MCI Success Story

How an EMS system improved its MCI-response strategy through planning & practice

BY EDWARD M. BRAZLE, MPA, NREMT-P

ON SEPT. 22, 2000, EMS, FIRE AND RESCUE CREWS were jolted from their morning routine when dispatch set off alert tones for a mass transit accident. A Virginia Beach (Va.) School District school bus had run off the road in a semi-rural section of the city. The bus driver had over-corrected while trying to maneuver the vehicle back onto the pavement and lost control. The bus rolled onto its side. Amid the wreckage, 40 middle-school passengers and their belongings lay scattered.

PHOTOS STEVE SILVERMAN

may also find it worthwhile to provide initial antidotal therapy (three Mark Is) because you can do so rapidly.

Decontamination: All victims of nerve-agent attack require decontamination. Fortunately, all the principles of standard hazmat decontamination apply. Close coordination with your region's hazmat team will ensure smooth patient handling, effective patient management and thorough decontamination.

Establish a decontamination site in the usual fashion. No special precautions or procedures are needed for nerve-agent contaminants, except to respect the extreme toxicity of the material. Establish stations at the limits of the hot zone to decontaminate patients and equipment. Move decontaminated patients to triage, treatment and staging areas in the cold zone.

Copious water irrigation with a detergent wash is effective as a dilutional decontaminant.[3,5] Use this method as your first choice in many nerve-agent-contamination situations. *The biggest drawback:* the large amount of water needed (approximately 20–40 liters, or 5–10 gallons, per person) and the need to catch, retain and dispose of the waste water.

The standard military decontamination solution is hypochlorite solution (ordinary bleach or swimming pool chlorine). Hypochlorite is inexpensive, relatively safe and readily available. The chief drawback is the need for several minutes of contact with the solution to completely deactivate any nerve agent. Use 0.5% solution for skin and the mask portion of PPE.[3] A 5% solution is used to decontaminate other equipment (except PPE mask). Hypochlorite is never used in the eyes or in wounds. Use plain water (or preferably, sterile saline) for these areas. The hypochlorite method of decontamination is falling out of favor as a primary method of decontamination among many hazmat experts because of its limited effectiveness and the potential to cause skin irritation. It remains a viable option, however, in cases where water is scarce.

Physical removal of the nerve agent using adsorbent material is also effective for decontamination and provides a useful option in some situations. Fuller or diatomaceous earth are effective for this purpose, inexpensive and readily available in bulk.[3,5] Activated charcoal is extremely adsorbent and is a component of the military M291 personal decontamination kit. In a pinch, flour, cornstarch or even earth (dirt) may be used.

Because absorbed nerve agent rapidly bonds to nervous and other body tissues, it's unlikely that body fluids of poisoned patients pose any special risk to EMS providers. Similarly, off-gassing from wounds or the patient's respiratory system is unlikely. Massively contaminated corpses, however, may harbor enough contamination to pose a threat to mortuary personnel.[6]

Conclusion

Nerve agents represent a unique and deadly terrorist threat. By understanding the mechanism of toxicity, symptoms and treatment of these deadly compounds, prehospital providers can mitigate the threat. Prehospital care should focus on airway management and positive pressure ventilation. Early antidotal therapy with atropine and pralidoxime is important. Also, frequent practice drills using full PPE and decontamination resources are essential components of preparation for nerve-agent terrorism.

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SCHOOL BUS

Initial response

When the initial response assignment of four ambulances, three engines, two heavy rescue squads, one ladder and multiple chief officers signed en route with the dispatch center, they learned a fully loaded school bus had overturned. The report indicated multiple injuries.

In my capacity as division chief for the Virginia Beach Department of EMS, I arrived on scene within five minutes and established incident command (IC). I saw a large scene rapidly becoming congested with bystanders, police officers, other school district buses and a TV news crew. The bus lay on its side, partially off the road. Bystanders had already removed the children to a spot on the road's shoulder, 100 yards from the crash site.

Nearly 40 children huddled in a cluster. Some cried, some bled from superficial injuries, but none appeared seriously injured. To gain control of the incident early, I directed all incoming units to stage off site at a nearby intersection until given an assignment. I verified the bus had been completely evacuated, and all children were conscious and alert.

Triage & treatment process

An EMS field supervisor and an ALS quick response vehicle arrived moments later and assumed control of the patients. They deployed a ribbon kit to conduct the primary triage using Simple Triage and Rapid Treatment (START) techniques. Within minutes, the triage officer reported a count of 35 patients. None received a red (immediate) classification and several were classified as yellow (secondary). But most fell into a green (minor) classification during initial triage.

With triage underway, I established the command post and directed crews to the scene. The first engine secured fire hazards at the bus and confirmed victim evacuation.

The second engine company to arrive established a treatment sector. To accomplish this function, personnel placed colored tarps (red, yellow, green) on a large open area of the shoulder across the road from the triage area. An engine from nearby Oceana Naval Air Station assisted with patient care in the treatment area.

By the time I received the first triage report, six firefighter/EMTs had established a patient collection and treatment area and prepared to receive patients. Additional firefighters, designated as an extrication group, assisted with the move-

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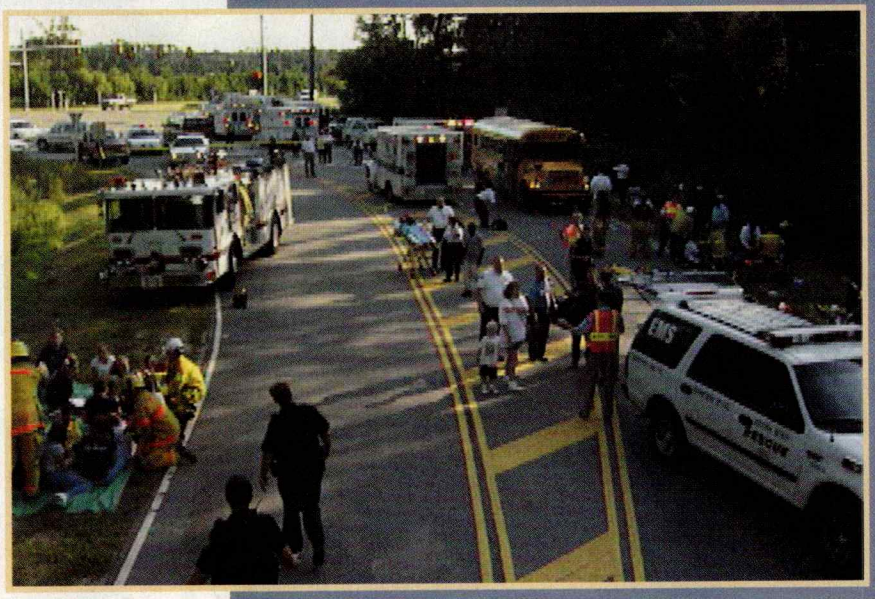

PHOTOS COURTESY VIRGINIA BEACH FIRE DEPARTMENT

Top: The sight of a bus on its side should prompt you to move into an MCI response mode.
Center: When controlling a crowd of bystanders, don't let victims who claim to be uninjured slip away before they can be evaluated.
Bottom: Color-coded tarps can serve a useful function in helping providers identify triage and treatment areas at an MCI.

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It's about time.

MCI Tools

By Ed Brazle, MPA, NREMT-P

Effective MCI management requires special tools. Members of your response system need ready access to basic equipment during the first few minutes of an incident. This helps get things organized from the start. As more specialized apparatus arrives, more unique tools can be added to the mix. The following items have helped make our system successful at MCI incidents:

Each vehicle carries two triage ribbon kits.

Initial triage system

Attaching triage ribbons allows rapid patient sorting and identification. This occurs during initial triage—before placement of standard triage tags. Every vehicle (EMS and fire) has two ribbon kits, often referred to as "triage pom-poms." Each kit consists of 2' lengths of colored surveyor's tape attached to a card. Rubber bands bundle the colored tape (red, yellow, green, black) in lots of 25. The user can remove the bands and let the ribbons hang down from the card. The established number (25) of each color ribbon enables the triage officer to determine exactly how many patients were initially triaged simply by counting the number of colored returned and subtracting that number from 25.

Another rubber band is tied to each card so rescuers can attach the kit to their wrist, belt loop or turnout gear and keep it with them as they move about a scene. In Virginia Beach, we package ribbon kits in Ziploc bags along with a regional MCI plan checklist and grease pencil.

Because providers don't use triage ribbons every day, they may forget to pull them off the vehicle when rolling up to an MCI. To increase effectiveness, store them in a readily accessible location, such as the primary jump bag or cab door pockets.

Incident management vests

Officers assigned to incident management positions must be readily identifiable. Keep labeled vests available for all key positions. The earlier these vests arrive on scene, the better. However, it's not cost efficient to outfit every vehicle with vests for all positions. *Example:* There's little need for ambulances to carry the Landing Zone Manager vest.

It's more realistic to place a basic set of key sector vests on vehicles that will arrive in the first minutes of the event. This minimum set should include: Triage, Treatment, Transportation, Staging, Command and Medical Group vests.

All ALS quick response zone cars carry the basic Virginia Beach vest set. Options for other communities include outfitting one of every three vehicles. Ideally, at least one of these vehicles will arrive on scene in the early stages of any MCI.

Package the vests in a removable container, such as a milk crate. The vehicle operator can then easily deliver them to a single point for distribution. Place complete vest sets covering such important functions as EMS Assistants, Communications, Safety, Landing Zone and Rehab Officer, on command, rescue and special resource vehicles. Once on scene, place removable drawers or cases packed with scene vests in the command post for easy access and distribution.

Vest companion items

Vests alone do not arm an incident manager to properly to manage an incident. Tactical worksheets help guide each officer through the event. The trick is to package vests, reference guides, worksheets and clipboards together so everything is immediately accessible to users.

We package each of our vests with a clipboard. Clipboards are inserted into large plastic document protectors that also serve as sleeves for storing tactical worksheets and position checklists.

One lesson we learned in Virginia Beach—label each clipboard. The position titles were often hidden when the vests were folded. This forced officers to pull apart entire kits to find the appropriate vest for their position. A few minutes of work with a label maker resolved this problem. The title is now clearly defined and identified at the top of each clipboard.

Triage tags

Most EMS agencies carry triage tags. However, they're often buried at the bottom of a compartment. Store triage tags in a convenient area in

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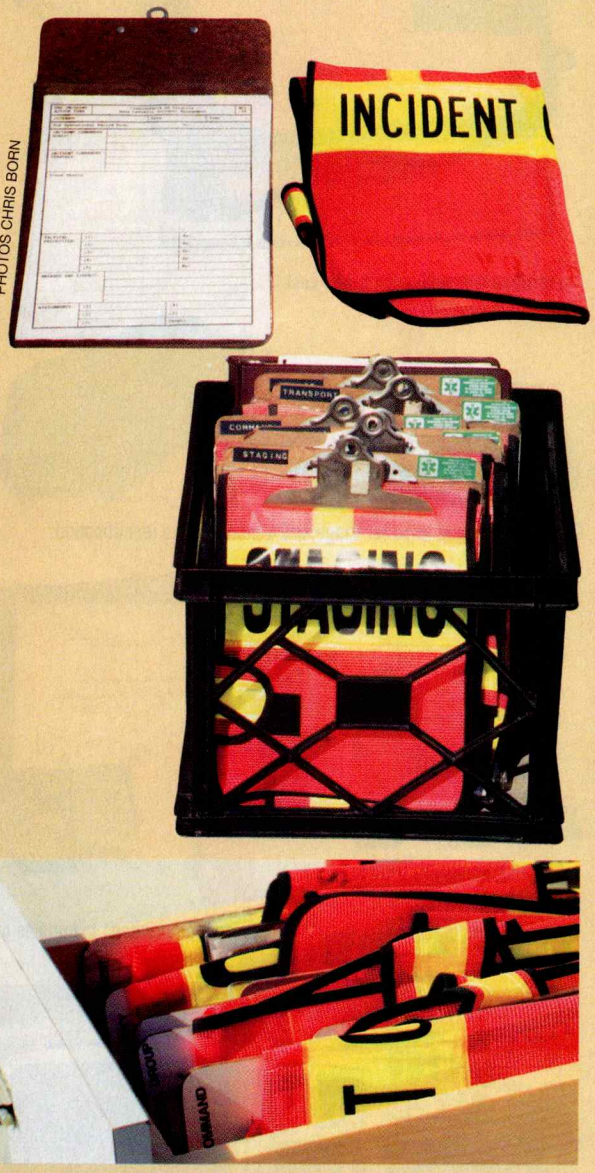


Top: Store tactical worksheets and position checklists with each vest.
Center: Store vests and clipboards in a removable container. *Hint:* Label clipboards at the top so personnel can easily locate the appropriate position package.
Bottom: Vests can also be stored in a removable drawer.

each vehicle. We maintain a cache of tags on each vehicle equipped with ICS vests. Groups of 25–50 tags are kept on the vehicles equipped with basic vest sets, and larger stocks of 50–100 tags are carried on command vehicles and heavy rescue trucks.

To ensure tags are deployed promptly, they must be in the triage officer's hands as soon as the position is established. Because the triage officer needs a vest, it's logical to attach a stack of tags to the triage clipboard.

Store triage tags with each triage vest.

Carry color-coded tarps for triage and treatment area identification.

MCI Kwick Kones are used to identify treatment areas before colored tarps are deployed.

Store triage ribbons in bundles of 25 per color.

Treatment area identifiers

A well-defined patient collection/treatment area is often needed to support care while patients await transport to the hospital. The patient categories should be clearly identified yet separated to eliminate confusion. Colored tarps serve as an ideal way to accomplish this. Tarp kits are strategically located around our system, with one set carried on every heavy rescue unit and EMS supervisor vehicle.

Because the treatment area is often established before the arrival of the tarps, other identification devices can be deployed initially. These include color-coded, numbered traffic cones or MCI Kones (a dual-purpose version of Kwik Kones). These items are small enough for storage on any ambulance and can be rapidly deployed by one person.

Use bicycle cones carried on each heavy rescue to designate the patient flow routes in and out of the treatment area. Crews can deploy standard traffic cones or scene barrier tape as an alternative.

Extra MCI medical supplies

Virginia Beach has a dedicated MCI truck that can support the needs of 50–100 patients. However, events of this scale remain rare. Multivictim crashes or carbon monoxide incidents prove much more commonplace. These calls require more gear than normally carried by ambulances and fire apparatus, but do not require the services of the large MCI truck. To meet the needs of small MCIs, all heavy rescue squads carry an MCI package.

A cache of spinal-immobilization gear, jump kits and blankets for up to 10 patients is available on each heavy rescue squad. Clear plastic containers ensure the easy identification of contents. Multiport oxygen manifolds with 50-foot hoses are also provided. Each truck carries a large, fixed O_2 cylinder, and the portable manifold systems can connect to any ambulance.

To capitalize on these assets, a heavy rescue truck is dispatched to all incidents involving more than six patients. You can achieve the same goal by stocking a reserve ambulance or utility vehicle and having a member of your training or administrative staff bring the unit to a scene.

Having these simple tools in place has had a significant impact on incident management in our community. At every major incident handled by our system last year, the first unit on scene had the capability to conduct rapid triage. As the IC structure grew, the officers had immediate access to vests, tactical worksheets and triage tags. Once extricated, patients were moved to well-defined and well-stocked treatment areas.

With a little planning, limited funding and creative thinking, this type of system can be put in place to meet the needs of your agency.

All heavy rescue squads in the region carry an MCI package containing vest sets, tags, tarps and supplies to support at least 10 patients.

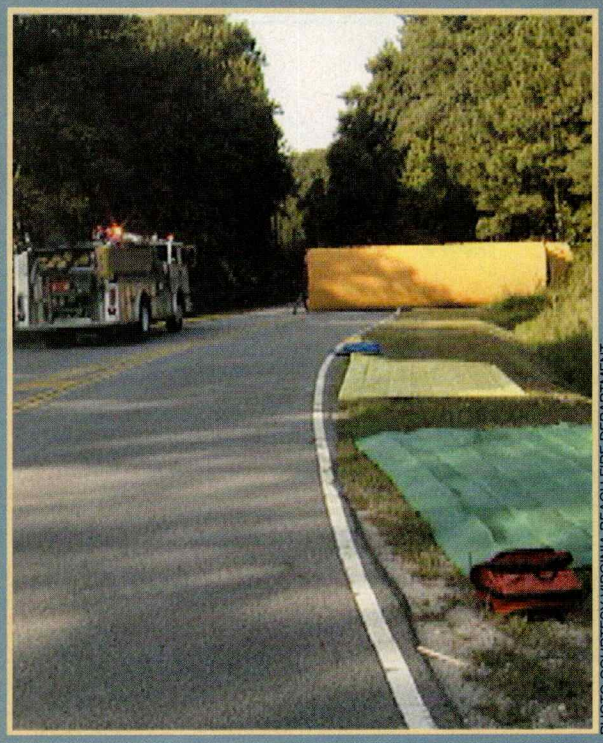


PHOTO COURTESY VIRGINIA BEACH FIRE DEPARTMENT

The placement of color-coded triage tarps clearly identifies patient priority and treatment areas and helps you organize and coordinate your MCI scene.

MCI SUCCESS STORY CONTINUED FROM PAGE 60

ment of patients to the treatment sector.

Just as the equipment from the first-arriving units depleted, two trucks from Davis Corner and Virginia Beach Volunteer Rescue Squads arrived to provide backboards and other supplies from their MCI caches to the extrication and treatment teams. Throughout this initial process, ambulances waited in staging, ready for transport.

Armed with the initial triage data, the assigned transportation officer confirmed the closest hospital, Sentara Virginia Beach General, had the available capacity to accept all patients. He also requested two vans from the Virginia Beach Fire Department fire training center to assist in transporting some of the green-classified patients.

After the triage and treatment teams had completed the simple START process, they extended their efforts to conduct a detailed secondary assessment. The triage officer then used standardized Virginia Triage Tags, stored with his vest in preparation for MCI use. He attached a tag to each patient so assessment teams could note findings and treatments and the transportation sector would have each patient's unique tag ID number for hospital assignment and patient-tracking purposes.

Because no patients had received a red priority, providers first focused their attention on the yellow (delayed) priority patients. Crews marked triage and treatment information on appropriate areas of the triage tags. Providers then packaged and prepared

the patients for transport.

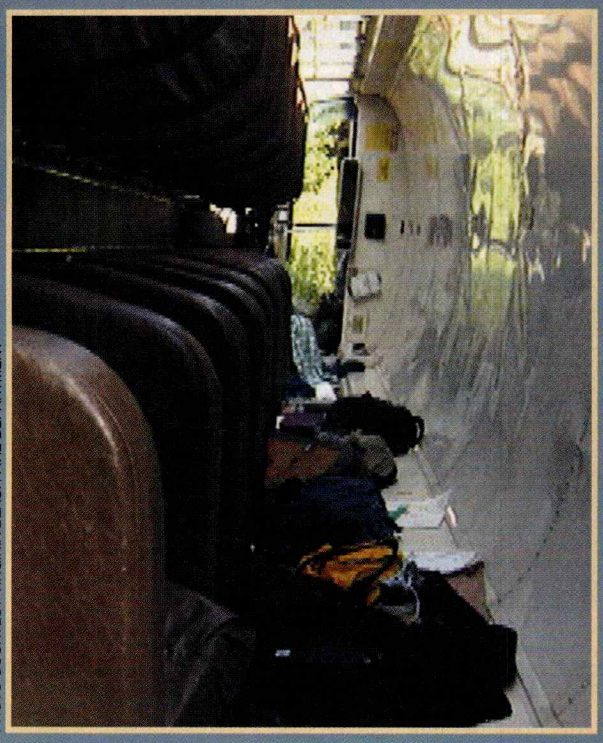
As providers loaded patients into the waiting ambulances, the transportation officer entered key priority, injury and unit data on his log. He radioed a report to the assigned hospital as each unit departed the scene. Thirty-two patients, suffering from a variety of complaints and injuries (from anxiety to fractures), were transported. The entire incident was resolved quickly and smoothly.

Post-incident critique

Although personnel noted some areas for improvement, all participants expressed satisfaction with the outcome. All key IC sectors—from staging to communications—were established in the first 10 minutes of the event. Leadership positions were assigned to both EMS and fire personnel without consideration of their home department.

All key officers wore clearly identifiable vests labeled with position titles. Sector officers used clipboards, checklists and tactical worksheets prepackaged with each vest. All required tools and equipment were immediately available to on-scene personnel. Most importantly, everyone knew exactly what to do from the moment they were dispatched.

At the post-incident critique, the hospital staff reported the call went "better than any drill conducted in the past." This success was no accident. It validated countless hours of work throughout the city's emergency response system.



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The second engine company on scene established a treatment sector using colored tarps. All 35 victims were removed from the bus and placed by triage category into the treatment sector.

MCI planning history

The city of Virginia Beach is served by a unique EMS system. It's the largest city in the country served by an all-volunteer ambulance service. Eleven volunteer rescue squads operate in a unified system to provide emergency ambulance and rescue services on nearly 30,000 calls annually.

Administration, training and operational oversight for the 750 volunteers is coordinated by the Virginia Beach Department of EMS. The Virginia Beach Fire Department has 407 career personnel who provide first response (ALS and BLS) and technical rescue services. Fire and rescue personnel operate in a team approach to provide a seamless continuum of care to our patients.

Like many communities, Virginia Beach once had a stack of old triage tags and a few officers with some MCI training. One of the city's rescue squads even owned a truck stocked with supplies capable of supporting more than 50 patients. We participated in drills and worked under the regional MCI plan. However, the city's EMS and fire agencies had not focused on standardized training of all members, use of an incident management system or stockpiled equipment to deploy at an MCI.

In 1995, a group of volunteer rescue officers attended an intensive MCI workshop. The variety of inexpensive tools and techniques presented to effectively manage a major incident inspired them.

Although senior staff appreciated the program, MCI remained just one of many issues on the plates of our EMS administration. They didn't see the need for vests, triage items, color-coded tarps, cones, or practices such as ambulance vehicle staging. Many old-time fire and EMS officers felt that if you threw enough engines and ambulances at a call, it would resolve itself. However, the spark provided by the MCI workshop ignited a flame of interest in improving our local MCI response system.

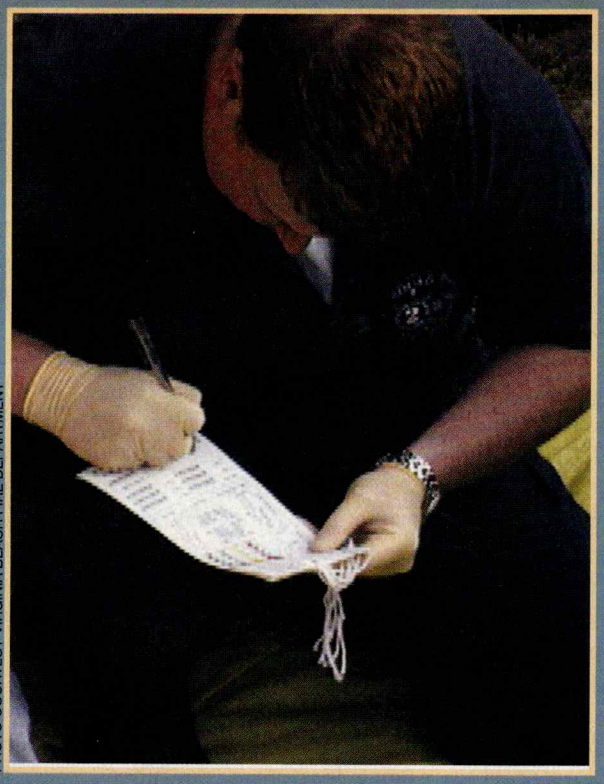
Although many different ideas and tools were available in the system, a unified approach was clearly needed. The Virginia Beach Department of EMS, consisting of city staff and rescue squad personnel, formed a planning committee to tailor procedures and equipment to our community.

The committee agreed early on to keep things as simple and as inexpensive as possible. Over a period of nine months, it conducted research and developed a list of recommendations for an MCI response standard. This standard covered everything from the triage method to the tactical worksheets for the transportation officer. The committee also drafted proposed operating procedures.

The recommendations were packaged into a presentation for the senior officers of the city's EMS department and volunteer rescue squads. Naturally, it raised a number of questions. But the team had done its homework and it provided a thorough package and answers to all questions. Although the city accepted the ideas, the Virginia Beach Department of EMS did not immediately offer equipment and funding. Some administrators still doubted the need for more vests and colored tarps.

Coincidentally, the Virginia Office of EMS unveiled a new MCI curriculum around the same time. The program consists of a basic, two-hour first responder course (MCI Module 1) and an eight hour operations class (MCI Module 2).

Module 1 was designated a required element of the EMT-B cur-



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In addition to being initially triaged through use of colored triage ribbons, all victims were tagged with standardized Virginia triage tags.

riculum in Virginia. The Virginia Beach personnel working on an MCI plan quickly saw this training program as a way to bring their proposed changes to the field. Module 1 became baseline training for all providers. Volunteer instructors taught the sessions needed for the large number of volunteer rescue crews. The fire department reached all career members by integrating the program into annual in-service training.

As part of Module 1, students learned the role of the first unit on scene and patient triage techniques. Enthusiasm began to build. People started to see the need for more incident management tools. More vests began to appear, and agencies bought triage tarps. Members offered to make triage ribbon kits.

However, all the MCI tools didn't mean a thing without practice. And a misconception had to be unveiled. Many officers believed the *toys* were only needed for major events. They saw little need to assign sectors or wear vests at day-to-day incidents.

Because the skills weren't being used, member interest and proficiency waned. When the rare Big One came along, crews forgot the basics. Freelancing and confusion became commonplace.

In response to this, the EMS leadership placed a new emphasis on using the IC procedures and tools on *all* calls. Chief officers were encouraged to assign key ICS positions whenever possible at smaller events. Leadership challenged everyone given a scene responsibility to wear the appropriate vest.

At first, some of the more seasoned members laughed at this. However, it quickly became obvious that calls ran more effectively when crews used the system. Crews started asking for assignments instead of freelancing. Communications improved. The more we played the game on smaller calls, the better we became.

With interest growing in better incident management, the system raised the bar. Agencies equipped each heavy rescue squad

with a basic package to establish a treatment area. They placed a set of ICS sector vests accompanied by clipboards and tactical worksheets for each position in each ALS response car and squad truck. The Virginia Beach Department of EMS purchased a Ford Expedition and equipped it to allow the EMS supervisor to provide more supplies and communication capabilities than possible from the trunk of a sedan.

Fire and EMS officials focused on more advanced MCI training. An old bus was placed at the fire training center and filled with manikins. As part of a multi-company in-service, all fire companies, battalion chiefs, EMS supervisors and volunteer rescue personnel cycled through scenarios involving the bus. Everyone got a chance to work through an MCI scenario and practice with triage tape, ICS vests, triage tags, color-coded tarps, etc. Even the federal firefighters serving the three Navy bases in Virginia Beach received the training. These exercises proved a crucial element in our successful handling of the September bus accident.

Today, we expect any member—whether volunteer or career—to have the same level of MCI training. And any officer, regardless of their home department, can fill any leadership position in the field. This has proven an asset at emergencies handled on a daily basis.

Although we challenge the system on a regular basis with drills, the key to the continued program success remains the organizational focus on proper incident management. We start members early by teaching the MCI Module 1 course as part of their basic EMT training. We routinely offer additional classroom training, including advanced EMS IC courses for officers. Next, we stress that everyone must use the IC system and tools to their fullest extent. It's now second nature for leaders to use the vests and tactical worksheets. All personnel know how to rapidly triage patients. The process has become routine, whether assessing four or 40 patients.

MCI readiness in Virginia Beach did not happen overnight, nor did it come without a price. Each department made a significant manpower, training and financial commitment. We spread the process and costs over time.

The equipment, training and operating practices by no means remain static. We continually evaluate the effectiveness of our program. We review larger incidents and roll lessons learned into future training programs. In fact, the September bus crash showed that we must work harder to integrate police and school officials into our IC structure.

At the time of the bus incident, the police department and school district had not been officially incorporated into the unified command process. *Our goal:* Have a senior police officer and a school official respond directly to the command post and remain there throughout the event.

The big picture

The process used in Virginia Beach can be applied in any community. Although your agency may not stockpile vests and triage tape, you can use a simple approach to get organized. First, assess your current capability. What equipment do you have, and how do you distribute it? Apply this capability to an

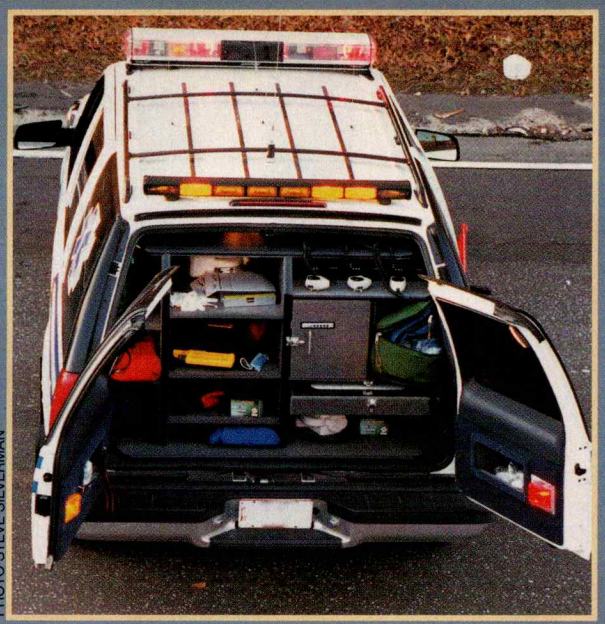

PHOTO STEVE SILVERMAN

The Virginia Beach Department of EMS purchased and equipped a supervisory vehicle similar to the one shown here. The vehicle carries extra MCI supplies and has enhanced communication capabilities.

MCI scenario. How would you respond to a 30-plus person bus crash? How will you conduct triage? Do you have a system in place and the necessary supplies to build a treatment area? This analysis will provide a true picture of your agency's status.

Immediately maximize what you already have. Does your agency have an old utility truck, ambulance or brush truck you can stock with MCI gear? Can your office staff spare a few clipboards to store with your vests? Do you have extra salvage covers you can use as triage tarps? The next time you order salvage covers, order a few red and yellow covers and place them with your existing supply of green tarps. Organizing these assets will show all members your department values good incident management practices and MCI readiness.

Finally, build a plan for the future. This requires both field and staff personnel involvement. Find members with an interest in MCI management. They'll already have a good MCI knowledge base. With a little coffee and organizational support, they'll produce a comprehensive plan. Be realistic. Ensure budget constraints are clear from the beginning, but prepare to spend a little money over time. Build interest throughout the organization by showing how these new ideas will make scene management and patient care easier on all calls, not just the Big One.

Throughout the entire process, integrate the equipment and procedures into your regular training and daily operations. Encourage triage exercises as part of daily drills. Build everyone up to a large-scale exercise. Unless your personnel see the principles in action, they'll forget the IC system. When the critics say, "It will never happen here," point out the next bus that passes your headquarters and ask them, "Do we have what it takes to manage a crash five minutes from now?"

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Easy-to-use resource directory of MCI and weapons of mass destruction equipment & supplies

COMPILED BY DAN MACK

The *JEMS* "2001 MCI Resource Guide" is the one-stop source for agencies and individuals seeking products or services in preparation for mass casualty incidents (MCI). The first section, categorized by product type, allows you to search for companies that make specific MCI supplies and equipment (p. 74). The second section, an alphabetical company listing, provides company contact information and a brief description of equipment they sell (p. 77). *Note:* The information contained in the guide was obtained directly from surveys submitted by the listed companies. Every effort was made to ensure the accuracy of the information.

PHOTO STEVE SILVERMAN