients, or participating in resuscitation, can be emotionally and physically demanding. Despite the frequency of these events, ED staff do not become immune to the stress they cause, and are often ill prepared and under supported to cope with them. This article reports on a study of nurses' and doctors' attitudes to, and experiences of, workplace stress in three EDs in Ireland, and offers some suggestions on how stress among ED staff can be reduced.

Holm, L. and L. Fitzmaurice (2008). "Emergency department waiting room stress: can music or aromatherapy improve anxiety scores?" Pediatric Emergency Care **24**(12): 836-838.

The aim of this study was to determine the effect of music alone, aromatherapy alone, and music in addition to aromatherapy on anxiety levels of adults accompanying children to a pediatric emergency department waiting area.

**METHODS:** The study was conducted over 28 consecutive days, assigned to 1 of 4 groups: no intervention, music, aromatherapy, and both music and aromatherapy. Adults accompanying children to the emergency department of an urban pediatric tertiary care referral center were given a survey including a Spielberger state anxiety inventory with additional questions about whether they noticed an aroma or music and if so their response to it. The music was classic in genre with a tempo of 60 to 70 beats per minute. The aroma therapy used the essential oil Neroli dispersed using 2 aroma therapy diffusers placed in strategic airflow ends of the emergency department.

**RESULTS:** The 1104 surveys were completed. There was a statistically significant decrease in anxiety level on those days when music was playing (36.3 vs. 39.2; P = 0.017). There was no difference in anxiety levels on those days when aromatherapy was present compared with the non-aroma therapy days (37.3 vs. 38.0; P = 0.347).

**CONCLUSIONS:** Music is an easy and useful way to decrease the anxiety of visitors in an emergency department waiting area. Although no difference was detected for the aromatherapy group, this could be because of environmental conditions or imprecise application of the aromatherapy; further study is needed to either prove or disprove its effectiveness in this setting.

Gulrajani, R. P. (1995). "Physical environmental factors affecting patients' stress in the accident and emergency department." Accident and Emergency Nursing **3**: 22-27.

This study is concerned with the physical environment of our Accident and Emergency (A & E) Departments, with reference to added stressors that may affect our clients' overall experience of A & E.



It will hopefully highlight awareness of the environment that we, as nurses, can do to enhance a therapeutic, humanised department that will not only help our clients cope, but in turn will assist the delivery and reception of our care. The functional purpose of our departments are paramount; however, must we totally ignore the aesthetic values of a humanised environment that will have a positive effect on its user groups? Cost is one factor which will probably spring to mind, however heightening awareness will initiate the process of change that will help establish rationales for change. There is not enough input from nurses with regard to environmental studies, or inclusion in the planning of our departments. If more is done then we can achieve even higher standards of care and more positive thought/memory of A & E.

## **VIOLENCE AND SECURITY**

Powley, D. (2013). "Reducing violence and aggression in the emergency department." *Emergency Nurse* **21**(4): 26-29.

Emergency department (ED) staff, particularly nursing students and inexperienced nurses, are at risk of violence and aggression from patients. However, by reflecting on violent incidents, nurses can gain new knowledge, improve their practice and prepare themselves for similar incidents. This article refers to the Gibbs reflective cycle to analyse a violent incident involving a patient with mental health and alcohol-dependence problems that occurred in the author's ED. It also identifies strategies for nurses to pre-empt and defuse violent situations.

Blando, J. D., et al. (2012). "Emergency department security programs, community crime, and employee assaults." *Journal of Emergency Medicine* **42**(3): 329-338.

**BACKGROUND:** Violence against health care workers is a serious occupational health hazard, especially for emergency department (ED) employees. A significant degree of variability in security programs among hospital EDs is present in part due to the absence of federal legislation requiring baseline security features. Nationally, only voluntary guidelines from the Occupational Safety and Health Administration (OSHA) for the protection of health care workers exist.

**OBJECTIVES:** The purpose of this study was to examine ED security programs and employee assault rates among EDs with different financial resources, size, and background community crime rates. **METHODS:** This cross-sectional survey was conducted among large and small hospitals located in communities with low or high rates of community crime. Hospital financial data were collected through the state health department, and employee assault data were abstracted from hospital OSHA logs. Comparisons were made using a chi-squared or Wilcoxon test.

**RESULTS:** Small hospitals located in towns with low community crime rates implemented the fewest security program features despite having the second highest rate of assault-related OSHA-recordable injuries among ED employees (0.66 per 100,000 staff hours).

**CONCLUSION:** Due to the highly stressful workplace characteristics of EDs, the risk of employee assault is universal among all hospital sizes in all types of communities.

Ferns, T. (2012). "Recording violent incidents in the emergency department." *Nurse Standard*, **26**(28): 40-48.

**AIM:** To evaluate the quality of record-keeping by nursing staff after violent incidents in one emergency department in the UK.

**METHOD:** This study was undertaken between August 2007 and May 2009 in the emergency department of one acute NHS hospital. A retrospective documentary analysis of violent incident forms completed by nursing staff (n = 38), semi-structured interviews (n = 9) and periods of non-participatory, unstructured general observation (52 hours) was conducted.

**FINDINGS:** From the documentary analysis, 25 incident forms (n = 38, 66%) were incomplete or lacking detail. Semi-structured interviews with study participants suggested that many violent incidents went unreported. It was widely accepted by the participants that the reporting process did not capture the reality of clinical practice, and the lack of a robust reporting process suggested that incident reporting was seen as a low priority.

**CONCLUSION:** This study's findings support those of previous studies examining the quality of record-keeping in clinical practice. Poor record-keeping is a common breach of the Nursing and Midwifery Council code of conduct, potentially compromising patient safety. Strategies need to be formulated to improve record-keeping. Avoiding individual blame and consideration of the working environment may encourage staff to complete incident forms.



Gillespie, G. L., et al. (2012). "Emergency department workers' perceptions of security officers' effectiveness during violent events." *Work* **42**(1): 21-27.

**OBJECTIVE:** The emergency department (ED) is among the most at-risk settings for violence by patients and visitors against ED workers. A first response to potential or actual events of workplace violence is often contacting hospital security officers for assistance. The purpose of this study is to describe ED workers' views of security officers' effectiveness during actual events of verbal and/or physical violence.  
**PARTICIPANTS:** Healthcare workers (n=31) from an urban pediatric ED in the Midwest United States.  
**METHODS:** Participants were interviewed regarding their experiences with workplace violence. Verbatim transcripts were qualitatively analyzed.

**RESULTS:** Six themes were identified: (1) a need for security officers, (2) security officers' availability and response, (3) security officers' presence or involvement, (4) security officers' ability to handle violent situations, (5) security officers' role with restraints, and (6) security officers' role with access.

**CONCLUSIONS:** It is important that early communication between security officers and ED workers takes place before violent events occur. A uniform understanding of the roles and responsibilities of security officers should be clearly communicated to ED workers. Future research needs to be conducted with hospital-based security officers to describe their perceptions about their role in the prevention and management of workplace violence.

Medley, D. B., et al. (2012). "An association between occupancy rates in the emergency department and rates of violence toward staff." *Journal of Emergency Medicine*, **43**(4): 736-744.

**BACKGROUND:** Studies have explored possible causes of violent acts in the emergency department (ED), however, the association of violence with ED crowding has not been studied. Although the total number of violent acts would be expected to increase, it is not clear if the rate of violent acts also increases as occupancy levels rise.

**OBJECTIVE:** The purpose of this study was to determine if there is an association between occupancy rates in the ED and rates of violence toward staff.

**METHODS:** This was a retrospective chart review study. Violent incidents in a community, Level I trauma center ED were identified from review of orders of emergency detention, adverse event forms, physical restraint logs, and pharmacy records from January 1, 2005 to June 1, 2008. Occupancy rates for all days were calculated and violent vs. non-violent days were compared using a standard two-sample t-test. Logistic regression analysis was then used to investigate other factors associated with violent incidents.

**RESULTS:** A rate of violence of 1.3 incidents per 1000 patients was found. When comparing the occupancy rates of violent days (mean 95%, SD 26%) with non-violent days (mean 86%, SD 24%), a statistically significant association was found ( $p < 0.0001$ ). Multivariate logistic regression confirmed a significant association between crowding and violence toward staff (odds ratio 4.290, 95% confidence interval 2.137-8.612).

**CONCLUSION:** These results suggest another possible negative effect that crowding has on ED staff and physicians. Policies and recommendations regarding ED operating procedures and staff safety during times of higher occupancy levels should be discussed.

Quigg, Z., et al. (2012). "Data sharing for prevention: a case study in the development of a comprehensive emergency department injury surveillance system and its use in preventing violence and alcohol-related harms." *Injury Prevention*, **18**(5): 315-320.

**OBJECTIVE:** To examine emergency department (ED) data sharing via a local injury surveillance system and assess its contribution to the prevention of violence and alcohol-related harms.

**METHODS:** 6-year (2004-2010) exploratory study analysing injury attendances to one ED in the North West of England using descriptive and trend analyses.

**RESULTS:** Over the 6-year period, there were 242,796 ED injury attendances, including 21,683 for intentional injuries. Compared with unintentional injury patients, intentional injury patients were more likely to be men, aged 18-34 years, live in the most deprived communities, have attended the ED at night/weekends, have been injured in a public place and have consumed alcohol prior to the injury. Detailed data collected on alcohol and violence-related ED attendances were shared with local partners to monitor local trends and inform prevention activity including targeted policing and licensing enforcement. Over the 6-year period, intentional ED injury attendances decreased by 35.6% and alcohol-related assault attendances decreased by 30.3%.

**CONCLUSIONS:** The collection of additional ED data on assault details and alcohol use prior to injury, and its integration into multi-agency policy and practice, played an important role in driving local violence prevention activity. Further research is needed to assess the direct contribution ED data sharing makes to reductions in violence.

Gates, D., et al. (2011). "Occupational and demographic factors associated with violence in the emergency department." *Advanced Emergency Nursing Journal*, **33**(4): 303-313.

Violence against health care workers is a serious and growing problem. The objectives of this cross-sectional study were to (a) describe the frequency of workplace violence (WPV) against emergency department (ED) workers; (b) identify demographic and occupational characteristics related to WPV; and (c) identify demographic and occupational characteristics related to feelings of safety and level of confidence when dealing with WPV. Survey data were collected from 213 workers at 6 hospital EDs. Verbal and physical violence was prevalent in all 6 EDs. There were no statistically significant differences in the frequency of violence for age, job title, patient population, and hospital location. Sexual harassment was the only category of violence affected by gender with females having a greater frequency. Feelings of safety were positively related to the frequency of WPV. Females were significantly more likely to feel unsafe and have less confidence in dealing with WPV. The study findings indicate that all ED workers are at risk of violence, regardless of personal and occupational characteristics. Feelings of safety are related to job satisfaction and turnover. Violence has serious consequences for the employers, employees, and patients. It is recommended that administration, managers, and employees collaborate to develop and implement prevention strategies to reduce and manage the violence.

Gates, D., et al. (2011). "Using action research to plan a violence prevention program for emergency departments." *Journal of Emergency Nursing*, **37**(1): 32-39.

**INTRODUCTION:** Although there are numerous studies that show that emergency department (ED) violence is a prevalent and serious problem for healthcare workers, there is a lack of published evaluations of interventions aimed at reducing this alarming trend. Using an action research model, the authors partnered with six hospitals to plan, implement and evaluate a violence prevention and management intervention. Phase one of this project involved gathering information from employees, managers and patients using focus groups.

**METHODS:** Ninety-seven persons participated in one of twelve focus groups. The Haddon matrix was used to develop focus group questions aimed at gathering data about the pre-assault, during assault, and post-assault time frames and to compare these findings to planned strategies. Analysis consisted of identification of themes related to intervention strategies for patients/visitors, employees, managers, and the work environment.

**RESULTS:** Thematic analysis results supported the relevance, feasibility, and saliency of the planned intervention strategies. With the exception of a few items, employees and managers from the different occupational groups agreed on the interventions needed to prevent and manage violence against ED workers. Patients focused on improved staff communication and comfort measures.

**DISCUSSION:** Results support that violence in the emergency department is increasing, that violence is a major concern for those who work in and visit emergency departments, and that interventions are needed to reduce workplace violence. The Haddon matrix along with an action research method was useful to identify intervention strategies most likely to be successfully implemented and sustained by the emergency departments.

Sprinks, J. (2011). "Emergency department revamp could cut violence." *Emergency Nurse*, **19**(1): 6-7.

Taylor, J. L. and L. Rew (2011). "A systematic review of the literature: workplace violence in the emergency department." *Journal of Clinical Nursing*, **20**(7-8): 1072-1085.

**AIMS AND OBJECTIVES:** To synthesise the body of literature on workplace violence in the emergency department and to identify characteristics of intervention studies that are the basis for guiding best practice modelling in the clinical setting. The research question addressed was what are the characteristics and findings of studies since 2004 on workplace violence in the emergency department?

**BACKGROUND:** Emergency departments are prone to increased incidents of workplace violence. Workplace violence in the health care setting has become a hot topic of policy, political debate and

research in recent years. Despite the research that has been carried out in this area, little consensus exists as to what are the best practices for mitigating violence in this setting.

DESIGN: Systematic literature review.

METHODS: Search using four online databases, including MEDLINE, CINAHL, PsycINFO and the Dissertations and Theses Full Text Database.

RESULTS: Most research focused on the incidence rates of workplace violence in the emergency department and effects on staff. There was a significant lack of intervention studies to provide a framework for guiding evidence-based practice. Themes of under-reporting violence, barriers and attitudes towards reporting, description and characterisation of incidents of violence, predisposing factors and the concept of safety or lack of fear were all major content areas addressed in the literature.

CONCLUSIONS: Incidence of workplace violence in the emergency department has been well documented in numerous published studies. Emergency department workers are exposed to significant rates of physical and verbal abuse. Under-reporting of workplace violence in the emergency department is common and contributes to the difficulty in accurately tracking violence.

RELEVANCE TO CLINICAL PRACTICE: Future research must move beyond descriptive studies to include more advanced research methods. Few practice-guiding implications can be gained from this body of research because of the lack of intervention studies.

Anderson, L., et al. (2010). "An integrative literature review of interventions to reduce violence against emergency department nurses." *Journal of Clinical Nursing*, **19**(17-18): 2520-2530.

AIM: To critique the evidence that underpins interventions intended to minimise workplace violence directed against emergency department nurses, to inform researchers and policy makers regarding the design, development, implementation and evaluation of emergency nursing anti-violence and counter-violence interventions.

BACKGROUND: Workplace violence perpetrated against emergency department nurses is at least continuing and at worst increasing. Occupational violence has detrimental effects on job satisfaction, retention and recruitment, and the quality and cost of patient care.

DESIGN: An integrated literature review.

METHOD: Searches of the Cochrane Library, CINAHL, MEDLINE and the Joanna Briggs Institute between 1986-May 2007. Included articles were appraised and then synthesised into a narrative summary.

RESULTS: Ten primary research studies were included. Interventions were classified as environmental, practices and policies, or skills. While each study has useful information regarding the implementation of interventions, there is no strong evidence for their efficacy.

CONCLUSIONS: The weight of effort is still directed towards defining the phenomenon rather than addressing solutions. Studies that assessed the efficacy of a single intervention failed to take account of context; and participatory context-driven studies failed to provide generalisable evidence. Concerted multi-site and multi-disciplinary, action-oriented research studies are urgently needed to provide an evidence base for the prevention and mitigation of violence perpetrated against emergency department nurses.

RELEVANCE TO CLINICAL PRACTICE: The investigation of interventions rather than repeatedly redefining the problem and directing resources into debating semantics or differentiating 'degrees' of violence and aggression is recommended. This review unambiguously identifies the gap in research-based interventions.

Pich, J., et al. (2010). "Patient-related violence against emergency department nurses." *Nursing and Health Sciences*, **12**(2): 268-274.

In a finding that reflects international experiences, nurses in Australia have been identified as the occupation at most risk of patient-related violence in the health-care sector. A search of the literature was undertaken to explore this concept, with a focus on the emergency department and triage nurses. Significant findings included the fact that nurses are subjected to verbal and physical abuse so frequently that, in many instances, it has become an accepted part of the job. This attitude, combined with the chronic under-reporting of violent incidents, perpetuates the normalization of violence, which then becomes embedded in the workplace culture and inhibits the development of preventative strategies and the provision of a safe working environment. Nurses are entitled to a safe workplace that is free from violence under both the occupational health and safety legislation and the zero-tolerance policies that have been adopted in many countries including Australia, the UK, Europe, and the USA. Therefore, policy-makers and administrators should recognize this issue as a priority for preventative action.

Gacki-Smith, J., et al. (2009). "Violence against nurses working in US emergency departments." Journal of Nursing Administration, **39**(7-8): 340-349.

OBJECTIVE: The objective of this study was to investigate emergency nurses' experiences and perceptions of violence from patients and visitors in US emergency departments (EDs).

BACKGROUND: The ED is a particularly vulnerable setting for workplace violence, and because of a lack of standardized measurement and reporting mechanisms for violence in healthcare settings, data are scarce. METHODS: Registered nurse members (n = 3,465) of the Emergency Nurses Association participated in this cross-sectional study by completing a 69-item survey.

RESULTS: Approximately 25% of respondents reported experiencing physical violence more than 20 times in the past 3 years, and almost 20% reported experiencing verbal abuse more than 200 times during the same period. Respondents who experienced frequent physical violence and/or frequent verbal abuse indicated fear of retaliation and lack of support from hospital administration and ED management as barriers to reporting workplace violence.

CONCLUSION: Violence against ED nurses is highly prevalent. Precipitating factors to violent incidents identified by respondents is consistent with the research literature; however, there is considerable potential to mitigate these factors. Commitment from hospital administrators, ED managers, and hospital security is necessary to facilitate improvement and ensure a safer workplace for ED nurses.

Ferns, T. and A. Cork (2008). "Managing alcohol related aggression in the emergency department (Part I)." International Emergency Nursing, **16**(1): 43-47.

Internationally, violence in the emergency department (ED) is of a constant concern to emergency practitioners. Frequently, both original research papers and anecdotal reports emphasise the phenomenon of alcohol related aggression in the ED. In this first paper, we highlight the literatures discussion of alcohol related violence in the emergency department and the potential psychological effects of alcohol intoxication. In the second we offer personal and organisational strategies clinical nursing staff may consider appropriate to minimise the risk of assault when caring for service users projecting alcohol related aggression.

Cork, A. and T. Ferns (2008). "Managing alcohol related aggression in the emergency department (Part II)" International Emergency Nursing, **16**(2): 88-93.

Violence in the emergency department (ED) is a global problem. In our first paper, we highlighted the potential psychological effects of alcohol intoxication, the literatures discussion of alcohol related violence in the emergency department and the importance of developing positive nurse/service user relationships. In this second paper, we discuss personal and organisational strategies clinical nursing staff may consider appropriate to minimise the risk of assault when caring for service users projecting alcohol related aggression.

Kansagra, S. M., et al. (2008). "A survey of workplace violence across 65 U.S. emergency departments." Academic Emergency Medicine, **15**(12): 1268-1274.

OBJECTIVES: Workplace violence is a concerning issue. Healthcare workers represent a significant portion of the victims, especially those who work in the emergency department (ED). The objective of this study was to examine ED workplace violence and staff perceptions of physical safety.

METHODS: Data were obtained from the National Emergency Department Safety Study (NEDSS), which surveyed staff across 69 U.S. EDs including physicians, residents, nurses, nurse practitioners, and physician assistants. The authors also conducted surveys of key informants (one from each site) including ED chairs, medical directors, nurse managers, and administrators. The main outcome measures included physical attacks against staff, frequency of guns or knives in the ED, and staff perceptions of physical safety.

RESULTS: A total of 5,695 staff surveys were distributed, and 3,518 surveys from 65 sites were included in the final analysis. One-fourth of surveyed ED staff reported feeling safe sometimes, rarely, or never. Key informants at the sampled EDs reported a total of 3,461 physical attacks (median of 11 attacks per ED) over the 5-year period. Key informants at 20% of EDs reported that guns or knives were brought to the ED on a daily or weekly basis. In multivariate analysis, nurses were less likely to feel safe "most of the time" or "always" when compared to other surveyed staff. CONCLUSIONS: This study showed that violence and weapons in the ED are common, and nurses were less likely to feel safe than other ED staff.

Luck, L., et al. (2008). "Innocent or culpable? Meanings that emergency department nurses ascribe to individual acts of violence." *Journal of Clinical Nursing*, **17**(8): 1071-1078.

AIMS AND OBJECTIVES: The purpose of the study was to explore the meaning(s) that emergency department nurses ascribe to acts of violence from patients, their family and friends and what impact these meaning(s) have upon how they respond to such acts.

BACKGROUND: Violence in the health sector is of international concern. In high acuity areas such as emergency departments, nurses have an increased risk of violence. The literature further suggests that violence towards nurses in emergency departments is under-reported.

DESIGN AND METHODS: This study was undertaken in 2005, at a regional Australian Emergency Department with 20 consenting registered nurses. Using an instrumental case study design, both qualitative and quantitative data were generated. Qualitative data were collected using participant observation, semi-structured interviews, informal field interviews and researcher journaling. Quantitative data of violent events were generated using a structured observational guide. Textual data were analysed thematically and numeric data were analysed using frequency counts. Mixed methods and concurrent data analysis contributed to the rigour of this study.

FINDINGS: Emergency department nurses made judgments about the meaning of violent events according to three factors: (i) perceived personalization of the violence; (ii) presence of mitigating factors; and (iii) the reason for the presentation. The meanings that were ascribed to individual acts of violence informed the responses that nurses initiated.

CONCLUSIONS: The findings show that violence towards emergency department nurses is interpreted in a more systematic and complex way than the current definitions of violence make possible. The meanings given to violence were contextually constructed and these ascribed meaning(s) and judgments informed the actions that the nurses took in response to both the act of violence and the agent of violence.

RELEVANCE TO CLINICAL PRACTICE: Understanding the meaning(s) of violence towards nurses contributes to the discussions surrounding why nurses under-report violence. Further, these findings bring insights into how nurses can and do, handle violence in the workplace.

Luck, L., et al. (2007). "STAMP: components of observable behaviour that indicate potential for patient violence in emergency departments." *Journal of Advanced Nursing*, **59**(1): 11-19.

AIM: This paper is the report of a study to explicate the components of observable behaviour that indicate a potential for violence in patients, their family and friends when presenting at an emergency department. BACKGROUND: Violence towards nurses is a contemporary, multifaceted problem for the healthcare workforce globally. International literature identifies emergency departments as having high levels of violence.

METHOD: A mixed method case study design was adopted, and data were collected by means of 290 hours of participant observation, 16 semi-structured interviews and 13 informal field interviews over a 5-month period in 2005. Thematic analysis of textual data was undertaken using NVivo2. Frequency counts were developed from the numerical data.

FINDINGS: Five distinctive elements of observable behaviour indicating potential for violence in patients, their families and friends were identified. These elements can be conceptualized as a potential nursing violence assessment framework and described through the acronym STAMP: Staring and eye contact, Tone and volume of voice, Anxiety, Mumbling and Pacing.

CONCLUSION: Staring and eye contact, Tone and volume of voice, Anxiety, Mumbling and Pacing provides a useful, practical nursing violence assessment framework to assist nurses to quickly identify patients, families and friends who have a potential for violence.

Peek-Asa, C., et al. (2007). "Workplace violence prevention programs in hospital emergency departments." *Occupational and Environmental Medicine*, **49**(7): 756-763.

OBJECTIVE: Hospital violence is a growing concern, yet little is known about existing programs. This study compared workplace violence programs in high-risk emergency departments among a representative sample of 116 hospitals in California and 50 hospitals in New Jersey.

METHODS: Information was collected through interviews, a facility walk-through, and review of written policies, procedures, and training material. Programs were scored on the components of training, policies and procedures, security, and environmental approaches.

RESULTS: California had significantly higher scores for training and policies and procedures, but there was no difference for security and environmental approaches. Program component scores were not



highly correlated. For example, hospitals with a strong training program were not more likely to have strong policies and procedures.

CONCLUSIONS: Most hospitals in California and New Jersey had implemented a workplace violence prevention program, but important gaps were found.

Gates, D. M., et al. (2006). "Violence against emergency department workers." Journal of Emergency Medicine, **31**(3): 331-337.

The purpose of this study was to describe the violence experienced by Emergency Department (ED) workers from patients and visitors during the 6 months before the survey. Two hundred forty-two employees at five hospitals who came in direct contact with patients or visitors completed a survey. The study found that most workers had been verbally harassed by patients or visitors at least once. There were at least 319 assaults by patients and 10 assaults by visitors. Sixty-five percent of subjects assaulted stated that they did not report the assault to hospital authorities. Sixty-four percent of subjects had not had any violence prevention training during the previous 12 months. There were significant relationships among violent experiences, feelings of safety, and job satisfaction. ED workers are at high risk for violence, and efforts are needed to decrease the incidence of violence. Such efforts are likely to have a positive impact on job satisfaction and retention of ED workers.

Ryan, D. and J. Maguire (2006). "Aggression and violence - a problem in Irish Accident and Emergency departments?" Journal of Nursing Management, **14**(2): 106-115.

Health care employees are more likely than other workers to be victims of violence or aggression. Results from one Australian study suggest that 30% of respondents experienced aggression on a daily or near daily basis. In an Irish context, a total of 22% of all reported injuries in the health and social sector related to injuries inflicted by another person. However, both in Ireland and internationally, there has been an inadequate categorization of the types of incident to which staff are exposed. This contributes to definitional difficulties as well as problems in comparing research findings and using such findings to make work environments safe. The current study aimed to identify the types of violent or aggressive incidents that staff in Irish Accident and Emergency departments were exposed to within a month long period. A cross-sectional study was undertaken with all nurses (N = 80) working in Accident and Emergency departments in two sites nationally as part of a larger study of aggression and violence in health services looking at both Mental Health Services and Accident and Emergency departments. Data were collected using the Scale of Aggressive and Violent Experiences - questionnaire adapted from the Perception of Prevalence of Aggression Scale. The questionnaire captured data on personal and professional demographics as well as experiences of aggressive or violent incidents respondents may have encountered 'in their work situation'. There was a response rate of 46% (n = 37). Data were analysed utilizing spss-11. The relevant data were subjected to a series of one-way anovas and chi-square analysis. The findings suggest that nursing staff in Accident and Emergency departments experienced high levels of verbal aggression. Additionally, they encountered violence or aggression that is vicariously experienced more than forms that were overtly directed towards staff. It is a matter of concern that less than one-third of staff in this study reported that they had training in the management of aggression and violence. The implications will be discussed in relation to both policy and practice.

Ferns, T. (2005). "Terminology, stereotypes and aggressive dynamics in the accident and emergency department." Accident and Emergency Nursing, **13**(4): 238-246.

There is a perception that violence against staff practising in accident and emergency (A&E) departments is increasing [Fernandes, C.M.B., Bouthillette, F., Raboud, J.M., Bullock, L., Moore, C.F., Christenson, J.M., Grafstein, E., Rae, S., Ouellet, L., Gillrie, C., Way, M., 1999. Violence in the emergency department: a survey of health care workers, Canadian Medical Association Journal 11, 1-6; Jenkins, M.G., Rocke, L.G., McNicholl, B.P., Hughes, D.M., 1998. Violence and verbal abuse against staff in the A and E departments: a survey of consultants in the United Kingdom and Republic of Ireland, Journal of Accident and Emergency Medicine 15, 262-265; . A survey of violence towards nursing staff in one large Irish Accident and Emergency department, Journal of Emergency Nursing 23(3), 214-219]. This paper discusses traditional stereotypes of the violent A&E client by critiquing the current literature. The paper then goes on to question whether some health care professionals themselves are contributing to a climate of fear and the development of conflict.

Ferns, T. (2005). "Violence in the accident and emergency department--an international perspective." Accident and Emergency Nursing, **13**(3): 180-185.

Violence and aggression experienced by emergency nurses has been the focus of international concern. This paper examines the phenomena of violence experienced by emergency department nursing staff from an international perspective by reviewing original, published research studies. Methodological inconsistencies and concerns, a lack of comprehensive studies and persistent under-reporting may mean that the reality of clinical practise has not been captured by researchers. The literature suggests that clients presenting with weapons in the emergency department may be characteristic of North American departments but is much less likely to occur in the United Kingdom where weapons use is much more likely to be opportunistic. Excessive verbal abuse is a global phenomenon and nursing staff and organisations may be significantly affected by workplace violence. However, violence against nursing staff remains poorly researched or understood.

Ferns, T., et al. (2005). "Personal safety in the accident and emergency department." British Journal of Nursing, **14**(13): 725-730.

Violence and aggression continues to be a significant problem for staff practising in accident and emergency (A&E) areas. In recent years the number of articles examining factors related to violence and aggression in the A&E department have steadily increased, allowing for a more in-depth examination of data. This article considers the characteristics of individuals who assault A&E staff, introducing the reader to the "recreational fighter", an individual who enjoys and is attracted to violent confrontations. The article goes on to consider the role of gender, alcohol, age and social history in relation to the characteristics of individuals who assault nursing staff practising in A&E and offers a number of strategies for nursing staff to consider when attempting to minimize the risk of personal physical assault.

Peek-Asa, C., et al. (2002). "Violent events and security programs in California Emergency Departments before and after the 1993 Hospital Security Act." Journal of Emergency Nursing, **28**(5): 420-426.

INTRODUCTION: Health care workers have long been recognized as having a high risk of work-related assault. In response to a growing threat of violence in hospitals, California implemented the Hospital Security Act (AB508) in 1993. This study compares surveys of emergency nurses before and after implementation of AB508.

METHODS: In 1990, the CAL/ENA surveyed emergency departments in California to enumerate violent events and describe security programs. Using the CAL/ENA membership directory, hospitals were resurveyed in 2000 to identify changes from the original survey. Surveys were mailed to the ED nurse manager or equivalent. Survey responses were anonymous.

RESULTS: Most hospitals reported fewer violent episodes after the implementation of AB508. However, 32% of hospitals reported that 5 or more verbal threats occurred monthly, and 5% reported that 5 or more violent injuries occurred monthly. Overall, hospitals reported improvements in security programs. The most notable increase was in employee training, which rose from 34% to 95.6% of reporting hospitals. However, almost a quarter of hospitals reported not having general violence prevention policies, and many believed that security personnel were inadequate.

DISCUSSION: Although results reported here cannot be directly attributed to AB508, the increase in security program components suggests that hospitals are responding positively to reduce violence. The high prevalence of threats and violent events reported indicates a persistent risk of violence against health care workers.

Presley, D. and G. Robinson (2002). "Violence in the emergency department: nurses contend with prevention in the healthcare arena." The Nursing Clinics of North America, **37**(1): 161-169, viii-ix.

Violence and assault in the emergency department (ED) are recognized as significant occupational hazards for nursing professionals. Learning what assault means to emergency nurses is a critical step in planning long-term solutions to workplace violence. It is vital that nurses take a realistic account of all the risks of assault and build a comprehensive and supportive approach to the problem so as to ensure the safety of EDs.

Lyneham, J. (2000). "Violence in New South Wales emergency departments." Australian journal of advanced nursing: a quarterly publication of the Royal Australian Nursing Federation **18**(2): 8-17.

In 1999 the International Council of Nurses recognised workplace violence as a significant issue in nursing. During the same year the Australian Institute of Criminology reported that health was the most violent industry. This study examined the nature and extent of violence in NSW hospital emergency departments. Emergency nurses experienced violent incidents in their department, in the wards and

outside the hospital setting. Every respondent (n=266) experienced some form of violence at least weekly. Ninety-two incidents involved lethal weapons. Ninety-two percent of perpetrators were patients or their relatives, however other staff members were also implicated. Non-reporting of violence is an issue as over 70% of incidents were not referred to authorities. Drugs, alcohol and emergency department waiting times are the most significant predisposing factors. Most emergency nurses are not satisfied with the response of administration to violent incidents within hospitals.

Mayer, B. W., et al. (1999). "Factors associated with victimization of personnel in emergency departments." *Journal of Emergency Nursing*, **25**(5): 361-366.

**OBJECTIVE:** The purpose of this study was to identify the incidence of ED personnel victimization in Central Florida and examine its relationship to victims' reports of 3 factors: characteristics of the patient/perpetrator, characteristics of the personnel victimized, and characteristics of the ED environment.

**METHODS:** Data were collected anonymously in a mail survey using 37 items from Mahoney's Emergency Department Victimization Questionnaire (EDVQ) and a demographic questionnaire. Chi square, Spearman's rank correlation coefficient, and Pearson's product moment correlation were used to describe frequencies, incidence, and their relationships to the variables studied. A sample of 226 of the 600 direct care personnel (37%) from 18 of the 19 hospital emergency departments in a tri-county area (95%) participated.

**RESULTS:** The incidence of physical assault was reported to be 42% during the past year and 72% during the respondents' careers. Alcohol use was associated with incidence (1-tailed Pearson;  $P = .001$ ). Verbal abuse was significantly higher on day shift ( $P = .043$ ). The most desired environmental variable was 24-hour security attendants, available to 51.8% of the respondents. More than a fourth of the subjects reported that they had completed no coursework or had no continuing education in violence prevention.

**DISCUSSION:** Respondents reported avoiding identification on duty, underreporting, post victimization staff turnover, dissatisfaction with security, and the desire for every security provision listed. The goals of reducing the fears and victimization of ED personnel should become a priority within the health care system.

Rankins, R. C. and G. W. Hendey (1999). "Effect of a security system on violent incidents and hidden weapons in the emergency department." *Annals of Emergency Medicine*, **33**(6): 676-679.

**STUDY OBJECTIVE:** To determine the number of weapons confiscated and assaults reported in an urban county emergency department before and after the implementation of a security system.

**METHODS:** This is a retrospective review of security records for a 54-month period from 1992 to 1996. We determined the number of weapons and assaults before and after the implementation of a security system consisting of metal detectors, cameras, limited access, and a manned security booth at the ED entrance. We calculated the rates of weapons confiscated and assaults per 10,000 ED patients treated.

**RESULTS:** Twenty-four weapons were confiscated before the implementation of the security system, and 40 were confiscated after the implementation ( $P < .001$ ). The percentage of weapons confiscated in the patient care area decreased from 92% to 42% after the security system was installed ( $P < .001$ ). Seven of the 17 weapons (41%) found in the patient care area after implementation were brought in by ambulance patients who bypassed the security booth and metal detector. The reported assaults per 10,000 patients, however, did not change significantly.

**CONCLUSION:** The implementation of an ED security system increased the number and percentage of weapons confiscated before patients were placed in patient care areas, but did not decrease the number of assaults. This emphasizes the importance of continued training of ED personnel in the management of violent patients and potentially violent situations.

Hoag-Apel, C. M. (1998). "Violence in the emergency department." *Nursing Management* **29**(7): 60, 63.

The spillover of societal violence continues to escalate in emergency departments (EDs) in the United States. The violence is not limited to urban, inner-city environments; it extends into the rural areas as well. Preventive techniques need to be addressed. An overview examines risk assessments, preventive strategies, security systems, and staff education.

Jenkins, M. G., et al. (1998). "Violence and verbal abuse against staff in accident and emergency departments: a survey of consultants in the UK and the Republic of Ireland." *Journal of Accident and Emergency Medicine*, **15**(4): 262-265.

**OBJECTIVES:** To determine the incidence of verbal abuse and physical violence in accident and emergency (A&E) departments and to discover the extent of provision of security measures and instructions for staff on how to deal with these problems.

**DESIGN:** A postal questionnaire.

**SETTING:** A&E departments in the UK and the Republic of Ireland.

**SUBJECTS:** Two hundred and seventy three consultants named in charge of 310 departments.

**MAIN OUTCOME MEASURES:** Frequency of physical violence and verbal abuse, injuries sustained, perceived precipitating factors, security measures instituted, and legal action taken.

**RESULTS:** Two hundred and thirty three replies were received. Alcohol, waiting times, recreational drug usage, and patients' expectations were perceived as the chief causes. Patients were the chief perpetrators with nurses being the commonest victims. Staff sustained 10 fractures, 42 lacerations, and 505 soft tissue injuries. There were 298 arrests and 101 court appearances that resulted in 76 convictions. Panic buttons and video cameras were the most common security measures.

**CONCLUSIONS:** Staff within A&E departments are regularly abused, both verbally and physically. Inner city departments appear to be most affected. Documentation is poor. Perpetrators are seldom convicted. There do appear to be actions which hospitals could undertake that might help to ameliorate these problems.

Rose, M. (1997). "A survey of violence toward nursing staff in one large Irish Accident and Emergency Department." Journal of Emergency Nursing, **23**(3): 214-219.

**INTRODUCTION:** Nurses in Ireland are increasingly concerned about the escalating incidence of verbal and physical abuse, particularly in Accident and Emergency (A&E) Departments. This first detailed survey of violence in A&E departments in Ireland was conducted at St. James's Hospital, Dublin, the largest hospital in the Republic of Ireland. The aims of the survey included determining the following factors: (1) what proportion of staff had experienced physical or verbal violence while on duty in the hospital, (2) the frequency of such attacks, (3) whether the violence was officially reported and sick leave taken, (4) whether age and experience changed attitudes to violence, or the reporting of it, and (5) the level of staff training, if any, in dealing with violence.

**METHODS:** A wide-ranging questionnaire was designed and confidentially offered to nurses and attendants (patient care assistants). Standard definitions of physical and verbal violence were framed.

**RESULTS:** Of 36 nurses on staff, 27 responded; nine of 13 attendants responded. Doctors were not included because only one is a permanent, non-contract employee. The responding nurses ranged in experience from newly qualified to senior nurses and unit managers with more than 15 years A&E service. The survey found that half of the nurses had been assaulted physically, or verbally, one third within the past 12 months. Only two of the 27 respondent nurses were not worried about being physically assaulted--both were psychiatric-trained male nurses and neither had ever been assaulted. Most verbal abuse was not reported--despite availability of an official report book--and 29% of nurses had not even reported their last physical assault. The likelihood of reports of verbal violence being made increased with age and experience. Staff criticised hospital managers, the police, and the courts for their attitude about assaults on nurses. Respondents believed assaults on nurses were treated less seriously than similar incidents involving private citizens.

**DISCUSSION:** The results of this study mirrored those of similar surveys in Britain and the United States. Non-reporting was revealed as a major problem, whereas reporting violence was often seen as an empty gesture because of a lack of institutional support for the nurse/attendant victims. Staff reported feeling vulnerable to abuse and there was a general desire for training in self-protection. Since the survey was first presented to hospital managers, St James's Hospital has made a number of changes to improve staff security. These include teaching staff breakaway techniques, increasing the number of security officers on duty, issuing personal alarms, and encouraging staff to officially report all incidents.

Schnieden, V. and U. Marren-Bell (1995). "Violence in the accident and emergency department." Accident and Emergency Nursing, **3**(2): 74-78.

A survey of Accident and Emergency nurses was undertaken to study the prevalence, types and possible precipitating factors of violence in the workplace. Violence was sub-divided into physical and verbal. Verbal violence was more common than physical assault but often not reported. Often physical violence is under-reported but in fact had affected one third of respondents. Associations with different types of violence are discussed. The need for further training in defusing violent situations and analysis of violent incidents is identified. Some suggestions for inclusion in a training programme are given.

Dimond, B. (1994). "Violence in the accident and emergency department." Accident and Emergency Nursing, **2**(3): 172-176.

It is not surprising that the increased level of violence in society has had its effect upon safety within the Accident and Emergency (A & E) department. At a time when every health professional including General Practitioners (GPs) report incidents of assault during their work, it is inevitable that such incidents should also occur within hospitals. Many A & E departments now employ security firms to guard the premises and to be on call should trouble arise. Most departments would have a system of closed circuit television which may be useful in identifying and controlling trouble at an early stage and in assisting in the recognition of offenders subsequently. Unfortunately such measures are not entirely successful in preventing violence in the departments, and the nurse may be confronted by such situations as: An injured person coming in with his drunken friends on a Friday night or after a football match, bringing havoc and uproar to the department. An injured spouse/cohabitee following a violent quarrel at home, with the uninjured party trailing behind fiercely defensive of his innocence and yet aggressive to others around Tramps, bewildered and terrified, denying the need for help and resisting the assistance of the staff. What is the legal position of the nurse in such situations? If the nurse fears for safety would the right exist to evict such persons from the department even though there may be severe injuries? Is the nurse permitted to take any action in self-defence? What duty exists upon the nurse's employer to secure health and safety? (ABSTRACT TRUNCATED AT 250 WORDS)

McAneney, C. M. and K. N. Shaw (1994). "Violence in the pediatric emergency department." Annals of Emergency Medicine, **23**(6): 1248-1251.

STUDY OBJECTIVE: To identify the frequency of violence and the perception of safety in pediatric emergency departments.

STUDY DESIGN: Descriptive, cross-sectional survey of directors of pediatric EDs with fellowship programs.

SETTING: University-based urban pediatric EDs.

PARTICIPANTS: Forty-seven pediatric ED directors were surveyed, with 94% responding.

RESULTS: More than three-fourths of those responding reported one or more verbal threats per week; 77% reported one or more physical attacks on staff per year; and 25% reported actual injury to staff. No pediatric EDs had weapon detectors; 7% had city police stationed there; and 54% had 24-hour security stationed in the pediatric ED. The majority reported that their staff members practice with at least occasional fear (55%) and had documented this concern (82%). Perception of safety was associated with the incidence of verbal threats ( $P < .006$ ), physical attacks ( $P < .03$ ), injury to staff or patient ( $P < .01$ ), and the frequency with which security was needed ( $P < .001$ ). Pediatric EDs with 50,000 or more visits per year were more likely to have multiple physical attacks on staff (relative risk, 2.89; 95% confidence interval, 1.33-6.26;  $P < .004$ ). More verbal threats were reported in pediatric EDs with longer waiting times ( $P < .001$ ). Fewer than half of the pediatric EDs with reported injuries had 24-hour security.

CONCLUSION: Pediatric EDs are not immune to the problem of violence. Efforts must be directed to increase safety through better security, more efficient patient care, and aggression management training.

Foust, D. and K. J. Rhee (1993). "The incidence of battery in an urban emergency department." Annals of Emergency Medicine, **22**(3): 583-585.

STUDY OBJECTIVE: To determine the incidence of battery against emergency department medical staff by patients or visitors.

DESIGN: Prospective descriptive study over a nine-month period.

SETTING: A university-affiliated ED Level I trauma center with an annual census of approximately 64,000 located in a major metropolitan area.

PARTICIPANTS: All staff members who had been punched, kicked, grabbed, pushed, or spat on by a patient or visitor while on duty in the ED.

INTERVENTIONS: Questionnaire that was completed after the incident.

RESULTS: During the study period, there were 19 instances of violence against staff by patients. Staff members were punched six times, kicked seven times, grabbed three times, pushed once, and spat on twice. Blows usually were sustained on the face or head (seven) or on the extremities (seven). In only four cases were hospital incident reports filled out, and in no case was there an injury serious enough to require ED treatment or disability leave. The assailant was usually male (15 of 19, 79%) and usually on a psychiatric or substance abuse detainment (15 of 19, 79%).



CONCLUSION: This study suggests that instances of battery in an urban university hospital ED usually are not serious and are committed by patients on a psychiatric or substance abuse detainment.

Cembrowicz, S. P. and J. P. Shepherd (1992). "Violence in the Accident and Emergency Department." Med Sci Law **32**(2): 118-122.

Crimes of violence are recorded increasingly frequently, including those involving health professionals. We reviewed records of violent incidents kept for a major Accident and Emergency Department over a ten-year period. Details were recorded in a Violent Incident Book by all grades of A/E staff, and separate records were kept by hospital security officers. A total of 407 incidents were recorded. Numbers, rank and sex of staff assaulted, types of assault, injuries received, weapons used and characteristics and disposal of perpetrators were recorded. Many were young males who had been drinking; others were regular attenders, of whom three subsequently died and one convicted of murder. Nurses and male doctors appeared to be at the greatest risk of assault and receptionists at the least risk. Recording of violent incidents and subsequent prosecution seemed inconsistent, and may have reflected the lack of a code of practice in this area. Suggestions are made about preventing, predicting and dealing with violence, and its aftermath, in the A and E department, including the use of security officers and closed circuit television, waiting room design, the recognition of body language and signs of alcohol or substance intoxication. The importance of staff support after an assault is emphasized, including immediate and long-term counselling, provision of legal advice, criminal or civil court action, victim support schemes and the workings of the Criminal Injuries Compensation Board. Free legal advice for staff assaulted at work should be included in the terms of service of NHS staff.

Hutson, H. R., et al. (1992). "Minimizing gang violence in the emergency department." Annals of Emergency Medicine, **21**(10): 1291-1293.

Street gang members are frequently injured, and the violence of their subculture may follow them from the streets into the emergency department. We present four cases in which in-hospital gang violence occurred or was prevented. To decrease the risk of injury from gang-related violence within the hospital, we offer guidelines for patient care and health care provider safety. Emphasis is on education, awareness, and early hospital security involvement.

Pane, G. A., et al. (1991). "Aggression directed toward emergency department staff at a university teaching hospital." Annals of Emergency Medicine, **20**(3): 283-286.

STUDY OBJECTIVE: To determine the scope and magnitude of patient and visitor aggression directed toward emergency department staff.

DESIGN: One-year retrospective review of university police log records and ED staff incident reports. SETTING: Medium-sized, urban, noncounty, university Level I teaching hospital treating approximately 40,000 ED patients annually.

TYPE OF PARTICIPANTS: All violent incidents involving patients/visitors and ED staff that triggered a police response to the ED area were included in the study.

INTERVENTIONS: None.

MEASUREMENTS AND MAIN RESULTS: All ED violent episodes were recorded and categorized by shift, type of incident, type of police response, perpetrator, and site of incident. It was found that police responded to the ED nearly twice daily; the night shift had 32% of the cases with only 13% of the patient volume; custody and medical psychiatric clearance patients accounted for 40% of the cases; more than 20% of incidents occurred in the waiting room; and 4.2% of the incidents represented a significant threat to ED staff. CONCLUSION: ED violence is a significant and under-reported problem at our medium-sized university teaching hospital. These data are useful in objectively quantifying the scope of violence in our institution, and they underscore the potential risk to emergency patients, visitors, and staff. There is an acute need for additional studies in other settings so that appropriate and cost-effective security recommendations can be formulated.

Spittler, K. (1991). "Violence in a pediatric emergency department: lessons learned from one experience." Journal of Emergency Nursing, **17**(5): 339-340.

A multitude of forces influence the probability of violence in an emergency department, but none impact as directly as the skilled response of the emergency nurse. It is important not to overlook the availability of security and law enforcement, but it may be equally important for nurses to take appropriate steps toward preventing or solving such problems with a minimum of physical and

emotional pain for all concerned. With time and practice, incidents of violence can be replaced with opportunities for growth and healing.

Lavoie, F. W., et al. (1988). "Emergency department violence in United States teaching hospitals." Annals of Emergency Medicine, **17**(11): 1227-1233.

Violence in the emergency department is a common concern. However, most aspects of this problem remain unstudied because no organization or government agency tracks such data and no regulatory or administrative guidelines adequately address its management. We surveyed 170 US teaching hospital ED medical directors with respect to violence and security issues and received responses from 127 (74.7%). Among other findings, 41 institutions report at least one verbal threat each day, and 23 report at least one threat with a weapon each month. Four-point physical restraint is used by 125 of the 127 facilities. Personnel in 32 of these facilities restrain at least one patient each day. Seventeen institutions report having significantly injured a patient during restraint in the last five years, resulting in one death. Twenty institutions report involvement with litigation with respect to restraint. Only 51 institutions provide ED nurses with formal training in recognition and management of aggression and violence, and only 79 institutions have security personnel present in the ED 24 hours a day. A sizable number of facilities receiving frequent threats and batteries are not among those with 24-hour-a-day security personnel. A preventative, risk-management approach that addresses environmental factors, training policies, restraint, security arrangements, and legal precedents is suggested.

### **WAITING TIME**

Yoon, J. and M. Sonneveld (2010). Anxiety of patients in the waiting room of the emergency department. Proceedings of the Fourth International Conference on Tangible embedded and embodied interaction. Cambridge, Massachusetts, Association for Computing Machinery: 279-286.

This study aims at understanding the patient's experience in the waiting room of the emergency department. The research explores and unveils the context and interactions in the waiting room and the factors that cause anxiety. As a result, a service that helps patients moderate anxiety has been developed.

For the research, 12 patients and their family members were observed, and an interview with the head of the department was conducted. These methods were used to answer the following research questions: How do people experience the waiting room in the emergency department? How can the negative aspects be relieved?

The main findings of this study reveal distrust between the patients and staff of the hospital, the patients' consistent focus on their status, and an uncertainty about the waiting time. The focus of this study is on alleviating these negative aspects by enabling patients to acquire sufficient information about the procedure and the waiting time.

Wilper, A., et al. (2008). "Waits To See An Emergency Department Physician: U.S. Trends and Predictors, 1997-2004." Health Affairs **27**(2): 84-95.

As emergency department (ED) patient volumes increase throughout the United States, are patients waiting longer to see an ED physician? We evaluated the change in wait time to see an ED physician from 1997 to 2004 for all adult ED patients, patients diagnosed with acute myocardial infarction (AMI), and patients whom triage personnel designated as needing "emergent" attention. Increases in wait times of 4.1 percent per year occurred for all patients but were especially pronounced for patients with AMI, for whom waits increased 11.2 percent per year. Blacks, Hispanics, women, and patients seen in urban EDs waited longer than other patients did.

Dunn, R. (2003). "Reduced access block causes shorter emergency department waiting times: An historical control observational study." Emerg Med (Fremantle) **15**(3): 232-238.

OBJECTIVE: To study the effect of changes in hospital occupancy and ED occupancy on ED waiting times during a 13-day period of improved bed access.

METHODS: A comparative, observational study of 1133 ED attendances in the study period and 2332 attendances in a historical control period.

RESULTS: During the study period, mean hospital occupancy decreased from 94.9% to 89.0% (P < 0.001), mean ED occupancy decreased from 19.1 to 14.8 patients (P < 0.001) and the mean ED waiting time decreased from 58.5 to 37.1 min (P < 0.001). There were statistically significant reductions in

waiting times for patients in Australasian triage scale (ATS) categories 2-5. Departmental staffing levels, attendances and patient acuity were not significantly different during the study and control periods.

CONCLUSIONS: Modest decreases in hospital occupancy resulted in highly significant reductions in ED waiting times. Emergency department overcrowding due to large numbers of admitted patients awaiting hospital admission is a major cause of ED dysfunction.

Lambe, S., et al. (2003). "Waiting times in California's emergency departments." *Ann Emerg Med* **41**(1): 35-44.

STUDY OBJECTIVE: Many perceive emergency department crowding as a significant problem that is getting worse. A national survey of ED directors defined crowding, in part, as waiting more than 1 hour to see a physician, a wait considered likely to result in adverse outcomes. Yet few data are available on ED waiting times among a heterogeneous group of hospitals serving a distinct geographic region.

METHODS: We observed a random sample of 1,798 patients visiting 30 California EDs between December 15, 2000, and May 15, 2001. We defined waiting time as the interval from ED arrival to first contact with a physician or midlevel provider.

RESULTS: Patients waited an average of 56 minutes (95% confidence interval [CI] 52 to 61 minutes; median 38 minutes); 42% waited longer than 60 minutes. Ordinary least squares regression analysis revealed that waiting times were significantly longer at hospitals in poorer neighborhoods: For every 10,000 dollars decline in per capita income, patients waited 10.1 minutes longer (95% CI 1.8 to 18.4 minutes;  $P=.02$ ) after adjusting for hospital ownership, teaching status, trauma status, proximity to a recently closed ED, ED volume, patient severity, and age. Lower ratios of physicians and triage nurses to waiting room patient were also associated with longer waits.

CONCLUSION: Waiting times often exceeded the threshold set by a survey of ED directors. Further study is required to examine factors that lead to longer waiting times at hospitals in low-income areas. Physician and nurse staffing should be investigated as a means of reducing waiting times.

Grouse, A. and R. Bishop (2001). "Non-medical technicians reduce emergency department waiting times." *Emerg Med (Fremantle)* **13**(1): 66-69.

OBJECTIVE: To observe the impact of trained non-medical technicians on emergency department waiting times. The technicians were to perform minor procedures that had previously been performed by medical staff.

METHODS: A prospective cohort study with two matched groups of patients. One group comprised patients who presented to the emergency department on days when the technicians worked (working group) and the other comprised patients who presented when the technicians did not work (control group). The waiting times for patients in each group were compared.

RESULTS: The median waiting time was 10 min shorter in the working group than the control group ( $P < 0.0001$ ). This reduction was confined to triage categories 3 and 4. The number of patients who left without being seen was reduced from 8.2% in the control group to 5.3% in the working group ( $P < 0.00001$ ). CONCLUSION: When added to the normal staff complement, non-medical technicians reduce patient waiting times in the emergency department.

Thompson, D. A., et al. (1996). "How accurate are waiting time perceptions of patients in the emergency department?" *Annals of Emergency Medicine*, **28**(6): 652-656.

STUDY OBJECTIVE: To assess the ability of patients to accurately estimate specific waiting times in the emergency department.

METHODS: A questionnaire was administered by telephone to a random sample of 776 patients (or parents or responsible caretakers, if appropriate) who had been treated within the previous 2 to 4 weeks in the ED of a suburban hospital. Respondents were asked their perceptions of two particular time frames: (1) the time elapsed from triage until initial examination by the emergency physician (physician waiting time [PWT]), and (2) the time elapsed from triage until departure from the ED (total waiting time [TWT]). Corresponding actual times were extracted from a computerized database. Time frames were divided into discrete periods for comparison. The correspondence between actual and perceived times was assessed by optimal data analysis.

RESULTS: Only 22.3% of the respondents accurately estimated PWT. Although this level of accuracy is statistically significant ( $P<.0001$ ), it reflects only 11% of the theoretically possible improvement in accuracy beyond chance. More respondents overestimated than underestimated PWT (49.9% versus 27.8%, respectively). In contrast, TWT was accurately estimated by 36.6% of the respondents ( $P<.0001$ ), reflecting 18% of the theoretically possible improvement in accuracy beyond chance. Fewer respondents overestimated than underestimated TWT (24.5% versus 38.9%, respectively).

CONCLUSION: Patients are not very accurate in their estimation of actual waiting times. Although fewer than one fourth of the respondents overestimated the TWT spent in the ED, almost half the respondents overestimated the PWT.

Thompson, D. A., et al. (1996). "Effects of Actual Waiting Time, Perceived Waiting Time, Information Delivery and Expressive Quality on Patient Satisfaction in the Emergency Department." *Annals of Emergency Medicine* **28**(6): 657-665.

### **WORKPLACE INTERRUPTIONS**

Chisholm, C. D., et al. (2000). "Emergency department workplace interruptions: are emergency physicians "interrupt-driven" and "multitasking"?" *Acad Emerg Med* **7**(11): 1239-1243.

OBJECTIVE: Although interruptions have been shown in aviation and other work settings to result in error with serious and sometimes fatal consequences, little is known about interruptions in the emergency department (ED). The authors conducted an observational, time-motion task-analysis study to determine the number and types of interruptions in the ED.

METHODS: Emergency physicians were observed in three EDs located in an urban teaching hospital, a suburban private teaching hospital, and a rural community hospital. A single investigator followed emergency staff physicians for 180-minute periods and recorded tasks, interruptions, and breaks-in-task. An "interruption" was defined as any event that briefly required the attention of the subject but did not result in switching to a new task. A "break-in-task" was defined as an event that required the attention of the physician for more than 10 seconds and subsequently resulted in changing tasks.

RESULTS: The mean (+/-SD) total number of patients seen at all three sites during the 180-minute study period was 12.1 +/- 3.7 patients (range 5-20). Physicians performed a mean of 67.6 +/- 15.7 tasks per study period. The mean number of interruptions per 180-minute study period was 30.9 +/- 9.7 and the mean number of breaks-in-task was 20.7 +/- 6.3. Both the number of interruptions ( $r = 0.63$ ;  $p < 0.001$ ) and the number of breaks-in-task ( $r = 0.56$ ;  $p < 0.001$ ) per observation period were positively correlated with the average number of patients simultaneously managed.

CONCLUSIONS: Emergency physicians are "interruptdriven." Emergency physicians are frequently interrupted and many interruptions result in breaks-in-task.

### **MISCELLANEOUS**

Laskowski-Jones, L. (2012). "RTLS solves patient-tracking emergency." *Health Manag Technol* **33**(3): 24-25.

Mazzo, A. R. (2012). SOS for Emergency Departments. *Healthcare Building Ideas*.

Stone-Griffith, S., et al. (2012). "Data-driven process and operational improvement in the emergency department: the ED Dashboard and Reporting Application." *Journal of Healthcare Management*, **57**(3): 167-180; discussion 180-161.

Emergency departments (EDs) in the United States are expected to provide consistent, high-quality care to patients. Unfortunately, EDs are encumbered by problems associated with the demand for services and the limitations of current resources, such as overcrowding, long wait times, and operational inefficiencies. While increasing the effectiveness and efficiency of emergency care would improve both access and quality of patient care, coordinated improvement efforts have been hindered by a lack of timely access to data. The ED Dashboard and Reporting Application was developed to support data-driven process improvement projects. It incorporated standard definitions of metrics, a data repository, and near real-time analysis capabilities. This helped acute care hospitals in a large healthcare system evaluate and target individual improvement projects in accordance with corporate goals. Subsequently, there was a decrease in "arrival to greet" time--the time from patient arrival to physician contact--from an average of 51 minutes in 2007 to the goal level of less than 35 minutes by 2010. The ED Dashboard and Reporting Application has also contributed to data-driven improvements in length of stay and other measures of ED efficiency and care quality. Between January 2007 and December 2010, overall length of stay decreased 10.5 percent while annual visit volume increased 13.6 percent. Thus, investing in the development and implementation of a system for ED data capture, storage, and analysis has supported operational management decisions, gains in ED efficiency, and ultimately improvements in patient care.

Welch, S. and L. Savitz (2012). "Exploring Strategies to Improve Emergency Department Intake." Journal of Emergency Medicine **43**(1): 149-158.

Background: The emergency department (ED) is the point of entry for nearly two-thirds of patients admitted to the average United States (US) hospital. Due to unacceptable waits, 3% of patients will leave the ED without being seen by a physician.

Objectives: To study intake processes and identify new strategies for improving patient intake.

Methods: A year-long learning collaborative was created to study innovations involving the intake of ED patients. The collaborative focused on the collection of successful innovations for ED intake for an "improvement competition." Using a qualitative scoring system, finalists were selected and their innovations were presented to the members of the collaborative at an Association for Health Research Quality-funded conference.

Results: Thirty-five departments/organizations submitted abstracts for consideration involving intake innovations, and 15 were selected for presentation at the conference. The innovations were presented to ED leaders, researchers, and policymakers. Innovations were organized into three groups: physical plant changes, technological innovations, and process/flow changes.

Conclusion: The results of the work of a learning collaborative focused on ED intake are summarized here as a qualitative review of new intake strategies. Early iterations of these new and unpublished innovations, occurring mostly in non-academic settings, are presented.

Castillo, G., et al. (2011). "How to create a new emergency department in 21 days or less." Journal of Emergency Nursing, **37**(2): 165-166.

Matambanadzo, S. (2011). HCD.11 Session Review: Hospital ICONs--Groundbreaking Emergency Departments. Healthcare Design.

Jarousse, L. A. (2011). "ED throughput: a key to patient safety." Hospital and Health Networks **85**(8): 33-40.

Richards, J. D. and T. Harris (2011). "Beam me up Scotty! Impact of personal wireless communication devices in the emergency department." Emerg Med J **28**(1): 29-32.

OBJECTIVE: A qualitative study performed with a cross-sectional survey to report staff perceptions on emergency department (ED) communication while trialling a personal hands-free wireless communication device (WCD) between August and October 2008 in a busy inner city ED.

METHOD: A survey of all Royal London Hospital ED staff was conducted pre and post-implementation of a personal WCD. The survey included responses to occupation, experience, communication modes, communication wait times, perceived interruptions at the bedside and general perceptions of communication efficiency.

RESULTS: No appreciable change in communication modes or perceived waiting times was reported. No increase in bedside interruptions were reported. An overwhelming number of respondents considered the system had contributed significantly to improving the quality of the work environment, patient safety and care.

CONCLUSION: This study correlated with others showing a very strong perception of improved communication and working environment: less noise, better handovers and improved staff resource use. The study adds to the limited number of published trials examining WCD in health care. Observational reports post-implementation were overwhelmingly positive. Quantitative studies measuring the impact on patient flow, safety and cost benefits should be considered.

Stephoe, A. P., et al. (2011). "Characterizing emergency departments to improve understanding of emergency care systems." Int J Emerg Med **4**: 42.

International emergency medicine aims to understand different systems of emergency care across the globe. To date, however, international emergency medicine lacks common descriptors that can encompass the wide variety of emergency care systems in different countries. The frequent use of general, system-wide indicators (e.g. the status of emergency medicine as a medical specialty or the presence of emergency medicine training programs) does not account for the diverse methods that contribute to the delivery of emergency care both within and between countries. Such indicators suggest that a uniform approach to the development and structure of emergency care is both feasible



and desirable. One solution to this complex problem is to shift the focus of international studies away from system-wide characteristics of emergency care. We propose such an alternative methodology, in which studies would examine emergency department-specific characteristics to inventory the various methods by which emergency care is delivered. Such characteristics include: emergency department location, layout, time period open to patients, and patient type served. There are many more ways to describe emergency departments, but these characteristics are particularly suited to describe with common terms a wide range of sites. When combined, these four characteristics give a concise but detailed picture of how emergency care is delivered at a specific emergency department. This approach embraces the diversity of emergency care as well as the variety of individual emergency departments that deliver it, while still allowing for the aggregation of broad similarities that might help characterize a system of emergency care.

Stewart, K. (2009). "EDIS. The synergy of Trinity. A Pennsylvania hospital discovers automating ED processes and patient tracking is a team effort." *Health Manag Technol* **30**(2): 18-21.

Welch, S. J. (2009). "In the Zone: Redesigning Flow." *Emergency Medicine News* **31**(7).

Welch, S. J. (2009). "Patient segmentation: Redesigning flow." *Emergency Medicine News* **31**(8).

Welch, S. J. (2009). "Twenty years of patient satisfaction research applied to the emergency department: A qualitative review." *American Journal of Medical Quality* **25**(1): 64-72.

This clinical review article examines the patient satisfaction literature for the past 20 years. This literature is summarized for qualitative themes and general trends. Intended for the practicing clinician, these themes are then applied to the emergency department (ED) milieu. According to the Agency for Healthcare Research and Quality, the ED is the point of entry for more than half of all patients admitted to the hospital in the United States. Indeed, the ED is the "front door" to the hospital. According to Press Ganey, satisfaction with ED care is at an all-time low. A review of the literature revealed 5 major elements of the ED experience that correlate with patient satisfaction: timeliness of care, empathy, technical competence, information dispensation, and pain management. The literature supporting these 5 elements is summarized and applications to the ED setting are suggested. Other minor correlates with patient satisfaction are also presented.

(2008). Proximity Computer Workstations Deliver Increased Efficiency. *Computer Workstations*. **21**: 1.

The article reports on the impact of the installation of 400 Proximity Systems Computer WorkStations on the operation of Centerpoint Medical Center in Independence, Missouri. After the installation of the computer workstations, Centerpoint offers efficient services towards patients. Moreover, they are designed by Hospital Corp. of America (HCA) to satisfy the needs of hospital's nurses, physicians, information technology staff, and designers. Shannan Pfeiffer, director of information technology and services at Centerpoint, explains that they decided to place computers in each patient room to improve efficiency on their medical services.

(2007). "EDs boost performance with Web-based data system." *ED Manag* **19**(2): 20-21.

Accessing current data on your department's performance can guide you toward better decisions in terms of staffing, flow strategies, and compliance with Medicare and accreditation requirements. The most important decision is deciding how much information you should capture. Being able to track the different steps within a process is critical to improving the time it takes to complete that process. Sharing data with nursing staff may show them short-comings of which they were not previously aware.

(2007). "Hand-held ultrasound serving three EDs." *ED Manag* **19**(2): 18-20.

Having a portable ultrasound available to your ED will enable you to perform scans during the nighttime hours, instead of having patients wait for several hours until the radiology department opens. Additional time can be saved by having a technologist read the scans, which frees your ED physicians for other duties. Having ED docs contact the technologist directly, rather than going through a resident, also saves valuable time. Arriving at a diagnosis more quickly provides a boost to patient safety.

Lang, E., et al. (2006). "Impact of an electronic link between the emergency department and family physicians: a randomized controlled trial." *CMAJ* **174**(3): 313-318.

**BACKGROUND:** Electronic information exchange is believed to improve efficiency and reduce resource utilization. We developed a Web-based standardized communication system (SCS) that enables family physicians to receive detailed reports of their patients' care in the emergency department. We sought to determine the impact of the SCS on measures of resource utilization in the emergency department and family physician offices.

**METHODS:** We used an open 4-period crossover cluster-randomized controlled design. During 2 separate 10-week intervention phases, family physicians received detailed reports of their patients' emergency department visits over the Internet, and in the alternating control phases they received a 1-page copy of the emergency department notes by mail. The primary outcome was the number of repeat visits to the emergency department within 14 days of the initial visit. Secondary outcomes included duplication of test and specialty consultation requests by the emergency and family physician. Outcomes were measured using the hospital database and questionnaires sent to the family physicians.

**RESULTS:** A total of 2022 patient visits to the emergency department from 23 practices were used in the study. Use of the SCS failed to reduce the number of repeat visits to the emergency department within 14 days (odds ratio [OR] 1.10, 95% confidence interval [CI] 0.8-1.51) and 28 days (OR 1.01, 95% CI 0.8-1.27). There was no significant duplication of requests for diagnostic tests between the emergency and family physician during the intervention and control phases (24 v. 22,  $p = 0.93$ ), but there was significantly greater duplication in specialty consultation requests in the intervention phase than in the control phase (20 v. 8,  $p = 0.049$ ).

**INTERPRETATION:** An electronic link between emergency and family physicians did not result in a significant reduction in resource utilization at either service point. Investments in improved electronic information exchange between emergency departments and family physician offices may not be substantiated by a reduction in resource utilization.

Group, T. C. (2007). Patient Throughput: A Critical Strategy for Success.

McFetridge B, G. M., Goode D, Melby V. (2007). "An exploration of the handover process of critically ill patients between nursing staff from the emergency department and the intensive care unit." *Nursing In Critical Care* **12**(6): 261-269.

The transfer of information between nurses from emergency departments (EDs) and critical care units is essential to achieve a continuity of effective, individualized and safe patient care. There has been much written in the nursing literature pertaining to the function and process of patient handover in general nursing practice; however, no studies were found pertaining to this handover process between nurses in the ED environment and those in the critical care environment. The aim was to explore the process of patient handover between ED and intensive care unit (ICU) nurses when transferring a patient from ED to the ICU. This study used a multi-method design that combined documentation review, semi-structured individual interviews and focus group interviews. A multi-method approach combining individual interviews, focus group interviews and documentation review was used in this study. The respondents were selected from the ED and ICU of two acute hospitals within Northern Ireland. A total of 12 respondents were selected for individual interviews, three nurses from ED and ICU, respectively, from each acute hospital. Two focus groups interviews were carried out, each consisting of four ED and four ICU nurses, respectively. Qualitative analysis of the data revealed that there was no structured and consistent approach to how handovers actually occurred. Nurses from both ED and ICU lacked clarity as to when the actual handover process began. Nurses from both settings recognized the importance of the information given and received during handover and deemed it to have an important role in influencing quality and continuity of care. Nurses from both departments would benefit from a structured framework or aide memoir to guide the handover process. Collaborative work between the nursing teams in both departments would further enhance understanding of each other's' roles and expectations.

Shiver, J. M. (2007). "ED performance improvement: process changes hospitals can make now." *Healthc Financ Manage* **61**(12): 70-73.

ED overcapacity is becoming increasingly common, and physical plant expansion to add capacity is not the only solution. By undertaking a few process changes, healthcare organizations can improve ED performance. Benefits include improved care, reduced costs, and increased patient satisfaction.

Vega, V. and S. J. McGuire (2007). "Speeding up the emergency department: the RADIT emergency program at St. Joseph Hospital of Orange." *Hospital Topics*, **85**(4): 17-24.

St. Joseph Hospital of Orange implemented a new emergency department (ED) program, the Rapid Assessment and Discharge in Triage (RADIT) program, designed to reduce patient waiting time and improve overall patient satisfaction. ED visitors presenting non-urgent problems were served by a roving RADIT team. The hospital established a goal of 90 min average time in RADIT and sought to reduce overall time in ED. After 6 months, results indicated that RADIT patients were discharged on average in 97 min; however, there was a slight increase in average time in ED. A patient satisfaction survey indicated that about 96% of RADIT patients rated the quality of service received as either good or excellent. The authors provide the background and context that resulted in the decision to implement RADIT.

Robinson, K. S., et al. (2005). "Nursing workforce issues and trends affecting emergency departments." Nurs Manage **36**(9): 46-53.

Explore current nursing workforce issues--staffing issues, nurse-to-patient ratios, current emergency department benchmarking data, and operational factors--that affect the quality of care and safety in emergency departments. Learn several recommended strategies to improve care for patients and increase the recruitment and retention of qualified nurses and personnel in emergency care settings.

Williams, R. M. (2005). "The costs of visits to emergency departments--revisited." Annals of Emergency Medicine, **46**(5): 471-472; Author reply 472-473.

Graber, T. W. (2004). "Structure and function of the emergency department: matching emergency department choices to the emergency department mission." Emerg Med Clin North Am **22**(1): 47-72.

Emergency caregivers experience considerable new challenges to the provision of competent, compassionate care. The good news is there are ample new approaches and new technologies to meet those new challenges. ED leaders who understand the ED mission and the resources available today and who engage vigorously in the change process will turn that mission into immensely beneficial action.

Haugh, R. (2004). "A true picture of what ails your emergency department." Hosp Health Netw **78**(6): 66-70, 62.

Relying on shaky assumptions about the causes of overcrowding in your ED can lead to expensive and ineffective solutions, say proponents of simulation modeling. Sophisticated simulation gives users a realistic view of what's happening in the ED and other departments to pinpoint problems and indicate where real improvements can be made.

Sedlak, S. K. and A. Roberts (2004). "Implementation of best practices to reduce overall emergency department length of stay." Adv Emerg Nurs J **26**(4): 312-321.

Overcrowding in emergency departments (EDs) has become a problem for the majority of US hospitals. The potential consequences include diversion of ambulances, prolonged waits, dissatisfied clients, potential for poor outcomes, and unnecessary costs. Our facility contracted with the Healthcare Advisory Board to identify improvement processes to overcome many of the hurdles associated with ED overcrowding. Using a multidisciplinary approach, we identified specific areas for change: bedside registration, hardwired checkout, dedicated radiology transport technician, centralized bed control, and ED physician admit authority. Results demonstrate a reduction in overall ED length of stay, improvement in patient satisfaction, and increased revenue.

Tregunno, D., et al. (2004). "Competing values of emergency department performance: balancing multiple stakeholder perspectives." Health Serv Res **39**(4 Pt 1): 771-791.

OBJECTIVE: To describe the performance interests of multiple stakeholders associated with the management and delivery of emergency department (ED) care, and to develop a performance framework and set of indicators that reflect these interests.

STUDY SETTING: Stakeholders (1,100 physicians, nurses, managers, home care providers, and prehospital care personnel) with responsibility for ED patients in hospitals in the Canadian province of Ontario.

STUDY DESIGN: Sixty-two percent of stakeholders responded to a mail survey regarding the importance of 104 potential ED performance indicators. Descriptive and inferential statistics are used to explore the interests of each stakeholder group and to compare interests across the five groups.

PRINCIPAL FINDINGS: Emergency department stakeholders are primarily interested in indicators that focus on their role and capacity to provide care. Key differences exist between hospital and nonhospital

stakeholders. Physicians mean ratings of the importance on ED performance measures were lower than mean ratings in the other stakeholder groups.

CONCLUSIONS: Emergency department performance interests are not homogeneous across stakeholder groups, and evaluating performance from the perspective of any one stakeholder group will result in unbalanced assessments. Community-based stakeholders, a group frequently excluded from commenting on ED performance, provide important insights into ED performance related to the external environment and the broader continuum of care.

Zilm, F. (2004). "Estimating Emergency Service Treatment Bed Needs." *The Journal of Ambulatory Care Management* **27**(3): 215-223.

Estimating the required number of emergency service treatment beds must be sensitive to utilization patterns and strategic operational assumptions. This article describes key issues and illustrates techniques for the analysis of arrival and service times. Seasonal arrival patterns, time of day of arrivals, and common statistical distributions for length of stay are discussed. Alternative modeling approaches to estimate future bed needs are described, including visits/year per treatment space, simple queuing modeling, and detailed computer simulation. Sample estimates of treatment rooms needs are provided for typical arrival rates and lengths of stay. A generalized regression model based on the simulation trials is suggested for cases that fall outside of the illustrated simulation case studies.

Forrester, N. E. (2003). "Accelerating patient-care improvement in the ED." *Healthc Financ Manage* **57**(8): 38-43.

Quality improvement is always in the best interest of healthcare providers. One hospital examined the patient-care delivery process used in its emergency department to determine ways to improve patient satisfaction while increasing the effectiveness and efficiency of healthcare delivery. The hospital used activity-based costing (ABC) plus additional data related to rework, information opportunity costs, and other effectiveness measures to create a process map that helped it accelerate diagnosis and improve redesign of the care process.

McMahon, M. and L. Fisher (2003). "Achieve emergency department restraint reduction." *Dimensions of Critical Care Nursing*, **22**(5): 227-229.

Reduce restraint episodes without compromising safety by implementing process-oriented, behaviorally based practice tools. Learn how one trauma center minimized restraint use with intensive process management.

Zilm, F., et al. (2003). "Virtual Ambulatory Care: Computer Simulation Applications." *The Journal of Ambulatory Care Management* **26**(1): 7-21.

Summary: Computer simulation modeling has evolved during the past twenty years into an effective tool for analyzing and planning ambulatory care facilities. This article explains the use of this tool in three case-study, ambulatory care settings—a GI lab, holding beds for a cardiac catheterization laboratory, and in emergency services. These examples also illustrate the use of three software packages currently available: MedModel®, Simul8®, and WITNESS®.

Goldmann, D. and R. Kaushal (2002). "Time to tackle the tough issues in patient safety." *Pediatrics* **110**(4): 823-826.

Kushel, M. B., et al. (2002). "Emergency department use among the homeless and marginally housed: results from a community-based study." *American Journal of Public Health* **92**(5): 778-784.

OBJECTIVES: This study examined factors associated with emergency department use among homeless and marginally housed persons.

METHODS: Interviews were conducted with 2578 homeless and marginally housed persons, and factors associated with different patterns of emergency department use were assessed in multivariate models. RESULTS: Findings showed that 40.4% of respondents had 1 or more emergency department encounters in the previous year; 7.9% exhibited high rates of use (more than 3 visits) and accounted for 54.5% of all visits. Factors associated with high use rates included less stable housing, victimization, arrests, physical and mental illness, and substance abuse. Predisposing and need factors appeared to drive emergency department use.

CONCLUSIONS: Efforts to reduce emergency department use among the homeless should be targeted toward addressing underlying risk factors among those exhibiting high rates of use.

Wears, R. L. and S. J. Perry (2002). "Human factors and ergonomics in the emergency department." Annals of Emergency Medicine, **40**(2): 206-212.

Although health care rapidly adopts technologic advances from other fields, it has been slow to incorporate well-established principles from human factors engineering into the health care workplace. This article demonstrates some of those principles by analyzing an all too routine clinical event from a human factors point of view. Review of this case and ergonomic principles leads us to conclude that the routine application of human factors engineering principles could improve patient safety and would likely improve system efficiency as well.

Watson, W. T., et al. (1999). "Elderly patients' perceptions of care in the emergency department." Journal of Emergency Nursing **25**(2): 88-92.

**OBJECTIVE:** Patients' perceptions and satisfaction are areas of growing concern in health care research, but little has been reported from the perspective of elderly persons. The purpose of this study was to describe elderly patients' perceptions of care in the emergency department.

**METHODS:** A qualitative, descriptive study design was used. Twelve elderly people were interviewed following a treatment episode in 1 of 3 emergency departments in the western United States and data were submitted to content analysis according to qualitative, interpretive methodology.

**FINDINGS:** The following 5 themes emerged from the analysis: "needs for information," "observations of waiting time," "perceptions of professional competency and caring service," "concerns about process and facility design," and "personal tolerance."

**DISCUSSION:** Findings support some aspects of existing literature and offer additional information regarding care of elderly persons in the emergency department. Results also support the need for more research in the area of the actual experience of elderly patients in the emergency department.

Zilm, F. (1999). "Urgent Care and the Emergency Department: Providing the Right Ambulatory Care Settings." The Journal of Ambulatory Care Management **22**(1): 1-7.

Emergency services are asked to treat a significant volume of patients that require non-emergent care. Alternative strategies have been proposed for managing this patient population, ranging from free-standing urgent care centers to the integration of urgent care patients with other patients treated in the ED. This article explores issues and physical options surrounding the provision of patient care of urgent care patients in the emergency services.

Williams, R. M. (1996). "The costs of visits to emergency departments." New England Journal of Medicine, **334**(10): 642-646.

**BACKGROUND:** Many visits to emergency departments are for minor medical problems, and these visits are criticized as being expensive and economically inefficient. This study examines the marginal costs (the extra costs for an additional visit) of emergency department visits.

**METHODS:** Monthly data on the costs of hospital and physicians' services from 1991 through 1993 were obtained from a sample of six community hospitals in Michigan. The data were analyzed with ordinary least-squares regression techniques to determine the ratio of marginal to average costs. Average and marginal costs were then determined for 24,010 visits during 12 randomly selected weeks in 1993. A visit by an individual patient was the unit analysis, and visits were classified as non-urgent, semi-urgent, or urgent according to explicit criteria. Costs and charges were determined for all visits and were classified according to the degree of urgency.

**RESULTS:** For all emergency department visits, the average charge was \$383, the average cost was \$209, and the marginal cost was \$88 (42 percent of the average cost). Thirty-two percent of the visits were classified as non-urgent, 26 percent as semi-urgent, and 42 percent as urgent. For non-urgent visits, the average charge was \$124, the average cost was \$62, and the marginal cost was only \$24. For semi-urgent visits, the average charge was \$312, the average cost was \$159, and the marginal cost was \$67. For urgent visits, the average charge was \$621, the average cost was \$351, and the marginal cost was \$148.

**CONCLUSIONS:** The true costs of non-urgent care in the emergency department are relatively low. The potential savings from a diversion of non-urgent visits to private physicians' offices may therefore be much less than is widely believed.

Pane, G. A., et al. (1991). "Health care access problems of medically indigent emergency department walk-in patients." Annals of Emergency Medicine, **20**(7): 730-733.



**OBJECTIVES:** To obtain health care access data on emergency department walk-in patients and to determine factors associated with delayed access to care.

**DESIGN:** Survey of stable ED walk-in patients in the triage area.

**SETTING:** University of California Irvine Medical Center, an urban, 493-bed, non-county, Level I teaching hospital treating 38,000 emergency patients annually.

**PARTICIPANTS:** A quota of 1,000 consecutive patients derived from a representative selection of service days was included; 94% of eligible patients agreed to participate. Patients with obstetrical problems (more than 20 weeks' gestation) were excluded.

**INTERVENTIONS:** Pretested health access survey, available in both Spanish and English, administered by investigator.

**RESULTS:** Public aid/self-pay insurance status was significantly associated with routine use of the ED for care (P less than .003), income of less than \$10,000 (P less than .0002), refusal of care by health provider (P less than .001), refusal of care at an ED (P less than .03), and delay in seeking health care (P less than .0002). Income of less than \$10,000 was significantly associated with routine use of the ED for care (P less than .02), and delay in seeking health care (P less than .04). Statistical analysis done using chi 2 with continuity correction and with the binomial test for comparison of two proportions.

**CONCLUSION:** Among stable ED walk-in patients surveyed at our facility, low-income individuals and those with public aid/self-pay insurance status were significantly more likely to use the ED as a routine source of health care, and more likely to delay in seeking needed health care, than higher income and fully insured individuals. These data should be useful to health policymakers in formulating rational, cost-effective strategies that improve access to early treatment and prevention.