Grandstand view of a spectator area at the Pennsylvania 500 at Pocono Raceway.

Paramedic Joe Panczer, working in the track operations/race control tower, oversees the movement of EMS units at the ground level and on/off track.
Preparing and planning for mass casualty incidents (MCIs) has been a high priority in Eastern Pennsylvania for quite some time, with regionwide disaster operating guidelines in place since the 1980s, plus a sophisticated regional MEDCOM communications system that links 144 EMS services, 16 acute care hospitals and all major EMS dispatch centers throughout the six counties served by the Eastern Pennsylvania EMS (EPAEMS) Council. So the opportunity to participate in a pilot program with the latest patient tracking technology that allowed instant identification and tracking of patients and EMS crews was quickly identified as yet another tool to add to the region’s cache.

Pilot program launch
In April 2006, the EPAEMS Council agreed to be the pilot region for a sophisticated program designed under the direction of Joseph Schmider, Director of the Pennsylvania Department of Health, Bureau of EMS, and Beth McAteer, preparedness manager.

EPAEMS Council Director of Operations John Kloss was tasked with assembling a project team, which included representatives from Salamander Technologies, Card Data Systems, EMSystem, Med-Media and other technology solution providers. Their goal: To develop a patient-tracking system that would be capable of tracking and coordinating patients attending the Pocono Raceway in Monroe County for the Pennsylvania 500 NASCAR race, and the EMS personnel operating on site.

Obstacles to overcome
With 225,000 fans anticipated to be in attendance over the course of the four-day operation, the project team needed to prepare to encounter and track a high volume of patients. Establishing a tracking system that would function at a venue of such size, which consisted of expansive grandstands and massive structures on its grounds that posed communications issues, while simultaneously broadcasting data to multiple on- and off-site facilities, was a challenge the team felt they could overcome.

The first task the team faced was linking the prehospital and hospital personnel on-site with the three off-site hospitals (one serving as the primary trauma center for the race); the on-site, multi-agency communications center (MACC); and the control tower for raceway operations. The MACC would serve as the central command and control center for local, state and federal agencies, such as local EMS and fire agencies, Air Medical Operations, the Department of Transportation, and teams from the FBI, ATF DEP, EPA and CRT.

Hospital integration
With the June event completed, the team established a working relationship with each hospital’s emergency department (ED) and information technology department. On receiving approval to establish special EMS Internet connections within the EDs and after ensuring security and HIPAA issues were addressed, the team moved on with developing Web-based training for each ED staff. This training focused on familiarizing staff with the project Web site, the information that would be transmitted by the patient-tracking system and how they could best use the data transmitted to them.

Scanners deployed
The next challenge was to determine the amount of equipment needed to outfit
EMS and on-site hospital staff members. Project planners had to equip 17 on-site EMS units, two pit teams, a command module located within the infield care center, four grandstand response teams and three fixed field hospitals.

Two hand-held scanner models were selected for use: FireTRAX COMMAND for the on-site data collection and transmission to the server, and medTRAX MC 9000 units for the transmission of patient data to receiving hospitals.

Off-site, the project team’s computers accessed a secured Web link to provide important locations with the ability to view data and EMS activity from the raceway in real time. The off-site facilities included Eastern PA MEDCOM, Pocono Medical Center, the raceway’s Multi Agency Communications Center (MACC), Lehigh Valley Hospital—Cedar Crest and Geisinger Wyoming Valley Hospital.

On-site training & orientation
Three days prior to the race, the project team began training the initial EMS personnel assigned to staff the event on the purpose of the patient-tracking system and its associated equipment. Working in small groups, technicians from the support teams assigned a hand-held device to each EMS provider and gave a 45-minute system and equipment orientation program to each group. This training continued through Sunday as new personnel reported for work and continued on an as-needed basis to meet the needs of the team.

To ensure everyone was comfortable with the technology, project technicians (wearing bright orange accountability vests and equipped with portable radios) were immediately available to provide assistance to EMS and on-site hospital personnel. The technicians were dispatched by project commanders from a secured RV in place on the racetrack infield.

To operate in conjunction with the raceway’s existing disaster plan, which included pre-designated triage areas, the project team positioned additional scanners and triage tags in a central location and developed a protocol for the dispatch of technicians to assist in patient tagging in the event of an MCI.

The project team was initially concerned that EMS providers unfamiliar with the system would be skeptical of the program. However, the team found that crews readily accepted the new technology, showed great enthusiasm for the project and quickly developed relationships with the pilot project staff and technicians.

Initial system testing
The team planned for the patient-tracking system to go live on Saturday, July 22, at noon. However, a heavy rainstorm delayed on-track events and presented unworkable conditions for the project team. They realized that the rainstorm would lower attendance and the anticipated patient contacts. At previous races, crews had typically encountered in excess of 300 patients.

Following the storm, the system went live and continued to function with minimal difficulty through the close of operations at 7 p.m. on Sunday.

Bar-coded triage tags, wristbands and self-adhering labels were deployed and...
used to meet specific needs of providers and patients. For instance, to meet the region’s data-capturing needs and balance the needs of the guests attending the event, EMS used standard-size triage tags for most patients. Those who didn’t receive a standard triage tag had a bar-coded wristband applied. And race spectators who walked into the fixed treatment facilities were assigned the self-adhering bar-coded decals, which were affixed to them on-site and to their receiving hospital paper records.

The bar-coded tags, each with a unique number, were placed on each patient record generated during the event. During initial contact, each patient was triaged, had a bar-coded triage tag or band secured, and was scanned with a hand-held unit. Field providers then gathered initial data, which consisted of the patient priority, location and chief complaint. This information was then synchronized with the Command Module, thus affording the command structure the benefit of viewing patient activity on a global basis as the event unfolded.

This approach facilitated a seamless process once the patient entered the standard-size bar-coded triage tag and triage wristband, each with six identical bar codes for placement on official records, patient belongings or wristbands of family members, to assist in uniting them with the patient later.
on-site hospitals. With the patient already identified by bar code, additional duplicate-numbered decals could be adhered to belongings and family member records for cross-referencing, and provided to prehospital personnel when a patient required transport from the raceway.

As patients were moved from an incident location or treatment area to one of the three fixed, on-site facilities, each had their status re-triaged and re-scanned to represent their present medical needs. The bar-code system enabled officials to easily obtain and reference updated patient information throughout the operation.

**Coping with interference**

The only challenge crews experienced involved delayed synchronization of handheld units from a few areas around the facility because of competing signals. During Sunday’s main race, crews were up against a barrage of RF signals, wireless networks and signals from more than 30 race team satellite dishes directed right at the system’s antennas. Staff repositioned antennas to better serve the project’s needs. These competing signals caused some minor delays, but at no point did the system fail and, although data transmitted was occasionally delayed, none was ever lost.

As the weekend progressed, various operational components of the system were also changed to meet the needs of the team. On-site facilities readjusted their routines to include one staff member to coordinate initial patient registration and bar coding, and assigned another to coordinate patient discharge.

Once determined that a patient would be transported off-site, personnel at the on-site facility would simply re-scan the tag. This patient transfer was referred to as an additional “transaction” with the patient. When the bar code was re-scanned and the destination entered into the hand-held unit, the receiving facility instantly received notification of the patient assigned to their hospital.

Throughout the three-day test of the system, more than 100 EMS and on-site hospital staff members were involved in the project, with 202 of the patients assessed and treated by on-scene physicians and support staff. Sixty percent of these patients were processed for care as a part of the patient tracking program.

**Conclusion**

The management of large patient encounters and MCIs requires an effective system to track victims and responders, on- and off-site. The education, communication and cooperation of all personnel involved with this pilot program were keys to its success. Technical issues encountered during the project’s implementation were overcome and project organizers were able to easily incorporate the system into this large, special-event operation. They also recognized the potential for further utilization of this new technology and integrating it into their region’s EMS communications components.

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