MCHB/EMSC Webcast

Making Trauma Systems Work for Injured Children –

EMSC Performance Measures Can Make a Difference

September 27, 2006

DAN KAVANAUGH: Good afternoon. Making trauma systems work for injured children. EMSC performance measures to make a difference. My name is Dan Kavanaugh, senior program manager, I will be functioning as your host and moderator for this webcast. Today's webcast focuses upon a major challenge faced as they try to develop emergency systems for care, and pediatric trauma. Pediatric injury continues to be the number one killer of children. Emergency response and care as well as trauma systems that plan for and incorporate unique needs of children will make a difference in the mortality and morbidity of trauma victims. Objectives, one, discuss pediatric field triage and transfer to the appropriate resources, second objective, define the role of online and offline medical direction in the initial treatment and transfer to appropriate resources. Thirdly, describe a system process that assures appropriate resources are available for all critically ill and injured children. And lastly, to discuss critical components of pediatric trauma and care that contribute to improve outcomes for children. We have three experts to join us to share information.

Before I introduce the speakers and move into the presentation I have a few housekeeping details to share with you. First of all, slides will appear in the central window and should advance automatically. Changes are synchronized with the speaker's

presentations. You do not need to do anything to advance the slides. You may need to adjust the timing of the changes to match the audio by using the slide delay control at the top of the messaging window.

We encourage you to ask the speakers questions at any time during the presentation. Simply type your question in the white message window on the right of the interface, select question for speaker from the drop-down menu, and then hit send. Please include your state or organization in your message so we know where you are participating from. The questions will be relayed to the speakers periodically throughout the broadcast. If we don't have the opportunity to respond to your question during the broadcast, we will email you afterwards. Again, we encourage you to submit questions at any time during the broadcast, and during this broadcast where -- we will be holding them to the end for all the three speakers. So the questions you submit, I will hang onto them and asking the questions to them once all three have completed their presentations.

On the left of the interface window, on the left is the video window. You can adjust the volume of the audio using the volume control slider which you can access by clicking on the loud speaker icon. Those of you who selected accessibility features when you registered will see text captioning underneath the video window. And at the end of the broadcast, the interface will close automatically and you will have the opportunity to fill out an online evaluation. Please take a couple minutes to do so. Your responses will help us to plan future broadcasts in this series and also to improve our technical support. Now I would like to introduce our three speakers for this afternoon's presentation.

The first you will hear from is Dr. Marianne Gausche Hill. Director of EMS and pediatric emergency medicine fellowships in Torrance, California. Second speaker is Evelyn Lyons, a nurse, and holds a masters in public health. EMC manager for the Illinois department of public health EMS and public safety. Marianne will be introducing the topic and discussing prehospital challenges and care. Evelyn will continue with discussions regarding care incorporating challenges and potential solutions in the emergency department. Our last speaker on the webcast is Dr. David Mooney, the director of pediatric trauma at Children's Hospital in Boston. And David is joining us today from Italy. Maybe someplace where others of us would like to be. David will be sharing information regarding pediatric trauma practices and those activities that evidence supports which are impacting outcomes in children. As each of our speakers present, be sure and note questions you would like them to further address and we should have about 15 to 20 minutes for questions and answers at the end of the presentation. The first presenter we are going to hear from is Dr. Gausche Hill.

MARIANNE GAUSCHE HILL: This is a pediatric trauma EMSC webcast, Marianne Gausche Hill. Welcome. The objective is to provide states with background materials illustrating delivery of essential pediatric trauma care utilizing four components of defined EMSC performance measures. Let's go over what the performance measures would be. One is prehospital provider agencies have online and offline medical direction at the scene of an emergency. Two, prehospital provider agencies have essential pediatric equipment and supplies as outlined by national guidelines. Three, existence of a statewide

territorial or regional standardized system that recognizes hospitals' capabilities of stabilizing and/or managing pediatric emergencies. And inter-facility transfer agreements that have capabilities to meet the clinical needs of critically ill and injured pediatric patients. Let's begin with our scenario.

Monday, early September, the parent carpool has just picked up the last rider. Four children seated in a van and the vehicle has come to a stop at the bottom of a hill. An 18-wheeler truck trailer is coming down the hill when the driver realizes the brakes are out. The truck then plows into the back of a van at full force, tossing the children forward and considerable force and impact on the vehicle. Upon impact the children in the last two rows are thrown forward as I stated onto the floor, and the front of the truck has intruded into the back of the vehicle. Five persons in the vehicle, we now have five patients. The driver is walking frantically, being the adult, and pointing at the van upon EMS arrival. There were four children in the van. What are the emergency care resources in this scenario? That's going to be important to evaluate how we move forward in terms of triage, transport, and what destination the children will be sent to? There is one paramedic and one EMT staffing.

The paramedics typically contact a regional base hospital for destination and online medical oversight or medical direction. There is a community hospital within ten minutes of the accident. With an emergency department and the nearest trauma center, level three, 15 minutes from the scene. A level one trauma center 25 minutes away by ground, ten minutes by air under the best of circumstances. Let's talk about our patients in our

scenario. The driver is ambulatory and appears unhurt as this person was in the front-most part of the van the children in the rear, let's go over what their injuries. Patient one, this patient was unrestrained and was thrown into the aisle striking her head. She currently is alert and responsive, but clearly has suffered some head injury. Patient two has a left upper leg deformity and he is also alert. What about patient three, patient three receives a full force of the truck in the back of the van, is apnic.

Patient four, pinned between the back door of the van pushed in by the truck bumper and the back of the middle seat. His chest is compressed and respirations are slow and shallow. Unresponsive and a large scalp laceration which is actively bleeding. So we have one obviously critical patient, one possibly dead patient, and two mild to moderately injured patients. What about trauma triage? Obviously this is a multi-casualty incident, and when we define that, it's generally that incident in which there are a number of -- the number of victims overwhelms the capabilities of either the immediate rescue, the EMS service that, service or services that respond, or the EMS system in total. So it could range from a few patients to hundreds of patients. Triage for pediatric patients in the setting is somewhat complex, and generally what is done is there is a balancing of what EMS resources are available to care for those patients with the patients medical, immediate medical issues.

What are the injuries that are sustained and again, what resources are available? What often happens are emotions are high, meaning the providers who come, very difficult to triage children without feeling some anxiety and emotional bond to those kids. So what

kind of resources do we have available? There is -- most EMS systems use something similar to the simple start triage. There is a pediatric modification of simple start triage, called Jump Start triage, and this was a great tool, I have the web site listed for you. Dr. Romig, a pediatric emergency medicine physician from Florida developed this, and it's really a modified trauma triage system for pediatric patients in a multi-casualty incident. And the diagram that you see there shows the jump start. And let's try to go through it a little bit more carefully. The way Jump Start works, any patient able to get up and walk is considered minor. And there would be secondary triage, additional resources could be brought to care for those patients. If the patient, then you move down. If the patient is breathing, then you need to know is the rate either too slow or too fast. Remember, rates that are too slow or too fast can indicate potentially respiratory failure in children. And if they are too slow or too fast, those patients are deemed immediate. If there is no palpable pulse and the patient does have a respiratory rate, those patients are also deemed immediate. And also if you move further down on the scenario, those patients with alert, verbally responsive, responsive to manual stimuli or unresponsive, they are considered immediate, alert, verbally responsive or responsive to painful stimuli may be slightly delayed in relative to the other patients.

So we are going to work through our patients using the Jump Start triage, and I think that will be extremely helpful. Some EMS systems like my own in Los Angeles County uses Jump Start has used it to meet our needs and our resources available. So issues in resource and triage, again, other resources are generally needed to care for patients at the scene. We know that, and this is true in this instance. If we have one rescue that

responds, one paramedic and one EMT basic, they clearly do not have the capability or the resource, they don't have the resources, that is, personnel and equipment to manage all those patients simultaneously. It would be quite difficult for them to do so. So other resources need to be called in. So EMS dispatch contacted to alert the system of possibility of multiple patients, and that should be early on so there's time for resources to get to the scene. What about the triage authority? The immediate authority is going to lie with the responding unit. They are responsible for triaging those patients appropriately and deeming which patients they are going to really target their resources to resuscitate. So it's a rapid assessment of patients in the truck and the van.

Patients who are alert and responsive generally such as in this scenario may be triaged after the two patients who are unresponsive. And they immediately know two patients are alert. They can wait for a period of time where they deal with the unresponsive patients and use those patients appropriately using Jump Start later on and the incident command center, if initiated, would have the overall authority. Appropriate transfer of patients to local destinations which are going to include community hospitals, level three trauma center and the level one trauma center. So what are our triage decisions with these patients? Patients one and two using Jump Start are alert and breathing normally, although they are not able to walk, they are not immediately considered minor. So they are going to, if they are breathing, yes, they do not have respiratory distress, alert, they would be in the delayed. And you can see there is a block circle.

>> A block circling the delay using the Jump Start algorithm. Patient three, position ahead and using a jaw thrust maneuver, you want to see if the airway is open, does the patient spontaneously breathe. In this case no, and no pulses are present. This patient would be triaged as deceased and no further personnel or other resources at least in the initial phases of resuscitation would be dedicated to this patient. This is probably one of the hardest thing for a medic to do. We'll say that it is important to understand that children who are victims of blunt trauma full arrest really have essentially a zero survival rate if they do not begin breathing with the simple jaw thrust maneuver. For patient four, respiratory rate of less than 15. The patient is unresponsive, and this patient would be triaged as immediate. So this is the patient in which the resources should be targeted at this patient and both providers would probably initiate extrication of the patient given that they are pinned against the seat, and treatment should proceed rapidly.

As you can see, I have circled on the Jump Start algorithm where the patient would lie and with all the criteria listed there, the patient would need immediate criteria for initiation of resuscitation. All right. What about treatment for this patient? First of all, after extrication of this patient, patient four, assessment and treatment should proceed in a logical sequence. And that's something that needs to be practiced, and certainly being involved in patient scenarios and continuing education will help to hone those skills. Some of the things we think about are the pediatric assessment triangle, developed as part of the pediatric education for prehospital professionals' course. There's a diagram of the pediatric assessment triangle. Again, part of the course. And what you see is that the pediatric assessment triangle would proceed. It's a visual assessment of -- we certainly understand

if the child is sick based on the triage, and then we move to our continuing with our initial assessment.

We know that the patient is unconscious. We know the patient has slow respirations, color is pale. When you put this together, we have the triangle, altered appearance, altered breathing, although work of breathing, there's no retraction. The patient is breathing slow, certainly of concern. And then circulation appears poor profusion to the skin. When we try to form our general impression which is going to drive our management priorities, we see that there are six essential categories using the pediatric assessment triangle. Obviously this patient isn't stable. They are not in respiratory distress but show signs of respiratory failure and shock. Both of those are highlighted. CNS metabolic, for those patients who suffer a single head injury or have a metabolic issue, such as hypoglycemia, and there are abnormalities in both respiratory failure and shock. How do we begin, knowing the patient has signs of respiratory failure, position the head stabilizing the spinal column and begin assisted ventilation as rapidly as possible with 100% oxygen?

Preferred method is bag mask, squeeze, release, release, and avoid excessive hyperventilation. In the interest of time, I'm not going to get into the medical issues here, but I can refer you to the original paper on this, which I did as a principal investigator of a large clinical trial or controlled trial in airway management of children, and I have the reference listed for you. In addition, recent guidelines published in pediatric critical care medicine in 2003, states that prehospital airway management, administration of oxygen is key, hypoxia is to be avoided, and something to keep in mind. Patient four, initiate the final

stabilization as I indicated, direct pressure on the bleeding site. Patients one and two could be treated by additional rescues arriving at the scene. In terms of assessment and treatment issues, local and regional EMS agencies should establish protocol for assessment and treatment. There are national resources available such as the national association of EMS physicians who have published in 2003 model pediatric policies, and I list the web site for you. In addition, there's other educational resources that could be used to help drive your local protocols or treatment protocol, and those are listed on the slide as well. What about oversight?

Certainly both offline, okay, offline and online medical direction or oversight are going to be key. When we talk about offline, those are the protocols, policies, treatment, etcetera, established prior to patient interaction. Such as getting the appropriate pediatric equipment for ambulances, also there would be a role for pediatric expertise within EMS systems. The recent IOM report which was released in June of 2006 states as one of the recommendations that EMS systems should establish a pediatric coordinator to help in really offline medical direction, in terms of planning, quality improvement, etcetera. Offline is absolutely critical for initial triage in medical management. Patients in this scenario, as those protocols need to be in place prior to a multi-casualty incident, and all providers need to understand what those protocols are. How about equipment? We have talked briefly about them.

There are some national guidelines available. In this slide I do have some resources for you. One is through the American college of emergency physicians, and American college

of surgeons. I list the web site for you as a resource. In addition, Dr. Seidel and others through a multi-disciplinary committee as part of an EMS fee project looked at guidelines for equipment and supplies and ambulances. And that's published in the emergency medicine. Realtime interaction of physician or designee with EMS providers caring for the patient is online medical direction. In addition, when the paramedics call a base hospital and get further medical direction, as well as destination decisions, this is also considered online. So there's really variable use of online medical direction within EMS systems. But some resource, or a resource available for online medical direction may assist with complex medical issues and destination decisions, especially in a scenario like this, which is a multi-casualty incident. For the transport physicians, one patient is going to be left at the scene, that is our deceased patient, number three. And the other three patients are going to require transport from the scene. We are going to address these in the last moments of my presentation.

What are the special issues in transport decisions for these patients? Should all the patients go to a closest receiving facility or local community hospital, and which patients should be transported to the level three versus the level one trauma center? Okay. In terms of the transport decision, two patients with mild to moderate injury have potential for deterioration. They could potentially be transported to the local community hospital or to the level three trauma center, depending on the resources available. There is one critical patient in respiratory failure and shock, and on scene is limited. Transport is key. Should all go to the closest receiving facility, the community hospital? I would say no. If three injured pediatric patients could overwhelm a small community hospital, and community

ED, it's important for you to understand which may see an influx of visitors in their region, such as in the summertime or winter, depending where you are located, should really plan for the possibility of surge of pediatric and adult patients.

Large numbers of pediatric patients should be part of the plan. Which patients should be transported to the level three versus the level one? It's based on your, on mechanism and if physiology, and it varies between systems. Typically those with a mechanism -- a high mechanism such as this, or alterations would be triaged to a trauma center. So really pediatric issues need to be addressed. And patients with extremists, or airway obstruction who may deteriorate if not immediately transported to definitive care could go to the local hospital or the level three trauma center. I will state that for the most critical patient here, since it's not an immediate airway issue, they are bagging, however, if there's no airway obstruction one might opt to take this patient to a trauma center because there is some evidence that patients with severe traumatic brain injury should be treated in a pediatric trauma center or adult trauma center without qualification. So the patient four would go to the trauma center. Really the goal is for regionalized coordinated EMS systems that really seamlessly triage and transport all patients, including pediatric patient, to the appropriate level of care. This requires planning and practice within those systems. All the receiving facilities should have staff, equipment, medications, and supplies, and also protocols, to be able to care for pediatric patients.

A reference for those preparedness guidelines is you can get at either the web sites, and in addition published in 2001 Annals, and it's care of children guidelines for preparedness,

and that's an excellent resource for hospitals to know what equipment and protocols they and staffing need in place to be ready to care for the pediatric patients who present such as in this scenario. Thank you.

EVELYN LYONS: The scenario described in the previous presentation should emphasize that all emergency departments need to be well prepared to handle pediatric emergency care needs. Children comprise nearly 30% of all ED visits. In 2002, which is the latest year that we have available of national data, it translates into over 29 million emergency department visits by children and adolescents across the country. Approximately 43% of the visits were trauma-related. It's important to note that most children initially present at general community emergency departments which typically are unlikely to get certain pediatric resources and supplies which may be needed. This should emphasize to all of us the need to ensure all of our emergency departments are appropriately prepared.

Next slide. How prepared are EDs for children? Parents and caregivers expect emergency and trauma care providers to handle any type of pediatric emergency appropriately. The reality is that across our country we have wonderfully dedicated EMS and emergency personnel sometimes working without the resources that would be expected to be available in caring for children. Institute of medicine released a report this year that cited several areas, one of which was pediatric equipment and supplies. In 2001, the American academy of pediatrics, in conjunction with the emergency college of emergency physicians developed a list of pediatric equipment and supplies that emergency departments should have in place to be prepared to handle the needs of children. As seen

on this slide, only approximately 6% of hospitals have all these supplies. About half of all hospitals have at least 85% of the supplies. Transfer agreements are another issue. Having a prearranged process and mechanism in place to expedite moving children to a higher level of care is critical. However, in a recent study when researchers looked at hospitals that do not have separate pediatric inpatient units, only half of these hospitals had a formal written transfer agreement with another hospital. And although much work has been accomplished over the past several years, related to this preparedness, many disaster plans do not take into account pediatric specific needs.

Next slide. Providing quality pediatric emergency and trauma care needs, well coordinated infrastructure based on scientific evidence and system performance. The 2006 institute of medicine report cited a number of literature references that demonstrate areas that we can clearly work to improve upon. In particular, in the areas of pediatric medication errors. Pediatric pain management. Consistency in pediatric practice patterns. Under treatment of children. And missed cases of child abuse. There is much we can learn from the findings from these and other studies.

Next slide, please. One very timely study that was recently published in pediatrics set out to characterize the quality of stabilization efforts in emergency departments in North Carolina. This was a prospective observational study of mock trauma simulation conducted in 35 emergency departments, five of which were trauma centers. The findings from this study identify the need for improvement in five specific task areas during a pediatric resuscitation. And these were estimating a child's weight, preparing for needle

placement, ordering Dextrose properly, correctly applying warming measures in a hypothermic child. These are areas we can all learn from. It's been information from these and other studies that the institute of medicine utilized in developing the report on emergency care, which identified the need for regionalization or categorization system for EMS, EDs, and trauma centers. Just as trauma centers are categorized according to their capabilities, they recommend a standard national approach so the categorization of emergency departments that reflects both adults and pediatric capabilities. These recommendations echo very similar recommendations that were made in an earlier institute of medicine report that was released 13 years ago in 1993.

Next slide, please. The concept of facility recognition or categorization has been long advocated by the national EMSC program. And beginning this year, EMSC has implemented several performance measures that each state EMSC program must begin to work towards meeting over the next five years. There are several other EMSC performance measures, but I'm going to focus specifically on the three measures that appear on this slide, which adapt, which include the adoption of a facility categorization system, along with implementing transfer guidelines and transfer agreements in each state. These performance measures are in line with the institute of medicine recommendations.

Next slide, please. Performance measures number 66C aims to assure that a standardized system is in place to effectively deliver pediatric emergency and specialty care. In order to meet this measure, they need to have a process in place that recognizes

facilities that can provide both medical and trauma care. A pediatric medical emergency facility recognition process may use such classifications as emergency department approved for pediatrics, or pediatric critical care center. While development of pediatric trauma facility recognition may utilize guidelines such as those through the American college of surgeons. Performance measure 66D focuses on assuring hospitals have documented transfer guidelines in place that outline procedures and administrative policies for transferring pediatric patients to facilities that provide specialized pediatric care. In addition, the guidelines should identify the responsibilities of both the referring facility and receiving center as well as the other bulleted items outlined on this slide.

Next slide, please. The third performance measure that is pertinent to this discussion is number 66E, which requires states to work to ensure that their hospitals have transfer agreements that address communication, transport level of care, medical records, and return transfer of the patient to the referring facility as appropriate. When a child's needs are beyond those available at an institution, inter-facility agreements help to assure and expedite the number of children to facilities with appropriate resources and competency. Timely services are critical to the outcome. Transfer agreements help to formalize this process and do need to be renewed on a regular basis. Trauma system development has assisted with the development of transfer agreement across the country. However, work is still needed in this area, in particular with medical transfers. Each state has begun work on these performance measures, and will be reporting their progress on a semiannual basis to the national EMSC program.

Next slide, please. In Illinois, we have a problem in place called pediatric facility recognition. It's been in place for several years, and it mirrors similar programs in a few other states. It provides a mechanism for our state to formally recognize hospitals prepared to meet the needs of children. When we initially began discussion regarding pediatric facility recognition, it was felt it wouldn't be a new concept within our state, since we have several types of hospital designation processes already in place. We have trauma centers, we have EMS resource hospitals, and these are lead hospitals that oversee prehospital care. And we also have burn centers and a perinatal system, and other states have other systems in place. We use the designation processes as models as we moved along. We were fortunate to have a strong trauma program already in place within our state that we could draw upon, and in fact, the majority of our trauma centers within Illinois already in the program. Other states will need to look at their process as they consider I implementation. To provide an overview of our experience in developing the facility recognition program we began by forming a multi-disciplinary task force that began meeting in 1995, and which continues to meet today to oversee and modify the program. This task force gathered experiences and guidelines from other states that worked on similar efforts, and we used those in tools and templates. California was one model we utilized. Our state decided on a voluntary I implementation process, since our state hospital association was opposed to having another mandate for hospitals. We then structured it as a three tiered system. We felt criteria that a large academic medical center could meet would be very difficult and cumbersome for a small community rural hospital. So criteria in each of the three tiers varies. The state is divided into 11 EMS regions. And in 1998, we piloted into two regions. One an urban, and the other rural. Pilot proved

successful and the following year we began I implementation throughout the rest of the state on a region by region basis. Once all regions were completed, we began to conduct our renewal process. Along the way we incorporated the program into the state's EMS rules and regulations. Last year as a deliver -- deliverable disaster funding, the state mandated all the EMS resource hospitals participate in this program.

Next slide, please. As mentioned earlier, the facility recognition task force that oversees the program is multi-disciplinary. In addition, most of the representatives also work clinically as nurses, physicians, and mid level practitioners, so they bring that perspective to the table. The groups listed on this slide participate on our task force, and I can't emphasize enough the need to have all the key players and organizations at the table for states that are thinking about beginning work on a similar program. It's especially important to have your state hospital association represented, since you need their buy-in or it will be difficult to move forward.

Next slide, please. This slide provides a brief overview of the three levels recognized in our state. Stand by emergency department approved for pediatrics is our base level. Criteria primarily aims to assure that they have the capabilities and trained personnel to provide initial management and resuscitation and also have transfer agreements in place to move the children to a higher level when appropriate. The emergency department is the next level. And typically more pediatric capabilities, but may not have pediatric inpatient specialty services. And so they need to also have transfer agreements in place. The PCCC, or Pediatric Critical Care Center is the highest level. And this is also the referral

center that received pediatric transfers. They need to have an emergency department that meets the criteria, as well as required to have a dedicated PICU, and other pediatric specialty and inpatient services.

Next slide, please. Our criteria includes facility requirements as well as people requirements. So those who are involved in the clinical care of a patient, physicians, nurses and mid level practitioners, need to meet qualifications and continuing education requirements. In addition, there are requirements related to physician coverage, consultation, and on-call capabilities. We also require hospitals to have an inter-facility transfer policy, as well as transfer agreement and these requirements are meeting the national performance measure. Continuing on, there are requirements in addition for specific policies, such as child abuse and latex-free policies. We also require emergency departments to have treatment guidelines in place, and a hospital can develop these guidelines based on their own high volume, high risk population. Quality improvement is a key component, and is what should be helping to drive their efforts. Requirements include they designate a liaison, who is responsible for the conduction of emergency department quality improvement activities. All the pediatric liaisons in a region meet on a regular basis and also work on an agreed upon regional monitor. These monitors have support at benchmarking, and the meetings have also served as an opportunity for liaisons to network and to share resources. And some of their regional monitoring activities have actually resulted in statistically significant improvement. And then last but not least in our requirements list, we also have equipment and supply items and medications that the department needs to have in place.

Next slide, please. Hospitals not currently recognized can submit an application to the level that best meets their capabilities. Hospitals that are already recognized undergo a renewal process every three to four years. Twice a year regional educational sessions are held in our state. These provide an opportunity to review the application packet, the process, and the requirements. The hospitals then submit an application containing documentation that verifies their compliance with the criteria. The application undergoes an internal review within the EMSC office, and the hospital is notified if any documentation is pending or needs clarification. A site survey is then scheduled and conducted. We continue to update and revise the program as needed. For example, two years ago we incorporated a review of hospital disaster plans during the site survey, so we had an opportunity to assess for pediatric inclusion into their disaster plans, and then to offer a recommendation. The site surveys are very much utilized as an educational opportunity to relate to hospital administrators and personnel, the need for the pediatric preparedness and enhance the awareness of what national standards out there are related to pediatric care, and other guidelines, educational opportunities, and other resources that they might want to take advantage of. Once the hospital satisfies all the requirements, the appropriate designation level is given. This shows a graphic of our state and our 11 EMS regions. We began I implementation in 1998. Over 100 hospitals are in the process. It's been a lot of hard work but it's paying off, and has helped to better prepare our hospitals for pediatric medical and trauma emergency. We do have some positive outcome data information that will be discussed by the next speaker. Another plus is that the facility

recognition is instrumental in building better pediatric disaster preparedness within the hospitals as well.

Next slide, please. As states contemplate embarking on this type of initiative, it's important to understand that it does require a huge commitment and will take time. First of all, it's the state that needs to take the initiative in order for this to move forward. And although there needs to be support from the top down, there is also a need to generation commitment from the bottom up, by stakeholders, organizations and other agencies in order to succeed and assure longevity. Also found the provision of any assistance to the hospitals is very helpful, and also very well received by the hospitals. So we conduct educational sessions, provide technical assistance, and also other resources to assist them. Our facility recognition task force and other committees help with this. And in addition, we have been able to secure some grant funding over the years that has helped support pediatric quality improvement and educational resources. But the majority of the work is up to the hospital. Being involved in this process is both rewarding and challenging. It's a critical step that national agencies are emphasizing in order to improve emergency care for children. The good part is knowing that it has been done successfully in several states, and that there are models and resources out there to help. So those states that are contemplating moving in this direction, be sure to access whatever resources you may need, and when challenges arrive be sure to -- the goal is worth it. Make things better for kids. Thank you very much and our next speaker is Dr. David Mooney.

DAN KAVANAUGH: Thank you, Evelyn. Our next and final speaker for the afternoon will be Dr. David Mooney and after Dr. Mooney's presentation we will have time for questions from the presenters.

DAVID MOONEY: Hi, I'm David Mooney, director of the trauma program at Children's Hospital of Boston. I'm going to wrap things up and talk about children and trauma. There won't be any rocket science. I will present some data as we studied about children in trauma centers and systems, and I would like to talk about the scenario, complete that, and discuss the trauma system differences and some of the special things for kids in trauma. Talk about what are trauma centers, what are the various levels, what are some of the considerations for children in trauma centers. Talk about the very nice work coming out of Illinois, preparation for children in emergency departments and some of the special additional consideration for kids that may not be covered.

In our scenario, one child is dead at the scene. Another child is critically injured trapped in the car, trapped in the van, and two children are mild to moderately injured, one with an obviously broken leg. The one child dead at the scene, pronounced dead at the scene, brought into the community hospital and declared dead [inaudible]. Critically injured child is brought to the trauma center. Whether by ground or air [inaudible] depending on the resources available, and the EMS [inaudible] we expect that they would end up at the trauma center. The children who are mild to moderately injured go to the community hospital. One may need to go to a trauma center for pediatric orthopedic expertise

Talking [inaudible] as you heard already today, the trauma systems is not just a trauma center. It's a component within a very broad -- communications received, communications from, that the event has occurred, and you notice I'm not saying accident, the event has occurred, communications to EMS, EMS training, and response, expertise, transfer and triage of patients from the scene, directly to a trauma center or to a community hospital, care within the emergency department. Care in the inpatient unit, both on the unit and the ward, rehabilitation care while the patient is in the acute care facility, and subsequently in the rehab center. And then evaluation, the care that each child receives will be the best care possible. Let's tart with -- start with triage. Why triage children? Why should one child go to the trauma center and the other to the community hospital? It has to do with the resources and experience. Would you take your Saab to someone who has never seen that, or fixes one a year, or bring the car to somebody that fixes that all the time? If it's down the street it's an easy decision. If it's 90 miles away, a more difficult decision. The trauma center has the resources and experience necessary to care for critically injured patients. And while the decision is more difficult when it's 90 miles away, it's easy when one is nearby.

Prepared in advance for the patients that are critically injured, proper attitude for injured children versus injured adults, and follow-up mechanisms in place for injured kids and adults, if there are adults there, and important to distribute the patients. Even a very busy urban level one trauma center can be overwhelmed by volume. And it's important to distribute the patients by the severity of the injuries. [Inaudible] one of the other reasons for triage, is diminishing -- [inaudible] a graph that shows the number of injured kids in the

New England region, six states of New England from 1991 to 1999. What this shows is that viewer than half as many children required hospital admission for an injury in 1999 as did in 1991. And at the same time, the kids still required admission were concentrated in a few hospitals in the region. What happened is that many community hospitals, 80% or 90% of the patients who used to be admitted routinely to the facility are being sent off to another hospital. Or being treated and released in the emergency room. This resulted in a marked diminishment in the experience levels and the expertise with pediatric injury care in non-children's hospitals in many parts of the country. And may be what is happening in New England. Different levels of trauma center.

The American College of Surgeons verified trauma centers, verification is different than a designation. Verification is a visit in which the site visitors verify that center has the various facilities and experience with trauma care as laid out in
The American College of Surgeons material. Local and state authorities designate that a hospital is or is not a trauma center, and the various levels, depending on the municipality or state college does not designate local or state authorities do that. The American College of Surgeons has four adult trauma center levels, from a one through a four, with a one having the most expertise and personnel and equipment. In addition, there's a level one and two pediatric trauma center verified by the American college of surgeons. Some states such as Pennsylvania have adapted The American College of Surgeons level to fit their own needs. Pennsylvania has level one and two adult trauma centers, which may not have all the capabilities to be a level one and two pediatric center but extra experience and extra qualifications for the care of injured kids. There is an adult trauma center. Other

states have followed a similar path. The majority of the hospitals in the United States are non-trauma hospitals. They have not been designated -- by The American College of Surgeons, another group, or -- [inaudible]. The highest level trauma center has the most resources, the most experience with critically injured patients. Dedicated personnel and resources for the care of injured patients.

They have specifically dedicated time and people to focus on this area. Pediatric trauma centers have dedicated personnel and time to the care specifically of injured children, separate from the care of injured adults. It doesn't matter. Doesn't matter if someone goes to a trauma center or not. Very nicely done study, McKenzie and her colleagues published a prospective analysis of patients treated in trauma centers versus non-trauma centers. What they found was the mortality decreased 25% if patients were cared for in trauma center versus non-trauma center. It's not known whether it's going to be able to extrapolate to children. Currently there is a similar pediatric study that's being planned and hopefully will begin some time in 2007. Looking at the influence of the type of hospital on the outcome of injured children. Pennsylvania trauma hospital, database that comprises information in some trauma registry for Pennsylvania.

Pediatric trauma centers versus the adult trauma hospitals with HQ. And what he found, pediatric trauma centers have the lowest mortality rates. Added qualification centers have the second, and the highest mortality rate occurred at the adult trauma centers in the care for injured children. Densmore published a study using the KID database. It's a database of hospital data from 27 states around the United States, containing over 70% of the U.S.

population, with over 2 million discharges. He pulled out 80,000, the records from 80,000 injured kids included in the database, and found that patients who are treated at children's hospitals had a 10.7% decrease in their mortality rate compared to children treated at non-children's hospitals. For the overall, length of stay shorter, cost of careless, when they were treated at the children's hospitals. And lower mortality rate [inaudible]. The hospital type doesn't seem to just affect the mortality rate, also seems to affect the management of the patient. For a very common injury for children, a ruptured spleen.

We published this year separate studies looking into very specific issues. Put the information from California, Florida, New York and New Jersey over a two-year period and found children who are treated at trauma centers had a lower rate than children at non-trauma centers. We found using the same KID base that Densmore used, the children treated at a children's hospital had half the chance of having the spleen removed. The children's hospitals had a lower mortality rate. It's not just the inpatient unit that matters. Very nice work done in Illinois, the state has gone to most of the hospitals in the state and some of the facilities have become approved for pediatric care. In other words, emergency departments have become approved for pediatric. Demonstrating that they have the equipment and the expertise necessary to provide state of the art care for injured children, and for ill children.

The study was conducted looking at the mortality of injured children in the state of Illinois in those facilities and went through the process. And what they found was mortality was improved. Not just improved a little, but improved a lot. In children with a low injury

severity score, one to nine, mortality rate dropped by 22% from before and after going through the process. For children with moderate to severe injuries, ten or greater, their mortality decreased 18% in that group statistically significant, decrease in mortality rate because the hospitals went through the process. This may be multi-factorial, and other things could be explained, but a clear con try but tore, the fact that the hospitals dedicated time and energy. Here is what we know so far. Children in trauma centers, mortality treated in trauma centers versus non-trauma centers. [Inaudible] the care they received for non-lethal injuries, such as a ruptured spleen is more appropriate. Shorter length of stay and shorter cost in the children's hospitals. And solely improving the care in the emergency department makes a difference in the out come of injured children. Why doesn't everyone do this? Transfer, triage and turf.

Hospitals are concerned for loss of patients, loss of revenue and loss of pride and prestige, especially in hospitals that pride themselves in being a full service hospital. Often times they are competing in groups, and competing hospital and trauma center is seen internally as a failure of that hospital. This is a problem every trauma system before, during and after I implementation, developing a trauma system does not make the issue go away. The only way to really overcome this is to never be -- the only way to overcome it, advocate for, during and after I implementation, to be a constant presence. Just finishing off system development does not make it all better. You cannot leave the table continuing presence is mandatory. And also data health helps a lot of. When the hospital sees the number of patients who require transfer is actually a small sliver of the overall group of injured children. A lot of the flames go down and the smoke goes away. Many

additional considerations for injured kids. Children suffer from psychological issues that adults don't face. Up to a third of the kids admitted to a hospital suffer from acute stress response. Half go on to suffer from post traumatic stress disorder. The simple maneuvers in children's hospitals did mitigate the problem. Parental presence, in the ICU, on the floors, not visiting for 15 minutes every three hours, but be at the bedside can help overcome that, as well as pediatric specific coping, whether it's in the emergency department and through the hospital stay can really help overcome this problem, which can sometimes become more severe than the physical problems.

Rehab, school integration and development issues can also help overcome some of the special problems the kids face. Other [inaudible] components with injured kids and adults that may not improve the health of the child before you today but might help the child tomorrow or next week or next year. Continue -- making it more efficient, fewer bumps on the road, complications occur, [inaudible] to ensure that they don't happen again, or if they do, that it's caught soon and addressed properly. Decrease the flow of injured children, obviously. Education, especially the centers that may not have the experience they had ten years ago or 20 years ago in the care of your children, to ensure that the children receive the optimal care, and including EMS also, not just ED, but EMS. And research, continually improve the care the children receive, now ways to care for children. And so much of what we do still, unfortunately, has not been [inaudible].

Trauma systems, whether adult or pediatric, includes -- inclusive system, all hospitals are players. No hospital is included and really comes down to the reality of children who are

injured go to every hospital. They don't just come to one hospital. Even if they just go to the emergency department in a facility, that facility needs to be included in the trauma system, needs to have the care reviewed, have performance improved, even if they don't -- if they are in a patient facility, that emergency department has to be able to see and handle the most critically injured child. That's one of the reasons why that process is so important. In Densmore study, 90% of injured children were not cared for at a Children's Hospital, they were admitted to a non-children's facility. Around the country care for injured children happens everywhere. And those hospitals have to be included. Cannot be an exclusive trauma system that only includes pediatric trauma centers with all the bells and whistles. There are 14, currently 14 verified pediatric trauma centers under The American College of Surgeons umbrella, and maybe a dozen or two more under verification systems, not enough to take care of the volume of injured kids the country faces each year. Again, all hospitals have to be prepared to care for an injured child, even if it's just -- [inaudible] so, to sum up, children have got to be considered at every step in the trauma system, whether it's mass casualty drills, disaster events, communication, EMS, education, emergency department, inpatient care and follow-up.

The work begins long prior to the event and very few true accidents in the world. Continuum of care from the scene through the return to the community, with follow-up, especially to those patients with moderate to severe brain injuries that may suffer ongoing, if not permanent disabilities related to their brain injury. Must have a constant evaluation to assure that patients receive the best care possible. Things will happen. When things happen, it's important to carefully review those events and make sure they don't happen

again. Inclusive systems are better than exclusive systems for injured children, because of the rarity of the pediatric trauma systems. And those systems that don't have the frequency or exposure anymore of injured kids to adequately maintain expertise without education. And finally, injury prevention. 75% of the kids we see could easily be prevented with injury prevention. Not by wearing a flack jacket and sitting on the coach, adding to the obesity problem in the U.S., but by enjoying themselves, and enjoying sports but in the appropriate way. Thank you very much.

DAN KAVANAUGH: Thank you. And our presenters are still on the line, and so I have some questions that been sent in, by those of that have been listening. I'll ask them to respond to. And as a reminder, complete the evaluation at the end of the webcast, and there will be an archive at www.mchcom.com. The first two questions I would like to ask of Evelyn. One of the questions is from Rebecca in Minnesota who asks what are some of the required CQI monitors and associated benchmark that Illinois uses?

>> This is Evelyn, and thanks for that question. The quality improvement indicators that all hospitals need to be performing include pediatric transfers, pediatric resuscitations, and as well as pediatric deaths. So those are all -- those are three mandatory activities that we require all of the hospitals to participate in. We do encourage them to look at their high volume, high risk population and also develop monitors that look at those groups. And then additionally, each of the CQI liaisons come together on a quarterly bases and come together with the other liaisons in the region and work on regional projects. They pick an

indicator, and those have looked at things as respiratory distress, seizures, a number of different

entities, and several of the regions have been able to demonstrate significantly statistic improvements. They are moving in the right direction and we hope at some point they'll be able to begin looking beyond process and starting to look at outcomes as well.

>> Okay. This is another question for you, Evelyn, from Pat from New Mexico who is asking, I think this is in reference to when you are reviewing applications within your state. Is asking are the application le -- reviews and site surveys done from within the state, or expertise from outside the state?

>> We have been fortunate to tap into resources within our state. But what we do, if you can recall from one of the slides during my presentation, I had a graphic of our state and that it's divided into 11 EMS regions. We utilize physicians and nurse surveyors, as well as mid level practitioners from outside of the region that is being surveyed to come in and assist us with the survey process. And those particular surveys, or surveyors have clinical expertise, they are currently working in the emergency department studying or an inpatient or CICU. We have the surveyors go through a process so everyone is on the same page in terms of their role and responsibilities and what they should be looking for when they go out on the surveys. But we do use internal is your -- surveyors from within our state. We have been able to tap into a few surveyors that are in facilities that border our state that have been enthusiastic about the process and interested in participating as Welch the -- as well. The majority are from within the state.

>> Thank you. This next question is for Dr. Mooney. Tom from Madison is asking one, who is coordinating the pediatric trauma study that you mentioned, and are there -- second question was are there really only 14 ACS verified PCTs nationwide?

>> Being coordinated to mirror McKenzie's work with adult trauma centers. I'm not sure. A planning meeting is scheduled for March in D.C., and I know that Keith from Wisconsin is involved, as I'm sure numerous organizations are involved also. I believe seeing Dr. McKenzie's name on the list. The second question, there are only 14 level one pediatric trauma centers in the United States. And the number varies a bit from time to time as one center may become verified or another may drop. There are states that don't use the American college of surgeons. Most every state uses some version of the college of surgeons criteria to verify trauma centers. Pennsylvania does not use the American college of surgeons, but the criteria for verification are remarkably similar. And I believe there are three, possibly four pediatric trauma centers in Pennsylvania. New York and other states do not use the ACS but have similar criteria. 14 is the number of American college of surgeon centers. But all told, for verified and/or level one pediatric centers, might be as high as 25 across the entire country.

>> Okay. I can add on to your, the first question about coordinating the pediatric trauma study. And there's actually, as David mentioned in March, there will be a planning group brought together to look at the potential for doing a study of this nature, actually being funded by the EMSC program, and also being funded by the agency for health care

research and quality. We are funding this planning meeting together to look at this, and it's being hosted, run, developed by Fred Rivera from Harvard View in Washington and also another from Wisconsin.

>> Another question that I have. It's not to any one specific presenter, if anyone wants to take it or maybe Marianne, Dr. Gausche Hill if you would like to take this. From Deborah asking what are your thoughts about the use of telemedicine versus transport for peds in rural areas?

>> This is Marianne. Just coming online. Can you hear me all right?

>> Yes.

>> The telemedicine really hasn't been well developed, although in some areas in California I know they are using it successfully there. There are some technical issues that I believe have to be overcome. However, it has been used for critical care, ill or injured pediatric patients that require critical care. In a sense it could monitor and evaluate the patient through telemedicine at a site, say, a critical access hospital, or a hospital that doesn't have any inpatient pediatric resources. And that has proven to be quite useful. Now from my understanding on that, there is a lot of technical issues, and I think it's possible, it's just a matter of working with your technical people and number one and twos you have to set up all the equipment at the -- is he site that needs to coordinate with the

critical care center, and that can be somewhat challenging. I don't want to discourage it. I want to say it's probably still in its infancy.

>> And for Dr. Mooney, is the KID database available publicly, and if so, where?

>> The KID database is part of the H cup project, and available from AH -- I cannot remember it but the agency for health care policy, AHPRQ. But a 1997 and year 2000, waiting for the 2003 to come out. It's a great database but unfortunately delayed. You can get it directly from the government and it's very inexpensive and easy-to-use for research like this.

>> Yes, if you go to AHRQ dot --.gov, and put in a search for the capital letters, you'll be able to find information on the databases and also the H cup database housed at AHRQ. Another question from crystal. I'll throw it out to all of you. The question is, what is being done about children who don't speak English and needing translators, what if hospitals do not have a person that speaks a specific language, and maybe that question is trying to get into how does that impact outcomes, or are we seeing any cases where that is impacting outcomes when there are cultural language barriers and maybe how, what are some efforts being done to overcome those?

>> This is Marianne. I can comment that many hospitals are making every he effort to have translators available, too. In the prehospital setting, we certainly are seeing that the providers in the area are, are learning various languages. Often Spanish is the one that is

most common. AT&T and some other phone systems could be available to assist in translation. And certainly they have used, you know, family translators which may not be the best option, but if it's the only option available, that's certainly done. But hospitals, I know, are making every effort to provide as many resources as possible for children who do not speak English. But certainly, I'm in California, and we have translators and we have access through the phone system so that we are able to speak to patients in the out of hospital setting, it's a little more challenging.

>> Okay. Thank you. Evelyn, I have two questions for you. One is can you share some of the challenges that small local community hospitals have had when applying for the designation? And how did your program assist in ensuring that they could successfully achieve meeting the established criteria, and then secondly, have any other states reproduced what you have been doing in Illinois?

>> Well, in regards to the first question, obviously the smaller hospitals have access to less resources and in many cases, they applied not for the EDAP level but the stand by, the SEDP level. But what we have seen not just in the smaller hospitals but pretty much across the board is that education and quality improvement were the areas that hospitals seem to have the biggest needs with. We also saw issues with getting physician buy-in to maintain the education requirements. That's been kind of an ongoing challenge. And some of the rural areas, access to educational opportunities may not be as available or as accessible as in urban areas. We have put together a listing of online educational opportunities on the site, which has helped make easier access to the information. And

some of the grant funds, and access HRSA funds to help support pediatric educational activities and also foster development of course instructors for some of the national pediatric focus courses. And then we have recently developed an electronic tracking system that hospitals are going to be able to use in the future to start tracking their pediatric and continuing education.

Since that's been a challenge for several hospitals to be able to tease out the pediatric hours so they can verify and assure they are complying with the required educational hours. And so that's, it's an electronic system that we're in the process of piloting, and then we'll make it fully available to the hospitals throughout the state. And it allows for broader application, so it's not just the ability to track pediatric hours, but trauma centers could use it to track trauma education hours and for any type of CE or credentialing information. And then in addition, we have been able to secure EMSC target issue grant funding a few years ago to help us with pediatric quality improvement and through that grant we have been able to provide technical support and assistance with development of QI monitors and companion educational modules. So I would have to say the biggest challenges, education and QI and anything that the state can do to provide resources for the hospitals can assist them then in those areas. And with respect to any other states that have developed a similar process, we actually modeled our program after the California program, so I know that there are several other states out there that may not be doing it exactly like we're doing it, but each state needs to kind of look at their resources and their capabilities and develop it differently, depending on their unique needs.

>> If I can make comment, being from California and being involved in the process since the 1980s, I can say that providing continuing education is really a challenge and monitoring that, I agree. Some of the unique things that have been done are partnering of the smaller hospitals, partnering with the care centers and having regional conferences and I think that's proven to be a great thing, because education is an -- it builds cooperation within hospitals of a region. They pool resources to put on educational offerings. One just occurred regionally in which a local community hospital partnered, and there were 200 people there from all over Los Angeles county, which is quite extensive. So I think it's those kinds of things can be done and it just takes one or two people to begin working together to start the process, and then the collaborative ball, so to speak, starts rolling, and then people get involved and supporting what you've done, you know, you have yearly regional conference ongoing that can be funded by various means and doesn't necessarily require any federal funding for that process. And many of the hospitals do have funds available for education. So I think that's helpful. I was going to say California has a model, Florida also has a slightly different model that I'm aware of, and we -- throughout the state of California, there are various models. The state also has essentially more of a minimum guideline model, such as the national guidelines for preparedness. Everybody can participate. So there's different ways to do it. But I think Evelyn's concept that, you know, get together with the people, the stakeholders in your area and begin to involve them early on and have them as part of that process, gets invested in the process and therefore the process is more likely to be successful I think is a great model.

>> Well, unfortunately I know we could talk a lot longer but our time for the webcast has come to the end. I would like to thank all of our speakers for their excellent presentations and this will be archived. We ask you to please forward it, pass it along to others who might be interested who were not able to attend the conference today. And there are some questions that we were not able to get to. What we'll do, we will compile those and then make sure that we do get those out to the participants and have them archived also. So I would like to thank everybody. Our speakers, and our participants. Thank you very much. Good afternoon.