The cover of this month's issue features a painting that is proudly displayed in the Florida College of Emergency Physicians' (FCEP) office in Orlando, Florida. It is a reproduction of a painting by acclaimed Central Florida artist Wayne Hovis. The original piece was commissioned by FCEP in 1991 to celebrate their 20th anniversary. The artist worked with FCEP to ensure that the painting portrayed the energy and drama of an emergency department.

The original painting, which features an emergency nurse at the head of the incoming stretcher and other emergency nurses in the nurses’ station, was purchased by Dr. Cliff Findeiss, MD, through an auction at FCEP’s 20th Anniversary Dinner Dance. In addition to the original painting, FCEP produced a limited-edition run of 200 signed and numbered prints of “On Duty.” FCEP continues to offer these prints for purchase at $50.00 per print (plus $5.00 shipping). (Contact Jake Bebber at (407) 281-7396, ext 20, or JBebber@fcep.org.) The income derived from the sale of “On Duty” prints is used to support FCEP’s projects. Cover art suggested by Pamela Bromley, BSN, RN, PM

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Four powerful hurricanes slammed into Florida, one after the other, all in a period of just six weeks in the fall of 2004. While wind, flooding, tornadoes, lightning, and storm surges battered cities and towns, nurses across the state steadfastly cared for the weary, sick, and injured. Interviews with six nurses reveal the commitment and camaraderie of nurses across the state, even in the face of significant personal losses.

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A joint task force of members from the American College of Emergency Physicians (ACEP) and the Emergency Nurses Association (ENA), appointed in 2003, critically analyzed the literature and made recommendations regarding use of five-level triage systems in the United States (US). This paper summarizes task force recommendations and supports the adoption of a reliable, valid five-level triage scale.

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Patricia Moreland, MSN, CPNP, CEN

A review of the research, opinions, and consensus on the issue of family presence during invasive procedures and resuscitation displays relevant studies in an easily referenced table for those considering the practice in the emergency department. The authors call for research that evaluates the long-term effect of family presence on families and health care providers, encourages multidisciplinary teams to develop written guidelines, and notes the need for nursing organizations to adopt position papers on the issue, as the Emergency Nurses Association has.

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Colleen K. Norton, DNSc, RN, CCRN, and Karen Kesten, MSN, RN, CCRN
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Emergency Nursing: Then and Now

As we begin the 35th anniversary year of ENA, it seems appropriate to remember where we have been and consider where we have yet to go. Our co-founders’ successful establishment of the ENA is a tribute to what emergency nurses can do. It is their spirit that has allowed each of us to have the privilege of being part of the recognized specialty of emergency nursing today.

Over the past 35 years, much has changed, but much has stayed the same. The initial issue of JEN (Jan/Feb, 1975) showcased issues that are very similar to the challenges we face today. Articles such as “Nurse-Scribe System Saves Time in the ED” and “The Alcoholic and the Emergency Department” reflect the exact same clinical issues we deal with today. In today’s world, however, the issues have become more complex and sophisticated. Emergency departments across the country are looking at ways to be more efficient and improve patient flow. Rather than nurse scribes, a role that would not reflect the professional autonomy of today’s emergency nurse, we use technologic advances such as hand-held personal computers, computerized charting systems, and bedside computers. We think “out of the box” and look to redesign patterns of patient flow and patient care. Patients with substance abuse issues continue to be seen in our emergency departments in ever greater numbers, and still pose unique clinical challenges. But today, we know so much more. We are much more careful about restraining patients and, in keeping with a greater appreciation for prevention and the larger picture, emergency nurses are just beginning to screen all patients regarding their use of alcohol. These are just two examples of how similar the issues are, but how much more complicated our practice is, 35 years later.

The preface in the very first issue of this Journal (Jan/Feb 1975) notes that “This journal is published by and for persons dedicated to the pursuit of excellence in the field of emergency nursing...” This statement reflects the reason many of us belong to ENA today. It is part of our heritage to want to learn more, to benefit from the practice experiences of others, and, in general, to provide better care for emergency patients. Anita Dorr’s crash cart is one of a thousand testaments to what emergency nurses do to improve patient care, and, ultimately, patient safety.

Emergency nursing is a passion; it is part of who we are, what we do, and how we interact with others. Our success is the result of our ability to work together to move emergency nursing forward, to be recognized as such a strong specialty. We have accomplished much, yet there is always more to be done.

I would like to thank each of you for your commitment to emergency nursing as we celebrate what others have done to bring us to where we are today. If it was our co-founders’ spirit that allowed us the privilege of being part of a recognized specialty, it is now your spirit that will bring emergency nursing to a new level. I look forward to working with emergency nurses across the country and around the world in our 35th year. I am indeed in good company!
ENA Celebrates
35th Anniversary, 25,500 Members Strong

Members of our national board of directors come from across the country to meet six times a year to represent emergency nurses on a national and international level. Two national meetings are held each year—ENA’s annual meeting is held in the fall (Nashville this year, September 14-17) when 2500 nurses and 1800 exhibitors and others come together. The Leadership Challenge meeting (Ft Lauderdale, March 10-13) gathers 1500 attendees, 1000 of them nursing leaders. There are also many other ENA state or regional sponsored educational conferences (see “Coming Meetings” in each issue of JEN).

Now a mature, sophisticated organization, ENA is a respected member of the community of organized nursing. We have liaisons with countless other professional and lay organizations. Our public relations firm, Fleishman-Hillard, helps ENA to give a greater public voice to emergency nurses and press releases heralding emergency nurses’ accomplishments and their positions now go out to hundreds of publications.

With full on-line access and the availability to search back issues, our Journals have extended the reach of the Association’s education around the world. During 2004 alone, JEN received 264,277 separate “hits” to www.JENonline.org, and during the first 10 months of 2004, 25,381 full-text articles were downloaded from Elsevier’s Science Direct service.

These are difficult times. Staff nurses and ED nurse managers are staggering under relentlessly heavier burdens, but our 35th anniversary is a cause for celebration and a reminder that ENA can help in ways that not everyone is aware of. Newer, less experienced nurses coming to work in the ED? ENA has an Orientation Program and offers many courses, including Trauma (TNCC) and Pediatric Emergencies (ENPC). Newer, less experienced nurses assuming the
position of ED nurse manager? ENA offers an ED Nurse Manager’s Course. At Chapter and State ENA meetings, ED nurse managers can “connect,” network, and share what the latest JCAHO visit was like or how a new computerized tracking system or a new policy to reduce the use of restraints is working. More stresses being put on ED nurse managers? ENA has a listserv for nurse managers, and each issue of this Journal is packed with strategies for nurse managers to deal with everything from overcrowding to EMTALA to HIPPA. Emergency nurses’ knowledge and expertise not being acknowledged? Becoming a certified emergency nurse tells everyone that an individual emergency nurse has acquired a body of specialty nursing knowledge.

Please join in the celebration. If you don’t belong, join! If you do belong, consider giving the gift of ENA membership, perhaps as a birthday or Christmas gift from a group of ED colleagues, or encourage your institution to do so. (Hats off to Abington Memorial Hospital in Abington, Pa. For the last 2 years, it has paid for ENA memberships for all 125 members of its emergency trauma center nursing staff!)

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ENA is involved in a dizzying number of initiatives and services, all to accomplish its broad mission—excellence of emergency nursing practice. The Association helps emergency nurses to respond to what *is*, but at its best, ENA also helps to envision and create the future of emergency nurses—what *could* be. With fond remembrance of its founders and early supporters and patrons, all those who labored tirelessly to create ENA in the very beginning, best wishes to ENA and its community of emergency nurses on the occasion of this 35th anniversary!
head high, knowing that she did the correct thing. Thank you for selecting this excellent paper for publication!—Robert G. Flade, RN, BS, Director, Emergency Department, New Britain General Hospital, New Britain, CT, and Vice-President, CT Emergency Nurses Association; RGFlade@nbgh.org.

REFERENCE

More on Magnet status and the emergency department

Dear Editor:

As ED nurses who recently spearheaded the department’s efforts to help Clarian Health Partners gain Magnet status, your conversation with Maryfran Hughes at Massachusetts General in Boston was particularly interesting and timely.

At Clarian, we are still celebrating our October designation. Like Massachusetts General, the enthusiasm is contagious here in Indianapolis. It is remarkable what this designation has done, not just for ED nurses, but the entire hospital staff. Yes, we love the fact that we got to show off in a big way all that we do every day in the emergency department. And while the Magnet process was rigorous, it has resulted in so much collaboration and camaraderie. It has torn down the invisible walls that kept nurses from communicating department-to-department, and it has given all of us more reasons to communicate with each other.

Clarian’s emergency department probably is not so different from others around the country. We felt like the stepchild, the burden for other nurses throughout the system. It always seemed like we were the ones dumping patients on other units, causing surgery delays because of incoming emergency cases. People only knew us as nurses from the emergency department. Now they know us as people, and they better understand the challenges we face and the important role the emergency department plays for the entire hospital system.

Going through the Magnet process helped all of us appreciate the jobs that others do throughout the hospital and the Clarian system. Most nurses will tell you that, at first, we thought, “This is just one more thing we are going to have to do.” But by the end of the process, people were eager to get involved, to participate in some of the fun games to keep everyone motivated, and to nominate colleagues who were “caught” in a Magnet moment. We began posting notes about nurses who went the extra mile to help patients. These “Magnet moments” were plastered around the department, a truly inspiring way to showcase the ways in which our nurses do remarkable deeds every single day.

Because this was a hospital- and system-wide effort, the ED nurses no longer felt isolated from the rest of our hospital or Clarian. In October, when we finally received the designation call from the ANCC, we all celebrated together: the nurses from OR, ED, ICU and all the other departments from across Clarian. It truly was an empowering moment for all of us. We had a great staff before the designation; now we have a re-energized staff.

At Clarian, we have all the same problems that other hospitals have. The difference in a Magnet facility is that the RNs are empowered to identify and, through collaboration, to help solve the difficult issues that affect patient flow and bedside care. Is everything perfect at our three hospitals? No, but as respectful professionals, we are actively looking at and solving our issues on a daily basis. Magnet is a journey, not a destination.

Thanks for your article and for spreading the word about the power of Magnet.—Shannon Vassar, RN, BSN, Charge Nurse, Emergency Department, Clarian Health Partners, svassar@clarian.org; and Kathy Hendershot RN, MSN, CS, Director, Clinical Operations, Emergency Medicine and Trauma Center, Clarian Health Partners, khendershot@clarian.org

Support for testing of elderly drivers

Dear Editor:

I read with interest the October 2004 Policy Perspectives column, “Motor Vehicle Crashes Among the Elderly: Advocates Cite the need for Mandatory Retesting of Elderly Drivers,”1 and I would like to voice my support for mandatory testing for elderly drivers.

By definition, I am one. I hope I recognize when I am no longer safe to operate a vehicle; however I know that many people do not.
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Thanks for your article and for spreading the word about the power of Magnet.—Shannon Vassar, RN, BSN, Charge Nurse, Emergency Department, Clarian Health Partners, svassar@clarian.org; and Kathy Hendershot RN, MSN, CS, Director, Clinical Operations, Emergency Medicine and Trauma Center, Clarian Health Partners, khendershot@clarian.org doi: 10.1016/j.jen.2004.11.012

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By definition, I am one. I hope I recognize when I am no longer safe to operate a vehicle; however I know that many people do not.
I live in a “snowbird” area and see examples of folks driving who should never be allowed on the road. Ironically, it is sometimes the case that they are not in crashes themselves, but rather, cause them. An example is the driver who suddenly stops at a green light. As other cars brake or swerve, they crash into a tree or another vehicle, while the elderly driver remains unaware of the problem. I have seen hearing impaired folks driving with their radios on, windows up, air conditioning at full blast—they do not even notice emergency vehicles behind them. They may turn right out of left lanes and vice versa. And sometimes they drive 25 mph in the fast lane, in areas that are posted with 50 mph speed limits.

Testing for elderly drivers seems reasonable, certainly by age 80. Allowances should be made for those who do not drive at night. There was a time when “daylight” licenses were given in some states. That may be a viable option for some older drivers.

Chronological age may have little to do with ability, but it is a good place to start for testing—we test “youngsters”; we can test “oldsters,” too.—Kate Reeves, RN, MA, CHPN, Mountain Center, Calif; E-mail: kate.mill_rch@royal-carriso.com

REFERENCE

doi: 10.1016/j.jen.2004.10.023
Available online 24 November 2004.
Clinical and Injury Prevention
Poster Summaries From the ENA 2004 Annual Meeting

The following Clinical and Injury Prevention Poster Summaries were presented at the 2004 ENA Annual Meeting, October 1-3, in San Diego, Calif. Contact information is provided to facilitate communication with the researchers. Research Paper and Poster Summaries appeared in the October 2004 issue of the Journal.

1. ACLS: Enhanced Learning Method. Elinor R. Stalker, RN, Melinda S. Day, RN, BSN, CCRN, Cheshire Medical Center, 580 Court St, Keene, NH 03431

Clinical Topic: Advanced Cardiac Life Support (ACLS) is a standardized course for teaching advanced cardiac life support and can be an intimidating, stressful learning experience. It is important to our facility to make the experience as stress free and enjoyable as possible to increase participation in ACLS and to improve recall in a clinical situation. The intent of this project was to develop and implement a new learning method to enhance the learning experience at the tachycardia arrhythmia station of ACLS.

Implementation: First, the Jeopardy! game format was used to develop a game for the tachycardia arrhythmia station. Four main categories were devised: scenarios, rhythms, medications, and cardioversion. Category specific questions covered all steps of the tachycardia algorithms, rhythm identification, medication usage, and doses and steps in cardioversion. Poker chips for scoring purposes were used to determine prizes won. Each class of participants is divided into 2 teams. During the game, a compact disc played Jeopardy! music and several songs with the word “heart” in the lyrics. At the end of the ACLS class, each teaching station was evaluated by every participant. One or both members of the team have taught the tachycardia arrhythmia station using this method 9 times and have had positive feedback each time.

Outcomes: The Tachy Game has had an excellent response. Participants have been very positive and have found this method of learning less stressful and more enjoyable, and the retention rate of the material given has improved. The success of this format has more than exceeded our highest expectations in enhancing an individual’s learning experience as evidenced by an overwhelming number of positive comments and evaluations by the participants.

Recommendations: After achieving success with the use of the ACLS Tachy Game, the team makes the following recommendations: (1) include the use of this game during each class; (2) if the game is not used in each class, evaluate retention rates between those that have and have not been exposed to the Tachy Game; (3) develop several scenarios to
keep the participants interested and challenged by the game; (4) continue trying new teaching methods at each station; (5) develop a pretest, posttest, and 6-month posttest to evaluate teaching effectiveness and retention of the tachycardia material; and (6) monitor the effect of this teaching method by continuous review of evaluations from each participant.


2. An ED-based Program for the Management of Patients With Acute Decompensated Congestive Heart Failure. Jay Hamm, RN, BSN, MHA, Margaret Crowley, RN, Jan Carroll, RN, Anne Ripley, RN, University of Virginia Health System, Box 801458, Charlottesville, VA 22908

Clinical Topic: With 500,000 newly diagnosed cases annually, the explosion of congestive heart failure (CHF) is a national epidemic representing a common reason for ED encounters and the most frequent reason for hospitalization of Medicare patients, with cost of $40 billion annually. Suboptimal medical treatment, inadequate social needs assessments, and lack of patient education may contribute to increased mortality and complications along with increased hospital costs. Because these factors were prevalent in this emergency department, a clinical process improvement program was designed to improve the care of our patients with CHF.

Implementation: A multidisciplinary group of nurses, physicians, and quality improvement specialists developed guidelines for the management of acute decompensated CHF in the emergency department. A clinical program was then established employing guidelines for directed patient education and social needs screening efforts. The setting was a suburban, university hospital emergency department with a Chest Pain Evaluation Unit (CPEU). The emergency department and the CPEU have an annual volume of 60,000 and 4,000 patients per year, respectively. All adult patients at high risk for acute decompensated CHF based on history, physical examination, and the results of diagnostic tests, including chest x-ray and B-type natriuretic peptide, were eligible for inclusion. Guidelines outlining the management of CHF were enacted on January 1, 2003. Nursing and physician staffs were trained through educational sessions. Order sets, including medication and diagnostic testing guidelines, were utilized. CPEU staff performed chart audits for compliance.

Outcomes: During the study period, 246 patients were treated using the ED-CHF guidelines. As overall nursing and physician adherence with the clinical guideline increased to 95% during implementation, total hospital cost per patient decreased 10% ($6582 before vs $5917 after) without significant increase in combined mortality and complications (6.9% before vs 5.3% after). Physician charges were not analyzed. Increased nursing adherence with patient education and social needs assessment improved from 30% to 85% as measured through direct audits of 100% of these patients’ records. Interpretation of patient outcome data was limited due to low volume and shifts between patient classification groups (ie, OBS, INPT, OUTPT-ED Visit). Informal staff feedback indicated greater staff satisfaction with the more consistent approach with the management of heart failure patients in the CPEU.

Recommendations: Successfully implementing guidelines for the comprehensive assessment and treatment of patients with acutely decompensated CHF is achievable in the ED setting. The implementation of standardized guidelines can improve patient education and decrease variability in medical management and nursing care associated with treating these patients, thus resulting in reduced and decreased complications.


3. An ED Track Within the Critical Care Internship. Edith J. Gray, RN, MSN, CEN, PHRN, Diana Haines, RN, MSN, CEN, Charlotte Buckenmyer, RN, MA, CRNI, Cheryl Celia, RN, BSN, Laura Scheetz, RN, BSN, Veronica A. Garstka Wilhelm, RN, CCRN, CEN, Brian Joho, RN, BA, David Tarr, RN, Thomas C. Wagner, RN, Jason Hughes, RN, BSN, Lehigh Valley Hospital & Health Network, Suite 601, PO Box 7017, 17th & Chew Streets, Allentown, PA 18105-7017

Clinical Topic: Shortages for nurses continue to challenge emergency departments across the nation; creative options need to be implemented to ensure that staffing needs are met. The ED leadership developed a flexible ED track for graduate nurses (GNs) that was designed to meet the needs of all 3 of its unique emergency departments. One site included a suburban regional level 1 trauma center, burn center, cardiovascular center, and neuroscience center. The second site was an inner-city multicultural emergency department. The third site was a suburban community hospital with a large behavioral health population.

Implementation: To ensure a successful program, the ED leadership created an interdisciplinary planning team. The goal of the team was to develop a GN internship that would meet the needs of GNs assigned to any one of the network’s 3 emergency departments. The first step was to develop the structure and foundation of a specialized ED track within the Graduate Nurse Critical Care Internship. Once established, progress continued by developing a specific clinical rotation. Design of an education process for the ED staff preceptors and ED team members was also necessary. Finally, the planning team established specific evaluation criteria for the program.

Outcomes: By developing a flexible and extensive graduate nurse internship, the emergency department was able to successfully retain GNs. Rotation of each participant to each unique site exposed him or her to clinical opportunities with different patient populations. The participant selected shift and hour preferences. The effects of the specialized ED track were positive for the interns and all 3 emergency departments. There was increased interest, involvement, and participation by the ED staff. The interns benefited from the specialized ED learning experience through both didactic and clinical processes. Retention of graduate nurses and seasoned staff has been enhanced due to the team building within the emergency departments. Since implementation, 39 participants have completed the ED track; 33 remain in the emergency department. The June 2004 track has 13 participants. The
increased participants reduced the ED nursing staff vacancy rate. A preceptor survey is in process.

**Recommendations:** This unique program could be implemented in rural, suburban, and inner-city emergency departments. Future goals should address development of a research evaluation tool to measure annual competency and compliance on specific performance expectations. Identifying the success and cost-effectiveness of a senior student nurse ED practicum and progression through the ED track also must be investigated.


4. A New-graduate Assimilation and Orientation Program Geared for Success. Deborah A. Keim, RN, BSN, CEN, Tim Scholten, RN, BSN, Spectrum Health Butterworth Campus, 100 Michigan NE, Grand Rapids, MI 49503

**Clinical Topic:** This level I pediatric emergency department in western Michigan (treating 95,000 patients per year) was experiencing turnover rates in excess of 50% over a 3-year period during which there was an average of 13 consistently open full-time positions (full staffing = 88 registered nurses [RNs]). Additionally, there was less than 10% involvement of all staff in a shared leadership council, along with low attendance at staff meetings and nonmandatory inservices held outside of work hours. The pool of available candidates for nursing positions consisted mainly of new graduates, who often have difficulty becoming comfortable and competent in the rapidly changing ED environment. This project sought to establish a new-graduate program that fosters a fertile learning environment so that new-graduate nurses will be fully prepared to manage the business and stress of the emergency department.

**Implementation:** ED core classes (including didactic, shadow, and preceptor) were developed to elevate the level of competence of the new staff. Working with the human resources department, 16 recently graduated nurses were hired over a 9-month period. Socialization was identified as an important component of this program and included such aspects as physical environment adaptation, acclimation to patient flow, and cognizance of individual staff members and the tasks they perform. A New Employee Support Team (NEST) and a mentorship program were developed and implemented as well. NEST is a monthly meeting, attended during the first year of employment, where the novice has the opportunity to interact with the leadership team informally. The former ED staff educator was hired as the off-shift clinical manager to further assist in coordinating teaching, mentoring, and coaching of these new hires. It is estimated that the cost for this program is approximately $15,000 per staff member, including an initial purchase of books and other in-house materials.

**Outcomes:** Since the program’s inception, the turnover rate of new graduates was 6.2% over 18 months (one RN left to go to a day position in another department, remaining in the ED pool of unit-based resource nurses). The new graduates’ participation has been 80% on the shared leadership council, 85% in monthly staff meetings, and 70% in nonmandatory continuing education activities. In addition, an improvement in overall satisfaction surveys from 2 years previous was observed. Although a formal survey of preceptors was not done, verbal feedback was given freely. Prior to the formal program implementation, it was difficult to recruit preceptors for the new graduates that were hired. Since implementation, there has not been one refusal or reluctance to participate. An unexpected discovery was that this large group of new graduates became the “freshman class,” displaying a genuine sense of camaraderie. This bond contributed to the fertile growth of the ED environment.

**Recommendations:** Other emergency departments should consider establishing a formal new-graduate program that includes didactic, shadow, and clinical components. This program should be implemented with both a NEST and mentoring components. Addressing the personal and professional needs of this group of employees is essential to retention. Constructing meeting agendas to touch upon the specific needs of this group will aid in keeping them engaged and active. The development of an interviewing team is also recommended to ensure that new staff will complement the current group.


5. An Online Course in the Canadian Triage and Acuity Scale for ED Nurses. Lynda Atack, RN, PhD, Doris McLean, RN, BSN, Robert Luke, RN, PhD, Centennial College, PO Box 631 Station A, Scarborough, Ontario, Canada M1K5E9

**Clinical Topic:** A 6-week online course on the 5-level Canadian Triage and Acuity Scale (CTAS) was developed to meet a growing demand for more patient-centered triage. CTAS has emerged as a more accurate and reliable tool for rapid patient assessment, and many hospitals across Canada have moved to implement CTAS in their emergency departments. Funded by Health Canada, this research study evaluated the impact of the online course on emergency nurses’ triage skills.

**Implementation:** The design of the online course involved using a problem-based learning approach. Learning took place through interactions with text and graphics on the 5 CTAS levels, case studies, online discussion, and a workplace project. Nurses’ experiences and learning were measured through surveys, interviews, and chart audits.

**Outcomes:** To date, 375 nurses have completed the course. One hundred twenty-three nurses (33%) participated in the project. Following course completion, a chart audit was conducted and nurses’ triage scores were compared with those of an ED nurse expert. The inter-rater reliability between the nurses and the expert reviewer within one triage level was 99.7%, a very positive finding. Additionally, nurses made significant gains in their computer skills during the 6-week course. A number of online teaching and learning practices were identified that enhanced transfer of learning to others in the workplace. Nurses reported that the online course promoted flexible access to CTAS training across Canada and internationally. Employers noted that the course was a cost-effective means for providing CTAS training and a good return on investment.
Recommendations: Based on the outcomes of the project, developing quality online courses will enhance nurses’ access to continuing education. An introductory tutorial may be needed to prepare learners for the online learning environment. The online discussion area in the course helps promote learning and the development of a supportive community of practice. Also, consider including a workplace project to help nurses apply the learning to their practice, thereby facilitating the transfer of learning to other staff in the emergency department and providing a return on investment for the employer. Finally, build an online evaluation tool into the course and conduct responsive evaluation with each course cycle.


Clinical Topic: A lack of interpersonal communication and respect for fellow staff members prevented the staff from practicing a team approach to creating an ideal patient encounter. A need for positive reinforcement and public recognition existed. The purpose of the Beads for Deeds program is to foster positive public recognition for any ED staff member who provides exemplary service demonstrating the organization’s commitment to excellence.

Implementation: Communicating service excellence standards, expectations, and program goals were the first steps. Our organization’s “Values-In-Practice” standards of behavior were distributed to each ED colleague and asked to sign “commitment letters” agreeing to demonstrate these behaviors. Nominations for “bead recognition” would be submitted when an ED colleague had exceeded expectations in any of these standards. Then nurse manager reviewed the nomination ballots weekly. The reward structure consisted of 4 bead levels and corresponding prizes: blue, green, red, and pearl. Every nomination is rewarded with one blue bead. Five blue beads are required to receive a prize or to continue to the next level, green. Beads are turned in to receive gifts. The pattern continues to the pearl level. Inexpensive beads were individually threaded onto a holder and placed on the ID badge. Hospital administration provided financial support. All ED staff was included in this program. Prizes range from lunch and movie tickets (pearl).

Outcomes: There was significant improvement in staff morale and respect, interdisciplinary working relationships, and interpersonal relationships. Peers previously voicing a sense of under-appreciation were pleasantly surprised when recognized. The National Research Corporation Survey showed patient satisfaction scores improved significantly after program implementation, increasing from 69% to 90% and remaining greater than 87% for 4 consecutive months. Our emergency department ranked in the 90th percentile of our national peer hospital group and improved our ranking among the Catholic Health East Hospitals from 20th to 6th among 23 hospitals for patient satisfaction. We believe that improved staff morale led to better working relationships, thus improving teamwork, interpersonal communication, and positive individual behaviors. These changes seem to have influenced patients’ perception of care rendered. The program has since expanded to include other interdisciplinary colleagues. Colleague satisfaction survey scores (of high performance and importance ratings) on manager/co-worker relations were achieved after program implementation. Although comparison to preprogram data is ideal, this measurement tool was not available.

Recommendations: The Beads for Deeds program is an inexpensive yet meaningful program that improves staff morale, fosters respect among coworkers, and improves relationships with outside agencies and ancillary staff, thus fostering an environment of increased patient satisfaction and an organizational reputation towards service excellence.


7. Cascade Learning Model: Implementation of HEICS in a Small, Rural Hospital Setting. Mary Kate Ollis Skaggs, RN, MSN, CAN, Angela J. Hodge, RN, BSN, CEN, SANE, EMT-P, Southern Ohio Medical Center, 1805 27th St, Portsmouth, OH 45662

Clinical Topic: In 2003, the State of Ohio began an initiative to increase collaboration during a critical emergency incident (CID), that is, bioterrorism, by encouraging the use of the Hospital Emergency Incident Command System (HEICS). HEICS provides crisis management using roles with responsibilities. Hospitals are able to provide aid to each other during CID using a common management structure, defined responsibilities, clear reporting channels, and common language enhancing interagency communication. Most hospital personnel of rural, Southern Ohio hospitals had no exposure to command systems. This purpose of this clinical project was to educate 2000 employees within a 60-day period.

Implementation: A multidisciplinary Emergency Preparedness Team revised emergency plans to incorporate HEICS. Cascade learning, an educational tool to deploy information to a large number of individuals in a short period of time, involves a 3-phase process, where management: (1) attends an in-depth educational session about the topic and receive educational tools, (2) provides education to their departments using the most appropriate tools, and (3) returns accountability sheets to Staff Development. Cascade learning packets (consisting of teaching notes, PowerPoint presentations, accountability/attendance sheets, evaluations, color-coded badges, and an emergency response flip chart) were given to management who were then instructed to develop departmental action plans. The flip chart serves as a quick reference and is the responsibility of individual departments. The presentations used prerecorded audio-video clips of movies for interest and retention. The initial cascade learning was offered during an Administrative Staff meeting attended by 91 Management staff. Staff Development summarized evaluations and attendance, and then provided feedback about compliance.
Outcome: Previous educational efforts had 40% attendance in a 60-day period, compared with cascade learning of 100% attendance. Retention of HEICS cascade learning was demonstrated during a Federal Disaster Drill held 7 months later. The Disaster Plan with HEICS was initiated. Drill evaluations reflected a satisfaction with HEICS and the ability to use HEICS training in a simulated CID. Evaluation showed a satisfaction of 4.3 on a 1 to 5 scale (5 being the best) with the cascade learning process and 4.1 with HEICS training. 

Recommendations: Cascade learning has been used for other educational needs with continued success and learner satisfaction and is a useful tool for information to be deployed to large numbers of individuals in a short time. Department managers agreed that cascade learning was an excellent method tool for educating at the department level. In the event of a disaster emergency, the organization must be confident that employees know their roles and are prepared to respond accordingly.


8. Defibrillator Competency Testing. Mary Sokolowski, RN, BSN, Cleveland Clinic Foundation, 9500 Euclid Ave M13, Cleveland, OH, 44195

Clinical Topic: The Nursing Education Department and the CPR Committee anecdotally noted that nurses were unfamiliar with the technical aspects of the defibrillators on their unit. The intent of this project was to ensure nurses’ clinical competence in the operation of the defibrillators on their unit.

Implementation: A committee was formed to address both didactic and clinical education needs. A Web-based learning module to educate nurses and test their knowledge of the operation of the defibrillators was designed. In addition, competency education for all nurses (in the hospital) with a hands-on return demonstration was required. Nurses completed the Web-based learning at their convenience, which included an article on monophasic and biphasic defibrillators, criterion checklists, and an online test. Competency education was held twice a month over a 5-month period. Nurses were to come prepared to perform a return demonstration on their unit-specific defibrillators.

Outcomes: First, increased knowledge and comfort level operating the defibrillator was reported. Improved accountability for testing and proper operation of the equipment was achieved. Nurses also reported that their knowledge of the special features of each defibrillator and indications for use had improved. A small random sample of nurses will be evaluated on their knowledge of the operation of the defibrillator 6 months after competency assessment, in July 2004. These data will be available in the poster presentation.

Recommendations: Based on the outcomes of this project, annual competency testing for nurses on defibrillation is recommended. Trainers, checking off clinical skills, and online education will accomplish this. In addition, identifying the impact of education on the reduction of equipment-related problems and the incidence of clinical problems related to defibrillation is needed.


9. Development and Implementation of Acute Coronary Syndrome Protocol in the Emergency Department to Improve the Quality of Patient Outcome. Cornelia Williams, RN, MA, Mercedes Chisholm, RN, MSN, Vepuka Kauari, RN, BSN, Erica Henry, RN, BSN, Jennifer Stant, MA, ANP, New York Presbyterian Hospital, 620 W 168th St, New York, NY 10032 

Clinical Topic: The purpose of implementing the Acute Coronary Syndrome (ACS) initiative was to improve the quality of care provided to our patients by decreasing the established average time required to get our patients from triage to treatment. Prior to this initiative, there was no standardized protocol between the adult emergency and cardiology departments. We are a large metropolitan academic medical center treating 60,000 patients annually of which 42% present with complaints of chest pain. Implementing this initiative led to a decrease in cardiac damage to patients, which ultimately improved successful outcomes, decreased length of stay, and increased the patient’s quality of life.

Implementation: The implementation consists of an institution-wide initiative created by the emergency department in conjunction with the cardiology department. ACS protocols were developed: level 1 (ST elevation) through level 4 (non-cardiac events), based on the American Heart Association standards. All levels of staff were educated on EKG interpretation and ACS levels in order to initiate the ACS protocol. Preprinted doctor’s orders were developed to initiate nursing care immediately. Improved communication via the stat miocardial infarction (“MI”) beeper and direct telephone line to the catheterization laboratory was implemented. The purchase of additional EKG machines, increase in trained staff to do EKGS in order to meet our performance goal of EKG within 10 minutes of patient’s arrival. An attending physician evaluates the EKG that is then faxed to the catheterization laboratory if deemed level 1 and the MI beeper is activated. A cardiology NP is present in the emergency department to facilitate coordination of the patient’s care with ACS syndrome.

Outcomes: The time requirement from emergency department to catheterization laboratory has decreased, thus improving our response time. Between 2001 and 2004, the average time between triage and treatment has decreased from 165 to 115 minutes. On the off hours (7 PM-7 AM), between 2002 and 2004 the average minutes from triage to treatment have decreased from 152 minutes to 124 minutes. Each member of our interdisciplinary team became more focused on the needs of our cardiac patients. In comparison to national average (85%), 93% of our patients received β-blockers upon arrival. The ED nurse now facilitates the initiation of the cardiac treatment protocol. Greater collaboration has developed between the cardiology and emergency departments. Accreditation as a Chest Pain Center was achieved.

Recommendations: The recommendations for continued effort to improve outcomes are to establish ACS committee and protocols nationally to improve patient outcome and expand inservices for staff EKG interpretation, which will
help to identify and treat patients with ACS level 1 in an expeditious manner. Currently, work toward improving off hour’s response time by having on-call personnel in house is in progress.


10. ED Diversion Project. Flora Tomoyasu, RN, PHN, BSN, MSN, CNS, Caron Hill, RN, BSN, Robin Durfee, RN, BA, CEN, CGN, Saddleback Memorial Medical Center, 24451 Health Center Dr, Laguna Hills, CA 92675

Clinical Topic: Nationally, 61% of emergency departments never close to paramedic runs. This emergency department had the highest rate of diversion (250 hours) in South Orange County, California, from August 2001 to July 2002 mainly due to both poor “turnaround time” (moving patients from the emergency department to inpatient rooms) and patient flow. This backlog of triaged patients (walk-ins) required paramedic diversion (back-door patients), leading to dissatisfaction for patients, physicians, and staff. ED diversion was identified as lost revenue because many of the patients brought by paramedics are admitted as hospital inpatients. The purpose of this project was to identify a process that would speed up “turnaround times” for inpatients, free up ED beds, decrease wait times, and decrease paramedic diversion in accordance with a county-wide mandate to decrease paramedic diversion.

Implementation: A multidisciplinary team identified barriers, developed a decreased diversion process, implemented the process, and monitored its effects. The barriers identified were staffing, physicians, patients, environment, delivery systems, and technology/equipment. The plan (implemented in the fall of 2002) consisted of multidisciplinary education, administrative changes, and an ED Diversion Tool. All departments interacting with the emergency department were educed on the barriers, solutions, and the importance of decreasing ED diversion. All managers committed to supporting processes that decrease diversion time, including teamwork approaches to moving patients quickly through the system, adding a house supervisor to monitor bed availability and patient flow, and requiring administrative approval prior to all ED closures. The ED Diversion Tool was used to daily track and monitor ED diversion hours.

Outcomes: Diversion decreased (by approximately 50%) to 145 hours in March 2003. A decrease in overall diversion at all hospitals was observed, although probably because all hospitals were working to decrease diversion per the county-wide mandate. One complication of keeping the back door open to paramedic receiving was the backlog of walk-ins. Turnaround time for admitted patients decreased by 60 minutes; however, patient satisfaction did not change. ED waiting room time doubled because all available ED beds went to patients brought in by paramedics; walk-ins were seen last. Patient dissatisfaction with long wait times caused “left-without-being-seen” numbers to rise, correlating with lost revenue from these patients. Other problems are the increased (winter) patient volume and mandatory nurse staffing ratios. Historically, ED patient volumes increase during winter and are accommodated by creating overflow and halfway beds. Mandatory staffing ratios no longer allowed for this solution without bringing in extra nurses, resulting in increased wait times, saturation, and subsequent closure.

Recommendations: Back-door patients are now balanced with walk-ins. A “Rapid Triage Protocol” is being developed that allows physician order sets to be started on patients in the waiting room (presenting signs/symptoms based). Hopefully, this will increase patients’ and physicians’ satisfaction by initiating tests, having results available sooner, and increasing turnaround time by using wait time efficiently. Further evaluation of the effects of the new nurse staffing ratios and increased patient volume on diversion time is needed.


11. How to Get and Use Real-time Data to Improve Customer Satisfaction. Susan Cook, RN, BSN, Fairfield Medical Center, 1101 Riva Ridge Blvd, Gahanna, OH 43230

Clinical Topic: The intent of this project was to increase internal and external customer satisfaction in the emergency department. It was determined that there was a decreased level of satisfaction among patients, staff, and physicians. Patients were rating their satisfactions with their emergency department visit at 79%. The goal of this project was to raise patient satisfaction level (regarding their ED visit) to 85%.

Implementation: Decreased satisfaction scores in the emergency department were identified. A committee of 8 staff members was formed to address customer satisfaction. Customers were defined as external (patients and their families) and internal (ED physicians and staff). The committee developed 3 sets of 10 questions each for patients, physicians, and staff to rate their satisfaction on a scale of 1 (poor) to 5 (most satisfied). These 3 groups were surveyed on a daily basis. The committee met weekly to evaluate the survey responses. Based on the responses, a “Goal of the Week” was chosen to address the areas that need to be improved. One example of a weekly goal was “Introduce yourself to the patient and family.” Each week the committee evaluated the previous week’s goal and selected a new goal.

Outcomes: Customer satisfaction has improved in the emergency department. The satisfaction score rose from 79% to 85%. The “Goal of the Week” is posted throughout the department as a constant reminder to help improve customer satisfaction. ED staff members assume ownership for customer satisfaction processes. The process is now established and continues in this format.

Recommendations: Implementing this project to improve satisfaction has been easy due to the weekly committee review meetings and the daily data collection from the patients, physicians, and staff. Physicians and staff have become committed to improving patient care and satisfaction.

12. Implementation of a Male Domestic Violence Screening Program. Barbara Davis, RN, BSN, CEN, Michelle Ortiz, RN, BSN, Charlotte Buckenmeyer,RN,BS,MS,Michelle Ortiz,RN,BSN,Gina Sierzega,BA,MA,Lehigh Valley Hospital & Health Network, Emergency Department, 17th & Chew Streets, Allentown, PA 18104

Clinical Topic: According to the Pennsylvania Coalition Against Domestic Violence, approximately 100,000 people are victims of domestic violence each year and, of this number, it is estimated that 5% are men. Although female domestic violence screening is prevalent today in most health care settings, many screening programs do not include the male population.

Implementation: In 2000, a domestic violence screening program for female victims was implemented at a 3-site tertiary care, level I trauma center in Eastern Pennsylvania that treats more than 103,000 patients annually across 3 ED sites. Preliminary review of 2002 and 2003 data showed that our emergency department had a 14.8% incidence of male domestic violence patients without a male screening program in place. Therefore, in January 2004, the current screening process was expanded to include male domestic violence screening for all patients aged 15 to 65 years. This age range represents the same screening criteria used for the female domestic violence screening program. To maintain continuity among male and female screening practices, the same age range was applied when screening men. Prior to implementation, the project leader met with community agencies to learn more about the available resources for male domestic violence victims. Staff was educated on the expanded screening process and was instructed to follow the same identification and referral process currently in place for female victims. All positive male victims were referred to a local domestic violence facility.

Outcomes: During the first month after implementation of the expanded screening process, 1100 patients qualified for domestic violence screening. Forty-two percent of the patients were men and 58% were women. From these numbers, one man (11%) and 8 women (89%) were positively identified as domestic violence victims. As the screening program continues, data will be analyzed on a monthly basis.

Recommendations: Based on results from our institution, we recommend that when implementing a domestic violence screening program, it would be most beneficial to implement a screening tool for both men and women, simultaneously. If a female domestic violence screening program is already in place, emergency departments should consider expanding the screening process to include men, because prevalence is higher than once thought. In order to maximize the program’s success, screening development and implementation should be a collaborative effort between ED staff and community resources.


13. Initial Antibiotic Timing and Administration for the Febrile/Neutropenic Pediatric Patient in the Emergency Department. Jennifer Hinrichs, RN, MSN, Patty Rubino, RN, MSN, CPNP, Karen Kight, RN, BSN, Stephanie Haler, BSN, Clarian Health Partners—Rikey Hospital for Children, 702 Barnhill Dr, Indianapolis, IN 46202

Clinical Topic: Neutropenia is the body’s inability to defend against infection due to insufficient white blood cell count. It leaves patients unable to combat bacterial infections usually deemed harmless in healthy children. Frequently, fever is the only sign of infection, which requires health care professionals to implement antibiotic therapy, the only means of defense. Inefficient antibiotic therapy initiation puts these patients at risk for sepsis and circulatory collapse. This project’s purpose was to develop and implement a process of administering antibiotics safely and efficiently to the febrile/neutropenic pediatric patient in the emergency department to reduce risk of circulatory collapse.

Implementation: Conducted in a large urban pediatric emergency department in central Indiana, this project collaborated with the children’s cancer center. A standard of care for the febrile/neutropenic patient, supported by administration, was developed. It consisted of laboratory studies prior to antibiotic initiation, maximum periods (physician assessment, antibiotic orders, and antibiotic initiation), and minimum patient monitoring standards during and immediately following initial antibiotic therapy. ED nursing, pharmacy, and medical staff were educated on these new procedures. Standard of care compliance was reviewed by quarterly chart audits for preantibiotic and postantibiotic timing.

Outcomes: Staff knowledge of potential circulatory collapse for febrile/neutropenic patients increased following unit-based inservices. Staff nurses completed case studies following inservices to demonstrate content comprehension. Standardized practice of initial antibiotic administration to febrile/neutropenic patients was achieved. Cardiac and vital sign monitoring increased from 68% to 100% and from 34% to 90%, respectively. Time from triage to physician assessment/antibiotic orders written within 30 minutes increased to 100%. Antibiotics beginning within 45 minutes of triage increased from 50% to 90%. Initial doses of antibiotic split between the central venous catheter lumens increased from 40% to 100%. Circulatory collapse signs/symptoms were identified earlier, allowing caregivers opportunity to intervene. Overall, a safe passage for neutropenic patients through the emergency department was created.

Recommendations: Based on this project’s outcomes, developing a standard of practice for the febrile/neutropenic pediatric emergency department patient is highly recommended. Additionally, a Fever/Neutropenia Standard of Care should be added to ED staff orientation (nurses, physicians, and pharmacy). Future research should investigate the relationship from time of initial phone call to the oncologist.
(about fever) to time of the initial dose of antibiotics in the emergency department to investigate the time of fever onset to antibiotic initiation in evaluating signs/symptoms of circulatory collapse. Such information will assist both oncology and emergency departments in Indiana in serving this patient population, decreasing the need for these patients to travel into the city for immediate treatment. Finally, a root-cause analysis of febrile/neutropenic patients experiencing signs and symptoms of circulatory collapse may aid in identifying if standard of care noncompliance is associated with negative patient outcomes.


14. Integration of the Emergency Severity Index System into an Existing 5-Category Triage System. Nina M. Fielden, RN, MSN, CEN, Tina Oleksiak, RN, BSN, The Cleveland Clinic Foundation, Emergency Department, 3344 Meadowbrook Blvd, Cleveland Heights, OH 44118

Clinical Topic: The triage system at this emergency department was re-evaluated to find ways to improve the process. The emergency department’s Professional Practice Committee recommended processes directed at the flow through triage, the review of existing triage guidelines, and the development of a computerized triage work list. A triage curriculum was designed, incorporating the new Emergency Severity Index (ESI) System, a reliable and valid triage system, into an existing 5-category triage system.

Implementation: This clinical project was conducted in the emergency department of a tertiary care hospital, which sees more than 50,000 emergency patients each year. The Professional Practice Committee identified that triage guidelines were not being initiated in patients who were sent to the waiting room after triage. These triage guidelines included orders the triage nurse could initiate per protocol. A computerized triage work list was developed to incorporate these orders. Additional staff was relocated to the triage area to implement the orders. The emergency department’s triage algorithm was revised to include resource utilization and danger zone vital signs, adapted from the ESI algorithm, to improve categorization of patients. Nurses who currently performed triage attended a 2-hour class that incorporated didactic education on triage and the ESI system and practice cases from the ESI handbook, taught by the clinical nurse specialist. After the classes, triage nurses categorized patients into one of 5 categories, initiating the triage work list for patients who fell into categories 3, 4, or 5. Triage orders were then carried out by the nurse or delegated to a clinical technician or paramedic, either in the triage setting if no beds were immediately available, or in the patient’s room after transfer.

Outcomes: Prior to education, a large percentage of patients were categorized in triage levels 4 (less urgent) or 5 (non-urgent), even though a chart review by the clinical nurse specialist suggested they be categorized in levels 2 (emergent) or 3 (urgent). During the classes, the triage nurses expressed satisfaction with the ease of categorizing patients based upon resource utilization and danger zone vital signs. After education, a greater number of patients were categorized in more appropriate triage levels. There was an increase in level 2 patients by 73%, an increase in level 3 patients by 60%, a decrease in level 4 patients by 3.4%, and a decrease in level 5 patients by 42%. The change in triage categories more closely reflected resource use in the department, as evidenced by a comparison of triage category and actual resource use in chart reviews.

Recommendations: Incorporating anticipated resource utilization into the triage process enhanced the triage nurses’ decisions in categorizing patients in our emergency department. Quality monitoring of the accuracy of triage categorization will be performed on an ongoing basis. Annual competency assessment using triage case studies will be performed.


15. Outpatient DVT Treatment: A Safe, Effective, Cost-saving Alternative Using a Comprehensive ED Protocol. Tamara H. Williams, RN, MSN, APRN, Melody Sides, RN, MSN, Northeast Medical Center, 920 Church St, Concord, NC 28025

Clinical Topic: Treating patients with deep vein thrombosis (DVT) in the emergency department on an outpatient basis rather than as an inpatient is preferable because it is less expensive than hospitalization and it allows patients the comfort of recovery at home. However, ED physicians who diagnose DVT have typically been reluctant to send patients home with instructions to take enoxaparin sodium (ie, low molecular weight heparin). The primary concern is that outpatient treatment requires extensive patient education on how to administer self-injections and how to adhere to an explicit follow-up regime. Typically, this type of education is generally unavailable and difficult to accomplish in the emergency department. A secondary concern is the liability aspect of the patient not adhering to follow-up recommendations.

Implementation: To create a situation where outpatient DVT treatment could be safely prescribed for patients who come to the emergency department, a multidisciplinary team comprised of case management, pharmacy, and emergency department staff developed a DVT protocol and discharge instruction plan. ED physicians were educated on when and how to use the plan. ED nurses were educated on discharge instruction contents and how to teach self-injections to the patients using a DVT education cart. This cart contained a TV/VCR, enoxaparin and warfarin videos, and self-injection models. The nursing staff received additional inservices on the DVT protocol and enoxaparin sodium 3 months after the protocol implementation to increase their comfort in giving the comprehensive discharge instructions. Patient follow-up included contacting the patient at home the first day after the ED discharge by the hospital telephone triage department. A set of 6 questions asked during the telephone interview focused on the patient’s understanding of the discharge instructions and adherence to the discharge plan.

Outcomes: The emergency department successfully discharged 6 patients with uncomplicated cases of DVT home with private physician follow-up plans from September 2003.

Clinical Topic: The rising cost of health care in Arizona was becoming too much of a burden for one county to bear. Maricopa County examined the viability of forming a hospital district for the county’s only level I trauma center. The odyssey of taking this idea through the legislative process placed a burden on the ED staff. The issue of how to raise public awareness for the need to keep the level I trauma center operating was at stake. The dilemma was, as county employees, nurses and other staff members were not allowed to educate, campaign, or talk about Proposition 414 while working or representing the hospital. However, if the proposition did not pass, the hospital would close. The task was to educate the public about the need for a reliable funding source for the hospital.

Implementation: An informal group of interested individuals comprised of ED managers, public relations, and ED nursing staff looked for ways to boost ED staff moral and keep the emergency department and hospital in the media and in the public’s view. Trauma patients with good outcomes were invited to speak at media events. A mini-documentary was filmed about the emergency department and hospital and then aired on a public broadcast television station. An ENA member working in the emergency department sent a letter to the Governor of Arizona who signed a proclamation on October 8, 2003, declaring it Emergency Nurses’ Day in Arizona. A pancake breakfast and an open house celebrating Emergency Nurses’ Day in Arizona was held, to which the media was invited. A trauma-injury prevention promotion group spoke on an early local news program about injury prevention and the trauma center.

Outcomes: On November 4, 2003, the voters of Maricopa County passed Proposition 414 by an overwhelming majority. The future of Maricopa Integrated Health Systems now looks bright. There are plans to expand the operations of the hospital, starting with a larger and more modern emergency department. We believe our public relations campaign had a major role in bringing about support for our institution and emergency department.

Recommendations: Everyday events in the emergency department provide opportunities to educate a broad population base about current health issues, injury prevention, and the resources that are available through their local hospital and emergency department. Developing a good rapport with the media can change unsavory portrayals of hospitals and give positive glimpses of the actual good emergency nurses and the staffs of emergency departments do on a day-to-day basis.


17. Increasing Knowledge about the Use of Appropriately Sized Blood Pressure Cuffs. Beth Musselman, RN, BSN, Clarian Health Partners, Indiana University Hospital, 550 N University Blvd, U1574, Indianapolis, IN 46202

Clinical Topic: The choice of a blood pressure (BP) cuff appropriate to the size of the patient’s upper arm circumference is important to obtaining an accurate BP reading. Additionally, the technique used when obtaining manual BP readings can result in inaccuracies. Using an inappropriate cuff size can distort blood pressure readings by as much as 30 mmHg. An undersized cuff overestimates BP; an overly wide cuff bladder results in a false low reading. A too narrow cuff can result in a false high reading. Loosely applying a cuff can result in a falsely high reading. Deflating the cuff too slowly results in falsely elevated diastolic readings, and deflating too quickly results in falsely low systolic and falsely high diastolic readings. Observation of nurses and EMTs on our unit revealed that an inappropriately sized cuff was commonly chosen. A poll of staff indicated a lack of knowledge in choosing a blood pressure cuff and the rationale behind the choice. Because BP is a component of the clinical assessment and care decisions are made based on this assessment, it was believed that education was needed.

Implementation: Two methods for educating ED nurses, physicians, and EMTs on selecting BP cuff sizes and BP assessment technique were implemented by Beth Musselman, RN, BSN. A literature review was conducted and the information presented in poster format and a 20-minute presentation at a staff meeting. The poster, containing information on the impact on accuracy of using improperly sized cuffs, was displayed in the nurse’s station. It included a table with the 4 sizes of cuffs available in our department, with the bladder size correlated to the upper arm circumference. The staff expressed new understanding of the importance of choosing the correct size cuff. The staff was surveyed about any barriers they had to choosing and using the appropriate sized cuff. Based on this feedback, the clinical practice council assessed whether various sized cuffs were readily available for use in the department.

Outcomes: The assessment of cuff availability revealed a deficit in the number of cuff sizes. cuffs were purchased to improve availability of a variety of sizes. Observation has indicated that staff is using greater care in choosing the correct BP cuff and in the technique used when obtaining manual BP readings. Additionally, staff is sharing this knowledge with patients to improve their knowledge.
18. Role of Emergency Nurse Research Coordinators in Pre-hospital Trials. Lea Ross, RN, BSN, CEN, Anna Yanes, RN, BSN, MA, Beverly Nighswonger, RN, Maria J. Fitzgerald, RN, BSN, Randy Sanoff, RN, Gigi Gaughran, RN, MSN, FNP, Jeffrey Saver, MD, Theresa Haley, RN, MSN, CNS, Sidney Starkman, MD, Barbara Tone, RN, Chelsea Kidwell, MD, Marc Eckstein, MD, FAST-MAG Clinical Trial, Neurology Department, Geffen School of Medicine, UCLA, 1072 Gayley Ave, Los Angeles, CA 90024

Clinical Topic: Neurologists and emergency physicians in Los Angeles have launched a large-scale phase III clinical trial in which paramedics will administer experimental neuroprotective stroke therapy in the field within the critical 2 hours following stroke onset. The study is being conducted entirely in Los Angeles County and will involve all 31 EMS provider agencies. All 69 county-area hospitals with adult emergency departments have been invited to participate. The size and complexity of the trial has posed challenges for implementation. In most multicenter trials, each participating institution hires a research coordinator. However, relatively few area hospitals have sufficient interest, expertise, or volume in clinical research to justify hiring a full-time research coordinator. In addition, the researchers needed personnel to provide support and training to approximately 3300 county paramedics.

Implementation: A centralized system of clinical nurse research coordinators was created to address these issues. Eighteen full-time registered nurses have been hired by the principal investigators to implement all aspects of the trial. Nurses’ salaries are paid through trial grant funding. Nurses were recruited through trade advertising, a posting on the UCLA Web site, and word of mouth. Emergency nurses were specifically sought for their ability to function in an emergency care setting, their knowledge of the EMS system, and their skill in interacting with prehospital personnel. Other qualities of emergency nurses desirable for this role included the ability to prioritize and reprioritize tasks and to work independently, as well as communication and critical-thinking skills. Research experience was not required. Nurses received a 2-week orientation that included education in research procedures, certification in research ethics and HIPAA considerations, education on stroke, training in the research protocol, and certification in the standardized neurological assessment tools that will be used to evaluate subjects. Each nurse serves as site coordinator for 3 to 5 hospitals and as liaison and educator for approximately 20 paramedic units.

Outcomes: This centralized trial coordination system has been successful. As of June 2004, Institutional Review Board approval has been granted for 21 hospitals; trial start-up activities and regulatory submissions are in progress at an additional 26 hospitals. Paramedic education in stroke recognition and trial procedures has begun at 8 EMS provider agencies, with others scheduled during the summer. Patient enrollment is expected to begin in September 2004.

Recommendations: This central nurse coordinator system will be in place for the implementation of future prehospital-based trials of acute stroke therapy. This model may also be applicable to studies for other emergency medical conditions in which the use of prehospital personnel will allow treatment in critical early time windows.


19. Utilization of Clinical Pathways in the Emergency Department. Donna Zadrozy, RN, BSN, Susan Jackson, RN, CEN, Heidi Jahnke, RN, BSN, Mary Lou Korves, RN, BS, CPHQ, St Joseph’s Hospital & Medical Center, Emergency Department, 350 W Thomas Rd, Phoenix, AZ 85013

Clinical Topic: The expectation of the use of clinical pathways in the emergency department is to improve patient care and outcomes. The purpose of this clinical project was to optimize the use of available resources. The development of interdisciplinary teams and their monthly meetings, evaluations, and recommendations for changes in the protocols optimize the efficiency in the use of the pathways.

Implementation: The Cardiology Quality Team for Acute Coronary Syndrome (ACS) and the Stroke Immediate Response Team (SIRT) are multidisciplinary and collaborative. SIRT included ED nurses, a stroke research nurse, 2 neurology physicians, an ED physician, a computed tomography (CT) technician, and a laboratory representative. The Acute Stroke Pathway consists of a preprinted order sheet developed by the stroke research nurse with input from ED nurses and then reviewed by SIRT. Team members educated their respective departments as to the goals for the care of acute strokes. Door to IV-tPA must be less than 3 hours from symptom onset. The team set a goal of less than 45 minutes from ED arrival to completion of head CT scan. The team met monthly and evaluated each stroke-one patient’s care from ED arrival to time to decision for the eligibility of receiving t-PA or an alternate course of treatment for acute stroke symptoms. The stroke research nurse entered data from the patient’s medical record into the neurology database. The specific issues regarding delay in timeliness of care and treatment were evaluated by the team. The Acute Stroke Pathway was initiated with a stroke team-one or stroke team-two activation based on symptom onset, less than 6 hours or more than 6 hours, respectively. The educational process of pathways usage (in both Acute Stroke and ACS) was done on an individual or group basis. For example, new ED members are inserviced on what, when, and how to use the pathway and how to activate the stroke pager. The activation of the stroke team can be initiated by the triage RN or the ED physician. Acute stroke patients are admitted to neurology and, if indicated, intravenous Alteplase was given within the accepted time. The initiation of the ACS/Chest Pain Pathway was started by the triage RN. The ED physician notifies the cardiology service and, if necessary, the cardiac catheterization laboratory was notified. Cardiac catheterization laboratory
nurses retrieved the patient from the emergency department in an effort to reduce door-to-balloon time.

**Outcomes:** From May 2003 to April 2004, door-to-tPA goal decreased from 70 minutes to 60 minutes, and CT to tPA time was 30 minutes. The quality of patient care in the emergency department improved with the use of clinical pathways for ACS and stroke. In the acute myocardial infarction patient population, the door-to-balloon time was reduced from 138 to 98 minutes in 2001 and as of February 2004, respectively. Door-to-EKG time is consistently less than 10 minutes.

**Recommendations:** The use of the clinical pathways has standardized this emergency department’s delivery of care to acute stroke and chest pain patients. Measurement of patient satisfaction and the perception of care is a topic for future research. The interdisciplinary team encourages collaboration and standardization by development of a preprinted order sheet for a specific clinical pathway.

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**20. Management of ED Patients Requiring Seclusion and Restraints.** Fidela S.J. Blank, RN, MN, MBA, Ann Maynard, RN, BS, Baystate Medical Center, 759 Chesnut St, Springfield, MA 01199

**Clinical Topic:** Violent behavior that requires putting the patient in restraint and seclusion has resulted in both patient and staff injuries. The Hartford Courant in 1998 reported 142 patient deaths while in physical restraints or seclusion. In one study of violence in the emergency department, 43% reported physical attacks on staff at least once a month. Fifty-three percent of all hospital assaults occur in the emergency department. The goal of this project was to design a program for ED patients requiring seclusion and/or restraints that will ensure both patient and staff safety.

**Implementation:** We are an urban, level I trauma center with a volume of 105,000 visits per year. To improve safety, an ED task force composed of the vice-chairman, the director, the day supervisor, and the clinical specialist developed and implemented a psychiatric advocacy program. The program involved revisions of the restraint policy and documentation forms to reflect Joint Commission on Accreditation of Healthcare Organizations (JCAHO) standards; an educational program for all ED direct care staff on how to handle patients requiring restraints; development of a chart audit tool, with feedback to staff; and identification of financial resources to add psychiatric advocate positions. Psychiatric advocates are ED assistants who are trained in CPR and have undergone nonviolence crisis intervention and psychiatric advocacy classes. The psychiatric advocacy class included 10 case studies that require the learner to apply the behavioral restraint policy and procedures identify signs and symptoms of physical distress and nutrition/hydration requirements for the restrained patients.

**Outcomes:** Prior to this program, we did not track the restraint and/or seclusion process. Since the program started, monthly audits of all restraints and seclusion patients began, which showed that the number of patients in mechanical restraints is down from an average of 16.8 patients per month to 10.5 patients per month so far this fiscal year. The length of stay in mechanical restraints is down from 2 hours 11 minutes to 1 hour 35 minutes. Documentation of restraint and seclusion use became more consistent with JCAHO standards.

**Recommendations:** Involvement of ED management in program development is critical for identification and approval of financial resources for the program. Policy revisions and documentation requirements should be taught and assessed during staff orientations and annual skill updates. Providing continuous feedback to staff through chart audits is helpful toward maintaining improvements. The goal of the psychiatric advocacy program is zero injury to patients and staff during use of restraints and/or seclusion. Ongoing monitoring of the program through monthly audits should be conducted to ensure that the zero injury policy is maintained.

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**21. Creating a Successful Remote Medical Clinic.** Audrey Snyder, RN, MSN, CEN, ACNP, Claudette Dalton, MD, David Cattell-Gordon, MSW, University of Virginia, School of Nursing/Emergency Medicine, McLeod Hall, PO Box 800699, Charlottesville, VA 22908-0699

**Clinical Topic:** In many rural areas of the United States, access to health care resources is prevented due to the lack of financial resources, lack of providers, and/or inability to travel. In rural Southwest Virginia, more than 25% of the population is uninsured.

**Implementation:** The local community health care providers identified the major community health needs and collaborated with Remote Area Medicine for a summer weekend clinic to provide dental and eye care at a clinic at the local airport in 2000. In 2001, this tertiary care medical center took on the challenge to provide a medical clinic. More than 60 physicians, nurse practitioners, nurses, pharmacists, laboratory technicians, and other hospital volunteers donated their time and services for the 2½-day clinic. Each summer, they package all the necessary equipment and supplies and then travel 6 hours to set up the remote clinic.

**Outcomes:** In 2003, in collaboration with local providers, the Lion’s Club, and a dental school, the volunteers saw more than 4700 patients (more patients than many emergency rooms see in a month) in 3 days at the local fair grounds. Encompassing a focus of health education, injury prevention, and diagnostic screenings, the services offered included medical screenings, hypertension and diabetes clinic, otolaryngology clinic, gastroenterology clinic, pediatric clinic, women’s health clinic, mammography, a limited laboratory, and a limited pharmacy. The Virginia Statewide Disaster Response Team, along with local emergency services providers, coordinated emergency calls at the fairgrounds. A permanent telemedicine site was established in the area for local health providers to obtain consultation with specialty physicians on a regular basis. An additional grant has provided
transportation funds for patient travel to medical appointments throughout the year.

**Recommendations:** The sheer magnitude of patients seen at this clinic reinforces the need for a nationwide health plan that covers the working poor. This work has cemented a relationship between the local health care providers and the tertiary care center. There is a continued commitment to provide support for the 2004 summer clinic. Based on the success of this clinic, the Governor of Virginia has organized weekend clinics in other rural areas of the state.

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**INJURY PREVENTION POSTERS**

**22. Alcohol Awareness-Crash Simulation.** Sue Trujillo, RN, Nancy G. Stevens, RN, MSN, CEN, C. Dewayne Siddon, RN, Tim Harden, RN, EMT, Carol Golden, RN, Stephanie Moon, RN, Darlene Groogan, RN, Kelly Hollandsworth, EMT-P, Scenic Cities Emergency Nurses Association, 480 Indian Hills Dr, Dayton, TN 37321

**Injury Prevention Topic:** Nationwide, alcohol-related motor vehicle crashes accounted for 17,448 and 15,626 deaths in 2001 and 2002, respectively. The intent of this project was to show the public (all ages) what actually happens following an alcohol-related crash, including police, fire department, emergency services interventions, and media coverage of the crash. The purpose of the crash simulation was to raise awareness about drinking and driving to decrease mortality rates.

**Implementation:** The program was developed by the local ENA Chapter, EMS, Fire Department, and Sheriff’s Department of Hamilton County, Tennessee. Advertisements promoting the event were placed on television, radio, newspapers, and the Internet. A public parking lot was used as the crash scene. A severely damaged vehicle was donated by a local wrecker company. The scenario was that this car had crashed on the way home from prom night and that the driver had been drinking and driving. The crash “victims” were played by an ENA member’s son and his friend. Wounds were simulated using moulage makeup. Bystanders were able to hear simulated 911 calls contacting police, EMS, and the fire department. Victims were removed from the vehicle using the jaws-of-life. One was transported away by EMS, the second pronounced dead and placed in a body bag. After the simulation, bystanders (target audience) were interviewed by television news reporters to assess their reaction to the consequences of drinking and driving. These interviews were aired on the local nightly news.

**Outcomes:** While bystanders did not fill out program evaluations, those interviewed stated that they would not drink and drive (100%). Actual family members that were interviewed were overwhelmed with sadness at seeing their loved ones in body bags. Although the target audience was all ages, this was not accomplished when the program was presented to the public because many people would stop for a moment but did not stay to view the entire program. Recently, the simulation was presented to high school students before prom night. Afterwards, school representatives reported that neither car accidents nor drinking and driving charges had occurred with their students on prom night. Although not proving that the simulation is completely responsible for this positive outcome, it seems that captive audiences are the better choice. Numerous schools have since requested the program be given before prom to their students as well. It has since been decided to switch the target audience from the public to such captive audiences.
Recommendations: Alcohol awareness is relevant to all injury prevention providers. Early and continuous advertising is important to high program attendance; however, a captive audience aids in assuring that the audience views the crash simulation from beginning to end, thus gaining the full effect. Because the simulation is very graphic, parental consent should be obtained before allowing minors to attend.


23. Cultural Diversity and Child Passenger Safety. Tiffany Strever, RN, BSN, CEN; Truman Medical Center, 2301 Holmes, Kansas City, MO 64108

Injury Prevention Topic: Death due to a motor vehicle crash (MVC) is the number one cause of death in Hispanic and African-American populations to ages 34 and 14, respectively. A 300-bed level I trauma center in Kansas City is the safety net hospital for the urban core and is committed to decreasing injury and death. Kansas City is a noted refugee relocation city and home to persons from many cultures. This medical center instituted an educational program to increase knowledge of child passenger and home safety in several culturally diverse populations of pregnant women.

Implementation: During Child Passenger Safety Week (February 2004), a baby shower was held to educate parents on child passenger safety (CPS) and home safety. This concept was chosen to encourage participation from pregnant women. The participants included 74 pregnant patients at the medical center’s obstetrical/gynecological clinic. Six language-specific programs were held in English (39 attendees), Spanish (14), Somali (6), French (3), Arabic (11), and Chinese (1). Interpreters were present to provide oral translation. The participants completed a pretest, presented in their native language, to assess baseline knowledge of CPS and home safety. A 20-item, true/false test was designed and administered as written (English, Spanish, and French) or orally (Somali, Arabic, and Chinese) using translators. Next, the injury prevention coordinator gave a child passenger safety PowerPoint educational presentation followed by a demonstration of placing an infant in a car seat. Participants repeated the test (same questions, different order) to assess knowledge gained and then completed a return demonstration of placing an infant in a car seat. All participants received an infant car seat and home safety products at the program’s completion.

Outcomes: During the past 3 years, this program reached more than 160 women. Evaluation of the pretest and posttest data to assess knowledge improvement is in progress. In evaluating the program, a few cultural issues were identified that might affect the success of the program. These issues included literacy, family presence (husbands of Arabic-speaking women wanted to take the test for their wives), and (possibly) concept of time. Many participants did not view “being on time” as important, so flexibility in scheduling was critical. Long-term program goals include repeating the posttest at 6 months to assess retained knowledge and expanding the child passenger safety program for pregnant women from additional cultures and backgrounds.

Recommendations: Trauma remains the number one cause of death and disability, crossing all barriers and ethnicity. Understanding that death and injury are preventable and can be reduced by education that is language and cultural specific, consideration is needed when designing and teaching injury prevention education. This type of program could be adapted for any area of injury prevention.


24. Development of Older Adult Falls Prevention Educational Materials. Carole Rush, RN, MEd, CEN, Calgary Health Region, 179 Bayview Dr SW, Calgary, Alberta, Canada T2V 0L4

Injury Prevention Topic: The Calgary Health Region (Alberta, Canada) identified a need to reduce the incidence of senior’s falls by 20% by 2006. One of the initial strategies identified was community education through the creation of a brochure and community display. This task was delegated to the Calgary Injury Prevention Coalition’s Older Adult Falls Prevention Committee. Review of the literature and local data indicated that 1 in 3 people aged 65 years and older have at least one fall per year and that two thirds of these individuals will fall again within 6 months. Additionally, nearly 1 in 4 people aged 65 years and older seen in Calgary emergency departments after a fall are diagnosed with a hip fracture. The greatest negative impact is that most people with a hip fracture do not regain their former activity level. Astonishingly, 40% of nursing home admissions are a result of falls.

Implementation: The first steps included a review of the literature of preventing falls in the elderly, community education, and brochure development. Once the basic content of the brochure was ready, a local communications company was then contracted to handle design and graphics. Focused evaluation, using 2 different drafts of the brochure, was conducted with a total of 20 local seniors. Information from these focus groups was used in the final brochure. Funding to print the brochure was received from the Calgary Health Region and from a grant. The brochure was launched in November 2002 at a Calgary Trauma Symposium, along with a presentation on older adult falls to trauma care personnel. The Committee developed one display to complement the brochure content. Ongoing dissemination of the brochure has been a challenge with limited financial and human resources.

Outcomes: The brochure has been disseminated to local seniors’ organizations (15) through committee members and at seniors’ health/resource fairs (10). The executive level of the Calgary Health Region has approved the use of the brochure in its acute, community, and long-term care facilities. There is an increase in interest in the issue of falls prevention within the Calgary Health Region since the administration initially identified the need to reduce the incidence of senior’s falls. A task force to address the reduction of seniors’ falls has been established.

Recommendations: Focused testing of educational materials with the target audience is highly recommended to help ensure the messages are appropriate and understood. Use of local photographs in a brochure increases its acceptance by the
target audience. The text must be large enough to accommodate the visual changes of the aging population. Displays can “come alive” by adding practical teaching examples (e.g., samples of appropriate footwear, nonslip mats, etc) in addition to take-home reading materials. Large quantities of educational materials are required for dissemination to an entire population on an ongoing basis, thus requiring funding and dedicated personnel for such a large task. The Calgary Injury Prevention Coalition’s Older Adult Falls Prevention Committee has not had success in requesting corporate dollars for this initiative and plans to seek private grant funding to accomplish these tasks.


25. Effect of an Alcohol, Drug, and Injury Prevention Program on Adolescents. Diana Ropele, RN, MSN, Connie Mattice, RN, MS, Robert Conners, MD, DeVos Children’s Hospital, 100 Michigan St, NE MC 30, Grand Rapids, MI 49503

Injury Prevention Topic: Drinking and driving under the influence by teens is a serious issue across the United States. In 2001, more than 5,500 teenagers died in motor vehicle crashes, with 45% of all fatally injured teenage drivers having alcohol in their bloodstream. The purpose of this research study was to determine whether providing adolescents with information about the consequences of illegal substance use and high-risk behavior leads to knowledge retention and behavioral change.

Implementation: A one-group pretest/posttest design was used. A projected sample size of 250 subjects was needed, with a power of 80% and a significance level of 0.05, in order to detect a difference of 5 percentage points for the test scores and a 10% absolute change in response rate for the self-report responses. Subjects were selected from nine public and parochial schools grades 9-12 in western Michigan. A convenience sample of 587 students completed the preprogram questionnaire and attended the educational intervention. Of these students, 526 students completed the postprogram questionnaire 4 weeks after the attending the educational intervention. Response to the preprogram and postprogram questionnaires was voluntary and anonymous. The educational program was the ENA’s Institute for Injury Prevention/ENCARE: Dare to Care: Alternative Teen Program and was presented by Emergency nurses from the local chapter of ENA. Although all presenters were trained by the state ENCARE Chair, consistency of the presenters was not formally validated. All presenters were given a copy of the preprogram and postprogram questionnaire. The program was 45 minutes long, which included time for questions. The pre- and post-questionnaire consisted of 10 educational questions (designed to determine if there was less reported information was collected confidentially prior to the program and 4 weeks after the attending the program. Students placed their responses in a nonidentifying envelope, and the questionnaires were marked by an x or circle. A pilot study was completed on the questionnaire to determine test/retest reliability. Scores (questionnaires and self-report data) were analyzed with the Chi-square test to assess preprogram and postprogram changes. Significance was assessed at P < .05.

Outcomes: Statistical significance (P < .05) was reported in the following areas: males reported an 8% decrease in riding with a drinking driver and a 12.4% increase in “always used” seat belts; male drivers reported a 19% increase in “always used” seat belts; all students reported a 9% increase in “always used” seat belts; male and female drivers reported a 11% increase in “always used” seat belts; males and females (<16) reported an increase in “sometimes used” seat belts. Additionally, though not statistically significant, males reported a decrease in number of times they rode with a driver under the influence of alcohol.

Recommendations: This study demonstrated that educating adolescents about restraint use, illegal substance use, and the tragic consequences of driving under the influence promoted positive behavioral change. Self-report can be a limitation as respondents can bias the results by giving misinformation. We recommend that others interested in reducing preventable adolescent death and injuries consider teaching the Dare to CARE: Alternative Teen Program. In addition, continued evaluation of observed and self-reported behavior change is needed to document the effectiveness of this alcohol, drug, and injury prevention program.


Injury Prevention Topic: Injury prevention is one of the fundamental goals of emergency nursing. The profession devotes many hours to educating the public about safety issues, yet emergency nurses infrequently collaborate with media to promote their message. This project is intended to demonstrate how emergency nurses can utilize the media effectively to disseminate information about injury prevention in the community through television and newspaper communications.

Implementation: This project has involved collaboration between one emergency nurse and the public relations department of a local hospital within a large, university-based health system. Using various injury prevention topics, the author has gained experience by writing and submitting 3 press releases and writing 4 articles for a regular children’s news column, “Kids Call the Shots.” Four television interviews on injury prevention and one news item featuring a car seat safety clinic have occurred and will be available for viewing.

Outcomes: The project has been successful on several levels. The author has gained knowledge and experience related to identifying media resources and communicating with those resources so that injury prevention stories will be given exposure to the public. Local media have identified that emergency nurses (and nurse practitioners) can be used as clinical experts.
for such topics, and the author is now solicited for contributions. The public has benefited from both the written and visual presentations and have given positive verbal feedback.

**Recommendations:** Emergency nurses involved in injury prevention topics should learn techniques for communicating with their local media to educate the public, reaching larger segments of the population. Educational sessions or handouts on writing press releases and presenting oneself during television interviews are highly recommended. Emergency nurses can also notify their institution’s public relations department that they are willing to contribute to articles or interviews with the department’s guidance. Other forms of media, such as periodicals or radio, are another avenue for exploration.

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27. Increasing Car Seat Safety: A Multidimensional State Council Initiative. *Meg Douglass, RN, MSN, ACNP, Diane S. Steele, RN, Mary Lou Forster Resch, RN, Ernestine M. Williams, RN, Marylou S. Moeller, RN, BSN, CS, Glen Wiffin, RN, Andrea Novak, RN, Janice Hales, RN, Melody Sides, RN, Durham Emergency Physicians/Durham Regional Hospital, 1103 Whiston Dr, Apex, NC 27502*

**Injury Prevention Topic:** The North Carolina State Council of the Emergency Nurses Association is committed to the concept of primary prevention through public awareness and education. An issue of great concern to the Council has been the lack of understanding by the public about the importance of car seat use, including the need to discard seats that have been involved in a motor vehicle crash of enough severity to render them useless. Currently, North Carolina State law does not prohibit the sale of used car seats in yard sales or consignment stores. The State Council has initiated a multidimensional project to address this issue on several levels.

**Implementation:** The initial goal of the project has been to educate the public regarding car seat safety in general, as well as the criteria for safe seat use after a motor vehicle crash (MVC) as established by the National Highway Traffic Safety Administration (NHTSA). This public education included a media campaign involving one newspaper article for both children and a television spot highlighting a safety seat clinic for national Child Passenger Safety Seat Week. Our Government Affairs, Injury Prevention, and Educational Committees are working collaboratively to address this issue by pursuing state legislators to sponsor bills prohibiting the sale of used car seats and allowing EMS and law enforcement to place an identifying sticker on any seat involved in an impact that mandates. Emergency nurses should educate any person involved in a motor vehicle crash in which a safety seat is involved to inspect the seat following the NHTSA criteria. Teaching guides for this purpose should be made available.

**Recommendations:** Car seat safety is a national issue and should be addressed at that level as well. Using North Carolina and Pennsylvania as examples, the Council should proceed with such discussions, collaborating with the ENA Government Affairs Committee to encourage a change in federal mandates. Emergency nurses should educate anyone involved in a motor vehicle crash in which a safety seat is involved to inspect the seat following the NHTSA criteria. Teaching guides for this purpose should be made available.

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28. Firearm Safety. *Dixie Kirkland, RN, Grand View Hospital, Kettering Medical Center Network, 405 Grandview Ave, Dayton, OH 45405*

**Injury Prevention Topic:** In the United States, approximately 18,000 children younger than 15 years are treated annually in emergency departments for unintentional firearm-related injuries. There is little debate that children and guns are a deadly combination. This purpose of this project was to adults and children about firearm safety through multiple outlets in 3 distinct demographic areas: urban, suburban, and rural.

**Implementation:** The motivation to develop this program began after a tragic incident involving a friend and subsequently learning that gun locks are available at no charge. After gathering information on gun locks and gun safety, the hospital administrators were approached about launching its own gun lock program. Firearm safety information and free gun locks were made available at a local hospital. Other sponsored events included open houses at fire stations, poster presentations at community affairs, PTA meetings, and question and answer sessions at school functions. These programs provided information on gun safety and responsible ownership and distributed free gun locks to participants. Attendance was approximately 55 people per event. Promotion of the program was done by “word-of-mouth” advertising along with coverage by the local media.

**Outcomes:** This is a grassroots/hands-on program. The evaluation tool is a simple written survey given to participants both before and after the program presentation. Questions pertained to basic safety, comfort with application of the lock, and appropriate reaction when unexpectedly encountered with a gun. Telephone surveys were conducted 6 months after the presentation to gauge retention of the principles learned. Of 120 participants contacted for the 6-month follow-up, 50% continue to use their gun locks, 15% were not using the lock (citing having to keep the firearm unloaded as an inconvenience), 30% used the locks most of the time, and 5% had no response.

**Recommendations:** Many caregivers, especially ED nurses, struggle to find ways to combat preventable firearm injuries. Once exposed to a firearm safety program, many become eager to help. Prior to the hospital program, personnel gave
little thought to gun safety. Today, gun locks and related information are available 24 hours a day at all hospitals in our network. Continuing to mentor peers to expand the interest in gun safety is a key goal. It is equally important to collaborate with other businesses to disseminate gun safety information to a larger audience. Public service announcements and articles in neighborhood/family sections of area newspapers also can be utilized. Establishing more gun lock distribution points and firearm safety information throughout the community also must be done.


29. Traumatic Injuries in the Pediatric Population. Cindy Magnole, RN, Audrey Stewart, RN, MSN, Vanessa Plunkett, RN, BSN, Valerie T. Thompson, MD, Jackson Memorial Hospital Emergency Care Center, 1611 NW 12 Ave, Miami, FL 33136

Injury Prevention Topic: In an attempt to describe, understand, and prevent injuries in children, an audit was performed on all traumatically injured children treated in our pediatric emergency department over an 18-month period. This audit was designed to identify how children were injured, what ages are most susceptible to injury, which injuries are most prevalent, and where these injuries occurred.

Implementation: A retrospective chart review of all patients seen in the pediatric emergency department was performed between July 1, 2002 and December 31, 2003 to identify pediatric patients with a traumatic injury. Over this 18-month period, 45,011 patients younger than 17 years were treated in the pediatric emergency department and 6031 were deemed to have sustained a traumatic injury. The number of injured patients seen, age, sex, date and time of injury, place of injury, type and mechanism of injury, and inpatient admission or discharge home were the variables of interest.

Outcomes: The results indicate that 2- to 4-year-olds and 11- to 13-year-olds are at greatest risk for traumatic injuries, followed closely by adolescents 14 to 17 years old. Falls were the leading mechanism of injury in 37% of the sample, 6% of which were falls from beds. Sports-related mishaps accounted for 12% of the injuries. Lacerations were the most prevalent type of injury (25%), followed closely by fractures (23%). Most of these injuries (39%) occurred in or around the home, while only 14% occurred at school. Male patients (65%) accounted for the majority of the injuries treated in the pediatric emergency department sample.

Recommendations: Given the prevalence (58%) of traumatic injuries in the 2- to 4-year-olds and 11- to 13-year-olds, it is imperative to disseminate information on injury prevention through clinics, schools, clubs, and other organizations working with children and adolescents. Educational programs (ie, Safety Day demonstrations) that focus injury prevention education toward high-risk age groups and the most common mechanisms and types of injuries also must be a goal. Coaches and athletic directors should be targeted for injury prevention education in an attempt to decrease the number of sports-related injuries that occur. Educating medical and nursing staff to improve documentation on the location and mechanism of injury, as well as encouraging use of protective gear and restraints such as seat belts, car seats, and bicycle helmets also may help in the overall injury prevention efforts to reduce traumatic injuries in the pediatric population.


30. Education to Increase Safety Behaviors of Children Who Hunt With Their Parents. Mary Alice Vanhoy, RN, CEN, BSN, NREMT-P, Shore Health System, 219 S. Washington St, Easton, MD 21601

Injury Prevention Topic: The tradition of hunting often is passed from generation to generation. For some families, hunting is a family event. While the family hunting tradition is common in many areas, the extent that firearm safety information is shared among family members is concerning. The Annual Report of Hunting and Hunting Related Incidents showed that for children 1 to 19 years old, there were 173 and 111 mishaps in 1999 and 2000, respectively. The data include both fatal and nonfatal mishaps for 2-party and self-inflicted incidents. In 2004, a 12-year-old was killed in our county because of a crossbow (which is illegal) mishap. However, the data does not include firearm deaths and injuries related to falls, exposure, submersion, and other nonweapon incidents. The purpose of this project was to augment currently developed firearm safety awareness programs in order to focus on the children who hunt with their parents.

Implementation: The safe hunting family project targeted families with children ages 4 to 16 years old who were residents of the rural Eastern Shore in Maryland. The children included were 4- to 10-year-olds who do not carry a bow or gun and adolescents and 10- to 16-year-olds who actively hunt. A poster reflecting safe family hunting was designed, which included the use of personal flotation devices while duck hunting, the use of safety straps in a tree stand, correct movement with a gun, and the use of a bow. Children are pictured hunting while demonstrating specific safety measures. This poster was developed and disseminated in collaboration with the other safety programs as part of an Emergency Medical Services for Children (EMS-C) Special Project. These posters were distributed in bulk (more than 500 total) to all the EMS-C Coordinators in the United States, at EMS conferences across Maryland, all sporting goods stores, wildlife management areas, and Department of Natural Resources offices on the Eastern Shore.

Outcomes: Evaluation of the effectiveness of the poster included the return demonstration of the children in stores or classes of gun and hunting safety techniques along with verbal feedback from both youth and family. The youth were asked to give examples of safety hunting in different scenarios. The long-term effectiveness of the posters to improve safe family hunting has not been quantified, other than knowing how many posters were distributed and to which locations.
Recommendations: Hunting is a part of life in many areas and provides time for family interaction. However, the youth hunter and family must maintain vigilance so that safety is always on each person’s mind. In addition, a formal evaluation of the posters should be conducted to verify that the message is reaching the target audience, from which this information would be used to adjust poster content accordingly.


31. Family Preparation for Responding to Disasters. Mary Alice Vanhoy, RN, CEN, BSN, NREMT-P, Shore Health System, 219 S Washington St, Easton, MD 21601

Injury Prevention Topic: Disasters can occur with warning (eg, fires, tornadoes, earthquakes, mudslides, power outages, or man-made events). Disasters, actual or anticipated, are extremely stressful events for a family, especially the children. Involving the children in the development of a plan for response will decreasing anxiety by increasing their understanding of the event and provided a pre-established and practiced plan of response for the whole family.

Implementation: The program was implemented by means of a combination of formal and interactive presentations. These programs, which included handouts and displays, were held at local community centers and health/safety fairs on the Eastern Shore of Maryland. The initial target population was children in Kindergarten through 6th grade because of funding received from the EMS-C program; however, parents requested additional information on family disaster planning to include the senior members of the family. The revised program focuses on the personalization by each family of a “Plan for Response,” including local and out-of-area emergency contacts, management of utilities, organization of evacuation, preparation of disaster/evacuation kits, and the preplanning of pet relocation, a major stressor for adults and children. Families identified 3 potential disasters in making their personalized response plans. Evaluation of the response plan required the family members to identify an out-of-state contact and the listing of 10 items for a disaster/evacuation kit.

Outcomes: The success of this program was demonstrated in 2003 during Hurricane Isabel as families prepared to evacuate or shelter in place. As part of the preplanning process, disaster kits were prepared and utilities were turned off. The school system has enhanced their databases to include emergency contact located on the Eastern Shore given that parents may be separated from their children due to Bay Bridge closures. The effectiveness of this program was assessed during the evacuation and community follow-up after Hurricane Isabel. Upon arrival of emergency equipment, many families were found with their utilities shut off, secured homes, and kits ready to leave. Observationally, it was noted by rescuers that families with young children were better prepared to evacuate than the elderly were. We were unable to assess the gauge the levels of stress because the impact of the storm was greater than predicted with more damage that lead to very high and long-term stress levels. A significant impact was that there were no life-threatening injuries or loss of life.

Recommendation: This project is part of an ongoing EMS-C grant (Kids in Disasters). Future projects as currently being discussed with the Community Emergency Response Teams to provide additional learning opportunities in disaster management or response within their neighborhoods. This program has an all-hazards application so it can be utilized for any natural or man-made disaster in any part of the country. It is vital that every member of the family is prepared and practiced in the management of any type of emergency. This preparation can lead to decrease in injury and loss of life. The next step on the Eastern Shore of Maryland is to expand this to schools and businesses so that they can learn how to effectively prepare for a disaster.


32. Teaching in Tandem: Injury Prevention in Children and Adolescents. Elizabeth Bayley, RN, PhD, Lynn E. Kelly, RN, PhD, Widener University School of Nursing, 1 University Place, Chester, PA 19013

Injury Prevention Topic: Injury is America’s number one public health problem affecting children older than 1 year. Yearly, 150,000 children die and 600,000 are hospitalized due to injuries in the United States. As faculty for a university that prepares advanced practice nurses, we recognized the need for greater knowledge of injury prevention among our students.

Implementation: Combining our expertise in pediatrics, emergency care, and curriculum development, we created a 3-credit elective course to provide graduate students with a comprehensive perspective on injury. Risk factors for and mechanisms of injury are addressed from a developmental perspective, prenatal through adolescence. Haddon’s Model of Injury Control guides analysis and evaluation of specific measures advanced practice nurses may implement to reduce injury morbidity and mortality. Central concepts of education, environment, enforcement, and economics are applied to prevention strategies. Student assignments involve extensive use of the internet to gather epidemiologic data and resources for prevention strategies. Videos, research reports, and curricula provided by governmental, professional, and consumer organizations, for example, the ENA, the Centers for Disease Control and Prevention, the American Trauma Society, and the National Safe Kids Campaign, actively engage students in learning. Students write an injury prevention article for a lay publication and develop an injury prevention project for a specific population that they then implement in the community.

Outcomes: The course has been offered 4 times in various formats, including 3 hours weekly over a semester, twice weekly for a 6-week summer session, and monthly all day. Enrollment has included 35 graduate nursing, school nurse, and health education students. Consistent positive student evaluations indicated increased awareness of risk factors for injury, greater knowledge of injury prevention strategies, and improved capacity for leading efforts to reduce injuries in their communities.
**Recommendations:** This course could easily be replicated in other colleges and universities. Social work, physical therapy, sports medicine, and education majors are among others who would benefit. Expanding this course to other majors and undergraduates and developing an online version are future possibilities.

**34. Traffic Safety for Diverse Populations.** Yvonne A. Michaud, RN, BSN, CEN, Haitian Creole, Khmer, Portuguese, Russian, and traditional Chinese. Based on the findings from the environmental scan, educational materials on the 4 priority topics were developed in each of the 5 languages identified. The educational materials are available in portable document format at [http://bidmc.harvard.edu/injuryprevention](http://bidmc.harvard.edu/injuryprevention).

**Recommendations:** Accurate data regarding race and ethnicity of those injured in traffic-related events is very limited. Injury prevention programs may begin to identify populations at risk through the examination of readily available census data. Complementing specific injuries according to race/ethnicity is a challenge. As populations continue to diversify, more work needs to be done to ensure education is available.

**Recommendations:** This course could easily be replicated in other colleges and universities. Social work, physical therapy, sports medicine, and education majors are among others who would benefit. Expanding this course to other majors and undergraduates and developing an online version are future possibilities.

**33. Traffic Injury Prevention Program.** Elizabeth Fiegel, RN, BSN, CEN, Sandra McCarty, RN, BSN, UTMB Healthcare Systems, 301 University Blvd, Rt. 0116, Galveston, TX 77553

**Injury Prevention Topic:** In Texas (1999), teen crashes accounted for 76% of all teen deaths caused by unintentional injuries. More than 20% of persons injured in a motor vehicle–related event were between the ages of 15 and 24 years old. The purpose of this project is to reduce the incidence of teen motor vehicle–related crashes by providing an injury prevention field trip program to teens (TIPP). Prehospital, hospital, and law enforcement are core components of the program. The message is proactive and positive in addressing driving safely and being aware of the lifetime impact of driving under the influence–related motor vehicle crashes.

**Implementation:** Students receive a teen drinking/driving crash scenario with hands-on education from EMS and the Fire Department in the extrication/resuscitation of victims from a wrecked vehicle. The participants escort “patients” to the trauma rooms for the resuscitation. The resuscitation is conducted in “real-life” simulation with nurses and physicians describing the patient’s injuries and treatment. The patient is taken to the burn unit where students learn about the burn treatment requirements. Physical appearance is significant to teens and this portion of the program gives impact on self-perception. To learn the long-term effects of drinking and driving, participants hear from physical therapists about the treatment of spinal cord injuries and other debilitating injuries. The day ends with an open discussion that is shared as a result. The theory behind TIPP is that by exposing teens to a traumatic scenario, the imprint of the sights, sounds, and the odors are recorded in the teen’s experience and can become powerful stimuli (toward injury prevention and behavioral change) in the future.

**Outcomes:** TIPP has been presented 15 times to approximately 1000 students. A pretest, posttest, and evaluation tool is administered. The subjects tested were between the ages of 16 and 18 years. Subjects (95%) scored less than 100% on the pretest. However, these same subjects scored above 95% on the posttest, demonstrating increased comprehension of the dangers of drinking and driving. The evaluation tools reveal that students were affected with “real-life” hands-on participation in the resuscitation of crash victims and by the “real-life” discussions with survivors who sustained (preventable) injuries.

**Recommendations:** A multidisciplinary and collaborative effort from different agencies is recommended, that is, hospital, prehospital, fire, and police. The main challenge for this program’s success is in obtaining adequate funding for work force to track, evaluate, and measure the outcomes.

**Injury Prevention Topic:** Injuries continue to be a serious health problem worldwide and account for more lives lost than any disease entity. In accordance with Healthy People 2010 objectives, efforts to reduce deaths and nonfatal injuries can be directed towards increasing usage of safety belt and child restraint devices for all occupants involved in motor vehicle crashes. US Census data reveal that immigration accounts for more than 31% of the shift in demographics of people within the United States since 1990. The projected impact on racial/ethnic groups is a rise of 15% within those electing to reside in the United States. Since 1998, Massachusetts has seen a steady rise in overall crash-related fatalities. A gap exists in the educational materials available to diverse populations or emerging linguistic groups within our state.

**Implementation:** Grant funding was provided through the National Highway Traffic Safety Administration to Beth Israel Deaconess Medical Center, in Boston, Massachusetts, to develop traffic safety materials for diverse populations. Identification of the existing diversity with the state was conducted using 2000 US Census data. Of the state’s total population of 6.3 million residents, there were positive gains in the following racial/ethnic groups: 16% Black, 49% Latino, and 70% Asian or Pacific Islander. Utilizing reports of hospital discharge data from the Massachusetts Division of Health Care Finance and Policy, as well as crash data from the Governor’s Highway Safety Bureau, the incidence and mechanisms of injuries were examined. The project coordinator conducted online and telephone queries of state and national traffic safety organizations and outreach programs looking at prevention topics, languages available, and medium (such as brochures, cards, or other materials) to steer the project.

**Outcomes:** The steady rise of traffic-related injuries and fatalities, coupled with the historically low safety belt use within the state, indicated a need for educational materials focused on the following 4 traffic topics: child passenger, restraint use, pedestrian, and bicycle safety. The languages selected were Haitian Creole, Khmer, Portuguese, Russian, and traditional Chinese. Based on the findings from the environmental scan, educational materials on the 4 priority topics were developed in each of the 5 languages identified. The educational materials are available in portable document format at [http://bidmc.harvard.edu/injuryprevention](http://bidmc.harvard.edu/injuryprevention).

**Recommendations:** Accurate data regarding race and ethnicity of those injured in traffic-related events is very limited. Injury prevention programs may begin to identify populations at risk through the examination of readily available census data. Complementing specific injuries according to race/ethnicity is a challenge. As populations continue to diversify, more work needs to be done to ensure education is available.
As health care advocates, consider supporting systems that accurately collect data relating to race/ethnicity to reflect populations at risk.


**35. Get it Together Challenge.** Maribeth Pierce, RN, MSN, CCRN, Hackensack University Medical Center, 226 Columbus Ave, Hasbrouck Heights, NJ 07604

**Injury Prevention Topic:** The purpose of this injury prevention challenge was to increase safety belt use among teens through education and dissemination of analyzed results from unannounced safety belt checkpoints. Recommendations for improving safety belt use in this age group were shared with all participants to develop strategies for injury prevention initiatives.

**Implementation:** In September 2003, Hackensack University Medical Center’s (HUMC) Trauma team sent a letter to local high school principals inviting them to participate in an injury prevention initiative called the Get it Together Challenge. This program (created by the Drive Smart Foundation from Colorado Springs, Colo) uses data on teen safety belt use collected at 2 unannounced checkpoints conducted at high school entrances. The checkpoints are held before and after injury prevention education. The goal is to show an increase in safety belt use among students after injury prevention education. The letter also outlined the school’s staff and volunteer commitment, unannounced checkpoint dates, the education schedule, and lastly, the program’s end date. As an incentive, each school was promised a plaque, the school with the highest safety belt use would win $750, and the most improved safety belt use school would win $500. Five local schools accepted the challenge. Teachers, students, and town police from the 5 schools attended a launch breakfast on October 1, hosted by HUMC’s Trauma team, which explained the program goals and instructions on checkpoint data collection. Checkpoints require 2 to 3 people at each school entrance, counting only students, recording safety belt use (all passengers and driver). The police and trauma team taught the injury prevention programs after the first checkpoint. Participant kits containing contact phone numbers, checkpoint collection forms, instructions, and program evaluation surveys were distributed. From October 10 to 17, the first checkpoints were completed and baseline teen safety belt use data were collected. Police issued phony traffic tickets to unbelted student drivers. Injury prevention lectures were held from October 20 to 31 and included programs such as ENA’s Institute for Injury Prevention/ENCARE’s Dare to Care Program, HUMC’s video Stoned Cold, a DWI re-enactment video, and police speakers. The second checkpoints took place from November 3 to 7. A week later (November 14), an Awards luncheon for the participants was hosted and the Get it Together Challenge results were disseminated.

**Outcomes:** Injury prevention education affected teen safety belt use by an overall increase from 831/1620 = 51% (Checkpoint No. 1) to 752/1450 = 52% (Checkpoint No. 2). An observational survey conducted at 12 high schools in the United States found that 46% of high school students were not wearing their safety belts when riding with adult drivers. Front seat passenger use increased from 488/904 = 54% to 436/800 = 54.5%. Driver use increased from 192/288 = 67% to 182/244 = 74.5%. Back seat use decreased from 151/437 = 34.5% to 134/406 = 33%.

**Recommendations:** Safety belt use among teens remains low, despite injury prevention efforts. Creating partnerships between law enforcement, teachers, parents, and emergency nurses to increase awareness and support tougher laws may be the first step to increase overall safety belt use in this population.

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A 27-year-old Man
With Marfan Syndrome and “Tearing” Nonradiating Chest Pain

27-year-old man presented to a community hospital with severe, “tearing,” and nonradiating chest pain. His vital signs were as follows: temperature, 37°C (98.6°F); respiratory rate, 24 breaths per minute; heart rate, 122 beats per minute; and blood pressure (BP), 170/111 mmHg. The patient had Marfan syndrome, but other medical history information, including current medications, was unavailable. An EKG done in the emergency department revealed no acute ischemia, and results from a complete blood cell count, electrolyte panel, and cardiac enzymes were unremarkable. However, a spiral computed tomography scan of the patient’s chest revealed an acute dissecting aortic aneurysm in his ascending aorta. To reduce cardiac workload and prevent further shear injury, the ED staff started an esmolol infusion at 50 μg/kg/minute, titrated to keep his heart rate at around 100 beats per minute. They prepared to transfer the patient by helicopter to a tertiary medical center for further evaluation and possible surgical intervention.

The flight crew arrived to find a young man who was alert and oriented but who was anxious and complained of chest pain. He rated his pain as 6 on a scale of 10 but had no shortness of breath. His vital signs at this time were as follows: BP, 190/110 mmHg; heart rate, 128 beats per minute; respirations, 32 breaths per minute; and temperature, 37.2°C (99°F). Physical examination revealed a tall man, approximately 193 cm (6 foot 4 inches), with an elongated face, large hands and feet, and congenital ectopia lentis (dislocation of the lens of the eye, in which the lens appears markedly off center). He also had pectus excavatum (ie, inward displacement of the sternum).
The flight crew increased the patient's esmolol infusion to 100 µg/kg/min and administered 100 µg of fentanyl for his pain. Within 5 minutes, the patient’s heart rate decreased to 100 to 106 beats per minute, and his BP maintained at 150 to 160 mmHg systolic and 90 to 100 mmHg diastolic. The goal of the flight crew was to lower his mean arterial pressure no more than 25%.

In patients with Marfan syndrome, the media, or middle layer of the aorta, is thin and weak, leading to widening of the aortic root with possible thoracic aortic dissection.

Upon arriving at the receiving emergency department, the cardiothoracic surgical team rapidly assessed the patient and took him directly to the angiography suite for an aortogram. The test results confirmed the presence of an evolving, dissecting aneurysm of the ascending aorta. The patient underwent a repair and grafting of his aneurysm and had an uneventful hospital course.

Discussion
Finding clues to help sort through the lengthy differential list for chest pain can lead to more rapid and accurate diagnosis and treatment. Our patient was known to have Marfan syndrome, a degenerative, inherited disorder that alters the chemical makeup of the body’s connective tissue, affecting bones, muscles, ligaments, and skeletal structures. Besides its obvious function, connective tissue supports the blood vessel walls and heart valves. In patients with Marfan syndrome, the media, or middle layer of the aorta, is thin and weak, leading to widening of the aortic root with possible thoracic aortic dissection. This condition accounts for most cases of sudden death in patients with Marfan Syndrome.1

Even if we did not know that our patient had been diagnosed with Marfan syndrome, we noted his “marfanoid” appearance—tall, lanky frame, pectus excavatum, large hands and feet, and ectopia lentis. These characteristics are pathognomonic for the condition. Most patients are taller than average for their age and family, with arm span exceeding height, and many have a positive family history of Marfan syndrome.2 Patients also have abnormal joint flexibility, scoliosis, flat feet, and a “stooped” appearance. In addition, our patient was very thin; subcutaneous body fat usually is sparse in patients with Marfan syndrome. Facial features often are narrowed.3

Diagnosis of this patient revolved around recognizing his increased risk for aortic dissection. Because of this risk, patients with Marfan syndrome should see a cardiologist for routine testing and close monitoring for aortic disease. β-Blocker therapy remains the cornerstone of treatment to prevent aneurysm formation.3 Patients with asymptomatic aneurysms may have prophylactic surgery, especially if the aortic diameter increases beyond 4 to 6 cm.4

REFERENCES

This section features actual emergency situations with particular educational value for the emergency nurse. Contributions (4 to 6 typed, double-spaced pages) should include a case summary focused on the emergency care phase, accompanied by pertinent case commentary. Submit to:
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Meeting the Challenge: First Person Accounts of Florida Nurses’ Courageous Response to the Hurricanes of the Fall of 2004

The 2004 hurricane season was forecast to be an active one, and that prediction turned out to be only too accurate. According to the Federal Emergency Management Agency (FEMA), the aftermath of the hurricanes in Florida involved the largest relief effort ever undertaken by that agency. An organization called “Volunteer Florida” claims that the worth of donations of materials and time by individuals and corporations had totaled over 67.3 million dollars by the end of October 2004.

Hurricane Jeanne was the fourth in a series of powerful hurricanes* to hit Florida in just over 6 weeks. The dangers inherent in hurricanes include not just wind and rain damage, but flooding, tornadoes, lightning, and storm surge. Many of the nurses I spoke with, both by phone interview and at the annual ENA conference, said that residents were “shell-shocked” by the time Jeanne was approaching, too weary to respond much to warnings, with a fatalistic, “whatever happens, happens” attitude.

Hurricane Charley arrived in Punta Gorda on Friday the 13th of August, slamming into this west coastal city and traversing diagonally through the state in a northeastern direction, leaving as a still-powerful hurricane just north of Daytona Beach. Terri Rohraff experienced this storm. She is the ED Clinical Coordinator at Bon Secours St. Joseph Hospital in Port Charlotte, just northeast of Punta Gorda. They were prepared, she said, but never expected that it was going to be a direct hit. “Charley was

*The 4 major Florida hurricanes were Category 2 (Frances, with winds 96-110 mph), Category 3 (Ivan and Jeanne, with winds 111-130 mph), and Category 4 (Charley, winds 131-155 mph). They struck Florida during a 6-week period from August 13th to September 25th, 2004.
supposed to hit just north of Tampa as a Category 1 or 2 (winds of 96-110 mph) and it was not until about an hour before the storm that we realized we would take a direct hit, and as a Category 4 (winds of 131-155 mph). They experienced winds of 145 mph, with a 20-foot storm surge. The hospital was prepared to evacuate upward, anticipating flooding from the original forecast. “That never occurred. We got wind, and the whole roof was taken off.” The ICU had been evacuated to the 4th floor, but was taking in water and wind. The nurses there described what they thought were windows rattling, but was, in fact, the metal casing on the windows being twisted. ICU patients were moved again, out into the hallway. “The storm lasted 2½ hours; vented patients were bagged for the whole time.” Terri relates a scary period when the 4th floor Clinical Coordinator came over the intercom in the command center, saying they needed to evacuate. As the stairwell door was opened, after first needing to overcome wind pressure, a waterfall was cascading down the steps from all the destroyed vents up on the roof. After the storm ended, those patients were again relocated, to the 3rd floor.

Terri relayed that the emergency department was brand new and apparently very well built. “You wouldn’t even have known there was a storm going on.” The wind could be heard, and bent-over trees were seen through the trauma doors. “We were safe in the ER; no window damage, no flooding.” Amazingly, no staff or patients were injured. They saw their last patient about 15 minutes before the storm hit, and did not see another patient come in until about 15 minutes after it ended. Communications were down: EMS radios and emergency phones were not working. The staff had no idea what was coming through their door. The other two hospitals in Port Charlotte had to evacuate due to extensive damage. “We went from seeing 60 patients/day to over 130, overnight.” Terri describes the biggest problem as being without water. “We had bottled water to drink, but the simple issue of not being able to flush toilets became a major problem.” By 10 am the day after the hurricane, it was 85 degrees. Port Charlotte has largely an older population, and the lack of water for drinking and sanitation and electricity for air conditioning took a rapid toll. Patients with dehydration, cardiac, respiratory, and sepsis problems started rolling in. No other emergency department in the county was open, and the staff was determined to serve their community.

Terri remembers: “Every nurse told me ‘We have got to stay open. We’re all that’s here.’ I cannot say enough about how wonderful each and every one of them was.” She describes a closeness and a bond among the staff in the emergency department. “They are covering for and taking care of each other,” when needing time off to get homes repaired, see insurance adjustors, and meet with FEMA representatives. Most have found temporary housing with friends, family, and coworkers. The Bon Secours family has donated money to help employees cover the deductibles for insurance claims.

Staffing plans revealed areas for improvement. “Teams had been set up: ‘A team’ for prior to and during the storm, and ‘B team’ for relief after the storm. The problem was that there was so much debris in the road, B team couldn’t get in.” The A team worked for 36 hours before B team started straggling in. “It really never crossed our minds that there would be so much destruction that they wouldn’t be able to get here.” Terri, laughingly, says that someone in the hospital commented that disaster plans work for about the first 7 minutes, and “after that, you get real. So true!” All staff was told that they could bring their families and pets to the hospital. “On a personal note, I found out that 4 people can sleep on a queen-sized blow-up mattress!” Families were all over; there was a general feeling of not wanting them far away. “Everyone gained a better appreciation of each other, of their families and community, and of our fire, EMS, and police.”

Terri commented on the presence of Disaster Medical Assistance Team (DMAT) personnel, and their invaluable contribution to the Port Charlotte community. “They showed up the day after the hurricane, came in, and said, ‘We have physicians and nurses at your disposal. Where do you want us?’ They set up their tents and saw all of the urgent care, ‘walking wounded’ patients for the first couple of days, then moved over to Charlotte Regional Medical Center, because they had no emergency department at all. Five nurses and a physician remained at St. Joseph’s to help them. Staff absolutely loved them. DMAT helped us; they cheered us on. They were phenomenal—above and beyond. There was almost a sense of separation anxiety when they left.”

Terri brought up some interesting points about transferring patients to other facilities. By 11:30 pm Saturday night (the storm hit on Friday), all their inpatients had
been transferred out; the emergency department was the only service open. Its function was to treat and release, or stabilize and transfer. “We had to find a way to get computer access to get onto MapQuest. EMS personnel were coming from as far away as Orlando and Miami to transfer our patients. They had no clue as to where hospitals were, say, in Tampa.” Signs on highways were gone, lights torn off, landmarks nonexistent. “You don’t think of these things ahead of time. Go on MapQuest. Print out maps to all hospitals within 100 miles of you. Reproduce them as needed.” Transfers were incredibly easy. A hospital in Tampa, Miami, or Orlando would be called and told that St. Joseph’s had a female patient for transfer. No provider-to-provider reports were needed; no EMTALA violations. “OK” was the reply from the potential receiving hospital—“That was it! ‘OK.’” Ambulances lined up in the parking lot were literally flagged down. The nurse would run out and say “I need an ALS ambulance”; a crew would reply “we’re next up” and load the patient, going with whatever map they could find. Terri sums it up: “The whole state was unbelievable.”

The hospital gave staff members a t-shirt, with the date of Hurricane Charley on the front. On the back, words proclaim “Because of me, Bon Secours-St. Joseph was able to provide care to the citizens of Charlotte County before, during, and after Hurricane Charley. Because of me, we were able to help countless individuals affected by the storm. I worked around the clock during our community’s time of need. My service and dedication is a true tribute to both my profession and this community. I made the difference.” “My husband says it’s just a t-shirt,” says Terri, “but I know better. This is something I will wear with pride. This was given to everyone on my staff, and we all feel the same way.” She concludes, “We definitely did learn. Our second hurricane went much better than our first. I hope if I am ever in another hurricane, I’m with the same people I’m with now. They are definitely the heart and soul of St. Joe’s.”

Julie Eidenberger is a senior nursing student in the baccalaureate program at Florida State University, Tallahassee. Fifteen classmates and 2 faculty members traveled to a Brevard County shelter to work for a week after Hurricane Frances. Frances made landfall near Jensen Beach on the east coast, between Cocoa and Vero Beach. The Category 2 storm arrived around 1 am on the Sunday of Labor Day weekend. It crossed the state and exited Florida just northeast of Tampa as a tropical storm, then made a second landfall near Tallahassee the next afternoon. Unlike Charley, which will be remembered for wind damage, Frances will be remembered most for flooding, including freshwater and tidal storm surge. Up to 14 inches of rain fell on affected areas.

The Dean of Julie’s program contacted the Department of Health, letting them know of students interested in doing disaster relief. The faculty members were both public health nurses who had done hurricane disaster relief previously. Students were briefed and later debriefed by a nurse traumatologist. The day they arrived, Julie said the students felt “out of our league.” “What could we do?” Walking into a big room serving as a shelter in Lafayette Park on Merritt Island, they found everything totally disorganized. “No one knew who was there, where they were from, what meds they were on or needed.” The students set about talking with each person, getting the needed information and phone numbers of family members. With organization in place, they started bathing people who had been there almost a week with no hygiene. The next priority was getting them shaved and into clean clothes. Wound care was the next focus, working with public health nurses, midlevels, and doctors.

They cared for a variety of people who had no money and no way to take care of themselves. Word got out, and more people started coming in to the shelter. “There were lots of homeless. Lots of elderly, retired people, living on money from the state, no one taking care of them. Just having someone there to talk to made a big difference to these people.” The part that made the biggest impression on Julie was the faces of the people. The students took evacuees around to their houses to see if they had utilities. “One woman had everything; her house was in great condition, and she was crying because she didn’t want to leave us. She was hoping that everything would still be cut off and she wouldn’t be able to live at home.”

Julie reflected that “any nurse you talk to remembers how hard nursing school is. Your goal is just to get through it. I had lost hold of why I entered nursing school and what I wanted to become. Getting out there and actually helping these people was a reminder of what nursing school is all about.”
Hurricane Ivan arrived near Pensacola on September 16th at around 2 am. This Category 3 storm had winds of 130 mph, with a 16-foot storm surge. Major flash flooding, widespread beach erosion, and numerous tornadoes accompanied this storm; up to 16 inches of rain fell around Pensacola. Patty Kyzar, an Interventional Radiology nurse at West Florida Hospital (and a former ED nurse and Trauma Coordinator), said there was plenty of advance warning of the hurricane. “We were as prepared as we could be.” The hospital itself was not immediately felt to have sustained tremendous damage, but the 11-story medical office/clinic building adjoining it did. Several doctors’ homes were at the beach, and they had evacuated to what they hoped would be the safety of their offices, which then had extensive damage from rain entering wind-shattered windows.

Staff on duty at the time of the storm had to stay, because oncoming shifts could not get in to work. Bridges which carry many daily commuters and general travelers were washed out, including a major highway bridge on I-10. Patty’s home phone service was initially out for a day, then went out again when electricity was restored 10 days later. More than 2 weeks after that, it finally came back on. Water at her hospital was contaminated, but could be used for toilets. She said that staff at nearby Sacred Heart Hospital were not so lucky; they needed “bucket brigades” to pour water in toilets to flush them.

Obtaining generators became a nonstop priority; they were nowhere to be found locally (or anywhere in the state). Patty met a couple at a rest stop near Montgomery, Alabama, while they were filling gas cans. They had a generator shipped from San Diego to their Houston home, and were driving it to Pensacola to set it up for their elderly, sick parents. Most areas in Florida hit by any of the hurricanes were without power for approximately 14 days after the storm, and the constant hum of generators became a way of life. Patty says it was eerie when power came back on and generators started going off.

About 60 hospital employees lost their homes, either from being actually washed away or so damaged they were uninhabitable. One of the coronary care unit techs lost her home and the car parked there; she took the other car into work that night. When she went out to the hospital parking lot in the morning, there was one tree down on one car in the lot—hers! Patty described an astonishing moment when she realized that a large tree had fallen onto the road, right behind her car, while she was approaching an intersection.

Margie Hobbs, the Emergency Department and Trauma Services Director at West Florida Hospital, also serves with the local Emergency Operations Center. Heeding the predictions of the approaching storm’s force and projected path, the Pensacola community’s preparations began on Monday, 2 days prior to Hurricane Ivan’s effects on Wednesday evening. Elective surgeries were cancelled, and patients ready for discharge were sent home as early as Monday. Staff scheduled for Wednesday evening, Wednesday night, and Thursday day shifts were called in, and all department directors remained at work. The hurricane force winds did not abate until around 5 am Thursday. Emergency calls went unanswered for these hours, as it was unsafe for crews to be out.

Remaining inpatients were moved into hallways, away from plywood-boarded windows. Due to water problems, hemodialysis patients were transferred out after the storm. Several of Margie’s staff members lost their homes, and 5 have left their positions in the emergency department since the hurricane. West Florida Hospital had more than triple their usual ED patient volume for about 10 days, and their numbers are still up. Patients ran the usual gamut, plus storm-related injuries: puncture wounds, chainsaw lacerations, sprains and strains. Falls from roofs and trees kept the trauma service busy; neurosurgery was particularly hard-hit. There have been many respiratory complaints (initially related to oxygen-dependency, then the effects of lack of air conditioning, and now from mold problems). Hospital rooms which were cleaned after the initial water damage now need to be torn down and rewalled due to mold growth. This is happening in residential homes as well, and air quality is an emerging concern.

As a result of Margie’s staff vacancies and increased volume, “nurses are working their butts off. They are working very hard when they are at work, and picking up extra shifts as well, trying to cover a department which is pushed to the limit.” She estimates that she is spending about 75% of her time working clinically for coverage. Her staff is still “personally devastated,” and many have found shelter with friends and family. The hospital placed security deposits to reserve newly-constructed apartments for some staff unable to find other rentals.
Margie was generous in her praise of HCA, her hospital’s corporate owner. Supplies came from HCA much more quickly than from state relief agencies and the Red Cross. The biggest perk, she said, came in the guise of about 20 experienced emergency nurses, a physician, and a ward clerk. These professionals came from other HCA facilities across the country. Some even came from the West Palm area, which had been struck only a short time earlier by Hurricane Frances. “They knew exactly what we were going through and wanted to help.” Unfortunately, they had to leave after just a couple of days, because Hurricane Jeanne was coming, and they expected to be hit again. “These were wonderful, highly-skilled, fantastic ED nurses who walked in and said ‘tell me what to do’. That was the best help of all. As my staff fell apart, I could send them home and have another HCA nurse take over, so my staff could do what they needed to do.” Additionally, the DMAT teams, there for about a week, took a lot of the initial load off the emergency department. Margie concluded by saying “I was incredibly touched by how nurses can help each other.”

Mindy Yorke works in the emergency department at Holmes Regional Medical Center in Melbourne, Fla, a Health-First hospital. Her hospital is a 42-bed Level 2 department which normally sees 65,000 to 70,000 patients annually. The area was struck by Hurricane Jeanne on September 25th, making landfall as a Category 3 storm at almost the exact spot that Frances had 3 weeks earlier. “Jeanne did the most damage; there were lots of tornadoes after Jeanne.” At her hospital, they have a “before/during/after” list; employees sign up for their preference to work. They bring in a 3-day supply of water, food, and clothing for themselves, and day care is provided for the children of those working. Most staff members wanted to stay on the shifts they usually worked, and they were able to shower, eat, and sleep between shifts. They had an interesting system for relieving those on duty: each staff person had a “buddy” who replaced them, on a one-for-one exchange.

As in other areas, EMS stopped bringing in patients when winds reached 50 to 60 mph. The media stressed to the public not to go outside, as rescue personnel could not be sent out once winds reached a certain level, expected in so many hours. There was no significant physical damage to the hospital, but many of the ED staff lost their homes. As with the other hurricanes, DMAT crews were deployed. A team from North Carolina came after Frances, and a Florida DMAT responded for Jeanne. “They were wonderful, handling all the minor care cases, taking the load off the emergency department.”

The nurses had high praise for the DMAT crews, part of the National Disaster Medical System (NDMS). [NDMS used to fall under the US Public Health System (USPHS) until 9/11. Since the creation of Homeland Security, they fall under FEMA. Their benefits are vastly improved, and now DMAT members are paid for any unit activity (meetings, training, stocking, etc), not just when deployed, as when under USPHS. They are generally a regional group of volunteer medical professionals and support personnel who always work as a team, with the ability to quickly move into a disaster area and provide medical care. They can rapidly deploy for any type of disaster that requires an immediate medical response. Functions include triage, staging, and extended medical care. They are trained to function independently for 72 hours without any outside support.]

Karen Mulvaney, the CNS for Critical Care/ED/Progressive Care at Coral Springs Medical Center, part of the North Broward Hospital District, has worked with South Florida’s DMAT since shortly after 9/11. Her team was deployed to Charlotte Regional Medical Center in Port Charlotte for Hurricane Charley. Her 35-member team arrived at Punta Gorda at around 1:30 am, and they could easily see that the area was totally devastated. Large 15-foot highway signs were all twisted and torn down; concrete block buildings were demolished; power lines and trees were everywhere. They had a large convoy of trucks bringing in personnel and all their gear. As they approached the hospital, they saw that parts of the wall were actually shifted; the medical office complex’s roof was totally gone. After reaching the parking lot, tents were set up within an hour, and they started seeing patients. They had 3 care tents (triage, acute care, and critical care), plus a sleeping tent. South Florida DMAT is currently the only team in the country that has its own air conditioning units, and the community quickly took advantage of that. There was a high demand for nebulizer treatments and oxygen therapy. There was no way to refill oxygen tanks; phones were down and the durable medical equipment companies could not be contacted. The DMAT crews do not have a license to refill tanks, which was very frustrating for all involved. They set up a system for their recurrent
visit patients to make receiving the daily nebulizer treatments easier. Medications became an issue when power and water were out for days. People ran out of their medications, and pharmacies were not open yet. The Florida team was doing everything: being the local walk-in clinic, the pharmacy, the DME supplier, and the local hospital, because there was no functioning hospital in Charlotte county. “One of our concerns was how long will it take the community to recover, so people will not be lost in despair?” People were coming to their tent during the daytime, saying that the shelters would allow them to stay during the night only. “They had no where else to go. They had lost everything.”

Karen related a story illustrating the troubleshooting ability of nurses: a nursing home in Arcadia had to relocate patients down the stairs, and many were carried by staff. Those patients who were too heavy or immobile to carry were slid down the stairs on mattresses placed there by staff members. She said she heard many stories from other DMAT members recognizing nurses’ ability to stay sharp and focused despite sleep deprivation, hunger, and fear. In 11 days, their DMAT crew saw 1016 patients. “It’s hard to explain the comraderie,” Karen said. “Like anything else, you get out of it what you put into it.”

The DMAT team is typically made up of physicians, RNs (mostly emergency nurses), paramedics, midlevel providers, pharmacists, and respiratory therapists. Their team had an infectious disease specialist, a valuable resource when it came to the many skin and wound infections following lacerations and punctures. They function under a federal scope of practice. This essentially means that you can do whatever you have been trained and are competent to do wherever the DMAT is sent. “The whole point is that we are in a disaster mode, so some of the more usual restrictions go away,” says Karen.

Since becoming part of FEMA after 9/11, the DMAT personnel are paid for such activities as one weekend per year training, deployments, and approved exercises. They work on “deployment points”; the more you accumulate by activities for the team, the more likely you are to receive an assignment, which is always voluntary. Monthly team meetings, warehouse inventory, and restocking of supplies are all voluntary. Some DMAT members have been assigned to work at the Olympics and the political party national conventions. They operate under the Uniformed Services Act, as are those activated for military service. Their “civilian” jobs have to be held for 1 year, although they are only deployed for 2 weeks at a time. However, they can be redeployed. Hospitals are encouraged to publicize the DMAT activities of their employees as a potent marketing piece. Karen said “our hospital was very proud of us. This deployment opened the eyes of the community and the nation to what DMAT is.”

Overall, during many of the interviews reported here, there were similar comments about several issues: There was frustration that EMS, fire, and police had to shut down during the storms (due to a realistic fear of lack of safety for the crews). Several nurses found it unsettling to have armed National Guard troops patrolling their facility. The pulling together of local communities was universally mentioned, and most described the obsession with obtaining generators. Hospitals were less competitive with each other; staff from different hospitals worked well together and worried about each other. Ironically, the 14th annual Trauma Conference, co-sponsored by Pensacola’s 3 local civilian hospitals was cancelled; the hotel was washed out.

Terri Rohraff, from Port Charlotte, summed up the experience this way: “The more times I talk about this, the easier it gets; it’s almost cathartic to spit it back out. It’s the same way with my staff. We’re healing day by day, and we’re all still here! It hits home what the really important things are: family, friends, community. Other stuff is just frill.”

We can all be proud of our colleagues in Florida and can only hope that we will be equally graceful under pressure.

Acknowledgment
The author gratefully acknowledges the courage and insight of the nurses who shared their experiences and the invaluable help of Sandy Davis RN, BS, from the emergency department at Halifax Medical Center in Daytona Beach, who identified and provided contact information for several of the nurses interviewed and enthusiastically supported this article.
Sepsis is an aggressive killer and disabler. In 2001, the occurrence rate for severe sepsis was 750,000 with a mortality rate of 28.6%. Because of predisposing factors such as longer life spans with co-existing morbidities, increased bacterial resistance to existing medications, and the growth of opportunistic infections, the sepsis death rate is predicted to continue to climb at a rate of 1.5% per year.

Usually a patient with a systemic infection will exhibit at least 2 signs of systemic inflammatory response syndrome (SIRS) (Table 1). As the disease progresses to septic shock, hypoperfusion persists despite fluid resuscitation. The systolic blood pressure (SBP) remains <90 mm Hg or the patient has an unexplained drop in SBP >40 mm Hg. To meet the body’s increased metabolic needs, the tissues require more oxygen than is readily available. Tissue hypoxia ensues and produces lactic acidosis, oliguria, encephalopathy, and organ dysfunction. Consequently, one of the principal challenges in the treatment of sepsis is to identify and reverse this significant global tissue hypoxia.

Current practice

Traditionally, emergency medicine has focused on managing a patient with sepsis by treating pathologic deviations in the patient’s blood pressure, heart rate, and urinary output and promptly instituting antimicrobial therapy after obtaining blood or other cultures. More definitive management, such as invasive hemodynamic monitoring to measure oxygen debt and treatments to reverse tissue hypoxia, have been reserved for the ICU. However, many very sick patients remain in the emergency department...
for long periods, thus prolonging the start of goal-directed, intensive care–based interventions.

A new approach

Rivers et al3 conducted a single center, 3-year ED study (N = 263) using an early goal-directed therapy (EGDT) protocol. In addition to traditional monitoring and care, patients in the study group had a central venous catheter inserted that had oximetric capabilities to measure the saturation of central venous oxygen (ie, ScvO2). As a result, patients with inadequate tissue perfusion were identified more quickly and treated aggressively. At 28 days, the EGDT group demonstrated a 16% reduction in mortality (P value <.009).

Based on this study, one of the ED physicians in our inner city, tertiary care hospital adapted the EGDT sepsis protocol for our emergency department and ICU. Upon completion of the protocol, the chairs of the emergency department and ICU reviewed and approved it. The goal of the protocol is early identification and early intervention for patients who either are at risk for the development of systemic infection or who already are septic.

Ideally, recognition of sepsis or the potential for sepsis occurs during triage and the patient is categorized as being at level 2 (high risk and time sensitive) on the Emergency Severity Index.4 These adult patients either are in full-blown septic shock or have signs of infection and accompanying hypotension that is refractory to a fluid challenge. Subclinical septic cases are more difficult to recognize because these patients have sepsis-induced hypoperfusion but still have a normal blood pressure.

Protocol

Our EGDT protocol algorithm uses a step-by-step management process that we employ in addition to prompt initiation of antimicrobial therapy (Figure 1). Also, we consider administering drotrecogin alpha (Xigris), a drug with antithrombotic and anti-inflammatory effects, for patients with severe sepsis or those with significant comorbidities that place them at higher risk for death.

STEP 1: IDENTIFY THE PATIENT WITH SEPSIS

Identifying a patient with sepsis involves recognition of clinical symptoms of sepsis plus evidence of hypoperfusion. In tissue hypoxic states, cells compensate by resorting to anaerobic metabolism, thereby producing lactic acid. A lactate level ≥4 mmol/L indicates cellular anaerobic metabolism and insufficient tissue oxygenation. (Note: Delays in receipt of laboratory results should not preclude starting EGDT.)

STEP 2: PROVIDE SUPPLEMENTAL OXYGEN AND FLUID RESUSCITATION

Titrated to achieve normal parameters by arterial blood gas analysis or pulse oximetry measurement. We apply an adhesive forehead probe to monitor the pulse oximetry if significant peripheral vasoconstriction is present. Initiate crystalloid fluid resuscitation via a large-bore intravenous line with 250 to1000 mL boluses every 15 minutes.

### Table 1

<table>
<thead>
<tr>
<th>Systemic inflammatory response syndrome</th>
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</thead>
<tbody>
<tr>
<td>Temperature &lt;36°C (96.8°F) or &gt;38°C (100.4°F)</td>
</tr>
<tr>
<td>Respiratory rate &gt;20 breaths/minute or PCO2 &lt;32 mm Hg</td>
</tr>
<tr>
<td>Heart rate &gt;90 beats/minute</td>
</tr>
<tr>
<td>White blood cell count &gt;12,000 mm³ or &lt;4000 mm³ or &gt;10% immature bands</td>
</tr>
</tbody>
</table>

Cooper University Hospital severe sepsis early goal-directed therapy protocol. ABG, arterial blood gas; A-line, arterial line; CBC, complete blood cell count; CVP, central venous pressure; ETI, endotracheal intubation; HCT, hematocrit; IJ, internal jugular; IV, intravenous; MAP, mean arterial pressure; NIBP, noninvasive blood pressure; PA catheter, pulmonary artery catheter (not used in emergency department); PCWP, pulmonary capillary wedge pressure; PT, prothrombin time; PTT, partial thromboplastin time; SBP, systolic blood pressure; SC, subclavian; ScvO2, saturation of central venous oxygen; Source control, relieve source of infection if possible (eg, incise and drain abscess); SvO2, saturation of venous oxygen (measured by PA catheter); UOP, urine output. Adapted from Rivers E, Nguyen B, Havstad S, Ressler J, Muzzin A, Knoblich B, et al. Early goal directed therapy in the treatment of severe sepsis and septic shock. N Engl J Med 2001;345:1368-77.
COOPER UNIVERSITY HOSPITAL SEVERE SEPSIS EARLY GOAL-DIRECTED THERAPY PROTOCOL

SEPSIS-INDUCED HYPOPERFUSION
(Clinical picture of sepsis) PLUS:

1) Hypotension AFTER initial fluid bolus
   OR
   2) Lactate ≥ 4 mmol/L with any BP

   With hypotension defined as:
   - SBP < 90 mmHg or MAP < 65 mm Hg
   - Drop in SBP of > 40 mm Hg from baseline

Venous access:
- 2 large bore peripheral IVs (or equivalent) for fluid resuscitation
- Central venous catheter (IJ or SC) for drug infusions
- Establish ScvO2 or SvO2 monitoring ‡‡

Establish re-evaluation intervals.

**24-HOUR SUPPORT PAGER 614-3438 (614-EGDT)**

Critical care consultation (if not already consulted)

CVP < 8

CVP 8-12 mm Hg

CVP ††

MAP < 65

MAP ≥ 65 mm Hg

MAP ††

ScvO2 ††

≥ 70%

< 70%

Transfuse if HCT less than 30%

Inotrope (If PA catheter inserted, keep cardiac index ≥ 3.0 L/min/m²)

Vasopressors (norepinephrine or dopamine preferred)

Supplemental O2 ± ETI with mechanical ventilation (if necessary)

Venous access:

2 large bore peripheral IVs (or equivalent) for fluid resuscitation

Central venous catheter (IJ or SC) for drug infusions

Establish ScvO2 or SvO2 monitoring ‡‡

Standardized monitoring and data collection:

- Cardiac monitoring
- Continuous pulse oximetry
- Arterial line (or NIBP q 5 min)
  (A-line is preferred for persistent hypotension) ‡‡
- CVP (either transduced or via manometry) ‡‡
- Urinary catheter (follow UOP)

LABS:
- ABG
- Lactate
- CBC (w/ differential)
- Chem 12
- PT/PTT
- Cortisol

PRN labs as clinically indicated

For ALL patients:
- EARLY appropriate antibiotic therapy
- Source control (if possible)
- Evaluation/therapy for possible relative adrenal insufficiency
- Consider drotrecogin alpha

**This protocol should be initiated within ONE hour of presentation (or severe sepsis identification) and continued for the first SIX hours of resuscitation. Extending the protocol is optional.

†† Choice of monitoring techniques is based on individual clinician preference and may depend on location of the patient when the protocol is initiated (i.e., non-ICU vs. ICU).

‡‡ If PA catheter is inserted, PCWP target of 12-15 mm Hg replaces CVP target, and SvO2 ≥ 70% replaces ScvO2**
STEP 3: CALIBRATE THE $s_{cv}O_2$ CATHETER AND MONITOR

Insert a specialized triple lumen catheter with continuous venous oximetry capability via the subclavian or jugular vein to measure $s_{cv}O_2$ and central venous pressure (CVP) (Figure 2).

A mean arterial pressure $\geq 65$ mm Hg or an SBP $\geq 90$ mm Hg is necessary to ensure adequate tissue oxygenation. If the MAP reading is $< 65$ mm Hg or the SBP is $< 90$ mm Hg, we start vasopressor therapy using norepinephrine or dopamine.

STEP 4: MEASURE CVP

The CVP setup is similar to an arterial line system and involves a pressure bag, transducer setup, and pressure cable that are connected to a pressure monitoring port on our hardwire monitoring system. We monitor CVP continuously via the distal port on the central venous catheter.

A CVP measurement provides an estimate of the patient’s right ventricular preload and fluid volume status. A reading of $\leq 2-7$ mm Hg can indicate hypovolemia from reduced vascular volume or decreased mean systemic pressures. This may occur from dehydration or third spacing of body fluids, particularly at the capillary level—a condition that is common in sepsis. For a CVP reading $< 8$ mm Hg, we institute aggressive resuscitation with crystalloid fluid boluses until the patient maintains a CVP reading between 8-12 mm Hg or experiences symptoms of vascular overload.

STEP 5: ASSESS MEAN ARTERIAL PRESSURE OR SBP

A mean arterial pressure (MAP) $\geq 65$ mm Hg or an SBP $\geq 90$ mm Hg is necessary to ensure adequate tissue oxygenation. If the MAP reading is $< 65$ mm Hg or the SBP is $< 90$ mm Hg, we start vasopressor therapy using norepinephrine or dopamine.

STEP 6: DETERMINE $s_{cv}O_2$

An $s_{cv}O_2$ value $\geq 70\%$ is indicative of adequate tissue perfusion. A value $< 70\%$ is abnormal and indicates global tissue hypoxia. If the $s_{cv}O_2$ reading is $< 70\%$ and the hematocrit is $< 30\%$, transfuse red blood cells and provide inotropic support with dobutamine, norepinephrine, or dopamine. If the hematocrit is $\geq 30\%$ and the $s_{cv}O_2$ is $< 70\%$, start inotropic support.

STEP 7: CONTINUE TO MONITOR PARAMETERS AND ADJUST INTERVENTIONS

Continue to monitor parameters and adjust interventions until the patient achieves EGDT treatment goals (ie, CVP 8-12 mm Hg, MAP $\geq 65$ mm Hg, and $s_{cv}O_2 \geq 70\%$).

Implementation

Because emergency departments usually do not use hemodynamic monitoring, we took an interdisciplinary approach to prepare both the emergency nurses and physicians. Before we started using the protocol, we added...
3 vasoactive drugs to our medication dispensing system: premixed intravenous dopamine and dobutamine infusions and norepinephrine. In addition, we obtained an $s_{cv}O_2$ monitor with monitoring cable from ICU and housed it in the emergency department. This provided quick access to all equipment needed to start the protocol and greatly assisted the education process.

The ED physician who developed our EGDT protocol presented it to the attending physicians, residents, and the nurse educator at an ED Grand Rounds. After this session, one of the emergency medicine residents provided an in-service session on the use of the $s_{cv}O_2$ monitor for all of the emergency physicians and residents. The nurse educator provided one-on-one education on the EGDT sepsis protocol, $s_{cv}O_2$, and CVP monitoring and equipment for the emergency nursing staff over a 6-week period. We used the actual equipment and a CPR mannequin as visual aids. Each teaching session took approximately 30 minutes and was done during the workday as opportunities arose.

The nursing staff is accustomed to research-related changes in practice. However, the use of invasive hemodynamic monitoring presented a challenge for many of the nurses. Each nurse received a quick reference sheet, developed by the nurse educator, to use in setting up the CVP. Fortunately, we have several nurses with ICU experience who are familiar with the equipment and act as resources for the staff. In addition, the nurse educator created a quick reference book that includes the EGDT protocol algorithm, a picture guide to CVP equipment setup, steps in $s_{cv}O_2$ setup and monitoring, and reference sheets for norepinephrine, dopamine, and dobutamine administration. We keep this book in a basket attached to the $s_{cv}O_2$ monitor. Additionally, copies of the EGDT Algorithm were laminated and posted at the bedside and at the nursing/physician station. The physician responsible for implementation was available by beeper for assistance, 24 hours a day, 7 days a week for the first 6 weeks. Following that, he or an ICU fellow remain available for consultation.

A nurse familiar with the protocol can gather the supplies and set up the CVP and $s_{cv}O_2$ systems in about 10 to 15 minutes, but the time is decreased if a second nurse assists. Once the PreSep triple lumen catheter is inserted and the CVP and $s_{cv}O_2$ are connected and calibrated, continuous objective data are available to provide a clear direction for the care of the patient.

Conclusion

The American College of Emergency Physicians was 1 of 11 international organizations involved in the development of the 2004 practice guidelines of the Surviving Sepsis Campaign. The Committee recommended initial, aggressive treatment for patients with severe sepsis, beginning in the emergency department. Our emergency department initiates the EGDT resuscitation process that continues for 6 hours in the emergency department or ICU (if an ICU bed is available in <6 hours).

Most of the nursing staff report that they are comfortable following the EGDT protocol and setting up the equipment. Those who have used the protocol do find it time consuming, but this is to be expected, as these patients are very ill. The institution of hemodynamic monitoring in the emergency department has allowed the nurses and physicians to definitively assess and monitor alterations, both positive and negative, in the patients’ conditions. This objective feedback allows for early and aggressive adjustments to the patients’ treatment plans. Instituting an EGDT protocol is a challenge but also an opportunity to utilize research and existing technology to improve the outcomes for the septic patient.

REFERENCES
Five-Level Triage: A Report from the ACEP/ENA Five-Level Triage Task Force

A joint task force of members from the American College of Emergency Physicians (ACEP) and the ENA was appointed in 2003 to critically analyze the literature and make recommendations regarding use of 5-level triage systems in the United States. This article summarizes Task Force recommendations.

ED triage is the process of quickly sorting patients to determine priority of further evaluation of care at the time of patient arrival in the emergency department, that is, to sort and assign the right patient to the right resources in the right place at the right time. Triage is not an endpoint but the beginning of the medical screening examination process. The analysis of triage and other outcomes data then drives the design and operation of an emergency department.

In this era of ED overcrowding, the demand for emergency medical care has exceeded the limited space and resources of emergency departments to provide immediate care to all who present to the emergency department. The process of triage has been used to decide who needs immediate treatment, that is, who “can’t wait.” To avoid undertriage (ie, assigning a triage rating lower than the patients’ actual acuity), which compromises patient safety, and overtriage (ie, assigning a higher acuity rating than necessary), which exhausts ED resources prematurely, triage decisions must be as accurate as possible.

Although many triage systems are in use, no uniform method currently exists in the United States that would facilitate development of operational standards in emergency departments. A nationally standardized reliable and valid triage scale would provide emergency departments with an accurate system to make safe decisions. Planners and policy makers would have the common tools and comparative data needed to initiate discussion on rational improvements in the emergency health care delivery system.
US triage classification systems also have been utilized for other purposes, including (1) retrospective review for quality assurance (eg, correlation of assigned triage classification with final disposition and waiting times);1 (2) mechanisms to examine costs of delivery of emergency health care;2,4 and (3) efforts by government agencies to analyze the alleged inappropriateness of care delivered by emergency departments. Triage systems have also been used concurrently by institutions5,6 and retrospectively by third-party payers to deny access to or payment for ED care. Such denials have raised concerns. Also, assumptions regarding ED overutilization have been attributed to common triage parlance (emergent, urgent, nonurgent),7 implying completion of the EMTALA medical screening examination at triage. This assumption is prejudicial against an understanding of the prudent layperson utilization of the emergency department. Finally, in 2002, the Centers for Disease Control and Prevention (CDC) reported that emergency departments experienced a 17% decrease in acuity from 1997 to 2000.8 It is difficult to understand how these findings could be valid given the current overcrowding and general perception of increased acuity. However, contradictory data are lacking. This report was based on an attempt to collate data from diverse triage systems into a 4-level triage system.

Emergency departments in the United States need an ED triage tool that would strongly predict outcomes including severity of illness, mortality rate, and resource requirements. Ideally, triage assessment should be done at a consistent point in the patient’s hospital visit (point of first contact), should be prospective, and should be done by experienced registered nurses with proven clinical judgment and decision-making skills.9 The triage process and rules must be easily understood, rapidly applied, have high rates of inter-observer agreement, facilitate appropriate placement, correlate with ED resource use requirements, and predict clinical outcome.

The “ideal” triage scale

The ideal acuity rating system should allow for quick sorting of patients and rapid identification of patients in need of immediate care. To maintain the accuracy of the scale, the definitions of each triage level must be clear. The triage acuity level should reflect the seriousness of illness or injury and should not be influenced by ED volume. The ideal triage scale must demonstrate the characteristics of reliability, validity, utility and relevance.

Excellent inter-rater reliability ensures accurate communication among users; nurses and physicians should be speaking the same language. An ideal scale should be applicable across all relevant patient populations and age groups and allow for the rapid triage of patients. It should provide an objective measure of acuity, which could be incorporated into funding formulas, and allow for meaningful comparisons within and between institutions. Diversion criteria, admission rates, outcomes, staffing level, and other measures that are acuity related could be both predicted and measured as a proxy indicator of predicted workload of the emergency department. Lastly, it is important that the system chosen be easily adaptable to computer-based documentation and system integration.

The current state of triage

There is neither consensus regarding whether to use a 3-, 4-, or 5-level scale, nor is there a single triage scale that has been adopted and implemented on an extensive basis in the United States.9,11 A recent study surveyed emergency departments throughout the United States regarding their triage system in use and reported that the majority (69.4%) of emergency departments use a 3-level triage system.12 However, a 4-level triage scale was used by 11.6%, a 5-level system was used by 3%, and some other or unknown scale was used by 4.3%. Approximately 11.7% of the emergency departments reported using no triage urgency scale at all. Nearly all of these emergency departments were small-volume facilities (0 to 10,000 annual visits) or medium-volume facilities (10,001 to 20,000 annual visits).

Literature review of currently published 5-level triage scales

In marked contrast to 3-level scales used by emergency departments in the United States, both Australia and Canada mandated implementation of 5-level triage scales in the mid 1990s. These scales continue to be in use and provide an excellent universal database that allows emergency departments to accurately describe and compare their acuity throughout the country.13 The presence of a National Health System in both countries presents a
stark contrast to the United States and was a key factor in mandated national implementation.

The Australasian Triage Scale

In 1994 Australia implemented the National Triage Scale (NTS), now renamed and referenced as the Australasian Triage Scale (ATS); it is currently used by every emergency department in Australia. The ATS is a 5-level triage urgency scale with each level having an associated time goal to initiation of medical evaluation. Table 1 describes unique characteristics of the scale. Data are aggregated by region and individual hospital results are made available on the Internet.13 Table 2 summarizes the current evidence of implementation, reliability, and validity.14-18 Inter-rater reliability has not been evaluated prospectively. One study has evaluated the impact of overcrowding on undertriage.19

Canadian Triage and Acuity Scale

The Canadian Emergency Department Triage and Acuity Scale (CTAS) was developed in the mid 1990s by a group of physicians at Saint John Regional Hospital in New Brunswick and is based on the ATS. CTAS became a mandated reporting data element by the Canadian Institute of Health Information in 1997 and has been adopted by several hospitals in the United States. CTAS is similar in many ways to the NTS. Unique characteristics are described in Table 1. Both the ATS and CTAS also include fractile response rates that are used to measure the ability of an institution to meet required time to physician assessment. For example, 100% of level 1 patients should be seen immediately. A summary of the current evidence is provided in Table 2. Similar to NTS, its inter-rater reliability has not been evaluated prospectively in the setting of overcrowding.

Both the ATS and CTAS use an extensive list of clinical descriptors for each level. These include high-risk historical factors (eg, envenomation and toxic ingestion), symptoms (eg, abdominal pain), signs (eg, stridor, deformity, amputation, and acute hemiparesis), physiologic parameters (eg, blood pressure), point-of-care testing (eg, glucose and pulse oximetry), and nursing assessment-diagnosis (eg, dehydration and a tight cast).20-22

Manchester Triage Scale

The Manchester Triage Scale (MTS) is a 5-level triage scale used by many emergency departments in Great Britain23,24 since 1997. It is unique in its approach; there are 52 presentational flow chart diagrams, each designed to assist in the triage of a specific presenting complaint (eg, head injury and cough). Each of the flow charts depicts 6 key discriminators: life-threat, pain, hemorrhage, acuteness of onset, consciousness level, and temperature. The system requires the triage nurse to access one of 52 different flow charts and then assess the patient based on the key discriminators.23,24 There has been little discussion about its validity and only 1 article reporting its reliability.18

The Emergency Severity Index

The Emergency Severity Index (ESI) is a 5-level triage algorithm developed by a group of emergency physicians and nurses in the United States in the late 1990s.25-30 The ESI has been successfully implemented by a small number of hospitals in the United States and several European countries as well. There has been ongoing refinement and research on this scale since its initial publication by Wuerz et al in 2000.28-30,46 The ESI is unique in its approach and integrates acuity and resource utilization. After assessing for the most acutely ill patients (ESI level 1 and 2 patients), the algorithm directs the triage nurse to estimate how many resources will be needed to stream the patient to ultimate disposition. The triage nurse bases this decision on definitions of what accounts for a resource and is required only to estimate up to 2 resources. Research has demonstrated the ability of the triage nurse to perform this function.29,30 Table 1 summarizes the scale characteristics and Table 2 summarizes current evidence.

Reliability and validity of current scales

RELIABILITY

Reliability, or consistency, is fundamental to use of any measure. Measures are made more reliable, or improved, by reducing error in the use of the measure. Interrater reliability refers to the statistical measurement of agreement attained by 2 or more users of the scale. Inter-rater
### TABLE 1
Comparison of characteristics of the ATS, CTAS, MTS and ESI 5-level triage scales

<table>
<thead>
<tr>
<th>Criteria</th>
<th>CTAS</th>
<th>ATS</th>
<th>ESI</th>
<th>MTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to triage Assessment</td>
<td>10 min</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Time to nurse Assessment</td>
<td>Based on initial triage</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Time to physician Assessment</td>
<td>Immediate/15/30/60/120 min</td>
<td>Immediate/10/30/60/120 min</td>
<td>NS</td>
<td>Immediate/10/60/120/240 min</td>
</tr>
<tr>
<td>Fractile response time (CTAS)/performance threshold (NTS)</td>
<td>I-98, II-95, III-90, IV-85, V-80</td>
<td>I-97.5, II-95, III-90, IV-90, V-85</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Pain scale</td>
<td>10-point scale</td>
<td>NS</td>
<td>&gt;7/10 consider up-triage to ESI level 2</td>
<td>A major factor considered for each chief complaint</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>Used in CTAS</td>
<td>NS but generally recognized</td>
<td>Pediatric VS criteria included to help determine ESI level 2 vs 3; fever criteria for &lt;24 mo included.</td>
<td>Not addressed in the algorithm</td>
</tr>
<tr>
<td>Sentinel diagnoses</td>
<td>Yes</td>
<td>Yes</td>
<td>Not used</td>
<td>52 chief complaints vs sentinel diagnosis</td>
</tr>
<tr>
<td>Expected admission rates</td>
<td>Specified</td>
<td>Defined using actual data from multiple sites</td>
<td>Benchmarking data available</td>
<td>NS</td>
</tr>
<tr>
<td>Rural setting</td>
<td>Yes</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

ATS, Australasian Triage Scale; CTAS, Canadian Triage and Acuity Scale; ESI, Emergency Severity Index; MTS, Manchester Triage Scale; NS, not specified; NTS, National Triage Scale; VS, vital sign.
reliability should not be nurse specific, nor should the nurse be influenced by the volume and acuity of the department at any particular time.

Inter-rater reliability is most frequently reported in the triage literature using the $k$ statistic, and $Q$ and measures the agreement beyond chance between raters. $k$ Equals 0 when the amount of agreement is what would be observed by chance alone, and $k$ is equal to 1 when there is perfect agreement. $k$ Levels are frequently evaluated with the following terminology.

| Poor agreement | Less than 0.20 |
| Fair agreement | 0.20 to 0.40 |
| Moderate agreement | 0.40 to 0.60 |
| Good agreement | 0.60 to 0.80 |
| Very good agreement | 0.80 to 1.00 |

A variant of the $k$ statistic is the weighted $k$ statistic. The weighted statistic adjusts for degrees of disagreement between different levels of ordinal scales. For example, the weighted $k$ would be higher if the agreement between users was “off” by only 1 level versus 2 levels. The fact that studies only report their results using one or the other of the $k$ statistics is a confounding factor in trying to compare different triage scales. When evaluating the literature, one should consider which $k$ statistic is used. While weighted $k$ has some limitations, it remains the only meaningful measurement and allows for comparison between studies.

**STUDIES OF TRIAGE SCALE RELIABILITY**

There have been 16 studies in the past decade measuring reliability of 3-, 4-, or 5-level triage scales. Table 2 displays a summary of 5-level triage data. Two studies have measured reliability of 3-level triage. These studies demonstrate fair to moderate inter-rater reliability. Evaluation of 4-level scales have demonstrated poor to moderate agreement. Studies of 5-level triage have demonstrated a range of agreement that varies from fair to very good. Studies evaluating reliability have been performed for each of the following scales: ATS, CTAS, MTS, St Paul’s Hospital, and ESI. Data for the ATS demonstrates only fair to moderate agreement. Reliability was good in a single study of a hospital based 5-level triage scale utilized by St Paul’s Hospital. Three studies of CTAS reliability demonstrated good to very good reliability ($k$ 0.77 to 0.84). It is important to note that all of the studies discussed so far were conducted with a retrospective chart review or evaluation of real scenarios rewritten and tested as paper cases. Neither ATS, CTAS, nor the MTS have been evaluated prospectively with real patients in the setting of overcrowding. Good to very good agreement has been demonstrated in all settings. Pragmatically, there is no 3- or 4-level triage scale that is being researched, supported, required, or promoted by any professional or governmental organization. In contrast, the ATS and CTAS are widely used scales with governmental mandates from Australia and Canada, respectively; ESI has been implemented and actively researched by a number of hospitals in the United States. CTAS and ESI have the highest reported reliability consistent from study to study.

**VALIDITY**

Validity refers to the agreement between the value of a measurement and its true value; a triage scale is valid if it measures what it is supposed to measure. For example, one
<table>
<thead>
<tr>
<th>5-level scale</th>
<th>Reference</th>
<th>Objective</th>
<th>( \kappa )</th>
</tr>
</thead>
<tbody>
<tr>
<td>St Paul’s Hospital</td>
<td>Fernandes 1999</td>
<td>Assess inter-rater and intra-rater reliability of a 5-level scale</td>
<td>0.76</td>
</tr>
<tr>
<td>MTS</td>
<td>Cooke 1999</td>
<td>Can the MTS reliability detect patients who need admission to the critical care area?</td>
<td>–</td>
</tr>
<tr>
<td>MTS</td>
<td>Goodacre 1999</td>
<td>Assess inter-rater reliability for both MTS and NTS</td>
<td>0.31-0.63</td>
</tr>
<tr>
<td>NTS</td>
<td>Goodacre 1999</td>
<td>Assess inter-rater reliability for both MTS and NTS</td>
<td>0.27-0.53</td>
</tr>
<tr>
<td>NTS</td>
<td>Dilley 1998</td>
<td>Assess inter-rater reliability of NTS</td>
<td>0.25</td>
</tr>
<tr>
<td>NTS</td>
<td>Jelinek 1996</td>
<td>Assess inter-rater reliability of NTS</td>
<td>No</td>
</tr>
<tr>
<td>CTAS</td>
<td>Manos 2002</td>
<td>Assess inter-rater reliability in first time users of CTAS</td>
<td>0.77</td>
</tr>
<tr>
<td>CTAS</td>
<td>Beveridge 1999</td>
<td>Assess inter-rater reliability</td>
<td>0.80</td>
</tr>
<tr>
<td>ESI</td>
<td>Wuerz 2000</td>
<td>Assess inter-rater reliability and validity against resources and hospitalization</td>
<td>0.80</td>
</tr>
<tr>
<td>ESI</td>
<td>Wuerz 2001</td>
<td>Implement ESI at 2 EDs; describe operational impact of ESI; assess inter-rater reliability and validity</td>
<td>0.73</td>
</tr>
<tr>
<td>ESI</td>
<td>Wuerz 2001</td>
<td>Assess association between ESI level and 6-month mortality</td>
<td>–</td>
</tr>
<tr>
<td>ESI</td>
<td>Travers 2002</td>
<td>Compare reliability and validity of ESI to previous 3-level tool at 1 hospital</td>
<td>3-level 0.53 ESI 0.68</td>
</tr>
<tr>
<td>ESI</td>
<td>Eitel 2003</td>
<td>Assess ESI Version 2 reliability and validity at 7 hospitals in 3 states</td>
<td>Case scenarios 0.70-0.80; paired triages 0.69-0.87</td>
</tr>
<tr>
<td>ESI</td>
<td>Tanabe 2004</td>
<td>Assess ESI Version 3 reliability and validity at 1 hospital</td>
<td>0.89</td>
</tr>
</tbody>
</table>

**ATS:** Australasian Triage Scale; **CCU:** critical care unit; **CTAS:** Canadian Triage and Acuity Scale; **ED:** emergency department; **ESI:** Emergency Severity Index; **MTS:** Manchester Triage Scale; **NTS:** National Triage Scale (initial name for ATS).
<table>
<thead>
<tr>
<th>Weighted κ.</th>
<th>Design and notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>κ -intracl</td>
<td>Good inter-rater reliability; 12 nurses and 7 physicians assigned triage ratings to 5 case scenarios; the scale was derived from the NTS</td>
</tr>
<tr>
<td>–</td>
<td>No measurement of inter-rater reliability; validity was assessed by a retrospective review of 91 patients admitted to a CCU; 67% of patients admitted to the CCU were correctly triaged as MTS level 1 or 2 in the ED; 18 cases were determined to be incorrectly triaged in the ED; the majority of errors in triage categorization were from not adhering to the MTS algorithm</td>
</tr>
<tr>
<td>No</td>
<td>Fair to good inter-rater reliability; 4 Australian physicians assigned triage ratings to 50 randomly selected ED charts (triage nurse acuity level was removed); this was a retrospective review of entire ED record and final diagnosis available was available on chart; physicians first used the ATS then used the MTS</td>
</tr>
<tr>
<td>No</td>
<td>Fair to moderate inter-rater reliability; as above</td>
</tr>
<tr>
<td>No</td>
<td>Fair inter-rater reliability; 108 nurses assigned triage ratings to 20 case scenarios</td>
</tr>
<tr>
<td>No</td>
<td>No κ score was calculated; 115 nurses triaged 110 case scenarios; agreement was achieved within one level of the modal value for 86%</td>
</tr>
<tr>
<td>Yes</td>
<td>Good inter-rater reliability; 20 health care providers (5 physicians, 5 nurses, 5 basic life support medics, 5 advanced life support medics) assigned triage ratings to 41 case scenarios; the case scenarios were randomly selected from the 50 scenarios used/developed by Beveridge (1999)</td>
</tr>
<tr>
<td>Yes</td>
<td>Very good inter-rater reliability; 9 nurses and 8 physicians assigned triage ratings to 50 case scenarios; scenarios were developed by randomly selecting from actual triage notes, so as to obtain 10 scenarios for each acuity level</td>
</tr>
<tr>
<td>Yes</td>
<td>Very good inter-rater reliability; in an ED currently using a 3-level triage system, a nurse and a physician (2 authors) retrospectively assigned ESI triage ratings to 219 actual triage notes; inter-rater agreement was calculated between the initial triage nurse rating and subsequent author rating; validity was demonstrated by correlating hospitalization rates with ESI triage level</td>
</tr>
<tr>
<td>Yes</td>
<td>Good inter-rater reliability; 2 University EDs implemented ESI; subsequently, a nurse and a physician (authors) assigned ESI triage ratings to 219 actual triage notes; inter-rater agreement was calculated between the initial triage nurse rating and subsequent author rating; validity was demonstrated by correlating hospitalization rates and resource use with ESI triage level; ED nurses were surveyed and they rated ESI easier to use and more useful than previously used 3 level scale</td>
</tr>
<tr>
<td>–</td>
<td>Validity was assessed by correlating 6-month survival with ESI triage scores; 6-month survival was strongly associated with ESI triage level: 1 (68%), 2 (86%), 3 (83%), 4 and 5 (100%); mortality was determined by query of Social Security records; N = 202</td>
</tr>
<tr>
<td>Yes</td>
<td>Good inter-rater reliability; a tertiary ED switched from a 3-level triage scale to ESI Agreement was measured between initial triage nurse rating and subsequent expert nurse (authors) rating; ESI had a higher weighted κ (0.68; N = 303) than the 3-level triage scale (0.53; N = 305); undertriage occurred less with ESI (12%) than for the 3-level scale (28%)</td>
</tr>
<tr>
<td>Yes</td>
<td>Good to very-good inter-rater reliability; reliability was measured for triage ratings of 3289 written case scenarios and 386 patient triages; validity was measured; ESI triage levels strongly associated with outcomes (hospital admission, mortality, resource consumption, and length of stay; prospective)</td>
</tr>
<tr>
<td>Yes</td>
<td>Very good inter-rater reliability; inter-rater agreement was calculated between the initial triage nurse rating and a subsequently determined “True” ESI rating for 359 systematically selected triage records; the True rating was determined by a panel consisting of 2 authors (physician and nurse) and an external ESI expert; validity was demonstrated by correlating ESI triage levels with hospitalization rates and admission location (intensive care unit, telemetry unit)</td>
</tr>
</tbody>
</table>

(Continued)
may want to measure how well (validity) a triage scale sorts patients based on medical urgency such that the sickest patients are seen first and least sick patients are seen last.

Unfortunately, there is no “gold standard” measure of medical acuity against which triage scales can be compared. As a result, surrogate markers of validity used by researchers in the field include hospital admission rates, mortality rates, resource utilization, and relative value unit measures of physician workload.

Studies of the ATS and ESI have demonstrated correlation with admission rates, ED costs, staff work time, and in-hospital mortality rate. There has been only one validity study of the MTS, which demonstrated the ability of this scale to detect the critically ill. There have been no validity studies of CTAS. ESI has demonstrated the ability to predict hospital admission, resource use, physician E&M codes, hospital charges, and 6-month mortality.

Pediatric use

CTAS has recently published its pediatric triage criteria based on expert consensus that has face validity. The ESI has integrated pediatric vital sign criteria in its algorithm. Neither the NTS nor MTS address pediatrics. None of the 5-level scales has been scientifically evaluated for use in the pediatric population. This is an important area for future research.

Risks/benefits of standardization

There are both benefits and risks to implementing any standard. Benefits of standardization in health care in general include: (1) improved data for benchmarking; (2) facilitation of various types of surveillance (bioterrorism, disease-specific, injury, and public health); and (3) support of clinical research.

Benefits of triage acuity standardization specifically include improvements in quality of care, patient safety and ED operations. Patient care improvements include the ability to accurately portray patient acuity and assure patient safety by prioritizing the sickest patients to receive treatment first. A triage standard will facilitate improvements in ED operations by allowing streaming of less-sick patients to urgent care areas. A standardized triage acuity system also will support benchmarking and surveillance activities by accurately portraying ED case mix. Adoption of a standardized triage system will allow further research, which will contribute to (1) understanding how patient acuity relates to ED overcrowding; (2) ensuring patient safety; and (3) accurately portraying ED patient safety and generating standardized data for national surveillance.

Risks of standardization include implementation costs, difficulty in implementing standards, and need for updates. Unlike countries with a single-payer system, promulgation of standards in the United States is difficult. Thus (voluntary standards) recommendations often are used, with resultant local variation. Ensuring good inter-rater triage reliability across individual clinicians and hospitals remains a significant challenge.

Risks of standardization also include uses other than originally intended, for example, for reimbursement or for triage of patients out of the emergency department before the medical screening examination.

Descending and ascending triage scales

ED triage scales can be organized numerically or descriptively by designating levels or gradations of acuity.
DESCENDING SCALES
Most published ED triage scales are ranked in a descending sequence of acuity, with level 1 indicating the highest level of urgency and higher numbers indicating lower levels of acuity. The ESI, Australasian, Canadian, and Manchester scales all are examples of 5-level descending scales, with level 1 patients being the most urgent or acute and level 5 being the least urgent. ESI also uses a descending resource utilization variant to assign level 3, 4, and 5 patients.

ASCENDING SCALES
There are examples of ascending scales in use in emergency medicine, such as the 5-level RBRVS Evaluation and Management (E/M) codes used to grade the intensity of professional service and the scoring systems used for trauma triage; however, there are few such examples in ED triage. An exception is the Sutter Triage Scale (STS) used by a regional hospital group. In this scale, level 1 (minor) indicates the lowest level of urgency and level 5 (crisis) indicates the highest acuity.

STRENGTHS AND WEAKNESSES
Advantages of descending scales are that they use a traditional acuity ranking methodology.

One advantage of ascending scales is that they permit decimal numeric expression of acuity. For example, a triage nurse using such a system might assign an actual score of 3.1 to one level 3 patient and 2.9 to another, with the understanding that the first case is more urgent than the second. Likewise, the average triage score for Facility X might be 3.1 and the average for Facility Y might be 2.9, indicating different patterns of utilization and resource consumption. Additionally, an ascending scale would allow for same-directional comparison with the aforementioned E/M codes, Ambulatory Payment Classification (APCs), and Charge Description Masters, thereby facilitating comparable analysis of pre-encounter and post-encounter resource utilization.

Reimbursement
Apprehension exists that a 5-level triage system may decrease payment for medical services. There seem to be 2 major concerns: (1) that payers could simply cross-walk the triage categorization from patient presentation to the final service determination, and/or (2) that a relatively low triage determination might inordinately influence a payer’s determination of the appropriateness of a patient’s accessing the emergency department for care.

In the ED encounter, there are 2 basic categories of caregivers who can generally bill, and receive payment, for services to patients: medical practitioners and the facility. Medical practitioners’ services usually are reported by means of the American Medical Association’s (AMA’s) Current Procedural Terminology (CPT) or the Centers for Medicare and Medicaid Services’ (CMS) Healthcare Common Procedure Coding System (HCPCS). CMS uses both coding systems in its Medicare Fee Schedule, with the respective payment for each service being based on the perceived relative work, practice expense, and malpractice cost for providing the service, modified for regional expense parameters. Numerous payers throughout the United States have adapted the Medicare Fee Schedule to their own purposes.

For ED services provided to Medicare beneficiaries, CMS requires facilities to report CPT or HCPCS service
codes, which CMS then translates into an APC. CMS states that each hospital is to determine its own valid and consistent methodology to delineate appropriate resource-use stratification among the E/M codes. CMS also acknowledges that it does “not expect to see a high degree of correlation between the E/M code reported by the physician and that reported by the facility.”\(^\text{45}\) Although facilities have the latitude to use other means to stratify and report their services for non-Medicare patients, many institutions use a Medicare-type format for the majority of their patients because of the operational realities associated with maintaining diverse systems.

The CPT codes that usually depict ED E/M services for both facilities (ie, under APCs) and practitioners are the ED (99281-99285), critical care (99291), and observation (99218-99220 or 99234-99236) codes. Because of CPT coding principles and CMS APC grouping criteria, these CPT codes result in, at minimum, 9 possible E/M levels for practitioners (ie, 99281, 99282, 99283, 99284, 99285, any one of the mutually exclusive observation levels, and 99291) and, at minimum, 4 discrete APC levels for facilities (represented by “99281 & 99282,” “99283,” “99284 & 99285,” and “99291”). If the definitions of the 5-levels of any of the triage systems referenced in this article are compared with the possible practitioner CPT or facility service levels, it immediately becomes evident that there is no simple cross-walk. For example, the highest severity triage level in ESI, and some part of the next lower level, seems to be compatible with critical care services (99291). This then leaves the other clinical services to be spread among the remaining 3-plus triage levels. Of course, some payers could develop unique grouping methodologies. However, the fact is payers can do that now. And, some do.

The concern that a relatively low triage classification might inordinately influence a payer’s determination of the appropriateness of a patient’s accessing the emergency department and thereby decrease the perceived E/M service level and payment has some merit. Currently a number of payers, based either on an ICD-9 coding basis or on a medical records audit basis, do question the “medical necessity” of reported procedures or the level of E/M services. A more discriminating triage methodology (ie, one with more levels than the now widely utilized 3 categories), especially one that is systemized and perhaps even adopted nationwide, could assist such payer scrutiny. However, such a triage system also could assist practitioners and facilities in making their respective cases for patients whose presentation presumptively places them in the higher levels of triage severity but whose ICD-9 coding could seem to imply some lower severity clinical findings.

There appears to be no definitive “trage to final code” cross-walk inherent in any of the 5-level triage systems and generally seems to be an unceasing creativity of third-party payers, so it is impossible to gauge the net impact on the current payment process from implementation of a 5-level triage system.

**Future possibilities**

A number of issues still need to be addressed. A reliable and valid scale will allow concurrent analysis of nursing labor cost, work load, and staffing level appropriateness, perhaps in conjunction with computer-assisted triage. Case mix groups can be more fully developed and outcome effectiveness tracking can improve, including costs and patient/staff satisfaction. As a scale is refined, we can compare acuity and case mix from different hospitals.

However, many concerns still remain. Pediatric scales have not been fully validated. The predictive value of vital signs has not been completely addressed. Work continues around coded chief complaints and presentational classification systems. More robust data are needed around such subjective areas as perceptions of pain. The use of a single measure for reliability has to be addressed, eg, $\kappa$ versus weighted $\kappa$. Finally, any system should allow for ease of computer integration. Much of this work should be done through a standing committee with input from ACEP, ENA, the Society for Academic Emergency Medicine, the American College of Osteopathic Emergency Physicians, and perhaps other interested parties such as the Joint Commission on Accreditation of Healthcare Organizations, CDC, American Hospital Association, and the AMA.

**Recommendation: triage scale standardization**

Based on our review of the literature, the Task Force recommended approval of the following policy: “The American College of Emergency Physicians (ACEP) and the Emergency Nurses Association (ENA) believe that
quality of patient care would benefit from implementing a standardized emergency department (ED) triage scale and acuity categorization process. Based on expert consensus of currently available evidence, ACEP and ENA support the adoption of a reliable, valid five-level triage scale.” The policy was approved by both organizations in the fall of 2003. The approval of this policy sends a clear message and lends strong support to emergency departments now contemplating implementation of a 5-level triage system. Use of a valid and reliable 5-level triage system will help manage emergency departments and assist in the understanding of daily operations and acuity case mix. In the era of ED overcrowding, lower level triage systems are no longer sufficient; they do not provide sufficient discriminatory ability to identify acuity in a high volume, overcrowded emergency department. Furthermore, based on the published evidence on 5-level triage systems at this time, the Committee believes that either the CTAS or the ESI are good options for emergency departments choosing a particular 5-level triage system. The task force continues to encourage further research of 5-level triage systems and recommends an in-depth, evidence-based review of all current 5-level triage systems, as well as those under development.

REFERENCES


The evaluation and treatment of congestive heart failure (CHF) and acute pulmonary edema (APE) have long been recognized as problematic for EMS providers. It is extremely difficult to differentiate cardiac causes of respiratory distress (RD) from noncardiac causes based on physical signs and symptoms alone, yet that—in addition to the patient’s history and medication list—is all that EMS providers have to work with. Despite these known difficulties, EMS providers are expected to institute advanced life support (ALS) interventions based on a presumed diagnosis for patients’ RD. This focused literature review summarizes the classic and current research evidence in an attempt to answer the following questions:

1. How accurate are EMS providers in differentiating CHF/APE from pulmonary causes of RD?
2. Does EMS administration of ALS intervention for CHF/APE improve patient outcomes?
3. Does erroneous treatment for CHF/APE (false positives or false negatives) result in negative outcomes for EMS patients?

Summary of the research

A computer search of the medical literature for the key words “congestive heart failure,” “EMS,” and “respiratory distress” yielded 7 germane reports of research from 1983 to 2003. In general, the studies were of 2 types: those looking primarily at diagnostic/therapeutic accuracy of EMS providers, and those looking primarily at outcomes.
of ALS care for adult patients in RD. Outcome studies were included in this review only if they included a report of the diagnostic/therapeutic accuracy. On the other hand, studies reporting on the accuracy of paramedic diagnosis and treatment did not always include information on outcomes. Table 1 summarizes these studies, providing the authors, years of publication, stated purpose of the study, study design, sample size, general description of the findings, and pertinent comments about each of the studies.

### TABLE 1
Evidence table showing error rates in EMS diagnosis and treatment of respiratory distress

<table>
<thead>
<tr>
<th>Author/purpose</th>
<th>Method and sample</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tresch et al, 1983; describe EMS diagnosis and treatment of patients in cardiac pulmonary edema</td>
<td>Prospective case series; 62 consecutive EMS patients; 3 hospitals; online medical control</td>
<td>% correct diagnosis</td>
</tr>
<tr>
<td>Hoffman &amp; Reynolds, 1987; compare different ALS treatments for “presumed prehospital pulmonary edema”</td>
<td>Prospective sequential trial; convenience sample of 57 patients</td>
<td>% false positives</td>
</tr>
<tr>
<td>Wuerz &amp; Meador, 1992; determine how prehospital medication for CHF with MS, furosemide, nitroglycerine affects LOS and mortality.</td>
<td>Retrospective case series; 493 patients; 252 treated; 241 not treated</td>
<td>% misdiagnosed</td>
</tr>
<tr>
<td>Schaider et al, 1995; determine accuracy of paramedic diagnosis in patients with cc of chest pain or SOB</td>
<td>Prospective, cross-sectional; convenience sample of 99 patients</td>
<td>Diagnostic concordance by kappa and McNemar’s $\chi^2$; also used sensitivity and specificity for some diagnoses</td>
</tr>
<tr>
<td>Rottman et al, 1997; to compare scene time, appropriateness of therapy, and accuracy of paramedic clinical assessments using OLMC vs standing protocols</td>
<td>Prospective, before and after, case series; 581; 287 with OLMC and 294 with protocols only</td>
<td>% agreements, 95% confidence intervals; % inappropriate decisions</td>
</tr>
<tr>
<td>Eckstein &amp; Suyehara, 2002; determine if paramedics can accurately select appropriate protocol for patients with congestive heart failure</td>
<td>Prospective case series; 102 patients</td>
<td>Sensitivity and positive predictive value</td>
</tr>
<tr>
<td>Pozner et al, 2003; determine the degree to which field assessment and treatment for dyspnea were in agreement (concordant) with ED diagnosis</td>
<td>Retrospective cohort study; convenience sample of patients $\geq 35$ years; N = 222</td>
<td>Kappa for concordance</td>
</tr>
</tbody>
</table>

ALS, Advanced life support; APE, acute pulmonary edema; cc, chief complaint; CHF, congestive heart failure; ED, emergency department; ETI, endotracheal intubation; LOS, length of stay; LTC, long-term care; MS, morphine sulfate; OLMC, online medical control; RD, respiratory distress; SOB, shortness of breath.

### Accuracy of EMS providers

The rates of error reported in these studies ranged from a low of 9% to a high of 23%, depending on the sample and method used to compute the rate. Unfortunately, the studies included in this review all used different methods for computing the accuracy of EMS providers, so it is not possible to combine their results into a simple “average error rate.” One of the earliest studies was
undertaken specifically out of concern for observed errors in EMS treatment.3 The authors were rather alarmed at the 23% error rate in their study. However, in later studies reporting error rates between 9% to 17%2,4-6 the authors expressed far less concern and indicated an increased appreciation of the difficulties in diagnosing CHF/APE in the EMS setting, as well as an acceptance of the apparent limits of clinical evaluation.

In the mid 1990s, EMS systems began to move from having paramedics work under online medical control to allowing them to function more independently using standing field protocols. Three studies2,4,5 looked specifically at error rates in diagnosing and treating adults in RD when paramedics used standing protocols. One study4 looked at error rates before and after the switch to online medical control, but the others only looked at rates using standing protocols alone. All 3 studies reported error rates between 13% and 17% when standing protocols were used.

### Results

| 89% correct diagnosis (55/62) | First such study in literature; no correction for chance agreement; no limits on age (range 30-88 y); no discussion of sensitivity, specificity, or predictive values; patient outcomes (improvement, cardiac arrest rate, survival, side effects) were for correctly diagnosed and treated patients only |
| 23% found not to have pulmonary edema | Predates (informed?) Wuerz & Meador; most measures subjective; looked at clinical as well as statistical significance of patient outcomes for all patients; small sample size |
| 15% (106 patients) treated had pulmonary diagnosis; EMS diagnosis correct for critical patients in 87.8% of cases; even less accurate for noncritical (67.6%) | Critical patients treated unnecessarily had no increase in mortality; those noncritical, non-CHF patients treated as if they had CHF had increased mortality if treated with either MS or furosemide in addition to nitroglycerine; no difference in LOS regardless of treatment; severity of illness based on paramedic judgment alone |
| Concordance for cardiac causes 0.45; for pulmonary 0.61; Overall, medics had 82% diagnostic accuracy; sensitivity for diagnosis CHF = 55%; specificity = 85% | Compared organ system involved, then diagnoses; no outcome data included in this study; 102 patients in study; EMS providers found 10 in CHF, ED doctors found 11 (not necessarily the same patients); EMS providers found 43 patients with pulmonary problems, ED doctors found 36 (again, not necessarily the same patients) |
| overall % agreements for “SOB” was 91% by OLMC and 85% by protocol; complete diagnostic agreement was 75% by OLMC and 71% by protocol | Complex study with many measures; main purpose was to compare error rates before and after practice change; no evaluation of sensitivity, specificity, predictive values in either protocol |
| Overall accuracy 86%; overall sensitivity 53%; low prevalence made specificity unnecessary; up to 13% treated inappropriately | Simple, straightforward study on error rates only |
| Overall, 77% agreement (k = 0.60); for all single cause noncardiac, k = 0.69; for cardiac, agreement was 86%; for noncardiac, agreement was 83% (no k given); for combined cardiac and noncardiac causes, 17% concordance | No difference in ETI, LOS, or discharge to LTC in patients with discordant diagnoses; no differences noted when patients treated in EMS with β2-agonists for pulmonary cause had ED diagnosis of cardiac cause; higher mortality rates and more ETIs in patients treated by EMS providers for single cause of RD (cardiac or pulmonary), but treated in ED for combined causes |

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CLINICAL/Shapiro February 2005 31:1 JOURNAL OF EMERGENCY NURSING 53
Therapeutic effects of out-of-hospital ALS

These reports demonstrate a limited benefit of EMS treatment of patients with CHF/APE. ALS interventions for RD in older adults follow along 2 distinct pathways (assuming the patients do not require immediate intubation for actual or impending respiratory arrest). Patients thought to be in CHF/APE are treated with sublingual or mucosal nitroglycerine, intravenous furosemide, intravenous morphine, or some combination of these agents. Patients thought to have a pulmonary basis for their RD are treated with inhaled β2-agonists such as albuterol.

Three of the studies\(^3\),\(^7\),\(^8\) looked at outcomes associated with CHF/APE treatments; none looked at outcomes associated with use of albuterol in these patients.

In the mid 1990s, EMS systems began to allow [paramedics] to function independently using standing field protocols. Three studies looked specifically at error rates in diagnosing and treating adults in RD when paramedics used standing protocols.... All 3 studies reported error rates between 13% and 17% when standing protocols were used.

In one of the first studies of EMS use of ALS interventions,\(^7\) intravenous furosemide was administered to 56 of 62 patients, and 42 received morphine. No patients were given nitroglycerine, and 27 received lidocaine for ventricular arrhythmias. The only outcome measured in this study was survival from cardiac arrest: 10 patients had cardiac arrest and 6 survived (60% survival). The authors concluded that EMS treatment was beneficial “in that most patients had improved on arrival in the emergency department,”\(^7\) but they did not elaborate on how that improvement was determined.

Hoffman and Reynolds\(^3\) compared all 3 ALS drugs; they looked at a variety of patient outcomes, including changes in vital signs and changes in assessments of lung sounds, RD, and mental status. They also included patients’ subjective sense of improvement. They reported clear benefits from use of nitroglycerine and no additional benefits from use of either morphine or furosemide. Although both the Hoffman and Reynolds study\(^3\) and the study by Tresch et al\(^7\) included an estimation of error rates in diagnosis of CHF/APE, neither included assessments of outcomes in patients who were erroneously treated.

Finally, Wuerz and Meador\(^8\) assessed the effects of EMS ALS treatment for CHF/APE on hospital length of stay and mortality rates. They included all 3 drugs in their study and reported outcomes for patients both correctly and incorrectly treated. They found that overall, EMS treatment for CHF/APE improves survival, regardless of whether it was appropriate or not, but did not affect hospital length of stay. For patients judged by paramedics to be in severe distress, there was no difference in mortality rates between those correctly diagnosed and treated and those treated erroneously. However, for those judged not to be in severe distress, erroneous diagnosis and treatment resulted in increased mortality rates when compared with those not treated at all.

These 3 studies used a variety of methodologies to evaluate the effects of EMS ALS treatment for CHF/APE; none involved a controlled clinical trial or similarly rigorous design. In addition, except for the Wuerz and Meador study\(^8\), the sample sizes were too small to draw firm conclusions.

Hoffman and Reynolds\(^3\) suggested that nitroglycerine was the treatment with the least harmful adverse effects and recommended that use of morphine and furosemide be reconsidered as possibly inappropriate for EMS use.

Adverse effects of treatment

If the benefits of EMS ALS treatment for CHF/APE are limited, can we at least say that it does not harm patients? Not based on these studies. All 3 studies that reported patient outcomes reported adverse effects of treatment. Two of the studies\(^3\),\(^7\) reported serious adverse outcomes in terms of individual responses to therapy, for example,
bradycardia, tachycardia, hypotension, or clinically significant dehydration. These outcomes were in patients correctly diagnosed and treated. Neither of these studies reported on adverse outcomes associated with erroneous treatment. Hoffman and Reynolds suggested that nitroglycerine was the treatment with the least harmful adverse effects and recommended that use of morphine and furosemide be reconsidered as possibly inappropriate for EMS use.

Wuerz and Meador did not look at individual adverse outcomes; theirs was a population-based study that examined hospital length of stay and mortality rates. They found no difference in length of stay, regardless of the accuracy of diagnosis or the ALS treatment administered. However, accuracy of diagnosis affected mortality rates based on the level of the patient’s RD. In patients judged by paramedics to be in severe distress, there was no difference in mortality rates between those correctly diagnosed and treated and those treated erroneously. For patients judged not to be in severe distress, erroneous diagnosis and treatment resulted in increased mortality rates when compared with patients not treated at all.

Discussion

Despite the difficulty in “averaging” the various error rates, it seems that paramedics likely err in treating patients for CHF/APE about 12% to 15% of the time, although it is not clear how many of those patients are “false positives” (treated when they do not need to be treated) and how many are “false negatives” (not treated when they should have been treated). As for the risks and benefits associated with treatment for CHF/APE, the studies cited in this review provide some support for the continued use of nitroglycerine but show no additional benefits from using morphine or furosemide, either alone or in combination with nitroglycerine. To the contrary, these studies identified risks associated with administering all 3 medications, especially in patients who were not in severe distress but were treated for CHF/APE when, in fact, they had another cause for their RD. One study found no adverse outcomes associated with use of β2-agonists in patients with RD of cardiac origin, but no other studies reported on risks or benefits of using β2-agonists with these patients.

Mosesso and colleagues, in a more comprehensive review of EMS therapy for CHF/APE, had similar findings. Given the evidence, their suggestion that a graduated approach be used in treating older EMS patients in RD seems wisest. However, their approach starts with a presumptive diagnosis of CHF/APE, which, as has been demonstrated, is itself problematic. In addition, 2 of the articles reviewed here have raised the issue of combined causes of RD in older patients, a problem not even acknowledged in most EMS treatment protocols. As Figure 1 suggests, it is possible to conceive of an EMS treatment algorithm for older patients in RD that does not rely—at least initially—on a presumptive diagnosis of the underlying cause.

RD has been identified as a priority area for EMS research, and it is clear such research is needed. We need research to inform us, for example, about whether the use of β2-agonists is beneficial or harmful to patients with CHF/APE. On another level, we need to develop an agreed-upon scale for determining the patients’ level of RD so we can reliably assess their responses to EMS treatments. While awaiting the results of much-needed research in this area, it may be appropriate to rethink current practices. In many if not most EMS systems, providers initiate ALS therapies even when patients are in mild distress. However, given the error rates in diagnosis, the questionable benefits of some of the standard treatments, and the possibility of increased mortality when patients are treated erroneously, it seems wisest to limit ALS interventions to those for whom the benefits outweigh the risks, including the risk of erroneous treatment.

This report, itself, is subject to some limitations. The literature search on which it was based, although extensive, was not exhaustive, and some research reports may have been missed. For example, some provocative research abstracts have appeared in the literature, but no subsequent complete reports were found, and I made no attempt to follow those up with the authors of those abstracts. However, in addition to using computer-based searches of the medical and nursing literature, I also reviewed the references in each article to identify any studies that other EMS researchers may have found that were missed in the original search. There may, indeed, be other reports in the literature, but they are not being widely cited.

Some of the older studies in this report are more than 15 years old, and one is more than 20 years old. I included them in this review for 2 reasons. First, they remain widely cited as background for more recent studies, and
second, there have been no subsequent studies to refute their findings.

Limiting the choice of outcome studies to only those that contain error rates in diagnosis and treatment may have introduced some selection bias, but it is impossible to adequately assess the benefits of any treatment without also considering the risks associated with its use, and at least in the EMS setting, there is substantial risk of treating patients with CHF/APE erroneously.

Despite these limitations, the evidence in these studies argues for reconsidering the EMS use of furosemide and morphine in patients with possible CHF/APE, especially where transport times are relatively short. Nurses working in EMS systems, whether as providers, educators, or administrators, and those interacting closely with EMS, such as base station coordinators and mobile intensive care nurses, might want to raise this issue for consideration.

REFERENCES


Family Presence During Invasive Procedures and Resuscitation in the Emergency Department: A Review of the Literature

An emotional debate has arisen among health care providers concerning the topic of family presence during resuscitation and invasive procedures. In the past, family members of seriously ill or critically injured patients have been excluded from the clinical area during the resuscitation process. Today, however, health care professionals are debating the validity of this practice. A transformation away from the traditional paternalistic approach of medicine and toward a collaborative practice with family involvement has emerged. Research evidence has shown that the majority of family members want to remain with their loved ones during their final moments of life. Literature has demonstrated a benefit to both the patient and the family when family members are allowed to remain. Despite these data, the process of active medical resuscitation in the presence of family members remains an ethical, moral, and legal dilemma to health care professionals. Opponents of witnessed resuscitation voice the following concerns: (1) the effect of witnessing upon family members, (2) the increased level of psychological stress on the medical staff, (3) family interference with the resuscitation process, (4) lack of support for family members, and (5) the risk of increased medico-legal litigation.

Relevance to nursing

Research consistently suggests that family members identify the nurse as the most approachable and accessible member of the emergency medical team.
Because of their perceived accessibility, significantly more nurses than physicians are asked by family members to be taken to the bedside. Thus, the issues of family presence are faced predominately by the nursing staff.

Although critical care and emergency nurses frequently deal with end-of-life issues, a recent study by MacLean et al. indicated that written policies allowing the option of family presence are infrequent. Lack of formal guidelines may indicate the degree of controversy that surrounds this practice within the medical community. On the basis of this study, and in an attempt to heighten the awareness of all health care providers regarding the research conducted in the field of family presence, the following review of literature is presented.

**Literature review**

A comprehensive search of Medline, Cinahl, Sociofile, and Dissertation Abstracts identified 23 articles for review. Key words entered included family, family presence, children, resuscitation, and parents. The studies chosen for inclusion were studies conducted in the emergency department. Studies conducted outside the emergency department, such as in the ICU or in patients’ homes, were excluded. A total of 21 published studies and 1 unpublished dissertation were chosen for review. The literature dates ranged from 1987 to 2003. Eighteen (82%) of the studies used survey methodology and 3 (14%) used randomized clinical trials as the method of study. The articles were divided based on whether they pertained to (1) the beliefs and opinions of health care providers (Table 1); (2) family member presence during resuscitation (Table 2); or (3) parental presence during invasive procedures (Table 3). The methodology, results, and limitation of each study are listed in the corresponding tables.

**Attitudes and opinions of health care providers**

Access to the resuscitation room is dependent on the beliefs and opinions of the ED medical team. A review of literature indicates that physicians are more likely to oppose family presence during resuscitation efforts and invasive procedures than are their nurse colleagues. This difference of opinion may be related to nursing’s holistic view of the patient. Nursing places emphasis on the patient’s role within the family system, recognizing the importance of the family to the physical and emotional well-being of the patient. In 1993, ENA became the first professional organization to develop evidence-based written guidelines endorsing the practice of family presence during invasive procedures and resuscitation. These guidelines were based on research evidence, which indicated that family presence facilitated the grieving process of family members and provided a sense of closure on a life shared together.

In 1993, ENA became the first professional organization to develop evidence-based written guidelines endorsing the practice of family presence during invasive procedures and resuscitation.

The attitude of the health care provider often affects the family members’ decision to stay or leave the room. Overt or nonverbal cues given by health care providers, such as turning their backs on the family or closing the curtain, indicate to family members that they should leave the room. These nonverbal cues often reflect the discomfort felt by many health care providers with the concept of family presence. However, studies have shown that health care providers with previous...
experience with family presence are more likely to support this practice. 3,5,7

**Family members’ perception of their role**

Family members who remain at the bedside during the resuscitation attempt view themselves as “active participants” in the resuscitation process. 5 They describe their presence as “natural” and an extension of the care that the medical staff is providing. 5 The 2 most frequently voiced concerns of family members are whether the patient will survive and whether their presence will interfere with the resuscitation. Family members reportedly recall the “pain of the event” more often than the details of the experience. 5 The family members who remain at the bedside express the belief that their presence helped them face the reality of the situation and facilitated their grieving. 9,11,14

The family members’ perception of their role in the resuscitation room seems to be in sharp contrast to the perception of health care providers. Health care providers often express the fear that family members will increase the stress of the medical team and disrupt medical procedures. 1,4,5 Family members are viewed as a possible source of increased legal liability. 4 The literature, however, fails to support these fears. Meyers et al 5 evaluated the perceived stress of 96 health care providers who had performed invasive procedures or resuscitation efforts with family members present. Of those surveyed, 84% believed their performance was unaffected by the family’s presence. Similar results were found by Boyd and White, 6 in a survey of 114 emergency personnel who had participated in resuscitation efforts with family members present. No significant difference was found in the perceived, self-reported stress of the health care providers who had participated in resuscitations with relatives present. In regard to the fear that distraught family members would disrupt medical procedures, a 9-year review of Foote Hospital’s witnessed resuscitation program found not one instance of interference by family members. 10

**Guidelines were based on research evidence, which indicated that family presence facilitated the grieving process of family members and “provided a sense of closure on a life shared together.”**

**Discussion**

This article presented the literature to date concerning the opinions, consensus, and research on the topic of family presence during invasive procedures and resuscitation. This concept is definitely a “work in progress,” with further research needed to evaluate the long-term effect of family presence on family members and health care providers.

All members of the emergency medical team must have the opportunity to express their feelings, concerns, and objections regarding family presence. Multidisciplinary teams consisting of physicians, nurses, social workers, chaplains, and other health care providers are needed to develop written guidelines. Support also is needed from nursing professional organizations such as the American Nurses Association, the American Association of Critical Care Nurses, and the Society of Trauma Nurses. To date only the ENA has proposed a formal statement in support of family presence.

Tables 1-3 on the following pages condense the data on family presence gathered by the authors to facilitate evaluation by emergency care providers.
<table>
<thead>
<tr>
<th>Author/year</th>
<th>Study design</th>
<th>Sample</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redley and Hood, 1996</td>
<td>Prospective survey conducted at 6 major metropolitan hospitals in Melbourne, Australia</td>
<td>Medical staff: n = 133 Physicians: 35</td>
<td>Staff from 6 hospitals completed a self-administered questionnaire</td>
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<tr>
<td></td>
<td></td>
<td>Nurses: 98</td>
<td></td>
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<tr>
<td>Mitchell and Lynch, 1997</td>
<td>Retrospective survey conducted at a London teaching hospital</td>
<td>A &amp; E nurses and physicians: n = 81</td>
<td>Questionnaires were mailed to A &amp; E nurses and physicians of all specialties</td>
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<td></td>
<td></td>
<td>A &amp; E nurses: 10 Senior registrar: 13 House officer: 8 Consultant: 23 Senior house officer: 27</td>
<td></td>
</tr>
<tr>
<td>Sacchetti et al, 2000</td>
<td>Survey study</td>
<td>ED staff: n = 85 Physicians: 57 Nurses: 22 Technicians: 4 Nurses aid: 2</td>
<td>The ED staff from 3 different hospitals were surveyed regarding their opinions of family presence during pediatric resuscitation; study facilities included R-ED, O-ED, and N-ED</td>
</tr>
<tr>
<td>Helmer et al, 2000</td>
<td>Survey study</td>
<td>AAST members: n = 368 ENA members: n = 1261 AAST members: Age: 53.2 ± 10.6 y Sex: Male 93.2% ENA members: Age: 43.7 ± 8.3 y Sex: Female 85%</td>
<td>An 18-question survey was mailed to members of the AAST and ENA to determine their opinion regarding which phase of the trauma resuscitation process family members should be allowed to be present</td>
</tr>
<tr>
<td>Meyers et al, 2000</td>
<td>Retrospective survey conducted in a university-affiliated level I trauma center</td>
<td>Medical staff: n = 96 Attendings: 14; Residents: 22 Nurses: 60 Medical staff: Age: 32 ± 6.6 y Sex: Female 56%</td>
<td>Medical staff who had participated in a resuscitation or an invasive procedure with family members present completed a 33-item survey within 17 days of the event; procedures included Invasive procedures: 24 CPR: 19</td>
</tr>
</tbody>
</table>

AACN, American Association of Critical Care Nurses; AAST, American Association for the Surgery of Trauma; A & E, accident and emergency; CR, critical resuscitation; ETI, endotracheal intubation; IPs, invasive procedures; N-ED, almost no family presence; O-ED, occasional family presence; R-ED, routine family presence.
Concerns of medical staff regarding family presence included:
- Procedures would be offensive to the family: 76%
- Increased stress on staff: 61%
- Family members would be disruptive: 48%
- Family members would interfere with treatment: 46%
- Staff may offend family: 33%

A & E members in favor of family presence:
- A & E nurses: 90%
- Senior registrar: 38%
- House officer: 0%
- Consultant: 60%
- Senior house officer: 8%

A total of 63% of the respondents were not in favor of family member presence in the resuscitation room.

Percentage of ED staff who favor family presence:
- ETI: R-ED, 50; O-ED, 33; N-ED, 12
- CPR: R-ED, 72; O-ED, 44; N-ED, 12
- CR: R-ED, 63; O-ED, 52; N-ED, 12

ED staff with personal experience with family presence during ETI, CPR, or CR were more likely to favor this practice; biases by ED staff lacking this experience may limit its introduction in unfamiliar institutions.

Percentage of AAST and ENA members who favor family presence:
- Primary survey
  - AAST: 19; ENA: 68
- Secondary survey
  - AAST: 17; ENA: 74
- ETI
  - AAST: 5; ENA: 40
- CPR
  - AAST: 3; ENA: 59
  - Thoracotomy
    - AAST: 3; ENA: 23

Attitudes toward family presence during trauma are significantly different between AAST and ENA members; implementation of family presence may cause conflicts and thus effect the performance of the trauma team.

Favored family presence during resuscitation:
- Nurses: 96%; Attendings: 79%
- Residents: 19%

Favored family presence during invasive procedures:
- Nurses: 87%; Attendings: 77%
- Residents: 33%

Comfortable with family presence:
- Nurses: 95%; Attendings: 77%
- Residents: 64%

Provider discomfort and inexperience decreases the likelihood of supporting family presence.

Sampling bias, small sample size, no demographic data on sample.

No demographic data on sample; no description of survey.

Combined all professions into one group; no demographic data of ED staff.

AAST members do not represent ED staff opinions.
<table>
<thead>
<tr>
<th>Author/year</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Boyd and White, 2000</td>
<td>Retrospective survey conducted in the Accident and Emergency Department at Hope Hospital Salford, United Kingdom</td>
<td>Medical staff: n = 114</td>
<td>Medical staff in the Accident and Emergency Department completed a written questionnaire 24 hours after participating in a nontraumatic adult cardiopulmonary resuscitation</td>
</tr>
<tr>
<td>O'Brien et al, 2002</td>
<td>Survey of military and civilian pediatric staff and residents from Tripler Army Medical Center and Kapiolani Women’s and Children Medical Center in Hawaii</td>
<td>Respondents: n = 245</td>
<td>10-question written survey completed by attendees of the American Academy of Pediatrics annual Uniformed Services Pediatric Seminar</td>
</tr>
<tr>
<td>McClenathan et al, 2002</td>
<td>Survey of US and international physicians, nurses, and other allied HCP attending the International Meeting of the American College of Chest Physicians</td>
<td>Respondents: n = 592</td>
<td>6-question written survey distributed at conference: CPR experience and opinions of FP</td>
</tr>
<tr>
<td>MacLean et al, 2003</td>
<td>Survey study</td>
<td>Respondents: n = 984</td>
<td>30-item survey mailed to members of the AACN and members of the ENA</td>
</tr>
</tbody>
</table>
Results | Conclusions | Limitations
--- | --- | ---
25 respondents reported >2 symptoms of acute stress reaction: 13 with family present and 12 without family present | Presence of relatives witnessing resuscitation did not affect self-reported stress symptoms | Study included only nontraumatic adult cardiopulmonary resuscitation

All respondents that would allow parental presence during pediatric code: 34.6% Physicians by specialty who would allow parental presence during a pediatric code: 
Outpatient: 26% 
Inpatient: 57% Residents: 50% All respondents who had previous experience with family presence who would allow parental presence again: 
Military: 55% 
Civilian: 77%

The majority of pediatricians surveyed were uncomfortable with parental presence during resuscitation; the pediatricians with experience with parental presence were more likely to repeat the practice

Majority of those surveyed were from a select population of military pediatricians; residents surveyed were from one single institution at which family presence was strongly encouraged; simple “yes” or “no” format of questionnaire did not allow respondents to explain their rationale behind answers; relevant factors (eg, religious beliefs, previous litigation, hospital protocols) that could influence a respondent’s answer were not identified

78% of all respondents opposed FP; 60% of HCP with previous experience with FP viewed it as a negative experience; physicians practicing in the Midwest were more likely to support FP than those in other parts of the country; physicians practicing in the Northeast were less likely to support FP than other parts of the country; FP during pediatric CPR was less accepted than adult CPR; no significant difference between opinions of International vs US physicians

The majority of physicians surveyed dealt with end-of-life issues frequently and did not support FP; guidelines regarding FP presented by the ECC were not supported by critical care professionals in this study; contrary to the results of previous studies, HCP with no previous experience with FP were more likely to support the practice

Surveys may have only been completed by those with a strong opinion for or against FP; only 20% of the physicians represented pediatricians; study was not a controlled prospective research study

Only 5% of respondents worked on units with written policies that allowed family presence during invasive procedures and resuscitations; 45% to 51% of respondents worked on units that allowed family presence without written policies; family members who asked to be taken to bedside: 
Resuscitation: 31% 
IPs: 61% Respondents who had taken family members to the bedside: 
Resuscitation: 36%; IPs: 44%

Family presence during invasive procedures and resuscitation is an infrequently written policy in the emergency department; further studies are needed to evaluate the lack of written policies

No reliability testing; sampling bias—only nurses who were members of the AACC and ENA were surveyed; only 33% of surveys returned
<table>
<thead>
<tr>
<th>Author/year</th>
<th>Study design</th>
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<th>Method</th>
</tr>
</thead>
</table>
| Doyle et al, 1987   | Retrospective survey conducted at an urban community nonteaching hospital | FM: n = 47  
Age: 12-82 y  
Sex:  
Female 32  
Male 15  
HCP: 21  
Physicians: 3  
RNs: 12  
Clerks: 6 | Family members who had attended a resuscitation completed a written survey 24 months after their loved one’s death |
| Hanson and Strawser, 1992 | Study design not included in article; Setting: urban nonteaching community hospital | Sample: unknown | Method not described |
| Anno, 1993          | Retrospective survey conducted at a pediatric ED  
Parents: n = 5  
Age: 20-42 y  
Sex:  
Female 4  
Male 1 | Parents who had witnessed part of their child’s resuscitation in the emergency department were interviewed per audiotape 5 mo to 1 y after the child’s death |
| Barratt and Wallis, 1998 | Retrospective survey conducted at an inner-city teaching hospital in London  
FM: n = 35  
Mean age: 58 y  
Sex:  
Female 69%  
Male 31% | Family members who were not present during the resuscitation completed a postal questionnaire 3 months after their loved one’s death to assess the family member’s desire to be present and to determine the family member’s knowledge of what was involved in the resuscitation process |
| Meyers et al, 1998  | Retrospective survey  
FM: n = 25  
Age: mean 42 y  
(range 13-72 y)  
Sex: Female 68%  
Mean educational level:  
13 y (range 7-17 y)  
Relationship to patient:  
Parent 36%; Child 16%  
Sibling 16%; Spouse 12%  
Other 5% | Family members who were not present during the resuscitation were interviewed per telephone 8 weeks to 15 months after the patient’s death; all patients had received CPR and died within 1 hour after admission to the ED; 95% of the patient’s deaths were caused by traumatic injury |

*FM, Family members; HCP, health care providers; IP, invasive procedure; RN, registered nurse.*
<table>
<thead>
<tr>
<th>Results</th>
<th>Conclusions</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM: 76% felt that their adjustment to the death was made easier by their presence in the room; 64% felt their presence was beneficial to the dying person; 94% would be present again if given the option; 100% believed that the medical staff did all that could be done HCP: 71% endorsed family presence; 30% expressed increased anxiety and the inability to remain distant and unemotional during the resuscitation</td>
<td>Allowing family members to be present during the resuscitation process is beneficial to their grieving process; the hospital Advanced Cardiac Life Support Committee found no difference in the clinical performance of the medical staff with family members present</td>
<td>Small sample size, no description of survey tool, limited demographic information, over interpretation of results</td>
</tr>
<tr>
<td>The authors reported that no family members had interfered with the resuscitation process at Foote Hospital since the program began 9 y ago</td>
<td>Allowing FM to be present facilitates their grieving process and acceptance of the patient’s death</td>
<td>No statistics were provided regarding sample or methodology</td>
</tr>
<tr>
<td>Parents separated from their child during the resuscitation expressed intense feelings of abandonment and emptiness; parents did not realize the seriousness of their child’s condition until they were able to see their child; being with the child enabled the parents to comprehend the staff’s attempt to resuscitate the child; the ability to be with their child during part of the resuscitation gave the parent’s a feeling of satisfaction</td>
<td>Parental presence during pediatric resuscitation was beneficial to the parents</td>
<td>Small sample size; inexperienced researcher; unpublished doctoral dissertation</td>
</tr>
<tr>
<td>Only 4 (11%) of the 35 FM were given the option of being present during the resuscitation; 62% of family members would have chosen to be present during the resuscitation attempt if they had been given the option; FM perception of resuscitation process: Electric shock: 26%; Cardiac massage: 20%; Mouth to mouth: 20%; Injection/ adrenaline: 26% Oxygen: 9%; No idea: 9%; Nothing was done: 3%</td>
<td>The inclusion of family members in the resuscitation process would have positive effect on family members; FM did not have an accurate idea of what occurred during CPR; further education of FM would be necessary to prepare FM for their attendance</td>
<td>Small sample size; FM who did not have a recorded telephone number were excluded; FM of patients who survived were excluded</td>
</tr>
<tr>
<td>80% of family members surveyed said they would have wanted to be in the room during CPR; 96% believed that they had the right to be present; 68% believed that their presence would have helped their family member; 64% felt their presence would have helped their sorrow following the death of their loved one</td>
<td>Family members support the option of being present during CPR</td>
<td>Small sample size consisted of only English-speaking family members; extensive period between death of family member and interview</td>
</tr>
</tbody>
</table>

(Continued)
### TABLE 2 (continued)

<table>
<thead>
<tr>
<th>Author/year</th>
<th>Study design</th>
<th>Sample</th>
<th>Method</th>
</tr>
</thead>
</table>
| Robinson et al, 1998<sup>14</sup> | Randomized controlled trial in an ED in Cambridge, United Kingdom | FM: n = 18  
Age: 19–78 y  
<50 y: 39%  
>50 y: 61%  
Sex: Female 56% | Family members of patients who required resuscitation were divided into 2 groups:  
1. FM given the option to remain during the resuscitation (n = 8)  
2. FM not given the option to remain during the resuscitation (n = 10)  
Relatives completed 5 standardized psychological questionnaires 1 and 6 mo after the resuscitation |
| Eichhorn et al, 2001<sup>15</sup>  | Retrospective survey at a university-affiliated level I trauma center | Patients: n = 9  
IP: n = 8  
CPR: n = 1  
Age: 36 y (mean)  
Sex:  
Female 6; Male 3  
Ethnicity:  
White 55%; Black 22%  
Hispanic 22% | Audiotaped phone interview with patients who had either an IP or CPR performed on them with FM present approximately 2 months after the event |

### TABLE 3

Parental presence during invasive procedures

<table>
<thead>
<tr>
<th>Author/year</th>
<th>Study design</th>
<th>Sample</th>
<th>Method</th>
</tr>
</thead>
</table>
| Bauchner et al, 1989<sup>16</sup>  | Prospective survey conducted in the pediatric ED of Boston City Hospital | Parents: n = 250  
Children: unknown No.  
Parents:  
Mean age: 30 y  
Sex:  
Female 88%; Male 12%  
Ethnicity:  
Black 54%; Hispanic 18%  
White 18%  
Children:  
Mean age: 4.5 ± 4 y  
Sex:  
Female 44%; 2Male 56% | Parents in a pediatric ED completed a written survey regarding their desire to be present if their child had blood drawn or an intravenous line placed |

*FM, Family member; HCP, health care provider; SD, standard deviation.*
<table>
<thead>
<tr>
<th>Results</th>
<th>Conclusions</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>The relatives who witnessed the resuscitation had lower levels of anxiety, intrusive imagery, depression, and grief than did those who did not witness the resuscitation; no FM in the witnessed resuscitation group reported being frightened or had to be asked to leave the room</td>
<td>Robinson concluded the study early after staff members noted the benefit family presence provided to grieving family members; routine exclusion of family members from the resuscitation room may no longer be appropriate</td>
<td>Small sample size; criteria for subjects not provided</td>
</tr>
<tr>
<td>The patient’s perceived beneficial effects of family presence included: caregivers reminded medical staff of patient’s “personhood”; patients felt safer, loved, and supported with family members present; family members interpreted and explained medical information to the patient; patients viewed family presence as their “right”</td>
<td>Family presence is viewed by patients to be supportive and beneficial</td>
<td>Small sample size; sampling bias: only English-speaking patients chosen for the study; only 3 ethnic groups were represented</td>
</tr>
</tbody>
</table>

78% of the parents responded that they would want to be present; 91% felt that their presence would make the child feel better; 80% felt their presence would make them feel better; of the 54 parents (22%) who did not want to observe, only 4% believed that an explanation of the procedure would be helpful; parents agreeing to observe were significantly more likely to have had other children who underwent procedures

Most parents want to be present when their children undergo invasive procedures

No description of statistics; cultural generalizations made based on population presented

(Continued)
<table>
<thead>
<tr>
<th>Author/year</th>
<th>Study design</th>
<th>Sample</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bauchner et al, 1991&lt;sup&gt;17&lt;/sup&gt;</td>
<td>Prospective survey</td>
<td>FM: n = 50</td>
<td>The physician-parent interaction during invasive medical procedures was studied; a research assistant observed both the verbal and nonverbal interaction that occurred between the parent and the physician during either an intravenous cannulation or venipuncture of the child; a questionnaire was completed by the physician and the parent immediately after the procedure</td>
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<tr>
<td></td>
<td></td>
<td>Children: n = 50</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>HCP: n = 28</td>
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<tr>
<td></td>
<td></td>
<td>Residents: 20</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Attendants: 2</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Nurses: 6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Children:</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Median age: 12 mo (range 6 mo-3 y)</td>
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<td></td>
<td></td>
<td>FM:</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Mean age: 29 ± 7.5 y</td>
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<td></td>
<td></td>
<td>Ethnicity:</td>
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<tr>
<td></td>
<td></td>
<td>Black 56%; Hispanic 14%; White 20%</td>
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<tr>
<td></td>
<td></td>
<td>Sex: Female 84%</td>
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<td></td>
<td></td>
<td>HCP:</td>
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<tr>
<td></td>
<td></td>
<td>Mean age: 29-30 ± 3.9 y</td>
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<td></td>
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<td>Ethnicity:</td>
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<tr>
<td></td>
<td></td>
<td>90% White</td>
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<tr>
<td></td>
<td></td>
<td>Sex:</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Physicians, 59% male</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nurses, 83% female</td>
<td></td>
</tr>
<tr>
<td>Sacchetti et al, 1996&lt;sup&gt;18&lt;/sup&gt;</td>
<td>Prospective survey conducted at a university-affiliated community hospital and a pediatric ED university hospital</td>
<td>FM: n = 111</td>
<td>Family members and ED staff were interviewed following 127 invasive procedures on 96 children; procedures included: vascular access 91 lumbar puncture 23 urethral catheterization 9 NGT placement 1 intubation 1 fluid resuscitation 1 foreign body to the eye 1 Family member activity included soothing the child, standing at the bedside, and restraining the child</td>
</tr>
<tr>
<td></td>
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<td>ED staff: n = 98</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Children: n = 96</td>
<td></td>
</tr>
<tr>
<td>Bauchner et al, 1996&lt;sup&gt;19&lt;/sup&gt;</td>
<td>Randomized controlled trial conducted in the pediatric ED of Boston City Hospital</td>
<td>Parents: n = 431</td>
<td>Parents were randomly divided into 3 groups: 1. Parents present during procedure and instructed on how to calm the child (n = 153) 2. Parents present but no instructions given (n = 147) 3. Parents not present (n = 131) Outcome variables included measurement of pain using observation and cry analysis; performance of procedure evaluated by number of attempts and completion time; anxiety of parent and physician measured by the State Trait Anxiety Scale; parental satisfaction evaluated by written surveys</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Children: n = 435</td>
<td></td>
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<td></td>
<td></td>
<td>Parents:</td>
<td></td>
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<td></td>
<td></td>
<td>Ages 20-24 y</td>
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<tr>
<td></td>
<td></td>
<td>Sex: Female 87%</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Ethnicity:</td>
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<tr>
<td></td>
<td></td>
<td>American-born</td>
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<tr>
<td></td>
<td></td>
<td>black 45%; Hispanic 22%; White 9%</td>
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<td></td>
<td></td>
<td>Children:</td>
<td></td>
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<td></td>
<td></td>
<td>Age &lt;3 y</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Sex: Female 58%</td>
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</table>
### Results

The parental decision to stay or leave was not related to the parent’s age, sex, race, marital status, or level of education nor the resident’s age, sex, or level of training; parents stayed with their child during 62% of the 50 procedures; parents were more likely to stay if they had previously stayed with this child or another; of the parents who did not stay, 37% reported that the physician had asked them to leave.

### Conclusions

Overt or nonverbal cues from the HCP may influence the parent’s decision to leave.

### Limitations

No description of questionnaire or its development.

---

91% of family members felt that remaining with the child helped the child and that the concept of family presence was a “good idea”; 94% of ED staff felt that family presence was a good idea.

### Conclusions

Family presence should be considered for critically ill children and those requiring more invasive procedures.

### Limitations

2 different sites with 2 different family presence policies were studied; only parents who elected to remain with their children were surveyed; limited demographic information.

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Pain: No difference in reduction of pain noted between the 3 groups; Anxiety of parent: parents who were not present reported being more anxious than parents who were present; Anxiety of physician: No differences between groups in anxiety scores of the clinicians; Satisfaction with care: Parents in the intervention group were more satisfied than parents in the other 2 groups.

### Conclusions

Parental presence did not negatively affect the performance of the procedure or increase clinician anxiety; parents who were present were less anxious than parents who were not present.

### Limitations

No interobserver reliability was assessed during the study; prerandomization may have created bias; wide range of age of children (0-36 mo); the cry analysis used to determine the level of pain has only been used with young infants.

(Continued)
TABLE 3 (continued)

<table>
<thead>
<tr>
<th>Author/year</th>
<th>Study design</th>
<th>Sample</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wolfram et al, 1997</td>
<td>Prospective randomized clinical study conducted in the pediatric ED of an urban teaching hospital</td>
<td>Parents: n = 96&lt;br&gt;Children: n = 96&lt;br&gt;Parents:&lt;br&gt;Age ± SD: 28.4 ± 7.5 y&lt;br&gt;Sex: Female 91%&lt;br&gt;Ethnicity:&lt;br&gt;White 56%; black 44%&lt;br&gt;Child:&lt;br&gt;Age: 1-7 y&lt;br&gt;Sex: Female 64%&lt;br&gt;Ethnicity:&lt;br&gt;White 56%; black 44%</td>
<td>Children requiring venipuncture in a pediatric ED were prospectively randomized into 2 groups: parents present and parents absent; patients were videotaped during the procedure to determine their level of distress; immediately after the procedure, the parent and the medical staff performing the venipuncture self-reported their own distress using a visual analog scale</td>
</tr>
<tr>
<td>Boie et al, 1999</td>
<td>Prospective survey conducted in an urban teaching hospital</td>
<td>Parents: n = 400&lt;br&gt;Age: median 37 y (range 17-76 y)&lt;br&gt;Sex: Female 75%&lt;br&gt;Ethnicity:&lt;br&gt;White 66%; African-American 31%; Hispanic 5%</td>
<td>Parents in an ED waiting room completed a written survey regarding their desire to be present if their child required invasive medical procedures; 5 scenarios of increasing levels of invasiveness were described</td>
</tr>
</tbody>
</table>

REFERENCES

<table>
<thead>
<tr>
<th>Results</th>
<th>Conclusions</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the parents present group, distress scores were lower for the parent and for the child than they were in the parents absent group; the medical staff performing the venipuncture had no difference in distress scores with or without parental presence</td>
<td>Parental presence may be an effective nonpharmacologic method of reducing both patient and parental distress in the pediatric ED</td>
<td>Study examined only VP, which is considered to be a minor clinical procedure; medical staff performing the VP had &gt;6 y experience with the procedure; results may have been different with a less experienced staff; potential for self-reporting bias and the Hawthorne effect was possible</td>
</tr>
</tbody>
</table>

2 Parents desiring to be present:
- All 5 scenarios, 65%; venipuncture, 98%; laceration repair, 94%; lumbar puncture, 87%; intubation, 81%; major resuscitation, 71%; child likely to die, 83%

Parental desire to be present decreased somewhat with increasing procedural invasiveness; most parents wanted to be present if their child were likely to die and 94% of parents did not want the physician to unilaterally determine their presence.

Scenarios were hypothetical and free of the emotional reactions that would be present in real life situations; order of scenarios were not varied, which may have led to participant fatigue.

B-type Natriuretic Peptide: A New Measurement to Distinguish Cardiac From Pulmonary Causes of Acute Dyspnea

You are working in a busy emergency department when an elderly man arrives via ambulance, acutely short of breath. He has a history of chronic obstructive pulmonary disease (COPD) and congestive heart failure (CHF), but which condition is causing his symptoms today?

CHF is the leading cause of hospital admissions in persons 65 years of age and older and accounts for 200,000 deaths in the United States each year. After the condition is diagnosed, the 5-year mortality rate is 50%, a rate higher than that for most cancers. However, despite the high incidence of CHF, the diagnosis is often difficult. Not all patients have the classic symptoms of volume overload, such as edema, weight gain, or jugular venous distention. Many patients present primarily with dyspnea that may be caused by CHF or by pneumonia or other preexisting pulmonary conditions, such as COPD. Consequently, the diagnosis of CHF is missed in some elderly patients.

When a patient has heart failure, the body releases natriuretic peptides—atrial natriuretic peptide (ANP) from the atria and B-type natriuretic peptide (BNP) from the ventricles—in response to stretch and increased ventricular volume. BNP sends a message to the brain to decrease angiotensin and aldosterone secretion. As a result, it promotes natriuresis (sodium excretion), diuresis (water excretion), smooth muscle relaxation, and vasodilation. As the CHF gets worse, the ventricles secrete BNP proportionately, so a serum level can quantify the severity of the heart failure.
BNP as a diagnostic tool

Although BNP was discovered 16 years ago, the Food and Drug Administration only approved a bedside laboratory test to measure BNP levels in November 2000. Today, the BNP assay can be performed for approximately $26 and completed in roughly 15 minutes. The test is up to 94% accurate in identifying heart failure, making it more precise in diagnosing and measuring the severity of heart failure than the Framingham Criteria or the National Health and Nutrition Examination Survey CHF Score.

As the CHF gets worse, the ventricles secrete BNP proportionately, so a serum level can quantify the severity of the heart failure.

A study by Maisel et al tested BNP levels on 1586 ED patients who presented with dyspnea. The mean BNP level for the subjects with acute CHF was $675 \pm 450$ pg/mL (the normal range is 0 to 100 pg/mL). For subjects who did not have CHF, it was $110 \pm 225$ pg/mL. Subjects who had preexisting left ventricular dysfunction without an acute episode of CHF showed a mean BNP level of $346 \pm 390$ pg/mL. When the BNP values are compared, there is significant overlap between the New York Heart Association Classification of Heart failure classes (Table 1), but the numbers show a trend toward higher BNP levels with higher classifications of heart failure. Some patients who have chronic CHF may have BNP levels that are chronically elevated (200 to 400 pg/mL), but if they are having an acute exacerbation of CHF, the BNP level will rise above their baseline. Primary pulmonary pathology, such as asthma or COPD, will not affect BNP levels.

The BNP assay can be performed for approximately $26 and completed in roughly 15 minutes.

Areas in which the use of the BNP level remains investigational involve using the assay to help to predict patient outcomes and to assess the effectiveness of and to titrate CHF therapy. Current research suggests that a BNP level >480 pg/mL may predict higher 6-month mortality from and rehospitalization rates for patients with CHF. An elevated BNP level 48 hours after myocardial infarction appears to be a strong predictor of death or the reoccurrence of heart failure within 1 year. A BNP level >700 pg/mL may indicate the need for hospital admission for heart failure, whereas a patient who has a BNP <254 pg/mL may be treated as an outpatient. When evaluating treatment regimens, a decreasing BNP level in a patient being treated for CHF appears to indicate improvement in the patient’s condition, while a rising level may demonstrate the need for more aggressive or different treatment strategies.

Preexisting disease states and their effect on BNP

Despite the usefulness of BNP in diagnosing CHF, there are occasions when a patient who does not have CHF might have a slightly elevated BNP level (although it is usually lower than that seen in patients with CHF). The level can be slightly elevated in women, the elderly, patients receiving hormone replacement therapy, patients who have

<table>
<thead>
<tr>
<th>Class</th>
<th>Exercise tolerance</th>
<th>Symptoms</th>
<th>Mean BNP level</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>No limitation</td>
<td>No symptoms with usual activity</td>
<td>$244 \pm 286$ pg/mL</td>
</tr>
<tr>
<td>II</td>
<td>Mild limitation</td>
<td>Comfortable at rest or with mild exertion</td>
<td>$389 \pm 374$ pg/mL</td>
</tr>
<tr>
<td>III</td>
<td>Moderate limitation</td>
<td>Comfortable only at rest</td>
<td>$640 \pm 447$ pg/mL</td>
</tr>
<tr>
<td>IV</td>
<td>Severe limitation</td>
<td>Any physical activity brings on discomfort and symptoms occur at rest</td>
<td>$817 \pm 35$ pg/mL</td>
</tr>
</tbody>
</table>
a pulmonary embolism, cirrhosis, or primary pulmonary hypertension, or patients who are undergoing dialysis. All of these situations can cause fluid overload and ventricular stretch, causing release of BNP.

**Primary pulmonary pathology, such as asthma or COPD, will not affect BNP levels.**

**New frontiers in treatment: Synthetic BNP**

Nesiritide is a recombinant form of human BNP that aids in the treatment of heart failure. Because BNP is not released by the body in sufficient levels to provide adequate diuretic and natriuretic response, nesiritide supplements the body’s natural properties. Studies have demonstrated that nesiritide causes fewer arrhythmias (a common complication in patients with CHF) than the use of dobutamine does, and patients treated with nesiritide had fewer readmissions and a lower 6-month mortality rate than did patients treated with dobutamine alone.

**Acknowledgment**

I thank Dr Stephen Dannewitz for editing the original manuscript.

**REFERENCES**

An Update on the Treatment of Heart Failure Using Biventricular Pacing and Intravenous Nesiritide

Case study No. 1

A 55-year-old woman arrived at the emergency department after having had a seizure. Her vital signs were as follows: blood pressure, 102/58 mmHg; heart rate, 92 beats per minute and slightly irregular; respiratory rate, 14 breaths per minute with a pulse oximetry reading of 92% on 2 L of oxygen; and Glasgow Coma Scale score, 14.

The patient’s daughter stated that her mother had a history of dilated cardiomyopathy from a past myocardial infarction, with a left bundle branch block (LBBB) and atrioventricular conduction delay (see EKG No. 1, Figure 1). Her medications included carvedilol, lisinopril, estrogen replacement therapy, and multivitamin and calcium supplements. Although she had a cardiac ejection fraction of 25% and had class III congestive heart failure (ie, minimal activity initiates symptoms, but symptoms subside with rest), she could walk with only mild shortness of breath and adhered to a heart-healthy diet.

The daughter reported that this was the third seizure her mother had in 2 weeks, each following syncopal episodes. After the first seizure, the results of a neurologic workup were negative. Following the second episode, a cardiologist suspected that the patient was having ventricular tachycardia resulting in syncopal episodes that initiated the seizures.

Electrophysiology studies determined that the patient needed cardiac resynchronization therapy (CRT), that is, the implantation of biventricular pacing leads to
synchronize systolic ejection of the left and right ventricles. This device is used in patients with class III or IV heart failure with an LBBB and wide QRS complex. Because of her ventricular tachycardia, the patient also received an implanted cardioverter-defibrillator.

After implantation, the patient’s EKG reflected dual chamber pacemaker artifacts (spikes) for each beat (see EKG No. 2, Figure 2). Compared with her pre-implantation EKG, the AV conduction time decreased and the width of the QRS complex narrowed because the ventricles were beating at nearly the same time.

BIVENTRICULAR PACEMAKERS

The standard pulse generator for CRT is implanted in the upper chest wall with 3 leads: the right atrial lead, the right ventricular lead, and a left ventricular lead, all placed via the transvenous approach. The left ventricular lead is threaded through the coronary sinus and placed in a left ventricular cardiac vein, as far away from the right ventricular apex as possible to ensure true synchrony of the ventricles. The synchronized contraction stabilizes the septal wall and prevents further obstruction of the outflow tract. The device must pace the ventricles 100% of the time to gain the true benefits of biventricular pacing.

Patients who undergo CRT have a dramatic increase in cardiac output, exercise tolerance, and an improved quality of life.1 Biventricular pacing may reverse remodeling, in part by altering hemodynamic load,2 as well as improve blood pressure, decrease sympathetic nervous system activity, and improve heart failure status.3 The MIRACLE study found a reduction in admissions to the hospital for worsening heart failure in patients with biventricular pacemakers.4 At 6 months, the risk of requiring hospital admission for decompensated heart failure was reduced by 50%, resulting in a 77% reduction in total hospital days for the paced group compared with the control group.
For patients with heart failure, adding the third lead for biventricular pacing can lead to improved ejection fraction and improved survival rates. For patients like ours with spontaneous ventricular tachycardia, cardiomyopathy, an LBBB and an ejection fraction of less than 30%, a combination of an implantable cardioverter-defibrillator and biventricular pacer device is ideal. According to one study, patients who received cardiac resynchronization therapy plus an implantable defibrillator had a 43% reduction in mortality.

Patients who undergo CRT have a dramatic increase in cardiac output, exercise tolerance, and an improved quality of life.

Patients with CRT must continue the medications they were taking before device implantation, maintain a heart-healthy diet with fluid restrictions, if necessary, and avoid magnetic resonance imaging examinations, metal detectors, and antitheft devices.

**Case study No. 2**

A 53-year-old man came to the emergency department and said, “I have gained 12 pounds in less than a week and I cannot sleep, because when I lie down, I can’t breathe.” Initial vital signs were as follows: blood pressure, 106/52 mmHg; heart rate, 96 beats per minute and irregular; and respiratory rate, 32 breaths per minute and shallow, with a pulse oximetry of 83% on room air and rales auscultated in both lungs.

The patient had 2 myocardial infarctions followed by a quadruple bypass with a cardiac defibrillator implanted 3 years earlier. Within the past year, his physicians discussed the option of a heart transplant, but the patient decided against this, stating, “I’ll just replace one set of medications (cardiac) with another (immunosuppressant therapy).” His medications included Lanoxin, captopril,
spironolactone, metolazone, allopurinol, aspirin, simvastatin, indomethacin, and amitriptyline. The emergency physician decided to administer nesiritide (Natrecor) for the patient’s acute decompensating heart failure.

**NESIRITIDE**

Natriuretic peptide is a naturally occurring hormone that exerts both cardiovascular and renal activity and is found in both the brain and cardiac tissue. It inhibits the reabsorption of sodium ions from the glomerular filtrate in the kidneys, thus allowing more sodium excretion in the urine. Nesiritide is a synthetic, human B-type natriuretic peptide produced by *Escherichia coli* using recombinant DNA technology. It is a potent vasodilator that reduces both preload and afterload and has additional diuretic and natriuretic properties. Intravenous nesiritide is indicated for the treatment of patients with acutely decompensated congestive heart failure who have dyspnea at rest or with minimal activity.

Research studies support the beneficial effects of a reduced pulmonary capillary wedge pressure (within 15 minutes of initiating the infusion), reduced systemic vascular resistance, and an improved cardiac index in patients treated with a bolus dose, followed by an infusion, of nesiritide. Patients receiving the drug reported greater improvement in their dyspnea at 3 hours than patients receiving a placebo.

Dosages of nesiritide are weight based. The recommended dose is an intravenous bolus of 2 μg/kg over 1 minute, followed by an infusion of 0.01 μg/kg/minute. No dose alteration is needed for patients in chronic renal failure. Because nesiritide can actually increase renal function, there have been instances when it has been used as a bridge to dialysis.

The most significant and frequent side effect of nesiritide is hypotension. Vigilant monitoring is recommended at all times during the infusion, particularly when the patient does not have an arterial line in place. The risk of symptomatic hypotension may increase if the patient also is receiving an oral ACE inhibitor. The hypotension is treated by interrupting the infusion until symptoms disappear. (The half-life of nesiritide is 18 minutes.) When the blood pressure stabilizes, the infusion is restarted without the bolus and at 30% of the initial infusion rate.

In addition to hypotension, the patient also may have headache, nausea, diaphoresis, lightheadedness, and sinus bradycardia. The hypotension and nausea appear to be dose related.

*Research studies support the beneficial effects of a reduced pulmonary capillary wedge pressure..., reduced systemic vascular resistance, and an improved cardiac index in patients treated with...nesiritide.*

Nesiritide has proven to be an alternative to intravenous dobutamine, dopamine, and nitroglycerin in the treatment of patients with acute congestive heart failure. Low-dose dopamine can be administered with nesiritide for blood pressure support and, when used together, a shorter duration of pressure support often is required because both nesiritide and dopamine increase cardiac output. The co-administration of nesiritide with intravenous vasodilators such as nitroglycerin and nitroprusside has not been evaluated. Because nesiritide is seen as an alternative to intravenous nitroglycerin, the current recommendation is not to administer the 2 medications simultaneously.

It is usually recommended that patients remain on the maintenance doses of their diuretic therapy. Because nesiritide will increase renal output, additional doses of diuretics are not required or recommended.

For more information on these 2 modalities for treating decompensating heart failure, check out the following Web sites: [www.theheart.org](http://www.theheart.org), [www.optseries.com](http://www.optseries.com), and [www.sciosinc.com/scios/natrecor](http://www.sciosinc.com/scios/natrecor).

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congestive heart failure: a double blind, placebo controlled trial.
Frequently Asked Questions
About Emergency Nurses’ Certification: Overheard at the BCEN booth in San Diego

Question #1: What do you mean, I don’t have to take the exam every other time?

Answer: We mean exactly that! Once you take the CEN or CFRN exam, you never have to take the exam again...ever. BCEN changed the requirement of taking the exam every other time for renewal in 2000. We changed the renewal process in response to your questions and suggestions. BCEN also has in place two very effective processes to assure that CENs maintain the knowledge that was tested on the original or proctored exam. The processes are renewal by CEUs (CEN-RO by CEU) and renewal by Internet-Based Testing (CEN-RO by IBT). This option is not yet available for CFRNs, but we are working on it.

Question #2: What is this I hear about taking the CEN exam online?

Answer: As mentioned above, BCEN has developed a renewal option for CENs called IBT (Internet-Based Testing). Renewal candidates can take this exam in the comfort and privacy of their own home. It is an open
book exam, so candidates can seek answers to items using resources from home and work. When a candidate chooses IBT as their renewal option, a Web site and password are sent to them by BCEN’s testing vendor. The candidate can access and exit the IBT site as many times as they wish for 30 days. After successfully completing the IBT, the renewing RN also receives 30 CEUs, which can be used for meeting state and agency continuing education requirements.

Once you take the CEN or CFRN exam, you never have to take the exam again...ever. BCEN changed the requirement of taking the exam every other time for renewal in 2000.

Question #3: Why can’t I take my first CEN online?

Answer: The CEN exam that you take the first time is referred to by the testing world as a “high stakes” exam. In other words, the initial exam assesses whether or not a nurse possesses a specific amount of knowledge about emergency nursing. To assure that the nurse taking the exam has that knowledge, BCEN makes sure that no books or other references are used in taking the exam. That is why the exam is taken at various testing sites (proctored), and like other “high stakes” exams, the candidate must provide proof of identity by presenting a picture ID.

Question #4: Is there a way that I can keep track of my CEUs for renewal online?

Answer: BCEN recently developed an excellent online renewal process. One of the options for renewal is CEN-RO by Continuing Education. The nurse renewing his/her CEN enters continuing education information in tables, and it is automatically tabulated as clinical hours or other educational hours. The calculator also automatically converts CEUs and CECHs into CEUs. CENs who visited the BCEN booth asked if it was possible to keep track of and save their CEUs online. BCEN does not have the capability to save individual CEUs online, but we are asking our Web master to make a downloadable version of the calculator available for CENs to keep track of their continuing education at home, so CENs can submit to BCEN for renewal when needed.

Renewal candidates can take this exam in the comfort and privacy of their own home. It is an open book exam.

Question #5: Have you considered having a pediatric CEN exam?

Answer: BCEN has considered a pediatric exam at least twice in the past, but for several reasons, we did not proceed with it. First of all, we know there are only 40 pediatric emergency departments in the country. The number of nursing staff in those EDs would not support a separate pediatric CEN. We did learn while talking with nurses at the booth at annual meeting, that there are some facilities that have separate pediatric and adult emergency departments with separate staff. BCEN still needs to explore the feasibility of having a separate pediatric exam further. We need to research the issue in order to find out how many pediatric emergency nurses there are in the United States. We need your help in determining what these numbers are, and what the true interest in a pediatric CEN exam really is.

Question #6: Are you ever going to come out with an Advanced Practice exam?

Answer: Again, BCEN is not averse to having an Advanced Practice exam, but we are aware there are not a large number of these professionals. Plus, there are usually 2 different roles within advanced practice: Clinical Nurse Specialist and Nurse Practitioner. BCEN would also consider partnering with an advanced practice organization to conduct some surveys and to obtain additional information to determine the interest in such an exam.

BCEN Board and staff members were glad to see everyone at Annual Meeting, and we would like to congratulate all of you for having the dedication and commitment to emergency nursing and its related specialties that you have demonstrated by asking questions, making suggestions, and by taking the CEN exam.
A New Mnemonic for Chest Pain Assessment

In our emergency department we see more than 110,000 patients per year, and a significant number of them have chest pain. One of our patients with myocardial infarction (MI) was younger than 18 years of age! We also are faced with varying experience levels among staff and employ a number of traveling nurses because of the nursing shortage. As a result, we, as educators, saw a need to improve triage and assessment of patients with chest pain.

During education efforts, we realized the staff did not find the PQRST mnemonic (provokes/palliates/precipitating factors; quality; region/radiation; severity/associated symptoms; time/temporal relations) easy to use. Although it did make the user think of the heart, it seemed to work better when it was obvious that the person was, in fact, having a myocardial infarction. The missing link seemed to be assessment of risk factors. Research uncovered another cardiac mnemonic used in Australia: SINODRARA (site, intensity, nature, onset, duration, radiation, associated features, relieving factors, aggravating factors). This mnemonic did not automatically make you think of the heart, but it did have a certain appeal.

Then we had an “aha” moment, and decided to try our hand at creating our own “chest pain” mnemonic. It had to make the user immediately think of the heart, but also be just as usable for patients who presented without classic signs of an MI as for patients who did present with these signs. We also wanted to add risk factors as an assessment point. What we came up with was CHEST PAIN (see Table 1). It has everything we wanted, and the name is obvious. It was revised after feedback from emergency and critical care nurses within our health care
system. We anticipate rolling it out this year as an ongoing effort to educate staff on chest pain assessment. We also have tentative plans to conduct research to validate the tool. To that end, any feedback from readers is greatly appreciated. We believe this is a simple upgrade to the standard PQRST approach. Stay tuned to see how everything turns out!

SUGGESTED READING


Send descriptions of procedures in emergency care and/or quick-reference charts suitable for placing in a reference file or notebook to:

Gail Pisarcik Lenehan, RN, EdD, FAAN
c/o Managing Editor, 77 Rolling Ridge Rd, Amherst, MA 01002
800 900-9659, ext 4044 ● awbkelly@comcast.net

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<table>
<thead>
<tr>
<th>LETTER</th>
<th>TRIGGER WORDS</th>
<th>ASSESSMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>History/risk factors</td>
<td>Do you have a history of heart disease? Is there a primary relative (parent/sibling) with early onset and/or early death related to heart disease? Do you have other risk factors, eg, diabetes, smoking, hypertension, or obesity?</td>
</tr>
<tr>
<td>S</td>
<td>Stays/radiates</td>
<td>Does the pain stay in one place? Does it radiate or go anywhere else in the body? Where?</td>
</tr>
<tr>
<td>T</td>
<td>Timing</td>
<td>How long does the pain last? How long has this episode lasted? How many minutes? Is the pain continuous or does it come and go? When did it become continuous?</td>
</tr>
<tr>
<td>P</td>
<td>Place</td>
<td>Where is your pain? Check for point tenderness with palpation.</td>
</tr>
<tr>
<td>A</td>
<td>Alleviates</td>
<td>What makes the pain better? Rest? Changing position? Deep breathing?</td>
</tr>
<tr>
<td>I</td>
<td>Intensity</td>
<td>How intense is the pain? Rate the pain from 0 to 10.</td>
</tr>
<tr>
<td>N</td>
<td>Nature</td>
<td>Describe the pain. (<em>Listen for descriptors such as sharp, stabbing, crushing, dull, burning, elephant sitting on my chest.</em>) Do not suggest descriptors.</td>
</tr>
</tbody>
</table>

Fatal Confusion
With Epinephrine: 1:1,000 is NOT 1:10,000

Every day around the country, epinephrine is administered in lifesaving doses. It is used primarily for ventricular standstill (during advanced cardiac life support [ACLS]), atrioventricular (AV) heart block with syncope, as well as with urticaria, acute hypersensitivity, and angioedema (anaphylactoid reactions to drugs, animal serums, insect stings, and other allergens), to prolong the action of local anesthetics, and to relieve bronchospasms associated with asthma.

Unfortunately, the Institute for Safe Medication Practices (ISMP) has received over 75 reports over the past 10 years related to error with the use of this medication, some of which have resulted in patient deaths. A common thread in many of these errors is that providers use the undiluted concentration of epinephrine (1:1,000 or 1 mg/mL) instead of the more common diluted form of the drug (1:10,000 or 0.1 mg/mL). Practitioners report they are often confused by the use of a “ratio expression” on the label to communicate drug concentration, as the errors below clearly demonstrate.

How errors happen

Following a radiology procedure, a patient developed visible hives and respiratory distress secondary to the use of contrast media, and was quickly transported to the emergency department for continued care. The physician prescribed 3 mL of epinephrine to be given (intending the 1:10,000 concentration be used); however, the ED nurse selected and administered 3 mL of the 1:1,000 concentration IV push. The patient developed tachycardia and hypertension, necessitating admission to the hospital.

In another recent case, this confusion regarding dose ratios took a deadly turn. One treatment for priapism...
(prolonged painful erection that occurs without sexual stimulation) is to inject an alpha-agonist, such as phenylephrine or epinephrine, into the penis (intracavernous injection). This causes the vessels to narrow and reduces blood flow. The dose is typically a 1:1,000,000 solution of epinephrine prepared by adding 1 mg (1:1,000) to 1 liter of normal saline. The corpora cavernosa is then irrigated with 10 to 20 mL of the 1:1,000,000 epinephrine solution. This may be repeated 3 to 4 times as needed. Recently a 16-year-old male was brought to an emergency department with priapism and the urologist ordered epinephrine. The label of the 30 mL vial of 1:1,000 concentration of epinephrine was misinterpreted as already “prediluted.” The patient received 4 mL (4 mg) of undiluted epinephrine solution injected into his penis. As the drug reached his systemic circulation, the patient arrested and could not be resuscitated.2,3

Eliminate if possible, (but at a minimum sequester) the storage of the larger 30 mL vials of undiluted epinephrine 1:1,000 from routine ED stock. (High-dose epinephrine is no longer used as part of the ACLS protocol, and thus, is not likely needed in this quantity for this or any other purpose.) Confusing Labels

This tragedy highlights the confusion that many practitioners have for the concentration of epinephrine being expressed as ratio strength (1:1,000), rather than a metric weight (mg) per volume. In addition, the label on the concentrated form (1:1,000) suggests that the epinephrine can be given subcutaneously or intravenously; however, it does not warn practitioners that it should be diluted prior to use. Many of the medications with concentrations expressed as ratios or percentages became available earlier than the 1938 Food and Drug Cosmetic Act, and therefore do not fall under current Food and Drug Administration (FDA) labeling standards. (See Table 1 for current epinephrine package availability.) Due to the continued concerns with these serious epinephrine errors, ISMP has petitioned the Nomenclature and Labeling Expert Committee of the United States Pharmacopoeia (USP) for changes to the epinephrine label to eliminate the use of ratio expressions. If you are aware of any dosing errors with epinephrine, report the problem to the Medication Error Reporting Program (MERP) by going online at www.ismp.org or calling 1-800-FAIL-SAF.

What can I do?

Eliminate if possible, (but at a minimum sequester) the storage of the larger 30-mL vials of undiluted epinephrine 1:1,000 from routine ED stock. (High-dose epinephrine is no longer used as part of the ACLS protocol, and thus, is not likely needed in this quantity for this or any other purpose.) If the undiluted 1:1,000 concentration in a topical formulation is necessary to make LET (lidocaine, epinephrine, and tetracaine used as a topical gel anesthetic prior to suturing, debridement, or irrigation), store these vials in the pharmacy, and have pharmacists compound and dispense this product in oral/topical syringes clearly labeled “for topical use only.” It is best not to stock 1:1,000 concentration of epinephrine, but if, for some reason, it is kept in the emergency department, only stock the small 1-mL ampules. The need for multiple ampules can then serve as an alert to the health care provider that the dose may be too high. Do not expect all practitioners to be familiar with percent or ratio expressions of concentrations, or for that matter, to be comfortable calculating dosages for drugs labeled in this manner. Bring clarity to this issue by preparing a dose conversion flow chart for all types of epinephrine available in your facility. Make them clearly visible in medication areas, in the trauma rooms,

<table>
<thead>
<tr>
<th>TABLE 1 Epinephrine concentrations</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 1 mL vials and 1 mg ampules; both at a 1:1,000 concentration</td>
</tr>
<tr>
<td>• 10 mL vials and 10 mg prefilled syringes: both in the 1:10,000 concentration</td>
</tr>
<tr>
<td>• Pen-like devices containing a 1:1,000 OR 1:2,000 concentration</td>
</tr>
<tr>
<td>• 30 mL vials for injection or topical use; both in the 1:1,000 concentration</td>
</tr>
</tbody>
</table>

DANGER ZONE/Paparella

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and anywhere else epinephrine may be prepared and administered in an emergency. During ACLS updates, review the forms of epinephrine available in the emergency department, their indications, and the potential for confusion between the varieties of dose concentrations available. Work with the pharmacy to affix warning labels as appropriate to guard against confusion, and to prompt for proper dilution as necessary. Also, point out to all coworkers the dangers of ordering any injectable medication by volume alone.4

If the undiluted 1:1,000 concentration in a topical formulation is necessary to make “L.E.T.” (lidocaine, epinephrine, and tetracaine used as a topical gel anesthetic prior to suturing, debridement, or irrigation), store these vials in the pharmacy, and have pharmacists compound and dispense this product in oral/topical syringes clearly labeled for topical use only.

Epinephrine is a high-alert medication with a very real possibility of causing harm and even death if misused. Until the standards change for the labeling of epinephrine, implement the strategies mentioned above. Do not gamble with epinephrine percentages! Take time today to see what strengths are in your emergency department, and take action to avoid similar error.

REFERENCES
2. USP-ISMP Medication Error Reporting Program (MERP). Reports received 1971-present.
Donning the “Magic Cloak”

The flight crew enters the trauma room and begins report: “This is Amy. She was the restrained front-seat passenger in a vehicle that was T-boned by a drunk driver on the passenger side. She started crashing on us in the elevator; her blood pressure is 80/60, heart rate is 125.” The trauma team, consisting of a trauma surgeon, staff physician, 2 residents, 3 nurses including me, and a paramedic, listen quietly as report is given.

As the team prepares to move Amy, I look at her face and notice what a beautiful girl she is. She has a perfect complexion and long curly hair and is only 19 years old. We transfer her to our gurney and place her on the heart monitor which shows a sinus tachycardia of 130, blood pressure 76/48. As I feel for a femoral pulse, I notice Amy’s entire pelvic area is incredibly bruised and swollen and seems to be getting bigger before our eyes. Another nurse and I are unable to feel femoral pulses. A physician feels for a carotid and says he has a weak pulse.

“Amy, I’m sorry, there’s just too much bleeding,” I mentally explain to her.
The trauma surgeon says, “Okay folks, we’re not going to be able to make any progress here. Let’s call it.”

Realizing Amy’s vital signs are ominous, I next check to make sure she has sufficient, patent IV lines. She has a large bore IV in each antecubital space. As the physicians complete their head to toe assessment, we are infusing warm normal saline at a wide open rate.

Suddenly Amy’s heart rate begins to drop. Her rate is 40 with no palpable pulses. The paramedic begins chest
compressions as code drugs are called for. As I push the epinephrine, I hold Amy’s hand. I notice she has painted her fingernails pink. I wonder what she was thinking when she painted them, and if she was excited to spend the day with her boyfriend. He was with her in the vehicle. For some reason at that moment I feel Amy’s presence. I know she is there, watching us. I offer up a sad smile and I think, “Amy, I’m so sorry. We aren’t going to be able to help you.”

A colleague hooks up the Level One and begins rapidly infusing blood. The physicians are attempting a cutdown on Amy’s left arm for an arterial line. I set up the arterial line tubing and then a chest tube is called for. I kneel on the floor as I set up the Pleuravac, and again I’m drawn to the thought of Amy’s spirit present in the room. “Amy, I’m sorry, there’s just too much bleeding,” I mentally explain to her.

The trauma surgeon says, “Okay folks, we’re not going to be able to make any progress here. Let’s call it.” Following a mass exodus from the room, suddenly another nurse and I are alone with Amy. I turn off the cardiac monitor and dim the lights. I hold Amy’s hand as she breathes her last breath. “It’s okay, Amy. It’s all going to be okay now,” I mentally reassure her.

As I walk into my next patient’s room, I put a smile on my face. “My name is Shannon. I’ll be your nurse today.”

When she is gone, I run warm water in the sink and wet a towel. As I slowly wash her face, I wonder about the girl she had been. I raise the head of her bed to minimize facial swelling, dress her in a clean gown, and cover her with a warm blanket.

A few minutes later, Amy’s mother enters with the chaplain. “My name is Shannon. I helped take care of Amy. Please let me know if there is anything I can do for you,” I tell her. She looks at me with tear-stained eyes, touches my arm, and says, “Thank you.” As the tears start falling down my own cheeks, I turn away from Amy and her mother. “Oh Amy, how can I go on today after you have touched me so?” I ask myself.

I stand before the curtain in Amy’s dim, somber room, mentally wrap the “magic cloak” possessed by all emergency nurses around my shoulders and step into the brightly lit, ordered chaos of the emergency department. As I walk into my next patient’s room, I put a smile on my face. “My name is Shannon. I’ll be your nurse today.”
Cutting-edge Discussions of Management, Policy, and Program Issues in Emergency Care

Polly Gerber Zimmermann, RN, MS, MBA, CEN

PREVENTING ED BACKUP

It seems as if our emergency department is always backed up and we are always holding ED patients. What strategies are others finding helpful?

Answer 1:

When we first started looking at our problems of diversion hours and long patient waits, we had both community and hospital-wide involvement to attack the problem on a number of levels.

First, we go into “preclosure” when we are getting full, seeing high acuities, or both, in combination with other area hospitals being closed. A page goes out to the house supervisor, ED manager and assistant managers, Admitting, Environmental Services, and the Assistant Medical Group administrator. Preclosure encompasses a quick assessment to help drill down the problem areas. (Keep in mind this situation is also affected by mandated California nurse-patient ratios.) However, if the emergency department continues to back up, we do proceed with closure for a maximum of 3 hours.

One of our proactive measures is to assign patients (upon arrival for an ambulance and after triage for a walk-in) to a physician and a team of nurses, rather than waiting until they are placed in an ED bed. With this Team Assignment approach, orders and care can begin even in the waiting room. Although the volume of the entire department can become overwhelming at times, the Team Assignment approach allows the team to run a “mini-emergency department” and decide how to best manage the patients they are responsible for.

Another preventative piece internal to Kaiser is the 30-60-90 rule that effects how long it takes to get a bed from the hospital side and for us to have “rolled out” of the department with the patient. There is a maximum of 30 minutes for an ICU bed, 60 minutes for a monitored/
telemetry bed, and 90 minutes for a standard medical-surgical bed. The hospital side “finds” a bed when there isn’t one available by looking at discharges, downgrading of care (if applicable), initiating room changes, expediting room cleaning, or whatever is needed.

If a nurse is not able to take the phone report, we ask for the charge nurse or any available nurse. If no nurse is available, we indicate that we are on our way and will be giving a bedside report. The whole issue of a floor unit’s inability to take report has become a minor issue since the other hospital staff realized that the emergency department would follow these guidelines regardless.

All of these changes were made with the full support and monitoring of senior administration. It is no longer acceptable for the emergency department to “hold” admitted patients. The entire hospital seriously strives to achieve all of these time goals and it certainly has “raised the bar” of expectations.

As a result of all of these changes, our left without being seen and leaving against medical advice rates are down from 5.2% in 2001 to 2.6% in 2004. Our diversion hours are down from 65.5 in 2001 to 4.1 in 2004! In addition, our patient and staff satisfaction scores are higher. We have a 75,000 annual census and all these improvements occurred within a time frame when our numbers of admitted patients and our patient acuities were increasing.

As our ED Medical Director Dr. Pankaj Patel indicates, you get results by “narrowing the front door, or widening the back door.” We are seeking to make the back door as wide as possible as our solution.

—Nancy J. Coombes, RN, Assistant Service Line Manager, Emergency Services, The Kaiser Permanente Medical Group, Inc, Kaiser Sacramento North, Sacramento, Calif; nancy.j.coombes@kp.org; coomfam@comcast.net

Answer 2:
We had a house-wide task force that included not only the emergency department and inpatient nursing but laboratory, radiology, pharmacy, and environmental services. We developed various color “codes,” with their specific criteria and resulting actions. For instance, “Yellow” means that ICU has no empty beds but the emergency department is currently flowing well. “Orange” is used when the emergency department is also full, when there is limited telemetry bed availability, and when there are no anticipated discharges. We are at the “Red” code when all monitored patient care areas are at 100% capacity, when there are no anticipated discharges, and when to-be-admitted patients cannot be accommodated.

Resulting tiered responses, according to the level, include some of the following responses:

- Calling in an extra environmental employee to clean beds for new admissions or to expedite approved intrahospital patient transfers.
- Extending the hours of the liaison nurse to aid with patient placement.
- Calling in an extra laboratory employee and giving priority to all ED specimens.
- Calling in an extra radiology technician and/or radiologist, who then reads the ED radiographs instead of the ED physician.
- Requiring all departmental managers to stay and “help” until the crisis is resolved.
- Alerting case managers to expedite discharges.

We are still in the beginning stages of implementation. Key to our success so far was senior administration’s acceptance that this was a hospital-wide problem (not just an ED problem) and that it was essential to have a progressive, proactive approach rather than a crisis knee-jerk response.

—Jim Richmann, RN, BS, CEN, Coordinator, Patient Care Services, Emergency Department, Underwood-Memorial Hospital, Woodbury, NJ; richmannj@umhospital.org

Answer 3:
Overcrowding in England’s emergency departments was as much, if not more, of a problem than it was in any American emergency department. There would be up to 58 patients waiting on stretchers (in addition to patients in the regular 20 ED beds). However, the (federal) government started to take the problem more seriously, and there has been significant improvement. By December 2004, the government established the target of 98% of ED patients being seen, treated, and given a disposition (admitted or discharged) within 4 hours.

Some of the ideas to reduce overcrowding:

- **Admission avoidance.** A “home team” (aka visiting nurse) with a nurse practitioner was formed to focus on patients older than 60 years of age who repeatedly came to the emergency department for minor complaints. Communities with these teams now manage deep vein thrombosis or chronic obstructive airway disease, etc, at home.
• **See and treat.** The majority of our ED patients have a minor injury or illness. Senior nurses can see and treat these patients using protocols.

• **Powerful case managers.** All hospital admissions must come through the bed (or case) manager. For this position to be effective, the person in this role must have the power to approve the admission, place the admission, and move the admission as necessary. “Back door” admissions, or any other loophole cannot be allowed. The person should report directly to the senior nursing executive so that no physician can “push” him or her around. In my experience, when the person in this position had this type of power, the physicians initially resisted but eventually liked it. There were now universally applied, nonpolitical boundaries and they knew their patients could always get a bed when they really medically needed it.

• **Medical Assessment Unit.** This unit allows a “workup” that private physicians use to typically send a patient to the emergency department, for example, “fainting, t/o syncope” or “fever of unknown origin.” The patient is being assessed to decide if he or she needs to be admitted; the patient is not admitted in order to have an assessment done. The unit is not used for ED patients’ treatments that are designed to determine whether they respond (eg, to hydration or respiratory treatments) or for “hold” admitted patients waiting for an inpatient unit. The unit is staffed with private (not ED) physicians. A decision must be made within 24 hours.

• **Faster discharges.** If you turn over just 6 patients a day 4 hours earlier than usual, you will produce 365 bed days a year. We have patients with a targeted date of discharge on their admission planning. We present RN-led discharge rounds based on protocols (eg, “If labs are “X” in AM, patient may be discharged”), and a discharge lounge for stable patients whose ride home is delayed.

The solutions for ED “holding” and “overcrowding” do not reside in funds as much as in attitudes and approaches. Additional information is available at www.nelf-ec.warwick.ac.uk; emergencynurse.co.uk; or doh.gov.uk/emergency.

—Brian Dolan, MSN, MsEd, RN, PhD(c), Director of Modernisation and Service Improvement, East Sussex Hospitals NHS Trust, and Emergency Care Nurse Consultant, Dolan & Holt Consultancy Ltd, Stratford upon Avon, England; brian.dolan@esht.nhs.uk

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**RADIOGRAPH PROTOCOL**

_Do other emergency departments have protocols/procedures for ordering radiographs in triage?_

**Answer 1:**
We use an “Extremity Injury Protocol” for any injury to the “glove or sock” region, which includes the triage nurse ordering an appropriate radiograph (medically defined as an area to include distal radius and ulna to metacarpal region and from the malleolus region distal to the metatarsal area). Also, the nurse orders a radiograph for any patient with a possible foreign body (glass, metal, etc.).

The nurse takes an assessment that includes time and mechanism of injury, presence of pain, ecchymosis, or edema, and the degree of disability to the range of motion. The nurse applies a splint and armboard if the injury is an unstable wrist or hand; otherwise the nurse applies ice and elevation.

Our doctors really appreciate having the triage nurse do this. It allows them to see and make a disposition on the patient very quickly.

—Vicki Blucher, RN, BSN, CEN, Clinical Educator, Emergency Department, St Joseph Medical Center, Towson, Md; vickiblucher@chi-east.org

**Answer 2:**
We have had an RN X-ray Ordering Guidelines Policy since 2000. The general guidelines are that a radiograph is indicated if there is a deformity, bony instability, crepitus, point tenderness, ecchymosis or severe swelling, moderate to severe pain in the hip, thigh, or foot with weight-bearing, any penetrating injury in a joint area, or foreign body present or suspected. We have guidelines for clavicle, shoulder, and hip/pelvis and specific extremities. Examples include:

• **Toes/fingers:** Order a radiograph only for the involved digit if all signs/symptoms are distal to the web space but order a radiograph for the foot/hand if there is any involvement proximal to the web space.
Foot: Use Ottawa Ankle Rules: Calcaneus films may be ordered for isolated heel pain after a fall from a height where the patient landed on the heels.

Elbow: Order when there is pain associated with limitations/loss of supination/pronation/extension; however, children younger than 5 years with suspected radial head subluxation (Nursemaid’s elbow) do not require radiographs.

Our guidelines also indicate to include information that, according to federal regulations, is needed for reimbursement:

- Body part to be examined (with a lateral view identified if appropriate)
- Clinical indication for the examination
- History (signs/symptoms)
- What is the question we are trying to answer?
- Attending physician’s name
- Date

—Jean A. Proehl, RN, MN, CEN, CCRN, Emergency Clinical Nurse Specialist, Dartmouth-Hitchcock Medical Center, Lebanon, NH; jean.a.proehl@hitchcock.org

Answer 3:
We have about 25 advanced nursing interventions that cover laboratory tests and radiographs for our top 15 diagnoses and have been approved by the ED physicians. They include extremity injuries (with radiograph, immobilize/ elevate, cold compress, and saline lock if obvious displaced fracture) and hip fracture (radiograph and saline lock if obvious fracture).

At first the use of the advanced nursing interventions was a struggle, but now the physicians get upset if the protocols are not completed.

—Mel Stibal, RN, BSHC, Administrative Director, Emergency/Trauma Services, Memorial Regional Hospital, Hollywood, Fla; stibal@comcast.net

Answer 2:
We have about 25 advanced nursing interventions, approved by the ED physicians, which cover laboratory tests and radiographs for our top 15 diagnoses. The orders include laboratory tests, portable chest radiograph, EKG, oxygen, aspirin, and nitroglycerin for chest pain. If the chest pain is pleuritic in nature (as assessed by the nurse), only a chest radiograph, EKG, and pulse oximetry is ordered. The advanced nursing interventions work well for us.

—Melinda Stibal, RN, BSHC, Administrative Director, Emergency/Trauma Services, Memorial Regional Hospital, Hollywood, Fla; stibal@comcast.net

Answer 3:
I developed more than 42 ED protocols, including triage and initial interventions, from about a dozen emergency and nursing resources. These patient care standards cover key historical factors to ask, related assessments to make, problems or nursing diagnoses, and age-specific considerations. They also include the standard of care with the desired outcomes, corresponding to the initial and eventual essential interventions.

For chest pain (suspect cardiac origin), we have a flow sheet. Under the heading to be done “immediately,” there is ordered:

- Oxygen (with space to fill in route and amount)
- EKG (if a prehospital 12-lead is negative and the chest pain persists, a 15-lead EKG is done)
- Notify physician (including a fill-in space for time the physician is present)
• Apply cardiac, vital signs, and saturation monitors (with a space to write in the blood pressure on the right and left arm)
• Give 4 chewable aspirin (325 mg)

Under the heading to be done “ASAP” (as soon as possible) there is ordered:
• Intravenous access
• Nitroglycerin (0.4 mg sublingual every 5 minutes for pain up to 3 tablets, if the systolic blood pressure equals or is greater than 100)
• Laboratory work, portable chest radiograph
• Nitroglycerin paste 1 inch (½ inch if the systolic blood pressure is less than 100 and omit if nitroglycerin drip is infusing)

There is a place for the physician to sign these standing protocol orders. The flow sheet also has areas for charting vital signs (including cardiac rhythm, skin assessment, level of consciousness and cognition), intravenous fluid/additives, and medications. At first it was a struggle to consistently apply these protocols, but now the physicians are upset when they are not done.

—Abby Purvis, RN, CEN, ED Director, Iroquois Memorial Hospital, Watseka, Ill; apurvis@iroquoismemorial.com

Answer 4:
By using a wireless EKG system, LifeSync*, the time to an EKG can be decreased by 5 to 10 minutes. The connecting time is decreased, each serial ischemic event can be captured within seconds, wires do not interfere with chest radiography or fluoro, and there is may be less risk for infection.

Vancomycin-resistant enterococci outbreaks have been attributed to contaminated electrocardiogram leads. In one study, 77% of the 100 EKG lead wires cultured were contaminated with one or more antibiotic-resistant nosocomial pathogens.1-3

—Mike Feutral, RN, BSN, Clinical Coordinator, Fort Lauderdale, Fla; mfeutral@gmpcompanies.com

REFERENCES

Answer 5:
We have standing chest pain orders that are tiered according to the EKG evidence and symptoms, based on the scientific evidence and American College of Cardiology (ACC) and the American Heart Association (AHA) guidelines.

• Level 1. This is defined as acute myocardial infarction by EKG ST-segment elevation, posterior myocardial infarction, or left-bundle branch block with ischemic symptoms. If there can be door-to-balloon time less than 90 minutes, interventional management in the catheterization laboratory management is preferred over fibrinolytic therapy. If that is not possible, then a fibrinolytic is considered next best. Orders that a physician checks off include the routine monitoring, laboratory work, nothing by mouth, activity, neurologic checks, and medication (aspiring [ASA], nitroglycerin, morphine, and then either fibrinolytic protocol or a catheterization laboratory protocol).

• Level 2. This is defined as a non–ST-segment elevation infarction, unstable angina, typical anginal symptoms with ST-segment depression, ischemic T-wave inversion, or new onset congestive heart failure with ischemic pain. These include similar basic orders with standard orders (including dose) for GP IIB/IIIA receptor blockade.

• Level 3. This is defined as moderate to high risk of acute coronary syndrome, typical anginal pain longer than 20 minutes with a normal EKG, or atypical symptoms with nondiagnostic EKG. The focus of these patients (according to the 2002 ACC/AHA Guidelines) is catheterization laboratory for revascularization, or at the minimum of provocative testing prior to discharge from the emergency department.

• Level 4. These are patients who are considered at low risk of acute coronary syndrome, have typical anginal pain of less than 20 minutes with a normal EKG, atypical symptoms with a normal EKG, or cocaine-associated symptoms with normal or nondiagnostic EKG. Our focus for these patients is an accelerated evaluation. They are considered for prompt disposition if they have a normal EKG.

*GMP Wireless Medicine, Inc/LifeSync Wireless ECG System; One East Broward Blvd, Suite 1702, Ft Lauderdale, FL; www.wirelessecg.com; 1-866-EKG.3888.
and a negative ischemia-modified albumin (IMA) level (see information on the newly-approved IMA test at [www.ischemia.com](http://www.ischemia.com)). They are considered for provocative testing if they have a positive IMA but a negative 2-hour change in troponin level.

This pathway was developed by a working committee of emergency physicians, cardiologists, ED nurses, Cardiac Laboratory nurses, pharmacists, laboratory representation, radiologists, and administrators. It is reviewed regularly as new studies are published or when guidelines are updated. For more details, see our commentary in the March 2003 issue of *Annals of Emergency Medicine*.

—Charles V Pollack, Jr, MA, MD, FACEP, Chairman, Department of Emergency Medicine, Pennsylvania Hospital, University of Pennsylvania Health System, Philadelphia, Pa;
pollackc@pahosp.com

REFERENCE


**Answer 6:**

Our original “Acute MI Team” soon realized we needed to expand our scope to all cardiac care, including congestive heart failure. Our current Cardiac Care Team is currently focusing on reducing inpatient mortalities related to acute myocardial infarction, including patients who have multi-system failures or whose acute myocardial infarction developed in relation to their other medical issues.

Some Web sites I found helpful include:

- [http://www.cms.hhs.gov/quality/hospital/HeartAttack.pdf](http://www.cms.hhs.gov/quality/hospital/HeartAttack.pdf) (outlines current standards and what mandatory reporting is based on)
- [http://www.cms.hhs.gov/manuals/100_qio/qio110c14.pdf](http://www.cms.hhs.gov/manuals/100_qio/qio110c14.pdf) (outlines mandatory reporting and how it affects all acute care facilities regardless if they are a cardiac care center)

—Pam Rowse, RN, Quality Consultant, Former Assistant ED Nurse Manager, St Rosa Dominican Hospital, Henderson, Nevada; wownurse@aol.com

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**CHILD ABDUCTION POLICY**

**Do other emergency departments have a policy in the event of a suspected infant or child abduction?**

**Answer:**

The emergency department is covered by the hospital-wide policy, which emphasizes that an abduction can occur at any location. Some of the points made in our policy include:

- An overhead “CODE PINK” is called, with the location of the incident and a description of the child, as soon as the child’s absence is noted.
- Personnel in departments adjacent to exits, including the main entrance and fire exits, immediately direct someone to guard those exits.
- Visitors are asked to remain until the police arrive. The script used is, “Please be informed that an alert is in progress. We appreciate your cooperation. Please stay where you are until an ‘all clear’ is called.” Employees are not requested to physically detain anyone.
- The area of the abduction is secured to preserve forensic evidence until the legal authorities arrive.
- The parents are relocated to ensure privacy, and a nurse remains with them at all times.
- Additional available staff are assigned to the outer boundaries of the facility, such as the parking garage exits.
- Staff are instructed to refrain from discussing it among themselves or acknowledging the potential abduction to patients or visitors. No staff may leave until the authorities have finished questioning them.

We did have to use the policy once and, fortunately, caught the estranged boyfriend who was taking the child. We practice the code pink protocol at least once a year, on both the day and the night shifts.—Melinda Stibel, RN, BSHC, Administrative Director, Emergency/Trauma Services, Memorial Regional Hospital, Hollywood, Fla; stibel@comcast.net

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DEALING WITH “DRUG SEEKERS”

Our department is noticing an increase in the number of people who appear to be seeking narcotics inappropriately. Besides the medical screening examination, do others have tips on how to best handle this population?

Answer 1:

We have had incidents in which carloads of “patients” blanket a city’s emergency departments, all seeking controlled drugs that are later sold on the street. Subjective complaints are used, usually a toothache. One patient alone accounted for over 300 ED visits in a single year in Western Washington for complaints of a migraine or toothache.

Two principles I use to detect people who are falsely claiming to have a toothache are to catch them in a lie or offer a local dental block.

First, I look in their mouth for signs of an abscess or local signs and then ask about their history of dental care and previous analgesics. If possible, I call the dentist’s office, last emergency department visited, or pharmacy to verify the history.

Second, I see if the patient is more interested in pain relief or getting some pills. I indicate the possibility of a local injection: Patients truly in pain will be open to anything that helps, but those who are only looking for illicit drugs usually decide suddenly to leave.¹

—Robert D. Herr, MD, MBA, FACEP, Emergency Physician, Virginia Mason Medical Center, Seattle, Wash; robertdherr@msn.com

REFERENCE


Answer 2:

We learned that the information on how to change the dose or bolus the drug on a patient-controlled analgesia (PCA) pump is widely circulated within some circles of drug abusers. It was a possible element in one case of a PCA overdose. Therefore, it may be advisable to consider alternative routes for analgesic administration in some situations. In addition, nurses should educate patients being placed on PCA pumps about the potential adverse reactions from overdose and the legal standards related to self-manipulating a controlled drug device.

—Greer A Smith, BSN, RN, CLNC, Assurance of Care, Tyler, Tex; aofcare@aol.com

Answer 3:

For patients with a chronic or episodic pain need, such as a patient with frequent sickle cell crisis, we have a “special needs alert” at registration. It identifies this patient as “known” with an existing pain management ED plan so we can start interventions in a timely manner.

For patients with a history of frequently seeking ED pain medications inappropriately, we created a “narcotic contract.” The contract indicates the fact that the ED physician will evaluate whether pain medications are appropriate and is initiated at the discretion of the ED physician, nurse, and social worker. The patient is given a copy, along with a discharge sheet that discusses other ways (besides narcotics) to manage pain. It is a signal to individuals who are only interested in obtaining controlled drugs that we are vigilant and do not dispense them indiscriminately.¹

—Judy Street, RN, Manager of Emergency Services, Swedish Medical Center, Seattle, Wash; judy.street@swedish.org

REFERENCE


Answer 4:

We use a tracking system to monitor the frequency of visits for pain. If there is a possible problem, the patient still receives the medication but the person’s name is referred to the ED care manager.

The care manager reviews the patient’s history, checks with the patient’s doctors, and draws up a care plan for pain management. Though every visit is evaluated to see whether there was in fact a medical problem requiring pain medication, the patient is sent a letter indicating that ED narcotics will not be prescribed (unless the attending physician indicated it is warranted).

The care plan is kept in the emergency department for the attending ED physician to refer to during future visits. This avoids the problem of patients inappropriately seeking drugs by coming in only when certain physicians
are on duty. The care plan also gives nurses a chance to educate patients and some were able to be steered into a treatment program.1

—Mark Mandell, MD, Chairman, Department of Emergency Medicine (Mark.Mandell@ahsys.org) and Richard Klemm, RN, Emergency Department Care Manager (Richard.Klemm@ahsys.org), Morristown Memorial Hospital, Atlantic Health System, Morristown, NJ

REFERENCE

Answer 5:
At a former job, I developed a “Chronic Care Plan” book for any patient frequently coming to the emergency department. I contacted their primary care physicians and asked how they would like for us to treat their patient. Many had a “no narcotic” stipulation.

We, of course, saw and evaluated each patient on every visit to make sure nothing new was going on. The patients were never told that no analgesics would be given prior to the completion of the medical screening examination because that is an EMTALA violation. However, the patients were made aware of the plan when it was followed after the medical screening examination.

We saw a dramatic decrease in the number of inappropriate visits, and the Joint Commission on Accreditation of Healthcare Organizations inspector praised this approach.

—Robert W. Stein III, BSN, MSHA, RN, CEN, CHE, Director, Emergency Services, Health Central, Ocoee, Fla; bobstein@prodigy.net

Answer 6:
A recent approach to what appear to be the issues raised here in relation to “inappropriate” or “drug-seeking” behaviors is to refer to “concern-raising” behaviors. When a concern-raising behavior occurs, it is described, possible causes are assessed, and a treatment plan is developed.1

Following is a list of behaviors related to pain that seem to concern clinicians who work in the emergency department. While any one of these behaviors might be related to addictive disease or to obtaining opioids to sell on the street, consider what else they may mean.

1. The patient requests a specific opioid and dose. This patient may have had several analgesics and may have found that this one does, in fact, provide the best pain relief or the fewest adverse effects.
2. The patient says he is allergic to everything but a specific opioid. The patient may have tried on several occasions to tell the prescriber what analgesic works best but in the end was denied that analgesic and given another. The patient has learned that being allergic to everything else gets him the drug he needs.
3. The patient only comes to the emergency department when a certain physician is on duty. If the patient with pain knows some physicians will, and others will not, prescribe pain relief, it is only natural for that the patient find out who is on duty before coming.
4. The patient frequently visits the emergency department and asks for opioids to relieve pain. This patient may have a chronic pain condition that his or her primary physician will not treat adequately, or insurance may not pay for an office visit.
5. The patient does not look like he or she is in pain. Many people value a stoic response to pain or they cope with pain by trying to sleep or using distraction. Clinicians inadvertently encourage manipulative behaviors if they do not respond to pain reports when patients are using these coping mechanisms. The patient learns to limp, frown, or cry.

The emergency department is seeing an increasing number of patients with chronic pain that is undertreated by primary physicians. Because of payment issues, the emergency department may be the only place the patient with chronic pain can obtain care.

ED staff are probably the least likely specialty to be educated about chronic pain assessment, such as using opioid and anticonvulsants for neuropathic pain. More education, revised protocols, and case managers may improve the pain care provided by the emergency department.

—Margo McCaffery, MS, RN, FAAN, Consultant, Los Angeles, Calif; margopain@ao.com

REFERENCE
What are other emergency departments teaching their staff to do to help prevent violent outbursts from patients or families?

Answer 1:
Crisis Prevention Institute (CPI) is an international company that specializes in helping people and workplaces stay safe in the management of challenging behaviors through relevant training, research, legislative work, advocacy efforts, and public outreach. Some of the things we teach for a crisis situation include the following:

- **Develop a plan.** Even if you only have seconds, stop and think rather than react. Use a team approach whenever possible. It will help you rationally detach and stay calmer.

- **Clarify messages.** Listen to what is really being said by using reflective questions, silence, and restatements.

- **Respect personal space.** Stay at least 1½ to 3 feet from the acting-out person. Encroaching on personal space tends to arouse an individual and escalate his or her behavior.

- **Be aware of your body position.** Stand one leg length away and at an angle off to the side. Standing eye-to-eye, toe-to-toe sends a challenge message.

- **Keep your nonverbal clues nonthreatening.** Be aware of your body language, movement, and tone of voice. The more an individual loses control, the less that person listens to the actual words.

- **Permit verbal venting when possible.** Verbal venting allows the individual to release as much energy as possible.

- **Ignore challenging questions.** Redirect the individual’s attention to the issue at hand if the patient challenges your position, training, policy, etc. Answering these questions often fuels a power struggle.

- **Always debrief after a crisis.** Discuss the behavior patterns, how staff influenced them, and plans for the future.

Our training opportunities include Nonviolent Crisis Intervention Training and Prepare Training. For more information, call 800-558-8976, E-mail info@crisisprevention.com, or go to our Web site, www.crisisprevention.com.

—Judith Schubert, BS, President of the Crisis Prevention Institute, Brookfield, Wis; jschubert@crisisprevention.com

Answer 2:
From my background in psychiatric nursing and emergency nursing, I teach safe, effective handling of aggressive, angry patients or families in the TriageFirst courses. First, trust your gut feeling. If you are feeling scared by someone’s agitated behavior, there is probably a reason. They probably are at risk to become violent. It is not unprofessional to feel scared; it is unprofessional to react poorly.

Acknowledge the patient’s emotional response. For instance, if the patient is yelling with an aggressive tone, pacing, and tense, tell them, “I can see that you are mad.” It won’t make it worse to bring it up; it annoys them to be ignored. And don’t further agitate them by quoting authoritative rules, for example, “You can’t act like that. This is a hospital!”

If the upset person is obviously homeless, I keep focusing my questions on their basic needs. “Have you eaten anything today?” or “Do you have a place to sleep?” Continually focusing on these (which I can help them with) will often help diffuse other less concrete anxiety.

If the patient’s family member is very emotional and making demands (eg, “Where is my family member!” or “I want to talk to the doctor now!”), I try to verbally “contract” with them. For instance, “I’ll check that out for you now if you can calmly stand here and wait for me to come back to tell you. Can you do that for me? Can you stand here and wait while I check?”

I think we underutilize the “psychiatric” tool of contracts in emergency nursing. Often patients or family members can control themselves if requested, and it avoids escalating the anger cascade or requiring physical interventions.1

—Bernard “Bo” Ball, RN, Faculty, TriageFirst, Asheville, NC; triagefirst@mindspring.com

**REFERENCE**

**Acknowledgments**
Many thanks to Barb Pierce, RN, MN, Director of Critical Care/ED, Southeast Georgia Medical Center, Brunswick, Georgia; Tom Trimble, RN, CEN, List Administrator “Em-Nsg-L,” San Francisco, Calif; Gail Neuman, RNC, Perinatal Nurse Associate, Tuatin, Calif; and Jerilyn Dugresne, Crisis Prevention Institution, Brookfield, Wis, for their help with sources or information for this column.
Reviews of Books, Videos, CDs, Audiotapes, Web Sites, and More, Written by Emergency Nurses

**The Nurse Manager’s Survival Guide: Practical Answers to Everyday Problems, 3rd ed.**


This book is a “must have” for every new nurse manager, and it should be a ready resource for the experienced nurse manager. Most nurse managers, whether novice or expert, receive little or no orientation to their position and, as a result, they are required to conduct a self-directed orientation. For the novice manager, this can be an overwhelming and confusing task. The more experienced nurse manager may not be as overwhelmed by this task; however they should stand ready, and armed, to assist their more novice colleagues. This book provides a framework for orientation to the nurse manager role. The *Nurse Manager’s Survival Guide* covers the many challenges faced by nurse managers today, and it provides the reader with many tips, sample forms, and resources for further reading.

The author has covered all the fundamental management topics, including effective communication, leadership style, human resources, budget basics, risk management, day-to-day operations, and more. Each chapter includes several “Manager’s Tip Boxes” related to the chapter’s subject. The “Manager’s Tip Boxes” are indexed inside the book cover for quick and easy reference. When I first opened the book, I was immediately drawn to this index and, as I reviewed each “Manager’s Tip Box,” I found myself thinking how helpful this information would have been had I been given it 12 years ago when I took my first management position!

The book is designed to be a quick reference, and it provides a broad overview of each chapter topic. The author, however, seemed to anticipate our need for more information and has concluded each chapter with additional
resources for more information. These additional resources include journals, books, and Web sites related to the chapter topic.

As all good things must come to an end, the author of this comprehensive text has thoughtfully prepared the final chapter to help managers when confronted with the realities of personal job satisfaction and professional growth. This chapter is designed to assist nurse managers in the art of gracefully leaving one position as well as the skill of successfully interviewing and negotiating the next one.


Reflections on the Hands of a Nurse


What an inspiration! This book is an excellent exploration into the spirituality of nursing and the world of healthcare. The author of this book understands that nurses face stress, frustration, burnout, challenges, and limitations on a daily basis. He has been a nurse for over 20 years and began this compilation in response to those frustrations. The prayers and stories in this book provide nurses the spiritual guidance and insights to help survive many of the issues nurses face daily and the emotions those issues evoke.

The book is divided into 3 sections: “Prayers,” “Your Stories,” and “Reflections.” Each section is independent of the others, making it easy to read what you have a particular need for during various circumstances. Following many of the prayers is a page of questions to elicit reflection. The section entitled, “Your Stories” provides very useful insights into the impact of nurses’ stories and helps the reader to discover how to write his or her own. The “Reflections” chapter depicts the lives of nurses in many nursing specialties and helps to reveal our universal commonality with nurses around the world.

If you are looking to explore your spiritual side to face the intensity of today’s nursing, you will find this book useful, time after time. It would be a valuable addition to the library of any nurse and would be a wonderful gift for a nurse in need of rejuvenation. Whether it is a prayer for someone who has died, a prayer to make a difference, a prayer when you cannot find a single vein, or even a prayer to get you through an understaffed shift, you will find the inspiration in this book. This book is also a catalyst to remind you of just how great a profession nursing is, and it offers us the inspiration to believe.

The hands of a nurse do what few others can . . .

“These are the hands of a nurse.” These are my hands.

Anaphylaxis Experienced by School Children Offers Opportunities for ED Nurse, School Nurse Collaboration

Allergies to bee stings, peanuts, tree nuts, milk, and shellfish present major challenges to schools—for example, preventing exposures to the offending antigen and providing an emergency response within minutes should an exposure occur. An additional challenge is the biphasic nature of anaphylactic reactions; that is, within 4 to 10 hours of a reaction, even with successfully treated allergic reactions children may experience a “rebound” reaction. Thus, all children who experience a life-threatening allergic event and receive epinephrine in school should be transported to the local emergency medical facility by emergency personnel who have epinephrine available and are trained in its use.

In 1998 the American Academy of Allergy, Asthma and Immunology issued the position statement “Anaphylaxis in Schools and Other Child-Care Settings” in response to increasing reports of deaths associated with anaphylaxis in settings where children are cared for. The position statement emphasized that epinephrine is the first drug to be used in the emergency management of a child experiencing a potentially life-threatening allergic reaction.1

In 2001, recognizing the need to provide guidance to schools, the Massachusetts Department of Education convened a task force that included the Massachusetts Department of Public Health, the Massachusetts School Nurse Organization, the Asthma and Allergy Foundation/New England, and other professional groups to develop a comprehensive document, “Managing Life Threatening Food Allergies in Schools.” The document was distributed to the public schools in 2002.2

In 2003, the Massachusetts Department of Public Health amended the Regulations Governing the Administration of Prescription Medications in Public and Private Schools (105 CMR 210.000) to include a detailed section
on the administration of epinephrine should an unintended exposure to an offending allergen occur in the school setting. The original regulations required a school to register with the Massachusetts Department of Public Health to permit school nurses to train unlicensed personnel to administer epinephrine via an EpiPen to a student diagnosed with a life-threatening allergy. The amended regulations include additional requirements to (1) institute a 911 call whenever epinephrine is administered and (2) submit a report to the Massachusetts Department of Public Health on any administration of epinephrine in the school setting. These reports form the basis of the Department’s continuous quality improvement program to ensure that optimal care is provided to these children. The reports include data on triggers, time between onset of symptoms and administration of the epinephrine, disposition, and outcome.

...within 4 to 10 hours of a reaction, even with successfully treated allergic reactions children may experience a “rebound” reaction.

Reports of 133 administrations of epinephrine in school settings

Between August 1, 2003, and July 31, 2004, the Department received detailed reports regarding the administration of epinephrine via EpiPens to 133 individuals (127 students and 6 adults) in Massachusetts schools. Of these cases, 29 students and 1 adult (22.6%) had no previous diagnosis of a life-threatening allergy. Another 5 students (3.8%) who were administered epinephrine via an EpiPen were students with known allergies who had not notified the school of their condition. These students, therefore, had no plan in place and no EpiPen available. In all cases, school nurses assessed the condition and administered epinephrine via an EpiPen from a stock supply.

Seventy-one percent of those who received the epinephrine via EpiPens (the 127 students and 6 adults) had symptoms involving their airway that are considered absolute indications for the administration of epinephrine. Seven of the students who received epinephrine were not transported by emergency medical services to the local emergency facility because of parental and/or primary care provider decisions. The Department continues intensive efforts to educate school nurses about the potential for biphasic reactions and the importance of follow-up assessment and observation in an emergency department for students who have received epinephrine.

All children who experience a life-threatening allergic event and receive epinephrine in school should be transported to the local emergency medical facility by emergency personnel who have epinephrine available and are trained in its use.

Opportunities for emergency nurses to educate school nurses

If the school nurses know the ED protocols for the following, they may prepare families and reinforce the teaching begun in the emergency department:

- General length of time the child will be observed in the emergency room after an anaphylactic reaction. There is a relatively high potential for biphasic reactions; as many as one third of children who experience grade 4 or 5 anaphylaxis have biphasic (or “rebound”) reactions.

- Instructions to be given to the family regarding the use of an EpiPen if the child has experienced his first anaphylactic event without a previous diagnosis of a life-threatening allergy. This may include helping the family obtain an EpiPen.

- Plan for referral of the child to the primary care provider and/or an allergist.

- Instructions to the family to meet with the school nurse the next day to ensure appropriate management in the school setting. (The school nurse and family will need to complete a detailed individual health care plan.)

For ED nurses who provide continuing education to school nurses on first aid, attention should be devoted to:

1. the description and prevalence of life-threatening allergies.
2. the use of the EpiPen.
the need for planning.
(4) the need for an order from the school physician for an EpiPen should a child with an undiagnosed allergy experience anaphylaxis.

There is a relatively high potential for biphasic reactions; as many as one third of children who experience grade 4 or 5 anaphylaxis have biphasic (or “rebound”) reactions.

Detailed information about creating a safe environment for children with life-threatening allergies is available through the Massachusetts Department of Education publication “Managing Life Threatening Food Allergies in Schools,” which can be obtained at the following Web site: http://www.doe.mass.edu/cnp/2002/news/allergy.pdf.

REFERENCES

Submissions to this column are welcomed and encouraged. Contributions may be sent to:

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Prompt recognition of supraventricular tachycardia (SVT), a potentially life-threatening arrhythmia, is challenging in children because of their normally rapid heart rates relative to adults. Health care providers working in emergency settings should be aware of the presenting signs and symptoms of SVT, be able to distinguish sinus tachycardia from SVT, and be familiar with management of this arrhythmia and ways to support the family.

SVT is the most common pediatric tachyarrhythmia, with an estimated incidence of 0.1% to 0.4%. SVT is a sustained tachycardia originating above the bundle of HIS. Several different mechanisms cause this arrhythmia, including a re-entrant circuit or an automatic ectopic focus. Most children with SVT have structurally normal hearts.

Presenting signs and symptoms

Parents of infants with SVT may report any of the following:

- A several-day history of poor feeding
- Sweating
- Lethargy
- Pallor

In the emergency department, the infant may present with signs of congestive heart failure (CHF) (tachypnea, cardiomegaly, and hepatomegaly). Infants can tolerate these rapid heart rates for 12 to 24 hours before deteriorating, but when CHF develops, the infant’s condition can deteriorate rapidly. Older children may report palpitations, tachycardia, chest discomfort, or
In severe cases, hemodynamic compromise may occur, resulting in syncope or shock.

Distinguishing SVT from sinus tachycardia

Tachycardia is defined as a rate higher than normal for the patient’s age; it usually develops in response to the body’s need for increased oxygen delivery or cardiac output. Most infants and children with tachycardia have a sinus tachycardia (less worrisome) secondary to another problem (eg, fever or dehydration). A patient’s history and physical can provide numerous clues that help distinguish SVT from sinus tachycardia. Children presenting with sinus tachycardia may have a history and examination consistent with dehydration and/or febrile illness. Generally, the lungs are clear and the liver size is normal. In contrast, children with SVT exhibit less specific signs and symptoms and may have signs of CHF (Table 1).

Management

Management of SVT varies with the severity of symptoms. Stabilization and termination of the arrhythmia is mandatory before additional supportive measures are instituted. Children who present in shock require immediate cardioversion. Cardioversion is performed with 0.5 to 1 J/kg and may be increased to 2 J/kg if the initial dose is ineffective. Do not delay cardioversion for intravenous insertion or sedation in the unstable patient.

When time and stability permit, intravenous access is recommended for chemical cardioversion. Adenosine, 0.1 mg/kg/dose, is used to convert SVT with a maximum initial dose of 6 mg. Because of the short half life of Adenosine (0 to 15 seconds), the medication must be administered intravenously in an upper extremity or central venous access.
The medication is given by rapid intravenous push followed immediately by normal saline solution flush. If conversion does not occur within 1 to 2 minutes, additional doses at incrementally higher doses by 0.05 to 0.1 mg/kg may be given. A common cause of failed cardioversion after Adenosine administration is the inappropriate delivery by slow intravenous push.

Adenosine’s onset of action is approximately 10 seconds, and adverse effects usually last less than 1 minute and are rarely serious. Adverse effects may include transient asystole, facial flushing, shortness of breath, and nausea. Intravenous verapamil is contraindicated in this age group because of cardiovascular collapse, bradycardia, and death in infants.

Vagal maneuvers may be instituted for asymptomatic infants. Applying ice or ice cold cloths to the face while not obstructing ventilation is one method that may be used. Care must be exercised to avoid applying ocular pressure, because retinal damage may occur.

If possible, obtain a 12-lead EKG with rhythm strip while the child is in SVT and during cardioversion. Continuous EKG, blood pressure, and pulse oximetry monitoring are indicated during all interventions. Consider sedation and analgesia prior to cardioversion. Admission is usually necessary for continued monitoring and investigation of any cardiac abnormalities. Transfer to a pediatric facility after stabilization is appropriate if medical and nursing expertise in pediatric cardiology is not available.

Chronic management is highly variable and ranges from no intervention in older children with infrequent mild symptoms, to combination drug therapy. Generally, the first-line drugs include digoxin and propranolol. Radiofrequency catheter ablation may be an option for older children. The majority of young infants with SVT, however, will outgrow the problem by 1 year of age.

Nursing implications

Careful nursing assessment is a crucial part of emergency department management, including detailed attention to hemodynamic status. Continuous EKG monitoring and documentation of rhythm strips allows both attention to the cardiac status and permits accurate diagnosis. Continuous pulse oximetry is also recommended. Careful attention to the child’s level of consciousness is essential because deterioration in level of consciousness may be an early indication of cardiopulmonary compromise. Comprehensive reassessment after any intervention is important to determine the child’s response to management and to assist with diagnosis. Other nursing responsibilities include obtaining intravenous access, safe and accurate administration of medications, assisting with procedures, monitoring intake and output, family education, and documentation.

Family support and education

Attention to the family is very important during an emergent event. An acutely ill child requiring emergency management imposes considerable stress on parents. The recognition of the family’s importance to a child’s recovery mandates attention to the family’s needs. Parents of children with cardiac problems describe the period of initial diagnosis as a time of stress and uncertainty. If this emergency department visit is the first indication that the child has a cardiac problem, parental distress is extremely likely and a necessary focus of attention.

While attending to the needs of the child, you should also:
- Keep the parents and family fully informed.
- Assign one person as the primary person to communicate with the family.
• Reassure the family that the health care team will do
  everything possible to provide optimum results.
• Update the family on the status of the child to help
decrease the stress level in the family.
• Minimize separation from the child, and facilitate
  participation in care.
• Continue to provide open and honest communication.
• Offer a chaplain or social worker to provide support.

When possible, provide a separate waiting area and a
telephone. The family may also need assistance with con-
tacting other family members and/or friends for support.

Acknowledge the family’s response to the situation.
Remember that the family’s perception of the event,
available support systems, past coping mechanisms, pre-
vious hospitalizations, and current family issues will
influence the family’s response to the present situation.
Look for nonverbal cues and recognize that responses and
needs vary.

Parent education is an integral part of family care and
ideally is initiated in the emergency department. Import-
ant topics include signs and symptoms of SVT, home
management of acute episodes including vagal maneuvers
if appropriate, safe medication administration, and when
to call the physician. Important safety issues include
reminding parents to store medication out of children’s
reach, medic alert ID tags, and availability of emergency
phone numbers.

Conclusion

Maintaining assessment skills and current knowledge of the
presentation and emergency management of pediatric
cardiac problems is important for emergency nurses. This
foundation of knowledge and skills can be life-saving for
the infant or child with heart disease.

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Stories of transition: Parents recall the diagnosis of congenital
The anion and osmolal gaps are laboratory values that can be useful in the evaluation of patients who have been poisoned. These gaps are complex in theory, but it is worth the effort to understand them.

**Anion gap**

The anion gap is defined as the difference between the unmeasured cations and unmeasured anions in the serum.\(^1\) The anion gap is measured by subtracting the serum values for chloride and bicarbonate from the serum value of sodium: \(\text{Na}^+ - (\text{Cl}^- + \text{HCO}_3^-) = \) the anion gap. The formula accounts for 90% of the body's cations and 80% of the body's anions, and that difference—caused by the unmeasured anions—is the anion gap. The normal gap is 8-12 ± 2 mEq/L. There is, however, no actual gap. Cations (positively charged particles) and anions (negatively charged particles) exist in equal numbers in order to maintain electrical neutrality. The anion gap is calculated using *routinely* measured cations and anions, which accounts for 90% of the cations and 80% of the anions. Cations and anions such as calcium, magnesium, potassium, phosphate, sulfate, and organic acids are not included because their values are very small, they do not fluctuate significantly, or they are impractical to measure.

Why do we use the anion gap? It is important because an increased gap usually is caused by an increase in unmeasured anions, and that most commonly occurs when there is an increase in unmeasured organic acids, that is, an acidosis. Acids (eg, lactate and pyruvate) are protons donors and must be buffered by bicarbonate. The consumption of bicarbonate by the unmeasured anions will increase the anion gap by lowering the serum bicarbonate level. The total numbers of anions and cations
are still equal, but the gap has increased because of a lowering of a measured anion, serum bicarbonate. The etiologies of an increase in organic acids have been well outlined. The most common ones can be remembered by the mnemonic MUDPILES: methanol, metformin, uremia, diabetic ketoacidosis, phenformin, iron and isoniazid, lactic acidosis, ethylene glycol, salicylates and starvation.2 These conditions produce an acid load that consumes bicarbonate, increases the anion gap, and lowers serum pH. If the patient is acidic and has an elevated anion gap, it is almost certainly caused by one of these conditions, each one with its characteristic signs, symptoms, and laboratory values.

The etiologies of an increase in organic acids have been well outlined. The most common ones can be remembered by the mnemonic MUDPILES: methanol, metformin, uremia, diabetic ketoacidosis, phenformin, iron and isoniazid, lactic acidosis, ethylene glycol, salicylates and starvation.

Osmolal gap

A review of the concepts of osmosis and osmotic pressure will help in understanding what the osmolal gap is and why it is useful.

Water moves into and out of the cell through a semipermeable membrane. This movement is called osmosis. It occurs because the body attempts to maintain an equilibrium of osmotic pressure, and osmotic pressure can be conceived as the number of osmotically active particles on either side of the membrane. A greater number of osmotically active particles (particles that can influence osmosis) on one side of the semipermeable membrane or the other will cause water movement—osmosis—into or out of the cell until the particles concentrations on either side of the membrane are in equilibrium. For example, a high concentration of sodium outside the cell (perhaps following the administration of hypertonic saline solution) will cause movement of water from inside the cell until the osmotic pressure is in equilibrium.3

The osmolal gap is the difference between the calculated serum osmolarity and the measured serum osmolality. Osmolality is the number of particles per kilogram of solution, and the major solutes in serum that contribute to osmolality are sodium, glucose, and urea. Their net osmotic pressure (measured in milliosmoles) can be calculated with the following formula:

\[ 2 \times \text{sodium} + \text{glucose}/18 + \text{blood urea nitrogen}/2.8 \]

Because there are a small number of osmotically active particles that are not included in the calculated osmolarity, there will be a difference between the measured and the calculated values. The measured values should be higher, and the normal osmolal gap is usually less than 10 milliosmoles. The gap is increased in 2 circumstances: a decrease in the water content of serum caused by hyperlipidemia or hyperproteinemia, or more commonly, the presence of a foreign, low molecular weight particle.4 In a patient who has been poisoned, foreign particles almost always are an alcohol: ethanol, ethylene glycol, isopropyl alcohol, or methanol. They are osmotically active, so their presence will increase the gap. Thus, assuming that serum levels of these alcohols are not readily available (this is often the case for ethylene glycol, isopropyl alcohol, and methanol), the increased osmolal gap can indicate their presence. Frequently, the serum ethanol is known and the calculation must be adjusted. To account for ethanol, divide serum ethanol by a conversion factor of 4.6 and add the result to the formula. The conversion factors for the other alcohols—isopropranol 6; ethylene glycol 6.2; methanol 3.2—can be multiplied times the osmolal gap to yield a rough estimate of their levels.

... a significant gap should alert emergency department staff to the possibility of an alcohol ingestion.

The osmolal gap is a useful diagnostic tool, but it has limits. A gap may indicate the presence of an alcohol, but the absence of a gap does not reliably rule out their presence. There are several reasons for this, but the most common is the large variation among the population of the osmolal gap. The normal gap is estimated to be less than 10 milliosmoles. However, it has been shown that a normal
osmolal gap can be much greater or much less. If the patient has a normal gap of –10 milliosmoles but has ingested an alcohol that will increase the osmolality by 10 milliosmoles, his or her gap may be zero. For this reason, an increased osmolal gap should not be considered an absolute indicator of the presence of an alcohol, but a significant gap should alert emergency department staff to the possibility of an alcohol ingestion.

REFERENCES

Submissions to this column are welcomed and encouraged.
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An 18-year-old man was the driver of a vehicle in a high-speed motor vehicle collision (MVC). The car rolled over and landed in a ravine. It is unknown if he was restrained. He had a prolonged extrication time of approximately 20 minutes. On scene, his Glasgow Coma Score (GCS) was 5. He received 1 point for no eye opening, 1 point for no verbal communication, and 3 points for decorticate posturing of his arms to noxious stimuli. Because the patient’s GCS was less than 8 and he was unable to protect his airway, paramedics performed rapid sequence intubation with etomidate and succinylcholine administered through a large-bore peripheral intravenous catheter. Vecuronium also was administered intravenously. Simultaneous inline cervical spine immobilization was performed. After intubation, a cervical spine collar was applied. The patient was transported by helicopter to our level I trauma center.

On arrival at the trauma bay, primary survey revealed proper endotracheal tube placement with equal breath sounds bilaterally and end-tidal carbon dioxide confirmation. Femoral pulses were palpable. The patient’s initial vital signs were as follows: heart rate, 77 beats per minute; blood pressure, 124/52 mm Hg; and oxygen saturation, 100% on 15 L of oxygen via bag valve mask ventilations. He was receiving normal saline solution intravenously (150 cc/hour). The patient’s disability was a GCS of 3TP (intubated, chemically paralyzed). The physical examination was otherwise unremarkable except for a lip abrasion. Initial laboratory results were normal: hematocrit, 40; amylase, 34; sodium, 137; potassium, 3.8; chloride, 105; carbon dioxide, 23; creatinine, 1.1; activated partial thromboplastin time, 26.8; prothrombin time, 11.8; and
international normalized ratio, 1.1. The toxicology screen was negative. His arterial blood gas revealed a pH of 7.45, p\text{CO}_2 of 39, p\text{O}_2 of 148, H\text{CO}_3 of 28, base excess of 2.3, and an oxygen saturation of 99%. Urinalysis was unremarkable. An EKG showed normal sinus rhythm. Results from chest and pelvic radiographs and computed tomography (CT) scans of the head, cervical spine, chest, abdomen, and pelvis were negative for injury except for a small left upper lobe pulmonary contusion. Because of the patient’s low GCS on scene and the mechanism of injury, the primary differential diagnoses were concussion versus diffuse axonal injury (DAI). The patient was taken immediately from radiology to the neurosurgical intensive care unit. The patient’s neuromuscular blockade was stopped and sedation was weaned to assess his neurologic status.

As expected, the patient’s recovery has been slow.... The patient has since been weaned off the ventilator and his tracheostomy tube has been downsized.... He moves all extremities purposefully but does not follow commands.

At this point, a neurosurgeon was consulted. The patient did not meet the American Association of Neurological Surgeons criteria for the placement of an intracranial pressure monitor because he had purposeful movement in his extremities bilaterally, and there was no traumatic lesion on head CT.\textsuperscript{1} Because his toxicology screen was negative and his sedatives were discontinued, shear injury was suspected as the cause of the patient’s low GCS.

Within 24 hours, our patient’s repeat head CT demonstrated punctate lesions at the junction of the gray/white matter in the right parietal region, left frontal lobe, along with areas of hemorrhage higher in both frontal lobes. This scan was consistent with the diagnosis of DAI.

As expected, the patient’s recovery has been slow. Both tracheostomy and percutaneous gastrostomy tubes were placed because of respiratory failure and inanition. The patient has since been weaned off the ventilator, and his tracheostomy tube has been downsized. His current GCS is 10T. He moves all extremities purposefully but does not follow commands. His current score on the Glasgow Outcome Score is 3, because he is conscious but dependent on others to perform his activities of daily living (Table 1). He continues to receive physical, occupational, and cognitive therapy. The patient has been admitted to our Traumatic Brain Injury Rehabilitation Unit.

### Discussion

Shear injury is a widely used term for DAI, the most common primary diffuse traumatic brain injury. The hallmark of this condition is persistent loss of consciousness from the moment of impact. The mechanism of injury most often associated with DAI is high-speed MVCs. The sudden deceleration and rotational forces that occur cause devastating brain injury.

**Shear injury is a widely used term for DAI, the most common primary diffuse traumatic brain injury. The hallmark of this condition is persistent loss of consciousness from the moment of impact. The mechanism of injury most often associated with DAI is high-speed MVCs.**

The specific brain trauma in DAI results from shearing and tearing of neural cells called axons, with the degree of insult dependent on the magnitude of force and the rate of deceleration associated with the tissue strain. The axonal damage occurs in a variety of brain regions and usually

### Table 1

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Score</th>
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<tbody>
<tr>
<td>Death</td>
<td>1</td>
</tr>
<tr>
<td>Persistent vegetative state</td>
<td>2</td>
</tr>
<tr>
<td>Severe disability (dependent ADLs)</td>
<td>3</td>
</tr>
<tr>
<td>Moderate disability (independent ADLs)</td>
<td>4</td>
</tr>
<tr>
<td>Good recovery</td>
<td>5</td>
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ADLs, Activities of daily living.
involves areas of multiple neurologic functions. Axon injury in the brain stem is considered the main etiology for coma in DAI. Complete axon disconnection rarely occurs at the moment of impact. Typically, within hours of the injury, inflammatory mediators cause significant axonal edema. This edematous swelling interferes with cell function and leads to complete disconnection of the affected axon from the surrounding axons within 30 to 60 hours after injury.

Secondary damage caused by increased swelling from disruptions in both the sodium and calcium channels in the brain continues to evolve over days to months. These alterations potentiate an influx of sodium and calcium, leading to increased swelling. Over time, protein builds up in the swollen axons. If left unchecked, this protein accumulation furthers axonal disconnection. Without the proper neural connections, axons lose the ability to communicate with other axons and target tissues. Each patient’s functional recovery depends on restoration of damaged axons that did not disconnect.

Our patient exemplifies the classic presentation and evolution of DAI: his initial head CT was negative for injury, but he had a low GCS. As time elapses, follow-up head CT scans of DAI often are characterized by multiple petechial hemorrhages scattered about the white matter of the brain. Diffusion weighted images on magnetic resonance imaging scans are more useful than CT in delineating the anatomical changes associated with DAI, but no studies have correlated these lesions with the injury severity or long-term prognosis. Moreover, magnetic resonance imaging has little value in directing the initial management of patients with a brain injury.

The difficulty of finding pathologic DAI lesions with current radiographic technology has challenged researchers to begin developing clinical criteria for a “DAI Syndrome.” The predominant features are related to difficulties with concentration and cognition. Other physical manifestations in patients with less severe injuries are similar to those of postconcussive syndrome and may include mood changes, photophobia, vision changes, nausea, vomiting, and headaches.

The intensive recuperative phase of DAI can last weeks to months or even years. It focuses on prevention of complications such as contractures, decubitus ulcers, and pneumonia. Psychosocial support for the families of these patients is crucial because caregiver’s role strain and emotional or financial stresses are not uncommon.

The predominant features [of a “Diffuse Axonal Injury Syndrome”] are related to difficulties with concentration and cognition.

Despite excellent medical and nursing care, the long-term prognosis of DAI varies between patients. Advanced age and initial GCS of less than 8 are associated with increased mortality, but are less important than initial hypoxia, hypotension, hyperthermia, and elevated intracranial pressure in predicting functional outcomes.

REFERENCES

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Patients With Chief Complaint of Headache: High-risk Decision-making at Triage

“Lower the risk of ED malpractice claims by addressing five underlying conditions” was the headline of the January 2004 supplement to Healthcare Risk Management. They suggested that ED staff could control liability by focusing on complaints of headache, chest pain, abdominal pain, head injury, and stroke. Due to increased patient volumes and emergency department wait times, the triage nurse’s decision-making is increasingly more high risk.

A recent commentary addressed the following case: A 48-year-old woman with a history of migraines and hypertension who presented with a 4-day history of headache. The onset was sudden and the pain was diffuse. She admitted, “it is maybe the worst headache I’ve ever had.” She had to sit down because of the pain and the associated nausea. She was treated with her previous migraine regimen of ibuprofen and ergotamine tartrate/caffeine. After having no relief, she was treated with intramuscular ketorolac and oral prochlorperazine. She had substantial improvement in her symptoms at this point. However, she continued to have pain when straining or bending over.

The physician was worried about a subarachnoid hemorrhage (SAH) and ordered a computerized tomography (CT) scan of the head. The results were normal and the patient was discharged. Knowing, however, that a CT scan is not 100% sensitive for SAH, the physician called the patient the next morning to see how she was doing. She stated that she felt much better and then the phone went dead. The physician called 911.

EMTs found the patient on the floor responsive to painful stimuli only. She was brought to the emergency department and underwent angiography, which demonstrated a posterior circulation aneurysm. The patient...
had surgery to correct the defect, did well postoperatively, and had a complete neurologic recovery.2

Another actual recent case involved a 72-year-old woman who presented with a headache (reported pain: 8/10). When questioned by the emergency nurse, the patient stated it was her “usual migraine.” The triage nurse noted that the patient had a history of high blood pressure, atrial fibrillation, and was taking coumadin. Her blood pressure was 150/100. The nurse assessed that the patient was pink, warm, and dry and was in no acute distress. She was asked to take a seat in the waiting room. About an hour later when the patient was called, there was no answer. She had apparently left without being seen. The woman returned about 6 hours later by ambulance, unresponsive with a blown pupil. She was diagnosed with a brain hemorrhage and subsequently died.

These are 2 examples of severe headaches on the high-risk end of the continuum, in spite of the fact that both patients appeared well. Most headaches are self-limiting and the patient is in need of pain control. These 2 cases demonstrate that it is difficult at best to triage patients and decide who is safe to wait. How do nurses know/learn how to interview patients? Do all emergency nurses go through a triage course before triaging? Are all emergency nurses precepted before they triage? Is everyone who is triaging a registered nurse? Do most triage nurses know that it is a red flag when the patient says, “This is the worst headache of my life?” Probably. Do most triage nurses know that 30% to 40% of patients with SAH will present with a normal neurologic exam?2 Probably not. Most triage nurses know to worry about complaints of headache with vomiting and stiff neck (meningitis?). It is hoped they will remember that changes in vision, level of consciousness, and inability to walk mean high-priority acuity level. However, it is usually the most experienced nurse who remembers to ask if the patient has a rash or if the patient has been irritable or lethargic (again, meningitis?). The experienced nurse should remember to ask the migraine patient if the associated symptoms are the same as before, or if the patient has had a “warning” headache in the previous few days/weeks. The experienced nurse should know that some patients call it a “migraine” headache, yet they have never been worked up for an “official” diagnosis of migraines. The experienced nurse will ask about the aura, triggers and usual symptoms and be suspicious if this headache is different. However, when the waiting room is full and there is a line of 4 to 5 patients to be triaged, will they remember or will they take the time to ask everything that is pertinent?

Many hospitals are implementing 5-level triage acuity systems, which have been demonstrated in some cases to be more effective and reliable than the 3-level triage systems.3,4 However, the nurse must still ask the questions, complete an assessment, and make the high-risk decision about who can wait. Emergency care providers are not the only ones focusing on triage. Risk managers are. For example, they have designed and tested one practical emergency nursing triage assessment tool (NTA) to achieve greater risk reduction for headache, pain, and fever.5 It includes a list of prompts related to each chief complaint that might indicate a high-risk situation. The triage nurse used the prompts to more thoroughly evaluate pertinent body systems and history to identify potentially serious conditions. They concluded that very large differences in learning can be attributed to the use of these prompters for body systems/complaints and that there was an increase in the adequacy of assessment and documentation.

Risk managers recognize that triage can be a high risk area. We would do well to partner with them and/or use them as a resource.

REFERENCES

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1. After reading the articles, darken the appropriate circles on the answer sheet on page 123 (or a photocopy). Each question has only 1 correct answer.
2. Review learning objectives on page 117 and complete the registration information and program evaluation* on the answer sheet.
3. Send the answer sheet with your registration fee to: Continuing Education Group, Lippincott Williams & Wilkins, 333 7th Ave, 19th Fl, New York, NY 10001.

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GENERAL PURPOSE

To provide registered professional nurses with current information about issues affecting emergency nursing practice.

LEARNING OBJECTIVES—RESEARCH (CONTACT HOURS 2.0; FEE $14.95)

After reading these articles and taking this test, you will be able to:
1. Summarize classic and current research evidence that describes the effects of EMS treatment of patients with congestive heart failure (CHF) and acute pulmonary edema (APE).
2. Outline the critical analysis of the literature by the American College of Emergency Physicians (ACEP) and the Emergency Nurses Association (ENA) regarding five-level triage systems and discuss their recommendations.
3. Discuss the literature review concerning the opinions, consensus and research on the topic of family presence during invasive procedures and resuscitation.

LEARNING OBJECTIVES—CLINICAL (CONTACT HOURS 3.0; FEE $19.95)

After reading these articles and taking this test, you will be able to:
1. Identify the normal laboratory values for the anion and osmolal gaps and state the significance of these values.
2. Identify the features of and prognoses for patients with diffuse axonal injury (DAI).
3. Describe the clinical manifestations and management of a pediatric patient with SVT.
4. Explain the use of the B-type natriuretic peptide (BNP) assay as a diagnostic tool.
5. Discuss the use of cardiac resynchronization therapy (CRT).
6. Identify the effects, dosing and potential side effects of nesiritide (Natrecor).

LEARNING OBJECTIVE—PROFESSIONAL/ADMINISTRATIVE (CONTACT HOURS 1.0; FEE $8.95)

After reading this article and taking this test, you will be able to:
1. Discuss the appropriate care for children who experience life-threatening anaphylactic reactions in the school setting.

*In accordance with Iowa Board of Nursing administrative rules governing grievances, a copy of your evaluation of the CE offering may be submitted directly to the Iowa Board of Nursing.
RESEARCH TEST QUESTIONS

Five-Level Triage: A Report from the ACEP/ENA Five-Level Triage Task Force (pp. 39-50)

1. A recent study that surveyed emergency departments throughout the United States regarding their triage systems reported that the majority of emergency departments use:
   A. no triage urgency scale.
   B. a three-level triage system.
   C. a four-level triage system.
   D. a five-level triage system.

2. Which of these statements about the Australasian Triage Scale (ATS) is accurate?
   A. It uses an ascending, 4-level triage urgency scale.
   B. It has been used in the majority of emergency departments in Australia since 1975.
   C. It uses an extensive list of clinical descriptors for each triage level.
   D. It has very good inter-rater reliability as determined by prospective studies.

3. A unique characteristic of the Canadian Triage and Acuity Scale (CTAS) is that it:
   A. uses a verbal-graphic pain rating scale.
   B. uses presentational flow chart diagrams.
   C. established its time to triage assessment at 10 minutes.
   D. has excellent inter-rater reliability.

4. The Emergency Severity Index (ESI) is unique because:
   A. it integrates acuity and resource utilization.
   B. it utilizes current procedural terminology (CPT).
   C. its triage levels correlate to final diagnosis codes.
   D. its use is the most widely accepted by third-party payers.

5. Which of these triage systems are consistently reported to have the highest reliability?
   A. ATS and MTS
   B. CTAS and ESI
   C. St. Paul’s Hospital and MTS
   D. NTS and CTAS

6. Validity studies reveal that the ESI has demonstrated the ability to:
   A. detect the critically ill.
   B. detect pediatric morbidity.
   C. predict 6-month mortality.
   D. predict hospital length of stay.

7. Pediatric triage criteria with face validity was recently published by
   A. Sutter Triage Scale (STS).
   B. National Triage Scale (NTS).
   C. Manchester Triage Scale (MTS).
   D. Canadian Triage And Acuity Scale (CTAS).

8. Which of these statements about the use of a descending triage scale is correct?
   A. It was used initially in the Sutter Triage Scale.
   B. It assigns the highest level of urgency as level 1.
   C. It encourages a decimal numeric expression of acuity.
   D. It is most useful for comparing pre- and post-encounter resource utilization.

9. Based on a review of the literature, the joint task force of the American College of Emergency Physicians (ACEP) and the Emergency Nurses Association (ENA) recommend:
   A. an in-depth, evidence-based review of all current 3- and 4-level triage systems.
   B. a government mandated, national implementation of a multi-level triage scale linked to reimbursement.
   C. the implementation of a standardized emergency department triage scale and acuity categorization process.
   D. reimbursement from third-party payers based on initial triage determinations from a reliable, valid 5-level triage scale.

Evidence Review: Emergency Medical Services Treatment of Patients With Congestive Heart Failure/Acute Pulmonary Edema: Do Risks Outweigh Benefits? (pp. 51-57)

10. The reports described in this article about the therapeutic effects of out-of-hospital advanced life support (ALS) demonstrate:
    A. limited benefit from EMS treatment of patients in CHF/APE.
    B. significant benefit from EMS treatment of patients in CHF/APE.
    C. inconclusive evidence regarding the benefit from EMS treatment of patients in CHF/APE.
    D. consistent adverse outcomes caused by EMS treatment of patients in CHF/APE.
11. Wuerz and Meador’s 1992 study on EMS ALS treatment and length of stay for patients with CHF/APE revealed:
   A. patients who were not treated and incorrectly diagnosed by paramedics experienced improved outcomes.
   B. patients who were correctly diagnosed and treated by paramedics experienced a 44% decrease in hospital length of stay.
   C. patients correctly diagnosed by paramedics and judged to be in severe distress experienced significantly lower mortality rates when compared to those not treated at all.
   D. patients judged not to be in severe distress who were erroneously diagnosed and treated by paramedics experienced increased mortality rates when compared to those not treated at all.

12. According to this author, paramedics are likely to err in treating patients for CHF/APE approximately what percent of the time?
   A. 12% to 15%
   B. 19% to 21%
   C. 27% to 30%
   D. 33% to 36%

13. The results of these reported studies revealed some support for the continued use of which of these medications for the treatment of CHF/APE?
   A. Lidocaine
   B. Morphine
   C. Furosemide
   D. Nitroglycerin

15. A study by Meyers et al (2000) that evaluated the perceived stress of healthcare providers who had performed invasive procedures or resuscitation efforts with family members present revealed that:
   A. physicians were more likely than nurses to believe their performance was affected.
   B. nurses were more likely than physicians to believe their performance was affected.
   C. the majority believed their performance was affected by the family’s presence.
   D. the majority believed their performance was unaffected by the family’s presence.

16. A 9-year study of family presence during cardiopulmonary resuscitation at Foote Hospital’s emergency department revealed:
   A. not one instance of interference by family members.
   B. a slight increase in charges of negligence and malpractice.
   C. patient outcomes were improved for these patients.
   D. parents of children under the age of 10 years were most likely to interfere.

14. A recent study by MacLean et al (2003) that studied family presence during cardiopulmonary resuscitation and invasive procedures, indicated:
   A. the majority of written policies specifically prohibit the option of family presence.
   B. the majority of written policies require physicians to determine if family presence is permitted.
   C. written policies allowing the option of family presence are infrequent.
   D. written policies allowing the option of family presence have steadily increased.

1. The B-type natriuretic peptide (BNP) assay is up to 94% accurate in identifying:
   A. heart failure.
   B. status asthmaticus.
   C. coronary artery disease.
   D. exacerbation of emphysema.

2. What is the normal range for BNP?
   A. 0 to 100 pg/mL
   B. 110 to 225 pg/mL
   C. 244 to 389 pg/mL
   D. 640 to 817 pg/mL

3. The BNP level may be slightly elevated in a patient who:
   A. is male.
   B. receives dialysis.
   C. is experiencing puberty.
   D. drinks caffeinated beverages.
4. Which of these medications is a recombinant form of human BNP?
   A. Nesiritide (Natrecor)
   B. Abciximab (ReoPro)
   C. Aprotinin (Trasylol)
   D. Vasopressin (Pitressin)

An Update on the Treatment of Heart Failure Using Biventricular Pacing and Intravenous Nesiritide (pp. 76-79)

5. Which of these statements about cardiac resynchronization therapy (CRT) is accurate?
   A. The implanted pulse generator must be checked via magnetic resonance imaging once a year.
   B. Use of this device is contraindicated in patients with a left bundle branch block or wide QRS complex.
   C. Biventricular pacing is accomplished via the use of right atrial, right ventricular, and left ventricular leads.
   D. Within 6 months of device implantation, patients are typically able to discontinue their previous cardiac medications.

6. Which of these is a beneficial effect of nesiritide?
   A. Reduced heart rate
   B. Increased preload
   C. Increased systemic vascular resistance
   D. Reduced pulmonary capillary wedge pressure

7. The recommended dosing for nesiritide is an intravenous bolus of:
   A. 75 mg I.V. push followed by an infusion of 2-4 mg/minute,
   B. 80 Units/kg I.V. push followed by an infusion of 18 Units/kg/hour,
   C. 2 mcg/kg over one minute followed by an infusion of 0.01 mcg/kg/minute.
   D. 500 mcg/kg/min over one minute followed by an infusion of 25 mcg/kg/minute.

8. A significant and frequent side effect of nesiritide is:
   A. tachycardia.
   B. hypotension.
   C. pulmonary edema.
   D. decreased renal function.

Supraventricular Tachycardia in Children: Symptoms Distinguish From Sinus Tachycardia (pp. 105-108)

9. An infant with supraventricular tachycardia (SVT) is likely to present with which of these findings?
   A. A pansystolic heart murmur
   B. A structurally abnormal heart
   C. Several day history of poor feeding
   D. Splinter hemorrhages under the fingernails

10. Which of these ECG changes would you anticipate in a child with SVT?
    A. A prolonged PR interval
    B. A widened QRS complex
    C. A heart rate of 190 beats/minute
    D. A P wave that is difficult to detect

11. An infant with SVT who is hemodynamically unstable and in shock is brought to the emergency department. Which of the following actions should be taken first?
    A. Sedation
    B. Cardioversion
    C. Performing a 12-lead EKG
    D. Determination of oxygen saturation

12. When administering adenosine to a pediatric patient, you should understand that:
    A. the dose is 0.5 mg/kg per dose.
    B. it should be reconstituted with normal saline.
    C. the onset of action is approximately 30 seconds.
    D. it must be given in an upper extremity or central line.

13. Which of these is a side effect of adenosine?
    A. Transient asystole
    B. Loss of consciousness
    C. Erythema multiforme
    D. Extrapyramidal reactions

14. What is the correct number of joules to use initially when providing cardioversion to an infant who weighs 6 kg?
    A. 0.5 to 1
    B. 3 to 6
    C. 12
    D. 20

15. What is a recommended method for performing a vagal maneuver on an infant with SVT who is asymptomatic?
    A. Applying ice to the face
    B. Applying ocular pressure
    C. Massaging the carotid artery
    D. Performing rectal stimulation
Understanding the Anion and Osmolal Gaps Laboratory Values: What They Are and How to Use Them (pp. 109-111)

16. The anion and osmolal gaps are laboratory values that can be useful in the evaluation of a patient who:
   A. has been poisoned.
   B. is hemorrhaging.
   C. has seizure activity.
   D. has recently had an infarct.

17. The normal anion gap is:
   A. < 4 mEq/L.
   B. 8 to 12 ± 2 mEq/L.
   C. 15 to 18 ± 2 mEq/L.
   D. 22 to 24 mEq/L.

18. Which of these mnemonics is useful when assessing a patient who is acidotic and has an elevated anion gap?
   A. SAVE
   B. ACIDOSIS
   C. MUDPILES
   D. SINODRARA

19. What is the normal osmolal gap?
   A. < 10 milliosmoles
   B. 12 to 16 milliosmoles
   C. 20 to 22 milliosmoles
   D. > 24 milliosmoles

20. An increased osmolal gap can occur as a result of:
   A. ketosis.
   B. over hydration.
   C. hypercalcemia.
   D. hyperlipidemia.

21. A significant osmolal gap should alert the ED staff to the possibility that a patient has ingested:
   A. cocaine.
   B. alcohol.
   C. warfarin.
   D. phenytoin.

Diffuse Axonal "Shear" Injury in an 18-year-old Man Following a High-speed Motor Vehicle Collision (pp. 112-114)

22. Which of these statements about diffuse axonal injury (DAI) is accurate?
   A. It is frequently referred to as second impact syndrome.
   B. The damage typically involves areas of multiple neurologic functions.
   C. It is the third most common primary diffuse traumatic brain injury.
   D. The mechanism of injury is most often associated with a blunt head trauma.

23. The hallmark of DAI is:
   A. a loss of temperature regulation.
   B. a widened pulse pressure.
   C. the development of generalized seizures within one hour of injury.
   D. persistent loss of consciousness from the moment of impact.

24. The predominate features of DAI syndrome are related to:
   A. weakness or loss of strength.
   B. sensitivity to sound or noise.
   C. inappropriate responses to people and things.
   D. difficulty with concentration and cognition.

25. Which of these is not commonly used to predict a long term prognosis of DAI?
   A. Tachycardia
   B. Hypotension
   C. Hyperthermia
   D. Initial hypoxia

26. A patient with a moderate disability who is independent with activities of daily living (ADLs) would receive which of these Glasgow Outcome Scale Scores?
   A. 2
   B. 3
   C. 4
   D. 5
PROFESSIONAL/ADMINISTRATIVE TEST QUESTIONS

Anaphylaxis Experienced by School Children Offers Opportunities for ED Nurse, School Nurse Collaboration (pp. 102-104)

1. Following the administration of an EpiPen to a child who had a life-threatening allergic reaction in school, which of these actions would be best?
   A. Determination of the child’s known asthma triggers
   B. Notification of the local State Health Department by the school nurse
   C. Transportation to the local emergency medical facility by someone with additional epinephrine and the knowledge of when and how to administer it
   D. Observation in the school nurse’s office and assessment of the child’s vital signs every fifteen minutes for at least 1 hour

2. The American Academy of Allergy, Asthma and Immunology’s 1998 position statement, “Anaphylaxis in Schools and Other Child-Care Settings,” emphasized:
   A. that only registered nurses should administer epinephrine to children in the school setting.
   B. the use of epinephrine in the school setting should be limited to those children with a prescription and a known allergy history.
   C. epinephrine is the first drug to be used in the emergency management of a child experiencing a potentially life threatening allergic reaction.
   D. diphenhydramine is the first drug to be used in the school setting for a child experiencing clinical manifestations of an acute anaphylactic reaction.

3. Reports submitted to the Massachusetts Department of Public Health between August 1, 2003 and July 31, 2004 revealed that of the 134 children and staff who had EpiPens administered to them in Massachusetts schools:
   A. 12% experience biphasic reactions in the school setting.
   B. 23% of the children had no previous diagnosis of a life-threatening allergy.
   C. 53% of the children had known allergies but had not informed the school.
   D. 78% did not have symptoms that are considered absolute indications for administration of epinephrine.

4. The Massachusetts Department of Public Health found that approximately what percentage of children whose symptoms were classified as grade 4 or 5 anaphylactic had biphasic reactions?
   A. 20%
   B. 33%
   C. 51%
   D. 74%
CE ENROLLMENT FORM

February 2005 issue—Journal of Emergency Nursing
Expiration Date: February 28, 2007
CEN-RO Category: Clinical
CE credit 2.0 contact hours research; 3.0 contact hours clinical; 1.0 contact hour professional/administrative.
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Program evaluation:
Please rate this CE material by darkening the appropriate circles below:
1. Did this CE activity’s learning objectives relate to its general purpose?
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   Professional/Administrative O Yes O No
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Instructions: Darken only one circle for your answer to each question.

RESEARCH (12 correct answers needed to pass)
   O b O b O b O b O b O b O b
   O c O c O c O c O c O c O c
   O d O d O d O d O d O d O d
   O b O b O b O b O b O b O b
   O c O c O c O c O c O c O c
   O d O d O d O d O d O d O d
15. O a 16. O a
   O b O b
   O c O c
   O d O d

CLINICAL (19 correct answers needed to pass)
   O b O b O b O b O b O b O b
   O c O c O c O c O c O c O c
   O d O d O d O d O d O d O d
   O b O b O b O b O b O b O b
   O c O c O c O c O c O c O c
   O d O d O d O d O d O d O d
   O b O b O b O b O b O b O b
   O c O c O c O c O c O c O c
   O d O d O d O d O d O d O d
   O b O b O b O b O b
   O c O c O c O c O c
   O d O d O d O d O d

PROFESSIONAL/ADMINISTRATIVE (3 correct answers needed to pass)
1. O a 2. O a 3. O a 4. O a
   O b O b O b O b
   O c O c O c O c
   O d O d O d O d

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FEES AND CONTACT HOURS LISTED ABOVE
A Glimpse of Emergency Care and Strife in Kosovo: One Emergency Nurse’s Experience

Author: Tiesha D. Johnson, RN, BSN, Rochester, NY

In March 2004 I was a member of a group from the University of Rochester medical staff who traveled to Kosovo in the former Yugoslav Republic. Our mission was to administer graduation examinations to the first-ever group of emergency medicine medical residents in Kosovo. The group would then present formal lectures at the first-ever Kosovo Emergency Medicine Congress. An experienced critical care and emergency nurse, I represented the nursing profession. We were accompanied by a Kosovar Albanian physician, Uc Gjonbalaj (pronounced “Utz”), who was our guide and translator.

Getting there

Following an 8-hour flight, we transfer planes in Vienna and 2 hours later arrive in Pristina, Kosovo. Outside the airport, our group is met by swarms of young people, some only children, who crowd around, trying to sell us cartons of cigarettes; it is a disorienting reception.

Our hosts from the hospital locate us, despite the crowd, and answer our questions about the war, the present status of the country and its people, and the current health care system. Rebuilding is under way everywhere, and everything new looks the same—brick. And everything not new looks the same—rubble and wreckage. Scattered along the roads and buildings are United Nations military guards who look bored but serious and ready.

Passing through the city, we travel on Bill Clinton Boulevard—we had been told they like Americans in Kosovo. Our hotel, the Victory, sports a replica of the Statue of Liberty on its roof.

Later, after a long drive through the dark and confusing city, we are ushered into a restaurant on the edge of town. We crowd together under a low-hanging ceiling, admiring and then enjoying a communal plate of fragrant grilled sausages and roasted meats. We drink robust wines amid a thick haze of the cigarette smoke that pervades the room. I understand only about half of the dinner conversation, but the company is warm and the atmosphere friendly.

The next morning from our hotel window I see a mosque in the distance and hear the eerie and beautiful chanting of the Muslim call to prayer, performed 5 times a day. The foreign sights and sounds remind me I am far away from home.

Everywhere people are begging, many with small children—sitting on sidewalks, inside restaurants... outside a mosque an elderly woman patiently waits for alms. With each encounter, our hosts hand over small coins, and we quickly learn to do the same. Poverty has no shame.

An interesting twist: At home, as an emergency nurse, I often encounter people speaking to one another in a different language. I guess I sometimes assume they are shy, sullen, or unwilling to talk with us. Now we are “those people” speaking a different language, talking among ourselves. If I try to say something just in passing, I probably...
won’t be understood anyway, so I just keep quiet.

The hospital: first impressions

The next day, as the physicians in the group begin with the examinations, I begin my own adventure. My interpreter is Rreze (Figure 1). Although she is only 20 years old, her eyes have the look of a much older woman, with a look of resignation and acceptance that is on all the faces I see. Rreze had worked as a nurse and is now in college, although I never quite exactly understand what she plans to do. She speaks several languages, loves Americans, and has high hopes and big dreams. Together we set out to see the hospital through nurses’ eyes.

The police outline the area with tape, keeping the growing assembly at bay. Then there is an eerie stillness. I can feel my heart pounding.

The first thing I see when I walk into the hospital is the universal sign for “prohibited.” Inside the circle is a gun. People are smoking in the hallways. ED stretchers have no sheets. On the floors, each room is like a miniature ward with 4 to 5 beds. There is no ambulance entrance. Attendants pull up to the door and bring the patient in... after dragging the stretcher up a flight of stairs.

From Rreze and the other nurses I learn that after the equivalent of elementary school, Kosovars begin training for a job, and by high school graduation, students are ready to join the workforce. Rreze began her secondary school nurse training at age 15 years. With no licensing, no been examination, and very few official standards, nursing is not a profession, but a job.

In fact, according to the European Agency for Reconstruction, standards of nursing in Kosovo have been very low. Presently, nurses and nurse midwives are trained in “specialist secondary schools” in programs that provide education and skills similar to those of nursing assistants in the United States. In Organization’s Collaborating Kosovo, nursing has been “a poorly paid and undervalued profession,” although efforts are currently under way through the World Health Centre for Nursing and Midwifery to raise the standards of nursing in Kosovo toward those found throughout Western Europe. As a result, in 2003, 5 Kosovar nursing students were to complete a minimum of 2300 hours of theory and 2300 hours of practice in Glasgow, Scotland, to receive initial qualification as nurses. They will return to Kosovo and teach at the growing School of Nursing in Prishtina.

It is sad to hear Rreze referring to nursing as her “former trade” and to learn that nurses in Kosovo make around $120 per month, although the cost of living seems to be about what it is here in the States.

We visit the ICU, a strong interest for me because that is where the bulk of my own nursing career has been. I see patients scrupulously cared for by obviously dedicated nurses. I do not take any photographs, although no policy prohibits it. The nurses want to protect the privacy and dignity of their unconscious patients. I am impressed with the care they are providing.

Unexpected trouble

When Rreze is late the next morning, I learn a Serbian man was killed the previous night, and the resulting disturbance has caused the roads to be closed.

I take advantage of the free time to buy some toys and crayons for the patients on the pediatric unit. Those kids are so sick—many terribly injured with broken bones and burns, and others suffering from congenital problems (Figure 2). Their parents have a universal look of fatigue and sadness, and the children too seem bored and depressed. While visiting the ward, I suddenly realize the street noise has a new sound—voices clamoring and sirens screaming. Crowds of civilians are gathering and even larger
crowds of people in white coats and medical uniforms are emerging from the building, bringing stretchers with them. The police outline the area with tape, keeping the growing assembly at bay. Then there is an eerie stillness. I can feel my heart pounding.

As we watch, people march up the hill and ambulances return with them beaten and battered. The hospital will be busy all night.

People in the crowd tell me the previous night’s murder led to 3 Albanian children drowning in the river as they were running from a Serb crowd. This news seems to trigger subsequent events; something is definitely occurring, just over the hill on the edge of the city.

The first ambulances rush to the entrance. In Kosovo, the ambulances are manned with drivers only. Medical personnel are picked up from the hospital and the units then proceed to the scene. I watch as “white coats” jump into the ambulances and speed away. Then more stillness.

The first ambulance returns bearing a patient. He is surrounded by a swarm of “white coats” who drag him onto a stretcher, bleeding—and disturbingly still. The stretcher is then carried up the stairs and out of sight. Another follows, and then more (Figure 3). I push my way through the crowds, into the building, through the lobby, and on to the trauma room. Straight ahead, CPR is in progress. To my right, bloody clothes are being cut off a patient. To my left, staff are looking for veins in a patient and placing intravenous catheters. As I look back toward the door, in pour 3 or 4 more patients being carried by frantic staff members. Police are trying to monitor who is coming and going. I run back to the hotel and change into scrubs, which gladly I brought from home.

I am back at the hospital within 15 minutes, and the place is now swarming with military guards, more people, and more police. People are crying. Some are obviously terrified. Some are just standing on their toes trying to see above the heads in front of them. Wearing my scrubs, the universal uniform, is my ticket back in. I again squeeze through the crowd, all the while hearing sirens, Albanian voices shouting, and feet running. Suddenly I hear gun fire in the distance and helicopters in the air. The hair on the back of my neck stands up.

In the trauma room, chaos reigns. There is more yelling and more running. On my way back in, I now see bodies in the hallway covered with sheets and shielded by screens. The doors swing back and forth each time a staff member bearing a patient pounds through them. I swallow hard, choose a patient, approach the stretcher, and get started. I cut clothes off one patient, obtain vital signs for another, and place an intravenous line in another. It then becomes clear I need to assign myself a different role. Because I cannot read the flow sheets, I do not know where to write the vital signs and I cannot understand medication orders (or much of anything else), so I end up removing clothing and helping transfer people onto stretchers, covering them with blankets. The monitors are much like what I am used to, so I place them on people as I remind English-speaking staff I can help wherever and however needed. I find the physicians in our group, tell them what I have been experiencing, and we ALL end up in the trauma room.

Back in the chaos, there are more patients than places to put them. They are on stretchers, on the floor, and sitting in chairs. Everywhere. Everyone looks terrified and overwhelmed—the patients, of course, but also the staff.

As we walk back to our hotel, we see the crowds have dispersed somewhat, although a large group of people are

FIGURE 3
Another unfortunate arrival from the fighting outside Prishtina, Kosovar. He is intubated, but a bag-valve-mask is not brought from the ambulance. Ventilation with an ambu bag is resumed after he is carried up the stairs and into the trauma room.

This is their country, their home, and I think they had begun feeling safe again after war and terror; now they see it starting all over again.

One doctor approaches our group with his eyes sparkling, his face gleaming with excitement. “You know what? I passed today!” he exclaims. It is hard not to cry, and it is such an honor to be present.

Most of us find we can be most helpful by taking care of the less severely injured patients and generally staying out of everyone else’s way.

We stay for about 6 hours that day, but the crisis continues after we leave and well into the next day. Overall, more than 200 patients come to the hospital as a result of the fighting.

As we walk back to our hotel, we see the crowds have dispersed somewhat, although a large group of people are
walking toward the hill where much of the fighting is taking place. One man is carrying a Kosovar flag. As we watch, people march up the hill and ambulances return with them beaten and battered. The hospital will be busy all night. Overhead, helicopters circle. The sound of gunfire and explosions comes from the hill. I wonder what the days ahead will be like.

An unexpected party

A party for the graduating residents, which we thought surely would be canceled, is still on. Before we know it, we are piling into taxis on our way to the graduation party after all. It is the best party I have ever attended. Amidst all the suffering, it is still a great day. Most of the graduates are there, and they have passed their boards. One doctor approaches our group with his eyes sparkling, his face gleaming with excitement. “You know what? I passed today!” he exclaims. It is hard not to cry, and it is such an honor to be present. Far into the night we drink, we eat (again), we laugh, and we dance. We learn traditional Albanian dances and perform them with vigor if not skill, linked arm in arm, dancing in a circle to the rhythmic clapping of many hands. Dancing on the edge of destruction, the intensity, the joy, and the release of tension seem to symbolize the whole day.

Early in the morning, we make our way back from the party along a dark road as surveillance airplanes drone overhead, without lights, invisible in the night sky. A helicopter still circles in the distance, aiming a spotlight on the ground as we pass 2 burning vehicles in the street.

That night, I lay out clothes and pack a bag with important items, which becomes a nightly ritual, just in case we have to leave the building quickly.

The morning after

The next morning we walk again through the now quiet city. Burned out UN vehicles are everywhere. A bar, popular among UN officials in Prishtina, stands empty, with all the windows smashed. Roadblocks are set up in the streets, and in the distance we can still hear sporadic gunfire. Looking up the hill from our hotel, we can still see smoke, and now armored tanks. We register with the American Embassy that day—better late than never.

Sadly, despite all of our hosts’ hard work and planning, the conference is canceled. Because the airport is closed, participants from other countries cannot get in. Most of the Kosovar participants cannot come anyway; they are still busy at the hospital. We are moved by the distress our hosts show—this has been a much anticipated event for all of them.

Coming home

After several more days, the airport reopens and the fighting stops. The hill above our hotel is cleared of the crowds and the road opens again. Our hosts are apologetic. We feel we have been treated like royalty, yet they are worried about our safety and well-being. They send us off with gifts of wine, Raki, pens, (and, very sweetly, make-up for the women). Driving up the now quiet hill and through the Serbian towns on our way to the airport, we see many homes that were standing on our arrival just days earlier, now destroyed. Military guards are everywhere. In the deceptive quiet, I know we are leaving a city where the stillness covers the screams of raging hearts.

Glad to be heading home, the 8-hour flight back gives me time to think and reflect. In one way, I cannot wait to tell my story, but in another way, I know I can never match the story told to me while there. I hope my result is somewhere between.

Afterword

I still keep in touch with Reece by exchanging regular E-mail messages, and according to her, all is quiet in Kosovo. I occasionally search government Web sites looking for the latest news; no further incidents have been reported. Some US government sites continue to advise Americans to use caution when traveling to Kosovo, but I would not hesitate to return.

REFERENCES

1. European Agency for Reconstruction [online] [retrieved 2004 June 5]. Available from: URL: www.ear.eu.int/kosovo/kosovo-a1c2c3b4e5.htm
PROTOCOLS, POLICIES, FORMS, AND OTHER DOCUMENTS ONLINE FOR ENA MEMBERS

Emergency nurses across the country can share forms, documents, and policies with one another at http://www.ena.org/document_share/default.asp. From the ENA home page (www.ena.org), members should go to “Nursing Practice” and select Document Sharing Area from the drop-down window. Because this is a Members Only benefit, members will need to log in to access this area, then select Document Sharing from the menu at the top of the Members Only home page. Documents are posted in PDF and Word (as available), and can be printed or downloaded in either format. There are 5 topic categories:

- Documentation and Forms
- Policies and Procedures
- Staffing and Scheduling
- Standards of Care
- Triage

The Web site depends on emergency nurses who are willing to share their documents to help colleagues so they will not have to reinvent the wheel. These category headings will expand as ENA receives different documents. For instructions on submitting a document to share with your colleagues, members should access http://www.ena.org/document_share/Instructions.asp (login required), or send an E-mail to webmaster@ena.org with questions.

LEADERSHIP CHALLENGE 2005 ONLINE REGISTRATION OPENS

The Advance Program and registration materials are now available online for Leadership Challenge 2005, to be held in Fort Lauderdale, Florida on March 10 through 13. These materials can be found at www.ena.org/conferences/leadership2005/default.asp. The 2005 State Leaders Conference will be held March 9 and 10, as well as a group of pre-sessions available March 9 and 10. New among the pre-sessions offered this year is the GENE, Geriatric Emergency Nursing Education, a comprehensive course designed to provide specific knowledge needed by ED nurses when caring for older patients. And back by popular demand, Key Concepts in Emergency Department Management offers ED managers best practice fundamentals and cutting-edge information essential to successfully running an emergency department. Advanced Level Courses designed to address the particular needs of the more seasoned nurse manager are highlighted in the Advance Program as well.

CALL FOR FACULTY FOR LEADERSHIP CHALLENGE 2006

ENA is calling for faculty submissions for Leadership Challenge 2006 in Austin, Texas. Applicants should have knowledge and experience in the areas of management, operations, government affairs, technology, team building, research, education, advance practice, and personal and professional development. The selection process is about to begin, and individuals interested in joining the faculty are encouraged to submit course proposals before the March 18, 2005, deadline. Applicants are encouraged to present two separate topics, or be prepared to repeat their lecture(s). Proposals for workshops involving interactive and in-depth content presentations are also requested. Course content should be intended for new nurse leaders and managers, or for those with greater experience.

Course proposals must be submitted in the format outlined or by an interactive electronic form which can be obtained by contacting ENA Educational Services at LeadershipChallenge@ena.org. Those who will prepare their course proposals independently should forward their materials to:

Call for Faculty and Courses
Leadership Challenge 2006
Emergency Nurses Association
Educational Services Department
915 Lee Street
Des Plaines, IL 60016-6569

Contact Educational Services at (800)900-9659 ext. 4123 for additional information. Proposals must be postmarked or electronically submitted by March 18, 2005.

Presentation proposals that are not complete or do not follow the submission guidelines will not be considered. Formal notification of selection will occur approximately 60 days after submission deadline date.

APPLICATIONS ARE NOW BEING ACCEPTED FOR NEW GRANT FOR ED OVERCROWDING RESEARCH

The Emergency Nurses Association Foundation (ENAF) and Emergency
Medicine Foundation (EMF) are jointly offering a grant to facilitate collaboration between the disciplines and to improve clinical research in emergency care. This grant is intended for physician and nurse researchers to combine their expertise to develop, plan, and implement clinical research in emergency care. The ENAF/EMF Directed Team Grant for ED Overcrowding Research Award presents a $20,000 grant for research over a one-year period. To apply, contact Janet McEwen at jmcewen@acep.org.

ENA IS LOOKING FOR EMERGENCY DEPARTMENTS TO PARTICIPATE IN NEW SBIRT STUDY

Every day in the United States, more than 20,000 people enter emergency departments for alcohol-related illness or injury. Alcohol Screening and Brief Intervention (SBIRT) has been shown to be effective in reducing alcohol consumption as well as repeat visits to the emergency department, decreasing alcohol-related injuries and illness, and increasing patient compliance with alcohol treatment programs. ENA is seeking emergency departments that are interested in becoming a study site to determine the feasibility of implementing SBIRT in the ED setting. For one year, ED patients would be routinely screened (4-6 questions) for risk of alcohol use and/or abuse. The nursing staff would then provide 5 to 15 minutes of patient counseling and offer referrals for follow-up care. Training is provided online for selected sites. To apply for participation in this study, go to http://www.ena.org/research/current/

NEW INTERNET-BASED COURSE AVAILABLE—ALCOHOL SCREENING AND BRIEF INTERVENTION IN THE EMERGENCY DEPARTMENT

A new Internet-based course, developed in part by the National Institute for Health, National Institute for Alcohol Abuse and Alcoholism, and supported by ENA, ACEP (American College of Emergency Physicians), and SAEM (Society of Academic Emergency Medicine), is now available on the ENA Web site. The goal of this course is to promote the adoption of screening, brief intervention, and referral to treatment (SBIRT) among emergency department providers in the context of National Alcohol Screening Day. Course participants will earn 1.2 CECH. For more information on this and other Internet-based educational opportunities, contact ENA at http://www.ena.org/education/continuing/ecomed/ or (800)900-9659 ext. 4116.

ENA RESOLUTIONS COMMITTEE BECOMES AVAILABLE TO THE MEMBERSHIP

Beginning in 2005, the Resolutions Committee will be available to ENA members for assistance with developing proposed bylaw amendments and resolutions all year long. This will allow members to have the resources needed to effectively write proposed bylaw amendments and resolutions in the proper format before the deadline. Formal consideration of proposed resolutions will take place at the 2005 General Assembly, September 14 to 15, 2005 in Nashville, Tennessee. The ENA General Assembly meets annually to determine official Association policy and positions by reviewing, debating, and voting on proposed bylaw amendments and resolutions. Proposed bylaw amendments and resolutions may be submitted by ENA members; the ENA Board of Directors; Association chapters (must be signed by the chapter and state president attesting to their acknowledgement and coordination); state councils (signed by the state president); and all other national committees and Boards.

E-MAIL ALERTS ON LEGISLATIVE AND REGULATORY ISSUES KEEP ENA MEMBERS INFORMED

Members who are interested in events happening in Washington, DC, and around the country that affect the emergency nursing profession can now sign up to receive ENA E-mail Alerts. These alerts provide strategic information on legislative and regulatory issues of concern to emergency nursing. Anyone interested in following public policy development is encouraged to subscribe. To start receiving future Alerts, send a short note to enagov@aol.com.
NEW EASY PAYMENT PLAN
OFFERED FOR LIFETIME
ENA MEMBERSHIP

ENA members can now choose a convenient 12-month Lifetime Dues Payment Option that spreads payments over a one-year term through credit card payment or automatic bank deduction.* Depending on the state of residence, most lifetime members pay just $101 per month on the new 12-month plan. Members interested in the new payment plan should contact Judie Cruse, Member Services manager, at (800)900-9659 ext. 4018, or jcruse@ena.org for more information.

ENA RECREATIONAL BOATING STUDY PLANNED FOR 2005

The ENA Recreational Boating Study continues into 2005 with regional training sessions to be held in February in Oregon, Illinois, and Massachusetts. This is a great opportunity for members to participate in cutting-edge research in their emergency departments and their communities. For this study, ENA is collecting data focusing on patients who have been treated in emergency departments for injuries relating to recreational boating. ENA is specifically recruiting site coordinators in emergency departments that see a higher incidence of these specific types of injuries. Limited scholarship money is available to offset costs, so early application is recommended. For more details, members should access www.ena.org/research.current; or call (800)900-9659 ext. 4119; or E-mail res@ena.org.

*Refunds are not available with this program. In cases of discontinued bank drafts before the full 12-month term, ENA membership will be prorated to reflect monies paid.
Coming Meetings

FEBRUARY 2005

Twentieth Annual National Conference on Wilderness Medicine, Second Session

Medicine and the Spirit of Adventure
May 18-22, 2005, Sweeney Convention Center, Santa Fe, NM.

Survival Skills Field Course
June 11-17, 2005, Whitewater Raft Expedition & Optional Mt. Shasta Climb, Northern Calif.

Twentieth Annual National Conference on Wilderness Medicine
August 3-7, 2005, Yellowstone Convention Center, Big Sky, Mont. Joint sponsorship by American College of Emergency Physicians (ACEP, CAL/ACEP) and Wilderness and Travel Medical Seminars. Contact: Carlson Travel Station, 1822 W Lincoln, Bozeman, MT 59715 Phone: (800)522-8747, (406) 587-8747; fax (406)587-2541. E-mail: wilderness@thetravelstation.com; registration and information: www.wildernessmedicine.com.

MARCH 2005

ENA Leadership Challenge
March 10-13, 2005, Fort Lauderdale/ Broward County Convention Center, Fort Lauderdale, Fla. Sponsor: Emergency Nurses Association. Contact: Emergency Nurses Association, 915 Lee St, Des Plaines, IL 60016. Phone:(800)243-8362; fax: (847) 460-4001; E-mail: enainfo@ena.org.

2005 Annual Conference of Vickie Milazzo Institute, a Division of Medical-Legal Consulting Institute, Inc.
March 11-13, 2005, New Orleans Marriott Hotel, New Orleans, La. Sponsor: National Alliance of Certified Legal Nurse Consultants (NCLNC). Contact: Vickie Milazzo Institute. Phone: (800)880-0944. E-mail: contact@legalnurse.com; Web site: LegalNurse.com.

Lifesavers
March 13-15, 2005, Charlotte Convention Center, Charlotte, NC. Lifesavers has no single sponsor and relies on the involvement of diverse private and public groups who share the common goal of improving highway safety. Contact: Mary Magnini, PO Box 30045, Alexandria, VA 22310. Phone: (703)922-7944; Fax: (703)922-7780; E-mail: mmagnini@cox.net.

New Jersey State Council 27th Annual Emergency Care Conference
March 16th, 17th and 18th, Tropicana Casino and Resort Hotel, Atlantic City, NJ. Sponsor: New Jersey ENA State Council. Contact: Jim Richmann RN, BS, CEN, Chatham Rd, Somerdale, NJ 08083; Phone: (856)853 2035; E-mail: richmannj@umhospital.org.

APRIL 2005

Essentials of Emergency Evaluation XXX
April 5-6, 2005, Marriott Hotel, Rochester, Minn. Sponsor: Zumbro Valley Chapter of Emergency Nurses. Contact: Diane Wrobleski. Phone: 507-281-4058; E-mail: wrobleski.diane@aol.com

Setting the Pace 2005
April 21-22, 2005, Buffalo Niagra Marriott, Buffalo, NY. Sponsor: New York ENA; Contact: Janice M. Francischine. Phone: (516)873-6598; E-mail: nnjanice@msn.com.

Cool Topics in Emergency and Trauma Care

MAY 2005

Injury and Violence in America: Meeting Challenges, Sharing Solutions
May 9-11, 2005, The Adam’s Mark Hotel and Conference Center, Denver, Colo. Sponsors: Centers for Disease Control and Prevention’s (CDC) National Center for Injury Prevention and Control (NCIPC), the National Association of Injury Control Research Centers (NAICRC), and the State and Territorial Injury Prevention Directors’ Association (STIPDA). Contact: Sandra Bonzo, Mailstop K65, 4770 Buford Highway NE, Atlanta, GA 30341-3724. Phone: (770)488-1506. Fax: (770) 488-1667. E-mail: seh2@cdc.gov.

CEN Review Course
May 19-20, 2005, Raddison Hotel, New Rochelle, NY. Sponsor: Montefiore Medical Center, Bronx NY. Contact: Lisa Kosits. Phone: (718) 920-5241; E-mail: lkosits@montefiore.org.
SEPTEMBER 2005

■ 2005 ENA Annual Meeting
September 14-17, 2005, Opryland Hotel and Convention Center, Nashville, Tenn. Sponsor: Emergency Nurses Association. Contact: Emergency Nurses Association, 915 Lee St, Des Plaines, IL 60016. Phone: (800) 243-8362; fax: (847) 460-4001; E-mail: enainfo@ena.org.

OCTOBER 2005

5th International Conference for Emergency Nurses

NOVEMBER 2005

CEN Review Course
November 3-4, 2005, Sheraton LaGuardia East Hotel, Flushing, NY. Sponsor: Montefiore Medical Center. Contact: Lisa Kosits; Phone: (718) 920-5241; E-mail: lkosit@montefiore.org.

FEBRUARY 2006

■ ENA Leadership Challenge
February 23-26, 2006, Austin, Tex. Sponsor: Emergency Nurses Association. Contact: Emergency Nurses Association, 915 Lee St, Des Plaines, IL 60016. Phone: (800) 243-8362; fax: (847) 460-4001; E-mail: enainfo@ena.org.
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