



The North Carolina Burn Surge Disaster Program Newsletter

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October Newsletter

Welcome to the October edition of the North Carolina Burn Surge Disaster Newsletter.

Combating Chemical Warfare

Someday, a bio-scavenger may be a soldier's best friend. In chemical warfare, nerve agents inhibit an enzyme that is crucial for muscle control. If the enzyme is poisoned, the diaphragm won't move, so the victim suffocates.

As a UNC doctoral student, Andy Hemmert set out to alter a similar enzyme into a bio-scavenger that would destroy all known nerve agents before they could do harm. When Hemmert arrived at Carolina five years ago, a previous graduate student had just deciphered the structure of an enzyme in the liver that breaks down toxins.

"What should we do with it?" was the question that Matt Redinbo, Ph.D., chemistry department chair, posed to the new doctoral candidate.

What it, they asked, that enzyme could be changed so it would break down chemical agents? Hemmert went to work.

"He did the work in the lab and would bring the data to me for feedback and suggestions on what to do next," says Redinbo. "It became a really collaborative relationship."

The U.S. military equips soldiers with treatments to neutralize some of the agents. They save lives but cause sickness and long-term side effects. Antidotes for all agents exist, but technologies to distinguish among agents – so that one knows which antidote to take – are too expensive and cumbersome to carry in the field.

Hemmert, a biochemist based in the University Of North Carolina School Of Medicine, set out to find a one-antidote-fits-all – a sort of bioscavenger. Of 560 potential changes to the enzyme, Hemmert found 50 that do the trick. Only nerve agent analogs – not the real thing – are used in UNC labs.

Their lead antidote candidate will be tested at the U.S. Army Medical Research Institute of Chemical Defense. The goal is to find out if an injectable version of the antidote will have few side effects and last several days in the bloodstream.

The ultimate goal? For soldiers and first responders to take the antidote before going into a situation in which they may face a chemical attack.

Meanwhile, Hemmert, Redinbo and graduate student Jonathan Edwards created a company, Identizyme Defense Technologies, to further the work. Funded by a \$70,000 grant from the Army, Identizyme is renting space at UNC. Hemmert has been lured away by a job offer, but Redinbo and Edwards will keep Identizyme thriving.

Another Identizyme project could help soldiers before the catch-all antidote is ready; creating a decoder about the size of a credit card that would show color patterns depending on which nerve agents were present. A color key would tell soldiers and first responders which antidotes to take.

Recently, Hemmert and Edwards developed a business plan for Identizyme in the course "Launching a Venture" at the Kenan-Flagler Business School.

"That was one of the best experiences offered at Carolina," Hemmert says. "I don't think that anywhere else I would have had the same opportunity."

Andy Hemmert, former post-doctoral fellow in the School of Medicine, has altered the structure of an enzyme so that it will destroy all known nerve agents used in chemical warfare. Now the U.S. Army is testing it. This story was originally posted as a Spotlight Story on the UNC-Chapel Hill website.

4-Echelon Casualty Management System: A Concept of Operations – James M. Rush, CHPM

A 4-Echelon (4-E) casualty management concept of operations was initially developed by the Israeli Defense Forces for the rapid triage, stabilization, treatment and rehabilitation of soldiers wounded on the battlefield. Originally named the 4-Echelon battlefield casualty management system, it was first used with excellent results during the Yom Kippur war in 1973. In the early 1980's, the US Air Force adopted this concept and the 4-E system became part of Air Force doctrine for casualty management in the event of a general war in Europe. With the current threat of terrorism attacks on America, natural disasters and the possibility of future pandemics, the 4-E concept of casualty care may prove to be the best healthcare model to use in saving lives and optimizing available healthcare resources.

Echelons of Casualty Management:

The 1st Echelon (1-E)- “First-care” is provided by first responders and consists of basic triage (separate the living from deceased) and first aid coupled with the **rapid transport** of the living. First responders rescue, resuscitate if necessary (establish an airway and control hemorrhage) and rapidly transport casualties by helicopter or ambulance to the 2nd Echelon of care.

The 2nd Echelon (2-E)- “Stabilization” care may be given at a trauma center or an emergency department. 2-E care is geared only to saving lives and stabilizing patients. Employing the latest advances in trauma care, 2-E care providers ventilate patients if necessary, control bleeding (perform amputations if necessary), provide medications, infuse blood products and expanders. Once stabilized, patients are rapidly transported to a 3-E Facility.

The 3rd Echelon (3-E)- “Definitive” care is typically given at a hospital or medical center and is the first Level where **definitive** care is offered. This includes a full complement of surgery specialties, diagnostics and follow-on care for about 7 days. Patients that cannot be discharged within a week are normally candidates for 4-E care.

In the early stages of a disaster, a hospital or medical center may provide both 2-E and 3-E care. It is likely that a hospital's 3-E capacity will almost immediately be reached and it will revert to 2-E care only.

3-E facilities may be within a single jurisdiction or may include hospitals in several sub-state regions, Federal regions or throughout America, depending on the number of casualties.

The 4th Echelon (4-E) “Specialty Rehabilitation” facilities are typically used to treat patients requiring more than a week of hospitalization. 4-E care typically include specialty centers

or rehabilitation hospitals capable of providing burn or wound rehabilitation, long term ventilator support, physical or occupational therapy and prosthetics services etc.

Question: Why should hospitals quickly transport stabilized patients to the next Echelon of care instead of admitting stabilized patients?

Answer: Resource conservation. A hospital's greatest asset is its care givers. During a large scale disaster, human resources (especially caregivers) are often stretched to the limits. If hospitals admit large numbers of casualties, the period of time it will take for the hospital to recover will be extended. Also, in order to offer hospital staff the decompression time needed after a disaster, hospitals may have to rely on Per-Diem employees to fill in for normal staff. By spreading out high-acuity casualties throughout a sub-state region or even hospitals in adjacent states, the affected hospitals can recover more quickly and resume normal hospital operations more quickly.

From a reimbursement basis, hospitals with good documentation and patient tracking systems can receive emergency care reimbursements at the 2-E level for very large numbers of patients. Thus, it may make sense from a reimbursement viewpoint for hospitals in the affected jurisdiction to transition very rapidly to 2-E care throughout a mass casualty disaster and until it and its staff fully recover and resume normal care operations.

Conclusion: The 4-Echelon Casualty Management System is a highly efficient and effective model of casualty care. 4-E care was proven in combat and lends itself well to optimizing the saving of life and minimizing patient suffering in a mass casualty environment. This proven system may be the best option for American healthcare providers to use for managing large numbers of casualties generated in future man-made and natural disasters.

Hazardous Materials Preparedness: Training For All-Hazards Response – Shannon Arledge, CDP Public Affairs (article reprinted from www.emsresponder.com)

The recent botched attempt to discharge explosive material in New York's Times Square may leave city leaders across America questioning their own levels of preparedness during an emergency.

The Center for Domestic Preparedness (CDP), located in Anniston, AL, plays a leading role in preparing cities and local response forces to protect, prevent, deter and respond to acts of terrorism or major accidents involving hazardous materials.

According to Captain William Brown, from the Minot Police Department, Minot, ND, the Emergency Responder Hazardous Materials Technician (ERHM) course reinforced situational awareness, identified potential hazards, and emphasized the need to communicate with other disciplines.

"First responders, especially law enforcement, need to recognize the need for enhanced training regarding first response to hazardous materials," added Brown. "Whether it is a chemical spill, train derailment, or a terrorist attack, police officers must recognize the threat is real and their role is vital to ensure any threats to the public are minimized, if not mitigated." He went on to say, "I am now better prepared proactively by recognizing potential threats, identifying available resources, and realizing the need to work collectively with other first responders in addressing methods to impact those events should they occur."

Released earlier this year, the Quadrennial Homeland Security Review Report stated that, among others, the threats and hazards that challenge U.S. interests include "high-consequence weapons of mass destruction." The report further specifies improvised nuclear devices and high-consequence biological weapons would have the greatest potential effects if used against the United States.

New York's recent failed attempt to kill and maim innocent people may be an example of what the "bad guys" are planning, in order to disrupt order, create chaos, and instill fear across the nation.

"The ERHM program is relevant to all responders," said Frank Esposito, acting course manager. "Whether you are a fire fighter, police officer, or emergency medical technician, all response personnel must have an understanding of identifying and mitigating hazards. This course is a response course and we teach first responders to respond properly, save lives, protect themselves, and mitigate the scene."

Among the many courses offered at the CDP for emergency response personnel, ERHM is a five-day class providing responders with a combination of lectures and advanced hands-on practical exercises.

The course introduces response personnel to the terrorist threat, the hazardous materials management system, responder health and safety, the Incident Command System (ICS), site management, information management, response objectives, and terminating the incident. The responder receives hands-on training in identifying hazardous materials, using advanced surveying and monitoring equipment, selecting and using the appropriate level of Personal Protective Equipment (PPE), and performing decontamination procedures.

"It is a busy week of training," said Mike Aguilar, CDP training specialist. "But well worth the time when you consider the importance of having a well trained hazardous materials

technician in hometown America." Aguilar stressed, "The responders from various disciplines attending this course arrive at the CDP with very little or no experience responding to a hazardous materials incident. Graduates of this course return to their jurisdictions better prepared to safely respond to and mitigate a HAZMAT incident including weapons of mass destruction involving chemical, biological, radiological, nuclear, and explosive materials."

In December 2008, the Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism released a unanimous threat assessment which stated: "Unless the world community acts decisively and with great urgency, it is more likely than not that a weapon of mass destruction (WMD) will be used in a terrorist attack somewhere in the world by the end of 2013--that weapon is more likely to be biological than nuclear."

These conclusions make it more evident that response personnel must remain vigilant and skilled with the preparedness knowledge to protect the citizens and cities they serve. ERHM provides the necessary training to prepare response personnel to tackle hazardous incidents.

The CDP is the only facility operated by the federal government for civilian training in Chemical, Biological, Radiological, Nuclear and Explosive (CBRNE) events. The CDP fully funds all training--including airfare, lodging and meals.

The CDP is a component of the Federal Emergency Management Agency's National Training and Education Division in the Department of Homeland Security. The Anniston training center is the nation's only federally-chartered WMD training facility for civilian responders.

Learn more about the CDP at <http://cdp.dhs.gov>



North Carolina Burn Surge Disaster Program Calendar of Events

Advanced Burn Life Support:

October 1st – Greensboro – NC Residents:\$75, all others \$200

December 6th – CapRAC \$75, all others \$200

December 14th – Chapel Hill – Experienced Provider Course
NC Residents \$150, all others \$250

2010 NC Burn Surge Disaster Symposium

The 2010 North Carolina Burn Surge Disaster Symposium will be held at The William & Ida Friday Center for Continuing Education in Chapel Hill, NC on **Wednesday, December 15th, 2010**. Registration will be conducted online,

and began on **September 11, 2010**. To register, please go to www.ncburndisaster.org.

The cost to attend the 2010 North Carolina Burn Surge Disaster Symposium is **\$100.00**. There is an early bird discount (before December 1) of **\$20.00**. North Carolina residents may indicate their discount code of *NCResident* for an additional **\$10.00** discount. Lunch and breaks are included in the cost of registration.

If you are interested in having a booth at this year's conference, please contact:

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Conference and Events

The North Carolina Burn Surge Disaster Program will have a booth at the following events:

- EM Today 2010 – Greensboro, NC *October 3-5*
- 23rd Annual Southern Region Burn Conference – Memphis, TN *November 12-14*
- 2010 North Carolina Burn Surge Disaster Symposium Chapel Hill, NC *December 15*

Please continue to check future newsletters for additional events, and refer to our website at www.ncburndisaster.org for more information. Share these dates with your co-workers and stop by our booth for information, course sign-up sheets, and a chance to win prizes.

Mission Statement

The Burn Surge Disaster Program is about identifying your assets and resources, and both quantifying and qualifying your needs. The gap between what you have and what you need is what we must work to address. The key to success is driven by our need to be prepared through planning, and deliberate actions to improve, develop resources and develop a sense of readiness based on the gap analysis.

Contact Information

When you contact the North Carolina Burn Surge Disaster Program, please include your Name, EMS or Hospital Affiliation, Daytime Telephone Number, and Email Address. All information will be kept private and we will not add your name to any third party mailing lists.

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Important Telephone Numbers:

North Carolina Jaycee Burn Center: 1-800-806-1968
Wake Forest University Baptist Medical Center: 1-800-277-7654

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This is an electronic publication that will be sent out on a monthly basis. All readers are encouraged to send in articles, stories, pictures and comments that they would like to have included to:

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Please remember that all submissions become the property of the North Carolina Burn Surge Disaster Program, and cannot be returned. Proper credit will be given to all authors. When sending a story idea or article, please include your contact information: name, daytime telephone number, and email address.