This is Just a Drill
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# This is Just a Drill

As I hopped into my car that morning, cup of coffee in hand, I began to think ahead of what I'd encounter on my shift. Of course as an emergency medicine resident I was hoping for some intubations or central lines, but as we all know, in a community hospital this does not happen every shift. And sometimes, an uneventful shift is a nice change of pace. As I parked my car outside the ED that morning, I noticed that there were no EMS vehicles in the bays. This was unusual, a slow start to the shift! Upon entering the department, I was informed that we were on diversion (hence no EMS vehicles). Within about twenty minutes of starting the shift, a call was made from the administrative head of the department that there was a motor vehicle collision on the highway just a mile away and that multiple casualties would be brought to our ED. Following this statement, came the red flag; "The vehicle that caused the accident was a 25 passenger tour bus full of seniors that careened off the highway; hit a train carrying liquefied ammonia, causing the derailment of multiple cars, the release of a plume of ammonia gas blowing directly toward our hospital, and the back up of two passenger trains." Oh, that made this morning a little more interesting I'd say!

Immediately, the hospital disaster plan went into effect and I was pulled into the mix as a "Medical/Technical Expert" to give input on what to expect with ammonia exposure. Remember that chapter in Tintinalli (chapter 185 in the 6th edition)? This was a test of whether I had read that chapter! As I tried frantically to access Tintinalli online via my PDA, a phone call was made from a floor nurse administrator into our Incident Command center stating that there were multiple patients and nurses experiencing shortness of breath, eye irritation, and a very strong smell of ammonia. At this point the Safety Officer shut down the entire hospital air intake system and all external doors were closed. Now, we had hot, sweaty, and sick patients!

Over the next two hours we received not only the walking wounded and those with actual respiratory problems, but also 200 dead bodies, subsequent to their proximity of the crash and high levels of ammonia gas exposure. Neighborhoods surrounding the crash were exposed to the ammonia cloud before anything could be done. The air quality outside our facility was contaminated making patient transfers difficult. Eventually, the air around our facility cleared but the hospital was ordered by the Fire Marshall to completely evacuate. Hence, began the arduous task of evacuation, including decontaminating the dead bodies and storing them before the coroner could pick them up, turning off the live web-cam mounted on our roof, transporting patients off the floors to EMS vehicles, and caring for the patients in the ED.

Did I mention this was just a drill? Our hospital regularly practices disaster drills to ensure that we are ready in the event of a real disaster. As an emergency medicine resident, exposure to disaster training is essential. As a discipline, we will play an integral role in any hospital setting in the event of an emergency. Within the hospital setting we will play a role as topic advisors, care givers, and leaders. Hospital administration will look to us for help with disaster planning,

training, and execution. If your residency program does not actively promote disaster training I recommend that you pursue some level of disaster training exposure. At a minimum, every emergency medicine resident should observe and participate in a disaster drill at their facility. Until you have tried to move a non-ambulatory 300 pound patient down three flights of stairs, you can never appreciate the difficulty of a hospital wide evacuation in the chaos of a disaster.

Our residency program regularly participates in table-top exercises which put residents in the position of overseeing the disaster. I've played the role of an incident commander directing the entire process of disaster management, and I've played the EMS director responsible for scene safety, triage, and transport. Additionally, we have participated in multiple disaster exercises involving local hospitals and regional resources.

Worldwide, more than 255 million people are affected by disasters[1]. There are currently ten disaster management/medicine fellowships in the United States[2]. Eleven years ago a study published in the Annals of Emergency Medicine suggested that Emergency Medicine residencies are not adequately trained to respond to bioterrorism events[3]. The Residency Review Committee requires that Emergency Medicine residents have some exposure to pre-hospital management and training, including disaster management.[4] However, to date there is no standardized curriculum for the disaster medicine for emergency medicine residents. In the event of any disaster, patients will be taken to the emergency department regardless of the hospital's level of disaster preparedness[5]. The Joint Commission currently requires that each hospital conduct at least one community-wide practice drill per year to ensure adequacy of the training of personnel, equipment preparedness, and resource management.[6] Contact your Emergency Department Head to participate in the next drill.

Ammonia is found in many household and industrial chemicals. It can be used for plastics manufacturing and explosives. Ammonia is a highly water soluble, colorless, alkaline, corrosive gas. It has a strong odor and rapidly reacts with water to form ammonium hydroxide, a caustic substance[7]. Fortunately, the properties of ammonia make it easy to detect based on its odor and its rapid symptoms of mucous membrane, eye, and throat irritation. Lower airway symptoms can also present as bronchospasm, pulmonary edema, and residual reactive airway disease if the exposure is severe[8] Lower airway symptoms do not manifest until a few hours after exposure and are typically aggravated by physical effort[9]. There is no antidote and treatment is largely supportive involving skin decontamination, eye irrigation, and ensuring respiratory patency. Particular attention must be paid to the eyes as corneal burns should be considered if the patient was exposed to highly concentrated ammonia.

If you are interested in pursuing more information on disaster management please see the ACEP webpage for informational resources under the "Practice Resources" tab[10].

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[1] Guha-Sapir D, Hargitt D, Hoyois P. Thirty Years of Natural Disasters 1974-2003: The Numbers. Louvain-la-Nueve, Belgium: Presses Universitaires de Louvain; 2004.
[2] www.saem.org; Accessed on 10/14/2010; Search "Fellowships"
[3] Pesik N Do US emergency medicine residency programs provide adequate training for bioterrorism? Ann Emerg Med - 01-AUG-1999; 34(2): 173-6

[4] ACGME Program Requirements for graduate Medical Education in Emergency Medicine (2007)RRC website, see point IV.A.5.a).(5)
[5]www.jointcommission.org/AccreditationPrograms/HomeCare/Standards/09_FAQs/EM/Emergency_Exercises Accessed on 10/14/2008, Last updated 11/24/2008
[6] Kaji, A.; Waeckerle, J.; Disaster medicine and the emergency medicine resident
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[7] New York State Department of Health: The Facts about Ammonia (2005)
[8] Tintinalli, J. *et al* (2011) Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 7th ed.; Chapter 15
[9] National Institute for Occupational Safety and Health: Ammonia International Chemical Safety Card (ICSC: 0414) (2005)
[10] www.acep.org/practres.aspx?id=30194; Accessed on 10/14/2010

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Dr. Saunders is currently a PGY-2 at the University of Toledo. He has a strong interest in international relief work, administrative aspects of emergency medicine, teaching medical students, and emergency department procedures. He resides in Holland, Ohio with his wife and three children.