

# HB 138 Special Projects #7: Evaluating Trauma Education

## Introduction

Injury is the leading cause of death and disability among children and young adults.<sup>1</sup> Trauma systems and trauma centers have developed over the past few decades with the primary goal of improving care for injured patients. As of April 2002, 35 states and the District of Columbia had formally designated or certified trauma centers.<sup>2</sup> Many of these same states have formal legislated systems that give authority for trauma system development to a state or private agency. Ohio has recently joined the group of states with trauma system legislation. In July 2000, Amended Senate Bill 138 of the 123<sup>rd</sup> General Assembly was signed into law.<sup>3</sup> The bill defined aspects of a comprehensive, organized trauma system for care of the seriously injured patient. The law addressed hospital trauma center requirements, patient triage, pre-hospital care, data collection, research and education issues, and is based largely on the American College of Surgeons (ACS) trauma care standards. The ACS is a national organization that sets optimal trauma care standards used by most states in their trauma systems. As of May 2003, Ohio has 44 trauma centers categorized as ACS verified centers or Ohio Provisional trauma centers per the Ohio Revised Code.

Education is vital part of trauma care. As an Ohio trauma center, hospitals must provide trauma education for nurses and physicians and some centers must also meet standards related to professional outreach education. Even hospitals that will not be recognized as trauma centers may realize some benefit in improving their own education programs. Education is an important issue at the state level as well. Emergency Medical Services (EMS) providers also need trauma training and continuing education. To address these issues, the trauma legislation built in research programs to help clarify educational needs for trauma care. Under the current law, the Emergency Medical Services (EMS) board was charged with studying methods to increase trauma education throughout the state. The intent was to evaluate the current situation regarding trauma specialty courses and other trauma education among appropriate health care providers, particularly in rural areas of the state.

Specific objectives were:

- 1.0 To identify which trauma education courses are currently offered by surveying Ohio's Accredited EMS Training sites/EMS agencies,
- 2.0 To ascertain the number and size of the trauma educational courses currently offered in Ohio by surveying state coordinators and professional health organizations
- 3.0 To ascertain the perceptions of the stakeholders (EMS providers, hospital and trauma center staff), by conducting a random sampling of to assess which courses they utilized.
- 4.0 To evaluate opportunities and barriers to offering trauma educational courses in a variety of settings

The Ohio Chapter of the American College of Surgeons Committee on Trauma (ACSCOT) and the Society of Trauma Nurse Coordinators submitted a proposal to examine this issue. Surveys were developed and data was collected from health care providers throughout the state to assess the current status of trauma educational programs. A phone survey was conducted to obtain information from training centers, and a stakeholders' meeting was held to gather opinions and perceptions from individuals.

## **Executive Summary**

**Background:** HB 138 required the EMS board to evaluate trauma specialty courses and study methods to increase trauma education in Ohio.

**Methods:** Surveys regarding accessibility, availability, barriers and perceptions of trauma education were developed and distributed to EMS providers, nurses, and physicians who care for trauma patients. Information about course offerings and other types of trauma education was also collected from training centers and course coordinators. Data was reported by population density, regions and other factors

**Results:** A majority of EMS providers across rural and urban areas have completed basic specialty trauma courses. Less than half indicate they are receiving all the continuing education necessary to care for trauma patients. Respondents identified financial support, frequency of courses and time off work to attend courses as barriers most frequently. More than half of nurses have taken specialty trauma courses. Only a quarter of nurses reported that they have received all the continuing education necessary to care for patients. Nurses cited time off work and financial support as major barriers. Three quarters of physicians indicated they have completed a trauma course; about half felt they have received all the necessary continuing education. Physicians reported time off work and frequency of courses as major barriers.

**Conclusions:** Many trauma providers have basic education, but often find continuing education difficult to obtain. Most reported that more education was needed to care for trauma patients. Major barriers to obtaining education include financial support, time off work, frequency, and location of courses. Distribution of information about available courses is not as widespread as it could be; finding out about courses that are offered can be difficult. There were no consistent significant relationships between population density and trauma courses taken. This suggests that completing trauma course is not related to being located in a rural or urban area.

**Recommendations:** There are many ways to improve trauma education within the state. Exploring new options in education using existing technologies could improve accessibility and variety of courses, as well as resolve location issues. On-line training, interactive educational software, and long distance education are all options that might enhance learning opportunities. Expanding trauma education programs beyond the basic level would be helpful in expanding continuing education options. Statewide

guidelines or standards for trauma education could also help identify the amount of trauma education needed. Better communication about existing courses might also address some of the issues with accessing courses. Further study in the cost of education and would be helpful, and investigating options for funding of trauma education would be helpful.

### **Information/Qualifications**

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### **A Review of the Literature**

#### **Introduction**

The need for education and training in the area of traumatic injury has been recognized since the emergence of trauma care as a specialty area. The American College of Surgeons (ACS) developed the Advanced Trauma Life Support (ATLS) course in the late 1970's in response to a recognized need for a trauma focused educational course aimed at physicians (American College of Surgeons, 1997). The Prehospital Trauma Life Support (PHTLS) and the Basic Trauma Life Support (BTLS) courses were subsequently developed to address education in the prehospital setting. In the past two decades, several other trauma courses aimed at improving care of the injured patient have been established. Many courses have expanded to international circles and are considered a basic requirement for trauma providers.

As trauma systems evolved, the need to determine the value and effectiveness of trauma education programs became increasingly important. Trauma life support courses are based on the assumption that appropriate and timely care can significantly improve the outcome of the injured patient. Since initiation of trauma education courses,

researchers have also tried to show that focused education can improve patient care and reduce death and disability. Jabbour, Osmond, & Klassen (1996) studied the effectiveness of life support courses for health care providers on the basis of patient mortality and morbidity, retention of knowledge or skills, and change in practice behavior. The authors reviewed and assessed relevance of studies published over a seventeen-year period. The authors concluded there is evidence that use of the ATLS course has been effective in decreasing mortality and morbidity. Ornato, Craren, Nelson, Kimball (1985) evaluated the effect of training of emergency medical technicians (EMT), paramedics, and physicians in a developing EMS system. The authors documented that the increase in cumulative number of EMTs trained, correlated strongly with the decline in prehospital and hospital trauma deaths. They concluded that improvements in the EMS system, to include increased training, resulted in fewer trauma deaths. In another study, researchers compared trauma outcome variables before and after the institution of an ATLS program (Ali et al., 1993). Researchers reviewed 800 patients including all deaths and serious injuries (ISS  $\geq 16$ ) and found that trauma mortality decreased post-ATLS. Research on a (PHTLS) course yielded similar results. Ali, Adam, Gana & Williams (1997) assessed trauma patient outcome after implementation of a PHTLS program. Post-PHTLS mortality and morbidity, length of stay and disability, were significantly decreased suggesting a positive impact of the PHTLS program on trauma patient outcome. In contrast, only one study (Vestrup, Stormorken & Wood, 1988) found that ATLS instruction for emergency room trauma providers failed to produce a quantifiable improvement in patient assessment or outcome.

Review of the literature suggests that reduction of mortality and morbidity may be related to an increase in knowledge level, judgment skills, and a better understanding of trauma procedures after trauma education. Ali, Adam, Gana, Bedaysie, & Williams (1997) conducted a follow-up study to identify factors that could explain decreases in morbidity and mortality post-PHTLS. The authors found that the frequency of advanced life support skills increased significantly after PHTLS training. Initiation of airway intervention, use of oxygen, cervical spine control, splinting, and hemorrhage control improved after the course. Ali & Adam et al. (1998) reported evidence to suggest that cognitive performance and skill testing are also enhanced after PHTLS. Small groups completed examinations and a trauma patient management scenario pre and post PHTLS. Examination scores and simulated trauma patient performance scores were statistically significantly higher for the post-PHTLS group.

There have been similar findings associated with other education courses. Johnson, Macias, Dunlap, Hauswald, & Doezema, (1999) evaluated a modified paramedic curriculum that focused on individualized patient assessment. In simulated testing situations of critical trauma patients, the authors found that inappropriate on scene procedures, and overall scene time decreased after the new curriculum was implemented. Physician reviewers also noted improvements in the appropriateness of patient assessment. Ali, Adam, Stedman, Howard & Williams (1994) reviewed the cognitive impact of ATLS on a moderate size group of US physicians. Test scores clearly improved post-ATLS. Attitudinal impact was also assessed through questionnaires completed by nurses and physicians. Both groups identified that ATLS-

trained physicians demonstrated better resuscitation skills, initiated more timely consultation, and showed greater confidence in trauma management. The groups also attributed a decrease in mortality and morbidity to ATLS training. All respondents recommended ATLS training for emergency room physicians. Finally, Swanson & Fosnoct, (2002) evaluated the impact of an airway education program (AEP) on prehospital intubation for paramedics and nurses in an air medical service. Results showed that establishment of an AEP resulted in a more appropriate use of rapid sequence intubation (RSI) and appropriate medications, as well as a decrease in cricothyrotomy rate. Intubation failure in non-arrested patients decreased as medications and RSI were employed. The research consistently shows a relationship between education courses and improved performance in testing and trauma care scenarios.

Several researchers have linked improved pediatric skills with pediatric specific training. Losek, Szewczuga, & Glaeser (1994) found that performance rates of advanced life support procedures improved among EMT-Paramedics (EMT-P) with the introduction of a Pediatric Advanced Life Support (PALS) clinical course. The authors evaluated success rates of intubation and vascular access and noted significant improvement, especially in younger children, after the course. Smith, Thompson, Shields, Manley & Haley (1997) initiated a multi-county pediatric education course for rural emergency care providers and compared post-course test scores with a group that had not received the training. The authors also used a self-report tool to assess anxiety levels regarding caring for pediatric emergencies. The results suggested the pediatric education course was effective in increasing the knowledge and confidence of emergency care personnel in the management of acutely ill and injured children. Providers in the intervention group demonstrated a significantly greater increase in test scores regarding knowledge of pediatric emergencies than did providers in the control group. Spaite et al. (2001) evaluated whether a continuing education program for paramedics, focusing on children with special health care needs, improved paramedics' assessment and management skills. Significant improvement was seen in appropriate assessment and overall care by paramedics who completed a specialized education program. The greatest improvement occurred in the initial assessment category.

The impact of trauma education for physicians and medical students has been extensively studied, particularly with regard to the ATLS course. Ali, Cohen, & Reznick (1995) confirmed trauma management skills acquisition by senior medical students after the ATLS course. Subsequent research yielded similar findings (Ali, Cohen, Gana, & Al-Bedah, 1998). Practicing physicians have also been shown to benefit from ATLS training. One study showed the teaching effectiveness of the ATLS program among practicing physicians as measured by improvement in test scores, and simulated trauma situations (Ali, Cohen et al., 1996). Williams, Lockey, & Culshaw (1997) reported that medical staff who had either undertaken the full ATLS course or an abbreviated form of the course were more effective in their management of simulated trauma cases. Gautam & Heyworth (1995) demonstrated similar findings when they determined that a change in knowledge among emergency department physicians resulted from formal training in trauma management. Ali, Adam, Williams et al., (2002)

reported on the teaching effectiveness of the Trauma Evaluation and Management (TEAM) module devised by the American College of Surgeons (ACS) for teaching senior medical students trauma management principles. Both trauma knowledge and clinical skills improved after the course confirming that the TEAM module was a very effective teaching tool. Girdley, Cohen, Birnbaum, & Bowman, (1993) conducted a pre-test and post-test to compare knowledge levels in physicians after ATLS training. Comparisons revealed significant differences for pre-test and post-test scores. Researchers have also addressed retention of knowledge after an ATLS course. Recently, Ali, Howard, & Williams (2002) assessed the effect of trauma volume on skills attrition among physicians completing the advance trauma life support (ATLS) course. The data concluded that trauma volume affects trauma skills attrition suggesting that continuing education must be included to assure retention of information.

Many trauma nursing courses exist, but there is little research on trauma nursing education. Gautam & Heyworth J. (1994) measured the change in knowledge of emergency nurses in three key areas of trauma care after attending a half-day course based on ATLS. A small sample of nurses completed a test questionnaire related to trauma management. The results showed a statistically significant improvement in test results after the course. The authors concluded that even abbreviated ATLS-based teaching improved theoretical knowledge for emergency nurses. Zuspan (1990) conducted a survey of how hospitals provided trauma knowledge to nurses in orientation and continuing education programs. Results showed that of trauma centers surveyed, most provided essential knowledge elements in orientation programs. A smaller percentage provided this information in continuing education. Only small percentage used both programs to educate nurses.

The literature clearly supports not only that skills and knowledge increase after trauma education but, in addition, studies also indicate high rates of satisfaction among health care providers after trauma courses. Physicians, nurses, EMT, and medical students consistently display increased comfort levels, improved assessment skills, less anxiety, and a better understanding of trauma care after trauma education (Campbell, Heal, Evans, Marriott, 2000), (Stewart, Paris & Heller, 1987) (Ben-Abraham et al., 2000) (Smith, Thompson, Shields, Manley & Haley, 1997), (Pollock, Brown, & Dunn, 1997), (Ali, Adam, Williams et al., (2002), (Kennedy & Gentleman, 2001). Understanding perceptions and attitudes of participants may provide valuable information that could increase attendance in trauma courses.

There are, however, other factors that affect participation in trauma education programs. Glaeser, Linzer, Tunik, Henderson, Ball. (2000) surveyed 18,000 EMTs regarding continuing education needs in pediatrics. Cost, availability, and travel distance were identified by all levels as the primary barriers to obtaining pediatric education. Esposito, Copass, & Maier (1992) reviewed participation records of ATLS courses for a four-year period. Results indicated participation of surgeons in ATLS courses is low, particularly among rural practitioners. Impetus for participation appeared to be related to requirements for hospital staff credentialing and preferences for treating patients with trauma. Esposito, Kuby, Unfred, Gamelli (1995) assessed Advanced Trauma Life Support (ATLS) training status of general surgeons, its perceived utility, and its relation

to clinical trauma practice. Only one-third of surgeons surveyed had taken the ATLS course within the past four years. Respondents who had not taken the course cited primary reasons related to relevance, redundancy, and credentialing. Inaccessibility, inconvenience, and cost were lesser factors. Richards, Panacek & Brofeldt, (2000) conducted a survey to determine differences in perspective towards ATLS between emergency medicine (EM) physicians and other specialties, and assess its value in the management of acute trauma. The authors concluded ATLS might not be useful for EM practitioners actively involved in trauma care and suggested omitting sections to shorten the course. Although there is limited information in this area, there is a strong suggestion that external factors affect participation in trauma courses. Political issues, perceptions of value, cost and accessibility have all been associated with pursuing further education in care of the injured patient.

## **Summary**

The literature review shows that improved knowledge, skill performance and test scores in trauma care have been associated with participation in trauma education programs. This effect has been clearly established in the EMS community, among residents and practicing physicians and, to a lesser degree, in the nursing profession. Furthermore, research throughout the evolution of EMS and trauma systems has demonstrated a relationship between provider attendance in education courses and reduced mortality and morbidity in critical trauma patients. Education courses have also correlated with a higher comfort level among trauma care professionals, an improvement in patient assessment skills, and reduced anxiety when caring for specific patient populations. Although trauma care providers have been shown to value trauma education, many barriers exist that prevent participation. Accessibility, perception of value, and cost have been reported as obstacles to attendance in trauma courses. There is little research to detail factors that improve the likelihood that trauma care providers will seek continuing education. Further research in this area would help determine methods to increase participation in trauma education.

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## Historical perspectives

Trauma systems exist for the purpose of reducing death and disability of injured people. An ideal trauma system consists of all the components associated with optimal care, such as prevention, pre hospital and hospital care, rehabilitation, research and evaluation and education.<sup>4</sup> The ACSCOT has long been recognized as a leader in the formation of trauma systems and set forth many of the original guidelines for trauma care. In 1976, the group outlined its trauma system recommendations in a document entitled *Optimal Hospital Resources for Care of the Injured Patient*. (to be referred to subsequently as *Optimal Resources*). The publication was followed by the development of a verification program for hospitals, a process by which the ACS confirms a hospital is performing as a trauma center and meets the criteria contained in the *Resources for Optimal Care of the Injured Patient* document.<sup>5</sup> An important part of the document was to identify categorizations of hospitals that care for trauma patients. The descriptions of the four levels of trauma centers are as follows:<sup>6</sup>

Level I-Provides comprehensive trauma care and leadership in education, research, and system planning  
Level II-Provides comprehensive trauma care as a supplement to level I centers or as a lead hospital in a less populated area  
Level III-Provides prompt assessment, resuscitation, surgery and stabilization with transfer to a level I or II as indicated  
Level IV-Provides advanced trauma life support prior to patient transfer in remote areas in which no higher level of care is available.

This document is updated every few years to reflect current trends and reflect research findings. Currently, all states utilize the guidelines of the ACSCOT as a foundation for their designation or certification process and many states use the ACS guidelines exclusively.<sup>7</sup>

The *Optimal Resources* guidelines include specific references to education for trauma professionals. From the beginning, ACS-COT recognized education programs for trauma professionals as a critical element of trauma care and trauma systems. The Advanced Trauma Life Support (ATLS) course was introduced by the ACSCOT in 1978 as a new approach to care for the major trauma victim. The course was based on the assumption that appropriate and timely care could significantly improve outcome of the injured patient. Subsequent research studies supported this assertion.<sup>8 9 10</sup> Following the success of the ATLS program, the ACSCOT developed the Basic Trauma Life Support course (BTLS) aimed at pre hospital providers. The ACSCOT *Optimal Resources* document was the first to integrate professional education into trauma center standards. The guidelines required ATLS certification for trauma surgeons and also mandated that other trauma professionals complete trauma education programs.<sup>11</sup> As trauma systems took hold and more hospitals sought verification as trauma centers, the need for focused trauma education for all levels of caregivers increased. Professional nursing groups and specialty organizations subsequently developed a variety of trauma courses for specific professional groups and patient populations. Today, there are

scores of trauma related courses and conferences available for the trauma professional. However, despite national research emphasizing the importance of trauma education and widespread acceptance of trauma courses, specific guidelines on the amount and type of training that should be required have not been established. There is also little data available on the methods that state, hospitals, and EMS programs use to educate trauma providers, maintain competency in trauma care, and establish quality improvement programs for education. This is an area that needs further definition and clarification to provide a guide for trauma centers and growing trauma systems.

### **Current Status of Trauma Education in Ohio and the Surrounding States**

Verification of the Nation's first trauma centers began in the late 1970s and early 1980s. The number of trauma centers has continued to grow over the past decade. A survey in 1991 found 471 trauma centers and a by 2002 , the number had grown to 1154 trauma centers.<sup>12</sup> Michigan, Kentucky and Indiana are three among only 15 states that have legislative authority to designate trauma centers and have conducted verification of trauma centers. West Virginia and Pennsylvania both have many elements of an organized trauma system in place and boast 14 and 25 trauma centers respectively.<sup>13</sup> Ohio's trauma legislation requires hospitals to be verified by the ACS as trauma centers or have provisional status through the Ohio Department of Health (ODH). The Ohio Revised Code grants a hospital provisional status if it has had a consultative visit from the ACS but has not yet been verified, is in the process of being re-verified, or has been cited by the ACS as having criteria deficiencies and is awaiting re-visit by the ACS.

Hospitals with provisional status or ACS verification both ultimately must meet the minimum education standards set forth by the ACS. Specifically, these education requirements mandate ATLS and 16 hours of CME annually for surgeons and emergency medicine physicians. Registered nurses in specific areas of the hospital are required to have trauma education of some type. Continuing education requirements mandate hospitals to provide trauma continuing education for physicians, nurses, allied health personnel, and prehospital personnel.<sup>14</sup>

Ohio has many well-organized trauma education programs to help fulfill these requirements. ATLS courses are provided throughout the state annually, primarily for physicians. Nursing trauma courses such as the Trauma Nursing Core Course (TNCC), Course in Advanced Trauma Nursing, and Advanced Trauma Course for Nurses (ATCN) are also available. Hospitals verified as trauma centers are required to provide basic and continuing education for staff members, as well as continuing education programs for the community. Most hospitals have annual trauma conferences aimed at all levels of health professionals, as well as many other types of educational programs and training sessions. EMT education is available in each region through EMS regional training centers, which provide training and certification for EMS providers at the level of First Responder, Basic Intermediate, and Paramedic.<sup>15</sup> Each level of EMT training contains some trauma content that tends to differ somewhat among regions. Surrounding states also host conferences and courses that are often available to Ohio residents.

Despite the existence of formal training programs and continuing education programs, there has been no comprehensive statewide data describing the quantity or availability of trauma education programs in and around Ohio. There is little published statewide data that indicates the number of physicians, emergency medical technicians (EMT), and registered nurses (RN) that have received training. . Programs are, by nature, concentrated in urban areas, however there is no clear picture of availability and accessibility of programs in rural areas. Financial aspects of trauma education are also not well defined. It is not clear what costs of education are borne by the participant and whether costs deter attendance. Some organizations provide financial support for attending conferences, yet others do not. Also unknown is the precise impact of trauma education costs on the part of hospitals and trauma centers. While this study does not specifically address cost, the information gleaned from this project may highlight future research needs in this area. This study seeks to evaluate the current situation with regard to trauma education in Ohio to determine whether essential trauma education is available and accessible for trauma professionals.

### **Current Status of the Topic Nationally**

Trauma centers in the US can be categorized into three groups: (1) centers that are designated or verified by a state or regional authority only; (2) centers that are both designated by a state or regional authority, as well as verified by the ACSCOT; and (3) centers that are verified by the ACS/COT, but located in states that do not formally designate or verify trauma centers.<sup>16</sup> Currently in the U.S., 35 states and the District of Columbia have formally designated or certified trauma centers, every state has at least one trauma center, and all states use an ACS based system.<sup>17</sup> Therefore, trauma centers and state trauma systems across the nation must meet educational requirements similar to those outlined in the Optimal Resources document. States with legislative authority often make education requirements a part of the law. ACS trauma center requirements provide a basis for trauma educational programs, but there is little specific research or guidelines detailing the specifics of how each state addresses educational issues. For example, it is not known if a small number of hospitals provide training for a majority of the state trauma professionals, or if all hospitals share the burden of training and continuing education equally. EMS providers can be educated at regional EMS training centers or through hospital programs. Hospital personnel are required to have trauma education by the ACS but it is not known if hospitals provide that education internally, or if there are other ways to meet the standard. Since the standards are not specific, hospitals' education programs could vary widely. Hospitals may use specialty education course like TNCC for their educational requirements or they may use others. Financial considerations and the impact of trauma education costs are also not known. The lack of information in these areas suggests a need for more in depth study. States and regional trauma systems are currently grappling with many financial issues affecting the viability of trauma centers. Education programs may be the first to suffer if cutbacks are made. There is little national data on how education programs are affected by financial crises, and scant information on how to sustain

education in an environment of shrinking resources for trauma systems. States with developing trauma systems should take steps early on to address educational issues.

### **Future Trends Both Regionally and Nationally**

The National Highway Traffic Safety Administration (NHTSA) Department of Transportation (DOT) has outlined future goals for trauma systems in the *Trauma System-Agenda for the Future* published in October 2002. Several recommendations relate specifically to education. The DOT goals state, “ the number of injuries and trauma cases will be reduced through education and training of clinicians, management and administrative personnel, volunteers, community support groups, potential "bystanders," and other key constituency groups.”<sup>18</sup> The document recommended increased training for all healthcare professionals in injury care, and inclusion of trauma and injury prevention in physician, nursing, EMS, and allied health schools. Further guidelines emphasized the need for accessible professional education opportunities for continuing education in injury care. The Emergency Medical Services for Children (EMSC) program has also identified goals related to education.<sup>19</sup> EMSC’s education goals are focused on all pediatric emergency care to include trauma. They suggest developing education standards for pediatric injury training and integrating injury prevention into EMS education. While these goals are broad, they provide structure and reiterate the ideal elements of trauma education.

The ACS authored a document in 1996 called *Consultation for Trauma Systems* to help trauma systems address all aspects of a trauma system. The ACS identified more specific goals related to education stating that trauma systems must have adequate education programs, as well as formal education standards for all trauma care providers in the system. This includes both pre-hospital and hospital caregivers. The document also recommended that there be a quality management plan for trauma education programs and a needs assessment prior to developing new or additional education activities. Finally, there was an emphasis on integrating injury control into education standards.<sup>20</sup> These guidelines likely represent future directions in trauma education.

Evaluation of a state trauma system must include a thorough assessment of education issues to include cost of trauma education. The Model Trauma Care Systems Plan (MTCSP) was developed under the Trauma Care and Systems Planning and Development Act of 1990 to provide a guide for states in the development of comprehensive trauma systems. The plan emphasizes that a trauma system must define, describe and estimate certification and education levels of all pre-hospital personnel, hospital caregivers and physicians.<sup>21</sup> The MTCSP also suggests that assessment of requirements for pre-hospital and hospital personnel be based on outcome analysis. The document further recommends adopting statewide education standards for pre-hospital providers.

An effort to address the financial burden of trauma education and system development recently emerged from the Texas Trauma system. Texas passed legislation that established the EMS and Trauma Care System Fund for continued development of the

Texas Trauma System. This included funds for improvement in EMS education.<sup>22</sup> Another study out of Texas addressed the possibility of using distance education to train EMS caregivers in rural areas. The study concluded that distance education may be an acceptable method and recommended increases in funding for distance education classes.<sup>23</sup> Creative strategies for the future will be needed to address education needs.

### **Financial Issues and Considerations**

Education programs are an integral part of a state or local trauma system. Implementation of a trauma system or an elevation of a hospital's trauma center status inherently dictates changes in education needs and may have an impact on EMS agencies and hospitals statewide. A growing state or regional trauma system must anticipate costs for professional courses and continuing education in trauma. Institutions seeking trauma center verification must include a budget for trauma training and continuing education. Specialty training courses like ATLS, TNCC and BTLIS can be expensive, and additional hospital trauma training associated with trauma center status also requires funding. Cost may be absorbed by the state or regional trauma system, hospital or EMS program, or by the individual. The success of an individual hospital program or a statewide system in terms of reducing mortality and morbidity could be affected by the financial commitment of hospitals and emergency medical systems.

Trauma centers around the country have cited lack of funding as a considerable barrier to trauma system development. In a 2002 survey of state trauma systems, only 38% of states with legislated trauma systems had a dedicated funding source for system administrative expenses.<sup>24</sup> There is little guidance to help hospitals and evolving trauma systems anticipate education related costs. Strategies to facilitate trauma system development include changes in financial programs that recognize the financial needs of trauma centers.<sup>25</sup> Lack of a consistent funding source will eventually take its toll on education programs. In a recent survey, 74% of states report serious economic issues that impede trauma system development.<sup>26</sup> Some states have found funding solutions through legislative action. Traffic fines license surcharges, tobacco settlement fund and property taxes have all been used to fund trauma systems. Several states are attempting to fund trauma care through cigarette, alcohol and firearms taxes.<sup>27</sup> Improvements in trauma systems of the future will likely seek legislative changes that require funding for trauma system administration and education programs. Education funding represents a small part of the financial challenges facing trauma centers. Ohio is in the early states of trauma system development and educational assessment. It is likely that trauma system development will have to address funding of system costs including education for trauma professionals.

### **Legislative and Regulatory Issues and Considerations**

Sustainable trauma systems require legislative authority to address organizational and funding issues.<sup>28</sup> Most systems require comprehensive statutes and regulations to institute trauma system elements.<sup>29</sup> States must consider whether legislative changes are necessary in order to improve trauma care. Research in the area of education will

help determine if the state should initiate more specific requirements for professional education. Some states have begun updating legislation to reflect identified needs of the system. Previous examples in this report have cited such funding and education initiatives. Ohio has taken first steps in legislating a comprehensive trauma system. Future changes may include legislative initiatives to modify the existing educational component of the system.

### **Data and Information Issues and Considerations (Methodology)**

Surveys were developed for EMS providers first with the intent of collecting a variety of information about trauma education. Questions were designed by the research group and an experienced statistician to describe the types of trauma education courses that are utilized in Ohio, delineate barriers to education, determine perceptions about trauma education, and identify the number of providers that have attended trauma courses. The survey was developed by a statistician using a Likart Scale and a ranking procedure. Demographics were also collected including region and county of the respondent. There was a section available for write-in comments. The nurse and physician survey were adapted from the EMS questionnaire to match specifics of those groups.

**EMS surveys:** A total of 2500 surveys were sent in a one-time mailing to the randomly selected EMS providers in each of Ohio's 10 HSA regions. A comprehensive mailing list provided by the Ohio Department of Public Safety (ODPS), Division of EMS was used to distribute surveys. Following the initial mailing, there was a follow-up card sent reminding respondents to return the survey. Of 2500 surveys distributed, 653 were returned representing a return rate of 25%. Return rate ranged from 16-34% by region. When evaluated based on population density category, the survey return rate ranged from 54-70%. (Appendix A: Distribution of All Survey Respondents by HSA Region and by County) (Appendix C EMS Survey)

**Nurse surveys:** There was no comprehensive list of trauma nurses available for this survey. To reach nurses who care for trauma patients, 50 surveys, cover letters and return mailers were sent to all 170 hospitals in Ohio totaling 8,500 surveys. A contact person at each facility was designated (the ED nurse manager) to distribute and collect surveys. The collection was set for approximately three weeks after the receiving date. The Ohio Society of Trauma Nurse Coordinators (OSTNC) promoted the survey process at their respective hospitals, and at hospitals in their regions that did not have Trauma Nurse Coordinators. The return rate was 10% with 866 surveys being returned. Survey responses were distributed across all ten regions and represented rural and urban hospitals. Return envelopes indicated the region but the hospital was not identified. Although survey envelopes did not indicate which hospital responded, respondents identified their county on the survey so that a general distribution pattern could be established. (Appendix B: Distribution of RN Survey Respondents by HSA Region and by County), (Appendix D: Nurse Survey)

**Physician surveys:** Two lists were initially used for mailing surveys to Ohio physicians. A list of Ohio EMS Medical Directors came from the ODPS. The second list came from

the Ohio ACS. The two lists were combined in an Excel file. A total of 1194 surveys were mailed from randomly selected names on these lists. A second mailing of 297 surveys was completed using contact information from the ACEP directory after concern that the first mailing was not representative enough of trauma physicians. The additional physicians to be surveyed were selected randomly and checked to avoid name duplication. A total of 1,490 surveys were distributed to physicians. As a result of random selection of physicians, surveys were not distributed evenly over the regions. Number of surveys sent to regions ranged from 45 for region 3 to 273 for region 5. There were 385 responses for a return rate of 25% with a range by region of 5-31%. (Appendix E: Physician Survey).

All survey results were entered into an Excel database by experienced trauma registrars. Spreadsheets were collated and sent to a statistician who completed data analysis using qualitative and quantitative methodologies. Results were compared based on population density, profession and region. Criteria of .001 were used to adjust for multiple comparisons ( $p < .001$ ). Missing data was not included in the Chi-square analysis. Not every respondent answered all of the questions, so totals do not always add up to 100%. The survey looked at primary barriers only. In the interpretations of the data, "strongly agree" and "agree" were combined when calculating the percentage that supported a statement from the survey.

**Regional Training Centers:** One training center was contacted in each region. A phone survey was conducted and information was gathered regarding regional trauma training information. The number of trauma hours in both training courses and recertification programs was documented. Contacts for Ohio courses (TNCC, BTLS, PHTLS, PALS) were contacted and information on numbers of courses and participants was collected for the year that was available.

**Trauma Courses:** A contact person for each course was located and information regarding number of courses offered, number of participants, and number of instructors was obtained. The goal was to document frequency of courses and course attendance for the past five years. This data was not readily available. Data were collected in a tabular format. Follow up phone calls and emails were done to attempt to locate more information. Some course information was also located on the Internet. Information was crosschecked with trauma coordinators and reported with the greatest accuracy possible.

**Stakeholders' Meeting:** A luncheon meeting was held with fifty-six (56) members of the EMS Board and the Trauma Committee during their annual retreat in Columbus, Ohio on January 29, 2003. Vickie Graymire RN, MS, Co-investigator for the grant project met with the members and coordinated an open discussion about trauma education for providers in the State of Ohio. There was a list of 11 questions presented for discussion. These questions were adapted from the questionnaires sent to the providers throughout the state to allow for a comparison of responses. Responses were documented on site at the meeting and a summary was generated shortly thereafter.

## Strengths of the Study

- Collaboration of persons from varying areas of expertise (physician, nurses, registrars, statistician), and representation from all areas of Ohio
- Leadership skills of principle investigator in relation to defining goals, problem resolution, and meeting deadlines
- Continuity of communication via e-mail
- Central location for returning all surveys
- Distribution of completed surveys to appropriate region
- Manageability of sending and processing surveys due to dividing the project between regions and disciplines
- Excellent distribution of EMS responses by region and by level of training. Good representative sample
- Strong expertise in data analysis by statistician
- Creativity in solving problems related to distribution of surveys to nurses and physicians

## Weaknesses of the Study

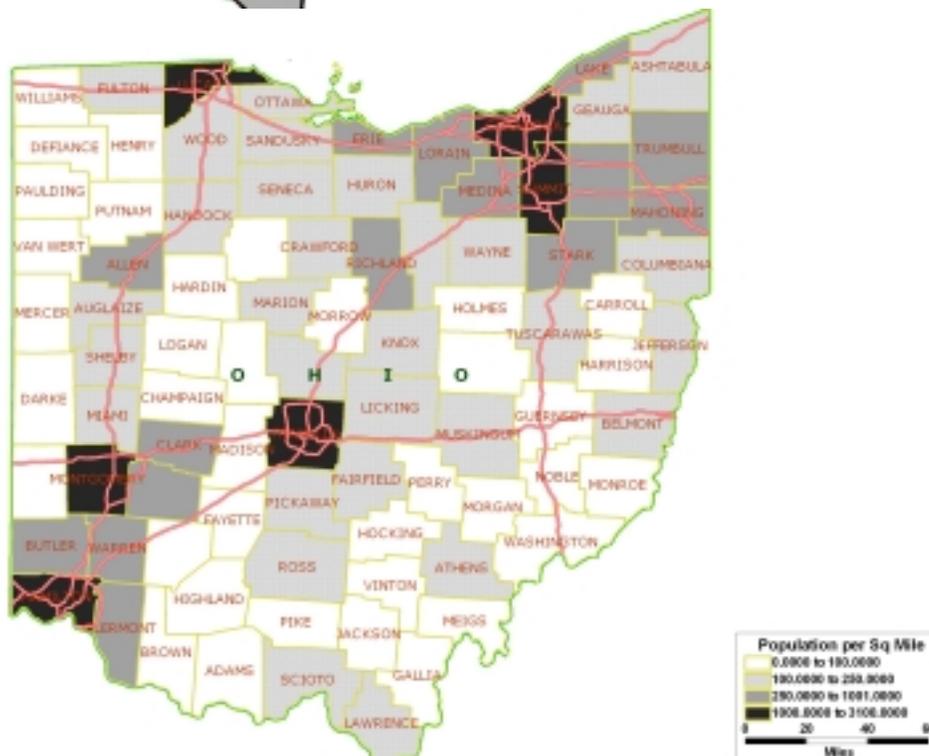
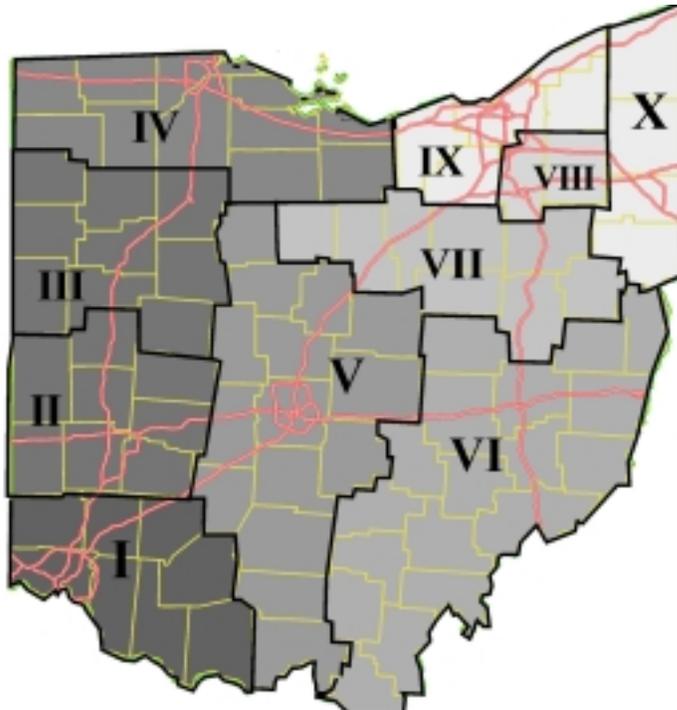
- Difficulty acquiring updated listings of EMS, Nursing, and Medical personnel
- Initial gross under-estimate of postage expense
- Time and expense of doing the mailings. Volunteers for this activity could have been used
- Printing of electronically transferred files, which 'dropped' check boxes from some questions on the survey
- An error on the survey question related to ranking barriers. Instructions said to rank 1-6, but there were 7 potential barriers listed
- Inability to identify which hospitals nursing surveys were returned from. Unclear if all hospitals are represented in the results
- Significant out-of-pocket postage expenses for which reimbursement was delayed
- Lack of mechanism in survey to indicate *when* trauma courses had been taken. Trauma courses could have been taken years ago and study would not detect it
- Relying on nurse manager to distribute and collect surveys could have introduced a possible bias as opposed to direct mailing to individual nurses
- Nurse surveys were returned to the nurse manager and this could have inhibited respondents from giving true opinions
- Training centers do not keep records to clearly address the number of trauma hours that are available. Phone contact was difficult and information was gathered from the first training center that was willing and able to share the information. Information may be incomplete or not representative of all other training centers. Sampling method was not truly randomized
- Trauma course information (number of students, instructors and courses) was not available for the past 5 years. Data collected for current year only
- Physician surveys were sent out but respondents were not randomized
- Return rates for physician surveys ranged from 5-31% per region. Some regions may not have had enough data to draw conclusions.
- Some categories of physicians may have been omitted due to difficulty in finding accurate list of physicians. Bias could exist by specialty

- Data entry done by multiple trauma registrars; interpretation of survey responses could have been different resulting in inconsistent data

## Data Analysis

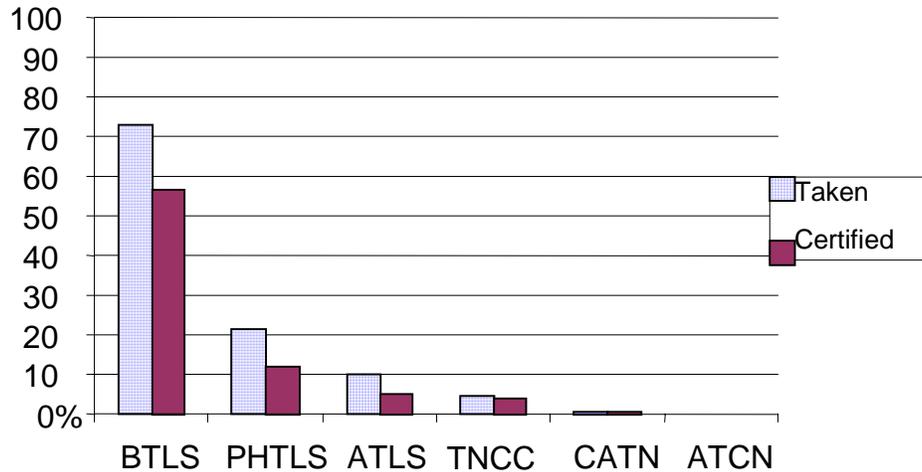
The survey results for EMS, RN, and MDs are broken out by overall state results, region, and population density.

The following maps illustrate the subcategories for the subsequent tables and figures.



# EMS Survey Results

## Trauma Courses

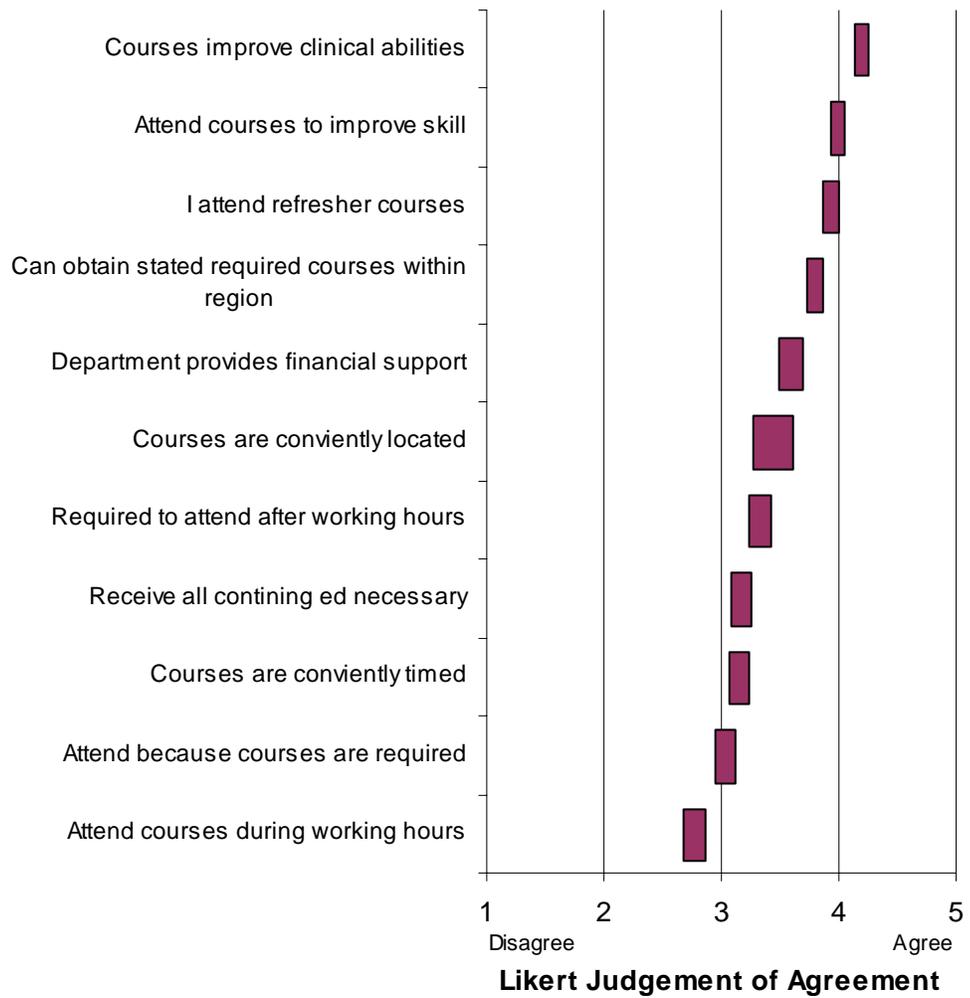


Region	Percent respondents took the test						At least one	Total Respondents
	BTLS	PHTLS	ATLS	TNCC	CATN	ATCN		
1	78.9%*	17.1%	5.3%	1.3%	0.0%	0.0%	61	76
2	69.6%	23.2%	7.2%	4.3%	0.0%	1.4%	52	69
3	50.9%	25.5%	1.8%	7.3%	0.0%	0.0%	37	55
4	69.4%	12.9%	9.7%	8.1%	0.0%	0.0%	47	62
5	83.8%	27.9%	14.7%	5.9%	0.0%	0.0%	58	68
6	77.9%	20.9%	10.5%	9.3%	2.3%	0.0%	70	86
7	80.6%	16.7%	9.7%	4.2%	1.4%	0.0%	58	72
8	84.4%	21.9%	15.6%	0.0%	0.0%	0.0%	58	64
9	64.3%	11.9%	7.1%	2.4%	0.0%	0.0%	28	42
10	59.3%	39.0%	15.3%	1.7%	0.0%	0.0%	41	59
Total	73.0%	21.7%	9.8%	4.6%	0.5%	0.2%	510	653

\*100 times number of EMS who took BTLS (60) divided by total respondents in Region 1 (76)

Note: BTLS=Basic Trauma Life Support; PHTLS=Pre Hospital Trauma Life Support; ATLS=Advanced Trauma Life Support Course; CATN=Course in Advanced Trauma Nursing; ATCN=Advanced Trauma Care for Nurses

Region	Percent Respondents Certified						At least one	Total Respondents
	BTLS	PHTLS	ATLS	TNCC	CATN	ATCN		
1	57.9%	7.9%	2.6%	1.3%	0.0%	0.0%	46	76
2	49.3%	13.0%	4.3%	4.3%	0.0%	1.4%	40	69
3	45.5%	21.8%	0.0%	7.3%	0.0%	0.0%	34	55
4	54.8%	4.8%	4.8%	3.2%	0.0%	0.0%	38	62
5	60.3%	16.2%	7.4%	4.4%	0.0%	0.0%	45	68
6	59.3%	11.6%	4.7%	8.1%	2.3%	0.0%	57	86
7	63.9%	9.7%	8.3%	4.2%	1.4%	0.0%	48	72
8	70.3%	10.9%	12.5%	0.0%	0.0%	0.0%	48	64
9	52.4%	2.4%	2.4%	2.4%	0.0%	0.0%	23	42
10	45.8%	22.0%	1.7%	1.7%	0.0%	0.0%	34	59
Total	56.5%	12.1%	5.1%	3.8%	0.5%	0.2%	413	653

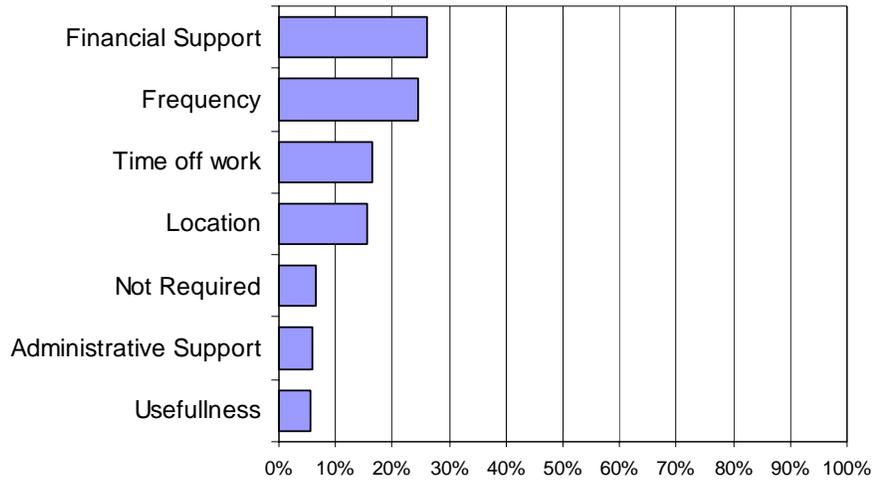


Considering your ability to attend trauma EMS education do agree or disagree with the following statements? Responses grouped by Region.

	Receive all continuing education necessary					Attend courses to improve skill				
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	6.8	27.0	29.7	28.4	8.1	0.0	6.7	12.0	61.3	20.0
2	2.9	27.5	20.3	40.6	8.7	1.4	7.2	7.2	68.1	15.9
3		37.7	18.9	34.0	9.4	0.0	7.3	9.1	61.8	21.8
4	6.6	31.1	18.0	32.8	11.5	1.6	6.6	8.2	59.0	24.6
5	1.5	33.8	14.7	44.1	5.9	1.5	2.9	20.6	52.9	22.1
6	4.7	43.5	23.5	23.5	4.7	2.4	1.2	12.9	61.2	22.4
7	5.6	26.8	25.4	36.6	5.6	1.4	1.4	9.9	62.0	25.4
8	3.1	18.8	29.7	39.1	9.4	1.6	4.7	9.4	60.9	23.4
9	4.9	22.0	29.3	36.6	7.3	0.0	4.9	12.2	65.9	17.1
10	8.6	25.9	29.3	27.6	8.6	1.7	1.7	13.8	65.5	17.2
Total	4.5	30.0	23.8	34.0	7.8	1.2	4.3	11.6	61.7	21.2
Region	Department provides financial support					Required to attend after working hours				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	12.2	10.8	14.9	41.9	20.3	9.3	20.0	29.3	26.7	14.7
2	9.0	4.5	6.0	59.7	20.9	7.6	18.2	30.3	28.8	15.2
3	5.5	10.9	12.7	43.6	27.3	5.7	17.0	32.1	32.1	13.2
4	12.9	9.7	12.9	45.2	19.4	5.0	15.0	33.3	23.3	23.3
5	7.4	10.3	19.1	38.2	25.0	17.6	26.5	23.5	26.5	5.9
6	8.2	18.8	12.9	41.2	18.8	4.8	21.4	15.5	32.1	26.2
7	16.9	9.9	11.3	40.8	21.1	5.6	9.7	25.0	36.1	23.6
8	10.9	7.8	15.6	45.3	20.3	12.7	28.6	9.5	41.3	7.9
9	7.1	21.4	9.5	47.6	14.3	4.9	22.0	34.1	29.3	9.8
10	13.8	13.8	19.0	31.0	22.4	6.9	12.1	32.8	27.6	20.7
Total	10.5	11.6	13.5	43.3	21.1	8.1	19.1	25.8	30.5	16.6
	Attend courses during working hours					Courses are conveniently located				
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	18.9	28.4	21.6	24.3	6.8	6.7	18.7	22.7	38.7	13.3
2	19.4	32.8	22.4	23.9	1.5	5.9	17.6	20.6	51.5	2.9
3	20.8	32.1	26.4	17.0	3.8	3.7	25.9	22.2	38.9	9.3
4	20.0	30.0	25.0	21.7	3.3	11.3	11.3	19.4	48.4	9.7
5	7.4	16.2	26.5	35.3	14.7		16.2	20.6	52.9	10.3
6	20.2	28.6	32.1	16.7	2.4	11.9	27.4	27.4	28.6	4.8
7	25.4	28.2	26.8	16.9	2.8	8.3	20.8	25.0	36.1	9.7
8	12.7	28.6	19.0	28.6	11.1	1.6	17.5	15.9	52.4	12.7
9	7.5	20.0	32.5	37.5	2.5	2.4	16.7	28.6	47.6	4.8
10	24.1	24.1	34.5	15.5	1.7	10.3	24.1	25.9	31.0	8.6
Total	18.0	27.1	26.5	23.2	5.2	6.5	19.8	22.8	42.1	8.7

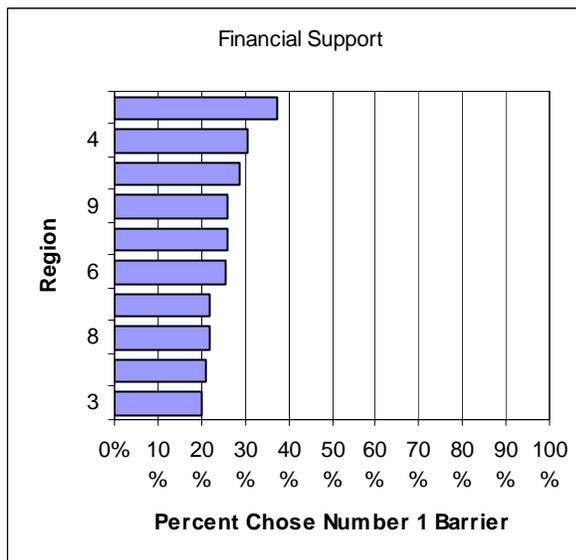
	Courses are conveniently timed					Can obtain stated required courses within region				
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	5.3	25.3	30.7	30.7	8.0	0.0	6.7	14.7	57.3	21.3
2	4.3	23.2	26.1	44.9	1.4	1.4	5.8	13.0	66.7	13.0
3	9.1	20.0	16.4	50.9	3.6	1.8	12.7	14.5	61.8	9.1
4	10.0	15.0	36.7	30.0	8.3	3.2	8.1	9.7	62.9	16.1
5		10.3	39.7	39.7	10.3	2.9	5.9	10.3	67.6	13.2
6	9.5	32.1	31.0	25.0	2.4	7.1	17.6	17.6	48.2	9.4
7	11.3	26.8	28.2	26.8	7.0	5.6	15.3	8.3	52.8	18.1
8	3.3	16.4	31.1	39.3	9.8	1.6	11.3	11.3	53.2	22.6
9	7.1	21.4	28.6	40.5	2.4	0.0	2.4	16.7	69.0	11.9
10	10.3	32.8	29.3	22.4	5.2	3.4	10.3	13.8	53.4	19.0
Total	7.0	22.7	30.0	34.4	5.9	2.9	10.0	13.0	58.6	15.4
	Courses improve clinical abilities					I attend refresher courses				
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	0.0	1.3	2.7	56.0	40.0	1.3	12.0	10.7	45.3	30.7
2	1.5	0.0	10.3	63.2	25.0	1.5	10.4	14.9	55.2	17.9
3	0.0	1.8	7.3	56.4	34.5	3.7	16.7	9.3	51.9	18.5
4	0.0	0.0	14.8	50.8	34.4	1.7	3.3	5.0	61.7	28.3
5	0.0	1.5	7.4	58.8	32.4	4.5	11.9	9.0	59.7	14.9
6	0.0	0.0	12.9	56.5	30.6	0.0	4.8	3.6	64.3	27.4
7	0.0	1.4	8.3	68.1	22.2	0.0	9.7	9.7	62.5	18.1
8	0.0	1.6	9.5	47.6	41.3	0.0	0.0	14.5	61.3	24.2
9	0.0	2.4	14.3	61.9	21.4	0.0	2.4	16.7	59.5	21.4
10	0.0	1.7	13.8	58.6	25.9	5.2	5.2	15.5	50.0	24.1
Total	0.2	1.1	9.9	57.8	31.1	1.7	7.8	10.5	57.3	22.8
	Attend because courses are required									
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree					
1	8.1	35.1	20.3	31.1	5.4					
2	13.2	29.4	22.1	27.9	7.4					
3	9.3	35.2	22.2	27.8	5.6					
4	11.7	16.7	25.0	38.3	8.3					
5	4.4	27.9	27.9	35.3	4.4					
6	5.9	36.5	27.1	22.4	8.2					
7	11.1	29.2	20.8	30.6	8.3					
8	8.1	17.7	27.4	38.7	8.1					
9	4.8	19.0	33.3	28.6	14.3					
10	13.8	27.6	31.0	24.1	3.4					
Total	9.0	28.1	25.3	30.3	7.2					

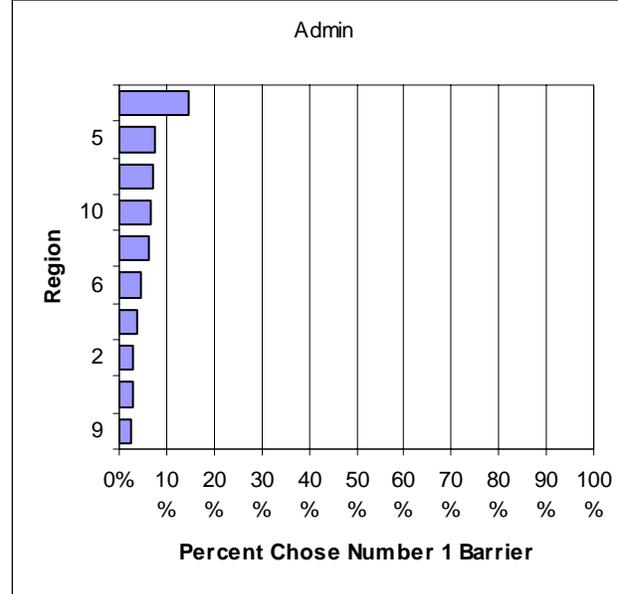
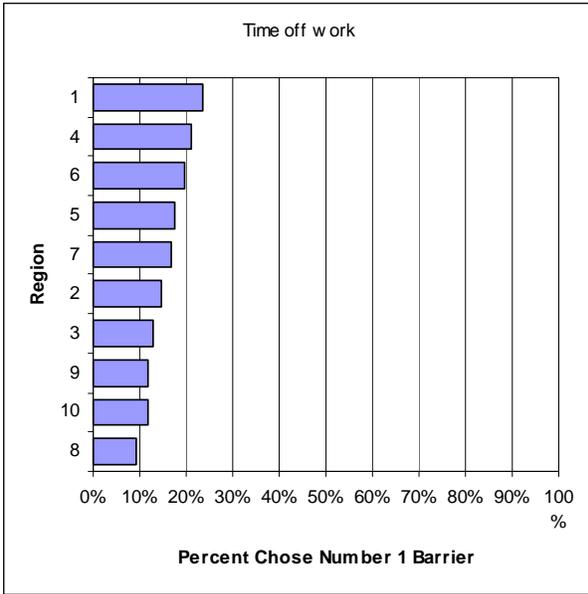
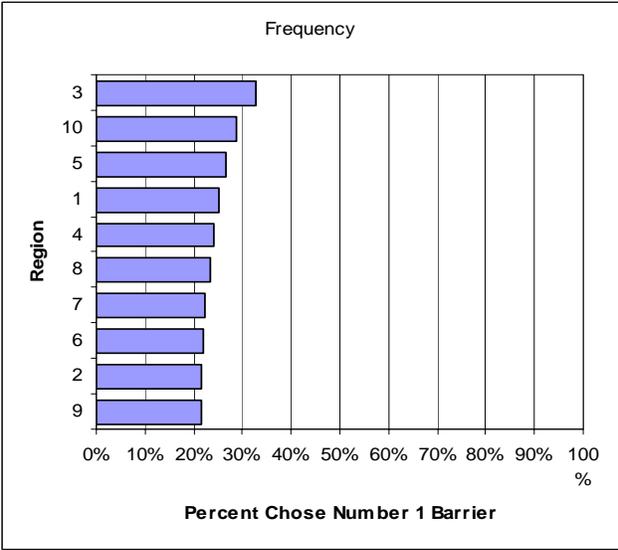
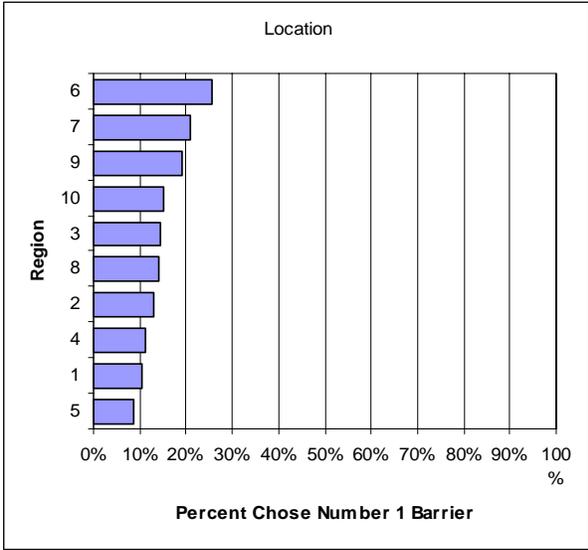
### Statewide Barriers to EMS Education

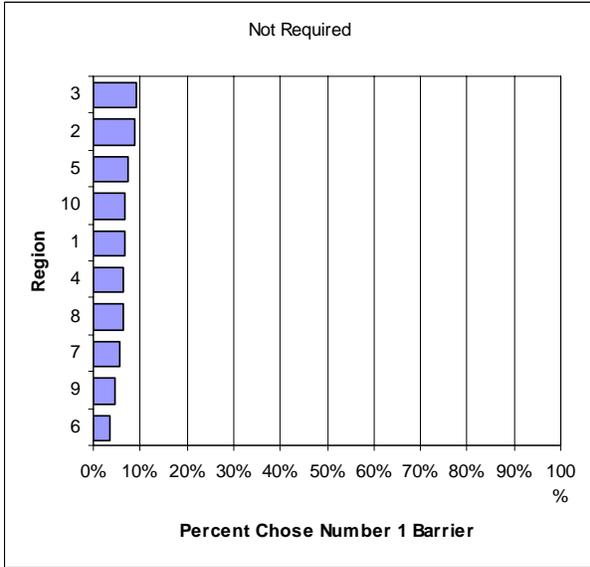
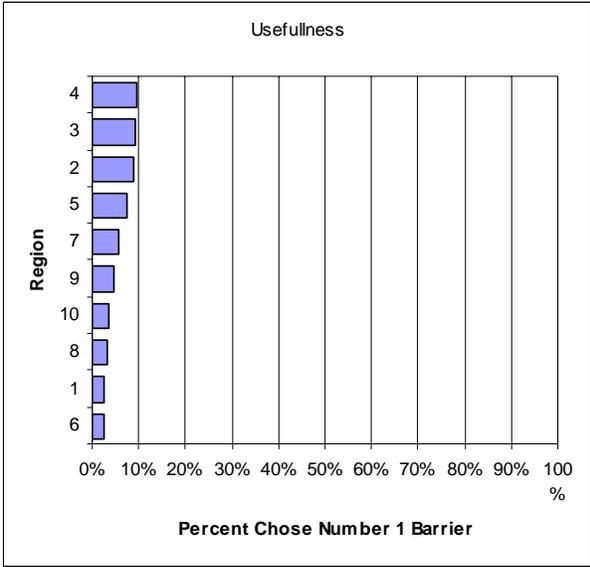


Percentage of barriers ranked as the number 1 barrier to obtaining Education.

Region	Financial Support	Frequency	Time off work	Location	Not Required	Admin Support	Usefulness	Total Responded	At least one barrier
1	21%	25%	24%	11%	7%	4%	3%	76	67
2	26%	22%	14%	13%	9%	3%	9%	69	60
3	20%	33%	13%	15%	9%	7%	9%	55	49
4	31%	24%	21%	11%	6%	15%	10%	62	52
5	22%	26%	18%	9%	7%	7%	7%	68	59
6	26%	22%	20%	26%	3%	5%	2%	86	74
7	38%	22%	17%	21%	6%	3%	6%	72	66
8	22%	23%	9%	14%	6%	6%	3%	64	51
9	26%	21%	12%	19%	5%	2%	5%	42	36
10	29%	29%	12%	15%	7%	7%	3%	59	54
	170	161	107	101	42	38	36	653	568







## EMS Personnel Responses Categorized by County Population Density

Counties were divided by population density based on the 2000 Census. The categories are 0 to 100 people per square mile (Rural), 100 to 250 (semi-rural), 250 – 1000 (semi urban), and greater than 1000 people per square mile (urban). The category definitions were arbitrarily defined.

### Population distribution in the density categories

People/Sq Mile	Number of Counties	Number of Survey Respondents*			Ohio Population
		EMS	RN	MD	
Rural (0 – 100 people/Sq Mile)	37	136	134	33	1,219,180
Semi-Rural (100-250)	30	176	184	61	2,313,915
Semi-Urban (250 – 1000)	15	165	257	60	2,954,771
Urban (1000+)	6	156	262	224	4,865,274

\*Survey respondents reported where they worked.

### Percent of EMS personnel attending at least one class

Population Density	BTLS	PHTLS	ATLS	TNCC	CATN	ATCN	Total Respondents	Attended at least one class
0 - 100 people/sq mile	74%*	18%	7%	5%	1%	0%	136	105
100-250	71%	22%	10%	5%	0%	0%	176	134
250 - 1000	69%	22%	9%	2%	0%	1%	165	125
1000+	81%	22%	14%	4%	0%	0%	156	132
Number Respondents	465	135	64	26	1	1	633	496

\*100 time number attending BTLS(100) divided by total respondents in rural areas (136)

### Percent of EMS personnel certified in each program.

Population Density	BTLS	PHTLS	ATLS	TNCC	CATN	ATCN	Total Respondents	Total giving at least one response
0 - 100 people/sq mile	62%	12%	4%	5%	1%	0%	136	91
100-250	54%	13%	3%	3%	0%	0%	176	108
250 - 1000	50%	10%	4%	2%	0%	1%	165	94
1000+	64%	13%	9%	3%	0%	0%	156	108
Number Respondents	362	75	33	21	1	1	633	401

Considering your ability to attend trauma EMS education do agree or disagree with the following statements? Responses grouped by population density (refer to the map) 0-250 would be considered rural areas.

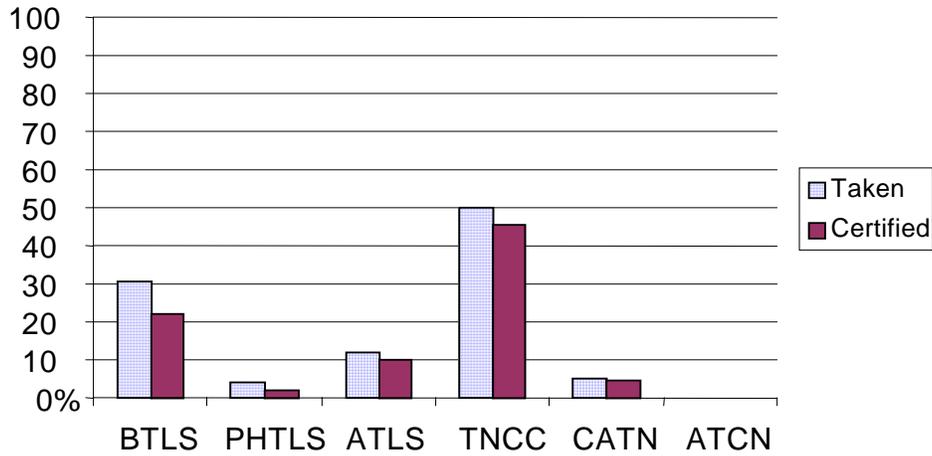
	Receive all continuing ed necessary					Attend courses to improve skill				
People/Sq Mile	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
0 - 100	4.4	37.0	23.0	30.4	5.2	2.2	3.7	8.2	64.9	20.9
100-250	2.3	30.7	21.6	38.1	7.4		3.4	10.3	61.7	24.6
250 - 1000	6.2	28.6	29.8	28.0	7.5	1.8	4.8	11.5	57.0	24.8
1000+	5.8	24.0	20.8	39.0	10.4	1.3	4.5	16.1	63.2	14.8
	4.6	29.9	23.8	34.0	7.7	1.3	4.1	11.6	61.5	21.5
	Department provides financial support					Required to attend after working hours				
People/Sq Mile	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
0 - 100	8.1	14.0	13.2	47.8	16.9	6.7	17.0	28.9	30.4	17.0
100-250	9.7	11.4	13.6	40.3	25.0	8.8	13.5	26.9	28.7	22.2
250 - 1000	13.0	6.2	13.0	42.6	25.3	8.0	17.2	28.2	30.1	16.6
1000+	11.0	14.9	12.3	44.8	16.9	9.1	29.2	19.5	32.5	9.7
	10.5	11.5	13.1	43.6	21.3	8.2	19.1	25.8	30.3	16.5
	Attend courses during working hours					Courses are conveniently located				
People/Sq Mile	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
0 - 100	20.7	35.6	25.2	17.8	0.7	10.4	28.1	24.4	31.1	5.9
100-250	18.8	25.3	30.0	19.4	6.5	5.1	22.9	22.9	39.4	9.1
250 - 1000	19.9	28.0	28.6	20.5	3.1	8.6	15.3	22.7	44.2	9.2
1000+	13.5	19.4	20.0	36.8	10.3	1.9	13.5	21.2	52.6	10.9
	18.2	26.7	26.1	23.7	5.3	6.4	19.7	22.7	42.1	8.9
	Courses are conveniently timed					Can obtain stated required courses within region				
People/Sq Mile	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
0 - 100	6.7	26.7	32.6	30.4	3.7	3.7	13.2	20.6	52.2	10.3
100-250	5.7	26.3	26.9	34.9	6.3	2.3	14.2	9.7	60.2	13.6
250 - 1000	10.5	22.2	27.8	33.3	6.2	3.0	6.7	11.6	56.7	22.0
1000+	4.5	16.2	33.8	37.7	7.8	2.6	5.8	11.6	63.9	16.1
	6.9	22.8	30.0	34.2	6.1	2.9	10.0	13.0	58.5	15.7
	Courses improve clinical abilities					I attend refresher courses				
People/Sq Mile	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
0 - 100	0.0	0.7	10.3	61.0	27.9	1.5	10.4	9.7	55.2	23.1
100-250	0.0	0.6	12.0	54.3	33.1	2.9	9.1	6.3	58.9	22.9
250 - 1000	0.6	1.8	9.1	56.7	31.7	1.8	6.1	16.0	50.9	25.2
1000+	0.0	0.6	7.7	60.6	31.0	0.7	6.5	9.8	64.7	18.3
	0.2	1.0	9.8	57.9	31.1	1.8	8.0	10.4	57.4	22.4
	Attend because courses are required									
People/Sq Mile	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree					
0 - 100	9.6	30.1	28.7	27.2	4.4					
100-250	8.7	31.2	24.9	28.3	6.9					
250 - 1000	12.3	28.2	25.2	29.4	4.9					
1000+	6.5	20.6	23.2	38.1	11.6					
	9.3	27.6	25.4	30.8	7.0					

Barriers to education. Respondents ranked the barriers. The following table represents the percentage of barriers that were ranked number one with in population density category.

Population Density	Location	Frequency	Time off work	Financial Support	Admin	Usefulness	Not Required	Total Responded	At least one barrier
0 - 100	19%	26%	25%	15%	6%	4%	7%	136	122
100-250	16%	26%	28%	15%	8%	7%	5%	176	154
250 - 1000	15%	24%	33%	15%	4%	4%	9%	165	149
1000+	12%	25%	20%	21%	6%	7%	5%	156	132
Number of Responses	98	159	168	103	38	36	42	633	557

# RN Responses

## Trauma Courses



### Percent courses taken by RNs by HSA Region

Region	BTLS	PHTLS	ATLS	TNCC	CATN	ATCN	At least one	Total Respondents
1	34.0%*	2.1%	16.0%	47.9%	4.3%	0.0%	66	94
2	31.2%	2.6%	31.2%	79.2%	24.7%	0.0%	66	77
3	20.4%	1.1%	5.4%	68.8%	1.1%	0.0%	68	93
4	35.9%	2.9%	10.7%	31.1%	0.0%	0.0%	63	103
5	22.8%	4.0%	10.9%	40.6%	3.0%	0.0%	54	101
6	10.7%	0.0%	7.1%	67.9%	7.1%	0.0%	22	28
7	32.7%	4.5%	7.3%	58.2%	9.1%	0.0%	81	110
8	35.7%	7.1%	12.9%	60.0%	2.9%	1.4%	51	70
9	39.6%	4.9%	9.0%	40.3%	0.7%	0.0%	94	144
10	13.0%	8.7%	8.7%	15.2%	2.2%	2.2%	16	46
Total	30.3%	3.8%	11.8%	50.0%	5.0%	0.2%	581	866

\*100 times number of RNs taking BTLS (32) divided by total RN respondents in Region 1.

### Percent certified in each of the courses by HSA Region

Region	BTLS	PHTLS	ATLS	TNCC	CATN	ATCN	At least one	Total Respondents
1	26.6%	1.1%	16.0%	46.8%	4.3%	0.0%	63	94
2	23.4%	2.6%	29.9%	77.9%	22.1%	0.0%	65	77
3	15.1%	1.1%	3.2%	63.4%	0.0%	0.0%	60	93
4	26.2%	1.9%	8.7%	25.2%	0.0%	0.0%	52	103
5	14.9%	2.0%	8.9%	34.7%	3.0%	0.0%	46	101
6	7.1%	0.0%	7.1%	67.9%	7.1%	0.0%	21	28
7	22.7%	1.8%	4.5%	56.4%	7.3%	0.0%	72	110
8	30.0%	4.3%	12.9%	57.1%	1.4%	1.4%	47	70
9	26.4%	2.8%	6.3%	31.9%	0.7%	0.0%	75	144
10	13.0%	4.3%	8.7%	10.9%	2.2%	0.0%	11	46
Total	22.1%	2.2%	10.2%	45.7%	4.3%	0.1%	512	866

Percent courses taken by RNs by county population density.

Population Density	BTLS	PHTLS	ATLS	TNCC	CATN	ATCN	At least one	Total Respondents
0 - 100	30%*	1%	8%	48%	2%	0%	92	134
100-250	26%	5%	9%	42%	3%	0%	109	184
250 - 1000	27%	4%	8%	46%	4%	0%	164	257
1000+	37%	3%	17%	59%	8%	0%	194	262
	253	32	94	416	42	2	559	837

\*100 times number of nurses taking BTLS (40) divided by Total Respondents in rural areas.

Percent courses certified by RNs by county population density

Population Density	BTLS	PHTLS	ATLS	TNCC	CATN	ATCN	At least one	Total Respondents
0 - 100	19%	1%	8%	43%	1%	0%	75	134
100-250	20%	3%	7%	39%	3%	0%	95	184
250 - 1000	20%	4%	7%	42%	3%	0%	141	257
1000+	27%	2%	16%	55%	8%	0%	182	262
	185	19	82	381	36	1	493	837

Considering your ability to attend trauma EMS education, do you agree or disagree with the following statements?

Nurse responses grouped by region.

Receive all continuing ed necessary						Attend courses to improve skill					
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
1	12.8%	33.0	23.4	14.9	9.6	3.2	9.6	12.8	40.4	30.9	94
2	1.3	28.6	18.2	35.1	13.0	1.3	1.3	13.0	44.2	36.4	77
3	8.6	38.7	19.4	26.9	3.2	2.2	9.7	5.4	60.2	21.5	93
4	7.8	40.8	26.2	18.4	2.9	2.9	10.7	13.6	49.5	22.3	103
5	9.9	45.5	17.8	21.8	1.0	0.0	12.9	16.8	43.6	21.8	101
6	0.0	42.9	21.4	17.9	7.1	0.0	7.1	7.1	50.0	35.7	28
7	8.2	42.7	28.2	17.3	1.8	0.0	10.9	10.9	51.8	23.6	110
8	14.3	31.4	15.7	34.3	1.4	1.4	10.0	14.3	55.7	17.1	70
9	11.1	50.0	18.1	16.0	1.4	4.9	14.6	15.3	45.1	19.4	144
10	26.1	37.0	28.3	4.3	2.2	8.7	17.4	26.1	34.8	10.9	46
Total	9.9	40.1	21.5	20.8	3.9	2.4	10.7	13.4	47.8	23.4	866
Hospital provides financial support						Difficult to fit trauma activities in with other duties					
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
1	4.3	18.3	25.8	34.4	15.1	5.4	26.9	22.6	36.6	6.5	94
2	1.3	6.5	16.9	59.7	11.7	5.2	29.9	22.1	32.5	9.1	77
3	6.5	15.1	20.4	45.2	10.8	5.4	31.2	26.9	24.7	11.8	93
4	20.4	20.4	20.4	29.1	8.7	2.9	26.2	28.2	34.0	8.7	103
5	8.9	22.8	15.8	39.6	10.9	1.0	20.8	29.7	35.6	10.9	101
6	14.3	7.1	14.3	46.4	14.3	0.0	21.4	32.1	42.9	3.6	28
7	11.8	24.5	16.4	34.5	11.8	1.8	33.6	26.4	31.8	5.5	110
8	15.7	14.3	14.3	40.0	7.1	4.3	30.0	22.9	32.9	10.0	70
9	27.8	29.2	17.4	16.0	6.9	2.8	26.4	27.8	34.7	7.6	144
10	23.9	15.2	17.4	39.1	0.0	4.3	28.3	19.6	34.8	10.9	46
Total	13.9	19.4	18.3	35.8	9.8	3.4	27.7	26.0	33.4	8.6	866
Attend courses during working hours						Courses are conveniently located					
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
1	19.1	50.0	10.6	12.8	6.4	5.3	17.0	24.5	43.6	7.4	94
2	31.2	42.9	11.7	11.7	2.6	2.6	13.0	26.0	46.8	11.7	77
3	23.7	49.5	8.6	16.1	2.2	5.4	20.4	30.1	36.6	7.5	93
4	22.3	56.3	8.7	8.7	1.9	6.8	32.0	35.9	22.3	2.9	103
5	23.8	43.6	11.9	16.8	3.0	8.9	14.9	35.6	37.6	2.0	101
6	17.9	50.0	14.3	14.3	0.0	3.6	32.1	14.3	42.9	7.1	28
7	29.1	45.5	10.0	12.7	0.9	5.5	27.3	23.6	40.0	2.7	110
8	32.9	32.9	12.9	17.1	2.9	5.7	18.6	22.9	47.1	4.3	70
9	40.3	43.8	5.6	6.9	2.1	4.2	26.4	34.7	30.6	3.5	144
10	47.8	32.6	10.9	8.7	0.0	30.4	32.6	19.6	15.2	2.2	46
Total	29.0	45.4	9.8	12.2	2.4	6.8	22.9	28.8	36.0	4.8	866
Courses are conveniently timed						Courses improve clinical abilities					
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
1	6.4	25.5	30.9	30.9	4.3	1.1	0.0	5.3	53.2	39.4	94
2	0.0	16.9	31.2	45.5	5.2	0.0	1.3	5.2	53.2	40.3	77
3	6.5	18.3	37.6	35.5	2.2	2.2	0.0	5.4	54.8	37.6	93

4	10.7	22.3	52.4	12.6	1.9	0.0	0.0	7.8	53.4	38.8	103
5	6.9	27.7	35.6	26.7	0.0	0.0	2.0	6.9	52.5	33.7	101
6	0.0	32.1	35.7	28.6	3.6	0.0	0.0	3.6	64.3	32.1	28
7	10.0	24.5	29.1	33.6	1.8	0.9	0.9	9.1	44.5	44.5	110
8	10.0	27.1	31.4	25.7	2.9	0.0	2.9	4.3	55.7	34.3	70
9	6.9	31.3	43.1	16.7	1.4	0.7	1.4	8.3	47.2	42.4	144
10	21.7	37.0	34.8	6.5	0.0	0.0	6.5	10.9	41.3	41.3	46
Total	7.9	25.6	37.0	26.2	2.2	0.6	1.3	6.9	51.2	39.1	866
	Opportunity to gain contact hours at other hospitals					Utilized out of state trauma education					
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
1	6.4	19.1	23.4	40.4	8.5	29.8	44.7	11.7	10.6	1.1	94
2	5.2	19.5	19.5	44.2	11.7	33.8	50.6	7.8	3.9	3.9	77
3	3.2	19.4	18.3	46.2	12.9	28.0	52.7	5.4	11.8	1.1	93
4	4.9	6.8	30.1	48.5	9.7	29.1	42.7	15.5	9.7	2.9	103
5	5.0	17.8	34.7	38.6	3.0	28.7	41.6	16.8	9.9	2.0	101
6	3.6	14.3	3.6	67.9	10.7	7.1	42.9	7.1	35.7	7.1	28
7	2.7	17.3	21.8	52.7	3.6	31.8	45.5	10.0	8.2	1.8	110
8	2.9	30.0	12.9	45.7	7.1	27.1	55.7	10.0	5.7	0.0	70
9	7.6	29.2	29.2	31.3	2.8	27.8	54.9	9.0	4.9	0.7	144
10	13.0	21.7	26.1	30.4	6.5	23.9	39.1	19.6	15.2	2.2	46
Total	5.3	19.9	24.0	43.0	7.0	28.4	47.8	11.2	9.4	1.8	866

Attend because courses are required					
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	7.4	37.2	21.3	30.9	1.1
2	7.8	28.6	9.1	40.3	14.3
3	7.5	43.0	17.2	28.0	3.2
4	19.4	39.8	24.3	13.6	2.9
5	14.9	41.6	19.8	19.8	1.0
6	17.9	28.6	25.0	25.0	3.6
7	9.1	44.5	19.1	22.7	2.7
8	14.3	30.0	21.4	24.3	5.7
9	7.6	34.7	27.8	20.8	7.6
10	15.2	45.7	23.9	15.2	0.0
Total	11.3	38.0	21.0	23.8	4.4

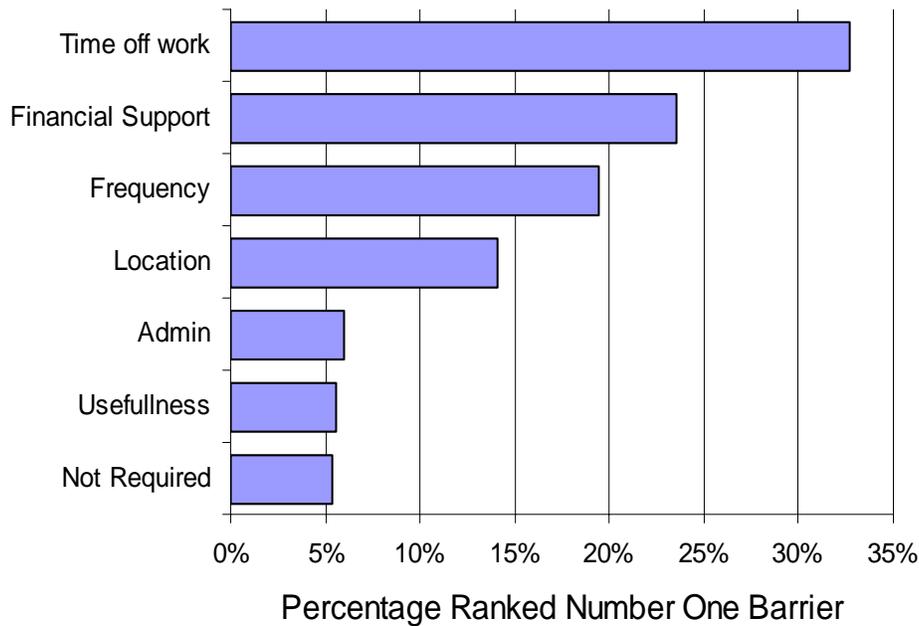
Note: Total row percents do not always add up to 100% due to non-responses.

Considering your ability to attend trauma EMS education, do agree or disagree with the following statements? Nurse responses grouped by population density.

People/sq mile	Hospital provides financial support					Difficult to fit trauma activities in with other duties					
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
0 - 100	13.8	10.0	14.6	44.6	16.9	3.0	26.3	24.1	34.6	12.0	134
100-250	14.4	18.2	18.8	39.2	9.4	3.9	32.0	26.5	26.0	11.6	184
250 - 1000	14.6	23.9	22.7	33.2	5.7	2.8	26.0	28.0	35.0	8.3	257
1000+	15.0	23.6	16.5	33.9	11.0	3.8	28.8	24.2	37.7	5.4	262
Total	14.5	20.3	18.6	36.6	10.0	3.4	28.3	25.8	33.8	8.7	837
Attend courses during working hours						Courses are conveniently located					
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree		
0 - 100	18.3	48.9	13.0	15.3	4.6	6.7	25.4	26.1	35.8	6.0	134
100-250	30.9	46.4	10.5	10.5	1.7	9.9	29.7	28.6	28.6	3.3	184
250 - 1000	33.7	46.7	6.7	11.0	2.0	10.2	24.2	29.7	31.6	4.3	257
1000+	30.0	44.6	10.0	13.5	1.9	2.3	15.8	30.9	45.2	5.8	262
Total	29.5	46.3	9.6	12.3	2.3	7.1	23.0	29.2	35.9	4.8	837
Courses are conveniently timed					Courses improve clinical abilities						
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree		
0 - 100	5.2	20.9	41.0	30.6	2.2	1.5	0.0	7.5	51.1	39.8	134
100-250	8.3	28.2	39.8	22.1	1.7	0.0	1.7	9.4	55.8	33.1	184
250 - 1000	12.6	28.1	37.5	20.2	1.6	0.8	1.2	7.1	46.3	44.7	257
1000+	4.6	25.9	34.7	32.0	2.7	0.4	1.5	5.0	54.6	38.5	262
Total	8.0	26.2	37.7	26.0	2.1	0.6	1.2	7.0	51.7	39.4	837
Opportunity to gain contact hours at other hospitals					Utilized out of state trauma education						
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree		
0 - 100	6.8	13.6	20.5	47.7	11.4	29.3	43.6	8.3	15.8	3.0	134
100-250	5.5	15.9	20.9	49.5	8.2	32.4	42.3	13.7	9.9	1.6	184
250 - 1000	3.9	21.6	26.7	43.1	4.7	25.4	53.2	9.9	10.3	1.2	257
1000+	5.7	24.9	26.8	36.4	6.1	30.1	50.2	11.2	6.2	2.3	262
Total	5.3	20.1	24.5	43.1	7.0	29.1	48.3	10.9	9.8	1.9	837
Attend because courses are required											
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree							
0 - 100	12.0	37.6	18.8	28.6	3.0						
100-250	16.6	43.6	18.8	17.7	3.3						
250 - 1000	10.6	37.4	27.2	22.4	2.4						
1000+	8.6	35.4	19.5	28.0	8.6						
Total	11.5	38.2	21.6	24.1	4.6						

Note: Total row percents do not always add up to 100% due to non-responses. Total respondents are 837 rather than 866 due to non-response on working county.

## Statewide Barriers to Trauma Education Reported by Nurses



Barriers to education. Respondents ranked the barriers. The following table represents the percentage of barriers that were ranked number one within HSA Region.

Region	Location	Frequency	Time off work	Financial Support	Admin	Usefulness	Not Required	At least one barrier	Total Responded
1	16%*	24%	26%	28%	6%	5%	9%	90	94
2	16%	12%	25%	22%	5%	8%	6%	69	77
3	18%	15%	33%	16%	8%	8%	5%	83	93
4	14%	20%	35%	23%	5%	8%	5%	99	103
5	14%	22%	37%	23%	9%	4%	3%	91	101
6	18%	32%	39%	14%	11%	0%	4%	24	28
7	15%	23%	27%	23%	5%	4%	5%	102	110
8	9%	20%	36%	20%	3%	4%	6%	63	70
9	8%	17%	35%	31%	7%	5%	6%	131	144
10	26%	13%	43%	24%	2%	9%	4%	46	46
Total	122	168	283	204	52	48	46	798	866

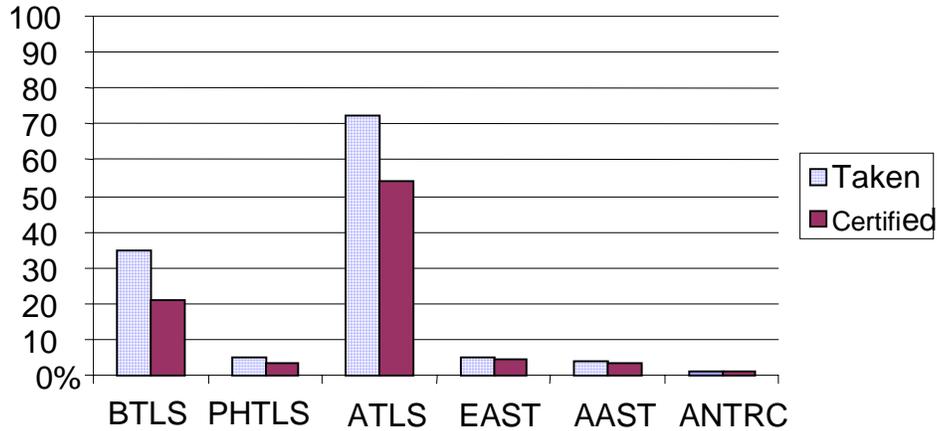
\* 100 times the number of RNs who identified Location as the number one barrier (15) divided by the total respondents in region 1 (94).

Barriers to education. Respondents ranked the barriers. The following table represents the percentage of barriers that were ranked number one within population density category.

Population Density	Location	Frequency	Time off work	Financial Support	Admin	Usefulness	Not Required	At least one barrier	Total Responded
0-100	21%	22%	29%	22%	8%	4%	4%	127	134
100-250	24%	21%	31%	21%	5%	6%	5%	168	184
250-1000	11%	21%	35%	23%	7%	5%	6%	248	257
1000+	7%	15%	35%	27%	5%	6%	6%	233	262
Total	119	160	279	198	50	46	46	776	837

# MD Responses

## Trauma Courses Taken By Physicians



Note: EAST=Eastern Association in Surgery of Trauma; AAST=American Association for Surgery of Trauma; ANTRC=Annual National Trauma Refresher Course

### Percent courses taken by Physicians by HSA Region

Region	BTLS	PHTLS	ATLS	EAST	AAST	ANTRC	At least one	Total Respondents
1	38%	15%	71%	6%	6%	0%	36	48
2	31%	8%	77%	8%	6%	2%	39	48
3	19%	0%	69%	0%	6%	6%	12	16
4	28%	6%	83%	3%	0%	0%	32	36
5	43%	3%	75%	6%	4%	3%	59	77
6	28%	6%	89%	0%	0%	6%	16	18
7	31%	0%	66%	3%	0%	0%	21	29
8	31%	0%	62%	3%	3%	0%	20	29
9	37%	6%	65%	6%	6%	0%	48	71
10	38%	0%	77%	0%	0%	0%	10	13
Total	35%	5%	72%	5%	4%	1%	76%	385

### Percent certified in each of the courses by HSA Region

Region	BTLS	PHTLS	ATLS	EAST	AAST	ANTRC	At least one	Total Respondents
1	10%	4%	46%	6%	6%	0%	25	48
2	23%	6%	54%	8%	6%	2%	28	48
3	13%	0%	44%	0%	0%	0%	8	16
4	19%	3%	72%	3%	0%	0%	27	36
5	26%	1%	52%	6%	3%	3%	42	77
6	11%	6%	89%	0%	0%	6%	16	18
7	21%	0%	52%	0%	0%	0%	19	29

8	24%	0%	38%	3%	3%	0%	15	29
9	24%	6%	54%	6%	6%	0%	40	71
10	31%	0%	62%	0%	0%	0%	9	13
Total	21%	3%	54%	5%	3%	1%	59%	385

Percent courses taken by Physicians by county population density.

People/sq mile	BTLS	PHTLS	ATLS	EAST	AAST	ANTRC	At least one	Total Respondents
0 - 100	33%	6%	73%	0%	0%	0%	26	33
100-250	34%	0%	79%	0%	3%	3%	51	61
250 - 1000	32%	3%	72%	2%	2%	0%	44	60
1000+	36%	7%	71%	8%	5%	1%	167	224
Total	35%	5%	72%	5%	4%	1%	288	378

Percent courses certified by Physicians by county population density

People/sq mile	BTLS	PHTLS	ATLS	EAST	AAST	ANTRC	At least one	Total Respondents
0 - 100	18%	3%	55%	0%	0%	0%	19	33
100-250	21%	0%	59%	0%	2%	2%	40	61
250 - 1000	18%	2%	50%	0%	2%	0%	34	60
1000+	23%	4%	54%	8%	5%	1%	133	224
Total	21%	3%	54%	5%	3%	1%	226	378

Considering your ability to attend trauma CME education, do you agree or disagree with the following statements? Physician responses grouped by Region.

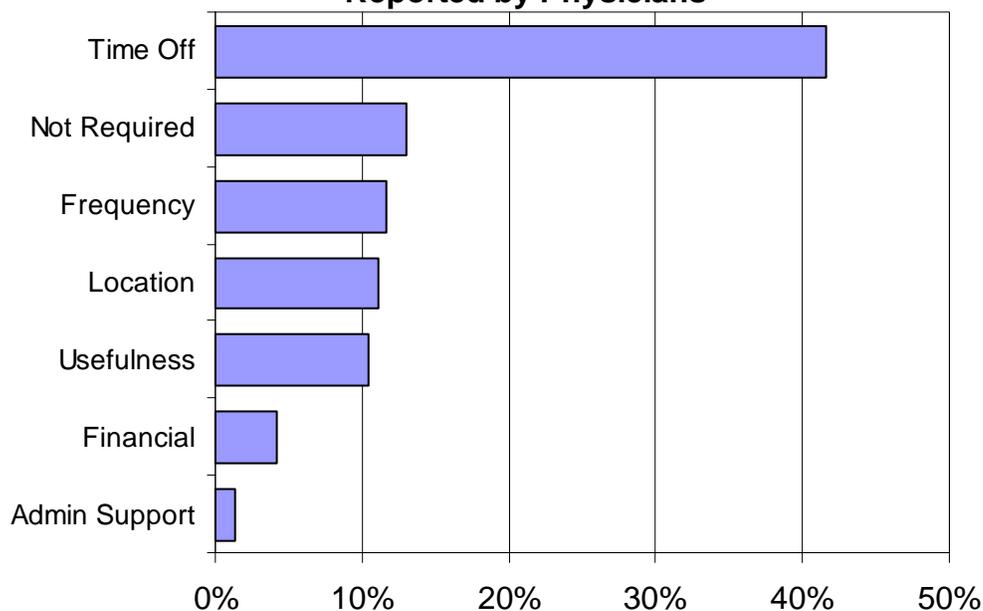
	Receive all continuing ed necessary					Attend courses to improve skill				
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	6.4	27.7	10.6	44.7	10.6	6.5	19.6	23.9	45.7	4.3
2	2.1	22.9	18.8	29.2	27.1	8.3	6.3	25.0	41.7	18.8
3	6.7	40.0	20.0	20.0	13.3	0.0	20.0	40.0	33.3	6.7
4	5.6	25.0	19.4	36.1	13.9	5.6	25.0	11.1	50.0	8.3
5	6.8	16.2	24.3	32.4	20.3	6.6	18.4	23.7	38.2	13.2
6	5.6	16.7	44.4	22.2	11.1	11.1	0.0	16.7	61.1	11.1
7	3.6	7.1	32.1	42.9	14.3	3.6	10.7	10.7	67.9	7.1
8	7.1	14.3	17.9	39.3	21.4	10.7	7.1	35.7	32.1	14.3
9	10.0	25.7	15.7	32.9	15.7	10.3	14.7	16.2	45.6	13.2
10	0.0	41.7	8.3	33.3	16.7	0.0	8.3	8.3	66.7	16.7
Total	6.1	22.1	20.2	34.3	17.3	7.2	14.4	21.1	45.6	11.7
	Practice provides financial support					Difficult to fit trauma CME in with other responsibilities				
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	26.1	21.7	10.9	32.6	8.7	4.4	20.0	26.7	33.3	15.6
2	29.2	20.8	10.4	22.9	16.7	8.3	27.1	20.8	31.3	12.5
3	40.0	40.0	13.3	6.7	0.0	6.7	26.7	20.0	40.0	6.7
4	27.8	16.7	5.6	41.7	8.3	5.7	34.3	11.4	34.3	14.3
5	30.7	16.0	8.0	29.3	16.0	6.7	29.3	21.3	36.0	6.7
6	27.8	16.7	5.6	16.7	33.3	5.6	27.8	22.2	44.4	0.0
7	35.7	21.4	0.0	28.6	14.3	0.0	28.6	17.9	46.4	7.1
8	41.4	10.3	10.3	24.1	13.8	6.9	13.8	27.6	34.5	17.2
9	26.1	21.7	13.0	21.7	17.4	11.6	23.2	21.7	27.5	15.9
10	15.4	15.4	7.7	38.5	23.1	7.7	30.8	15.4	46.2	0.0
Total	29.7	19.4	9.0	27.1	14.9	6.9	25.9	21.1	34.9	11.2
	Maintaining trauma skills important for practice					Courses are conveniently located				
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	13.3	15.6	8.9	44.4	17.8	2.2	10.9	41.3	43.5	2.2
2	6.4	10.6	17.0	40.4	25.5	0.0	6.3	39.6	43.8	10.4
3	0.0	6.7	13.3	53.3	26.7	0.0	40.0	20.0	40.0	0.0
4	2.8	16.7	13.9	47.2	19.4	8.3	16.7	22.2	47.2	5.6
5	6.6	6.6	22.4	40.8	23.7	3.9	14.5	32.9	40.8	7.9
6	5.6	0.0	5.6	55.6	33.3	5.6	11.1	33.3	44.4	5.6
7	3.6	10.7	10.7	50.0	25.0	0.0	18.5	51.9	22.2	7.4
8	13.8	13.8	3.4	48.3	20.7	0.0	10.3	34.5	51.7	3.4
9	10.0	12.9	18.6	35.7	22.9	5.7	20.0	35.7	31.4	7.1
10	0.0	23.1	7.7	46.2	23.1	0.0	23.1	23.1	46.2	7.7
Total	7.4	11.4	14.6	43.5	23.1	3.2	15.3	34.9	40.2	6.3

	Courses are conveniently timed					Utilized in state trauma CME to maintain skills				
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	6.5	17.4	54.3	19.6	2.2	15.2	23.9	17.4	39.1	4.3
2	2.1	10.4	43.8	37.5	6.3	12.5	27.1	12.5	39.6	8.3
3	0.0	26.7	66.7	6.7	0.0	13.3	46.7	6.7	33.3	0.0
4	8.3	22.2	25.0	38.9	5.6	11.1	22.2	30.6	33.3	2.8
5	5.3	18.4	38.2	35.5	2.6	13.2	34.2	5.3	38.2	9.2
6	0.0	11.1	55.6	27.8	5.6	11.1	22.2	22.2	38.9	5.6
7	0.0	22.2	48.1	22.2	7.4	7.1	35.7	7.1	39.3	10.7
8	3.4	20.7	34.5	37.9	3.4	21.4	21.4	25.0	25.0	7.1
9	7.1	24.3	38.6	27.1	2.9	24.6	26.1	18.8	29.0	1.4
10	0.0	30.8	23.1	46.2	0.0	0.0	30.8	23.1	38.5	7.7
Total	4.5	19.6	41.5	30.7	3.7	14.9	28.4	15.6	35.3	5.8
	Courses improve clinical abilities					Utilized out of state CME trauma courses				
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	4.4	11.1	20.0	57.8	6.7	22.2	33.3	20.0	22.2	2.2
2	0.0	6.3	22.9	56.3	14.6	6.4	27.7	14.9	40.4	10.6
3	0.0	0.0	7.7	69.2	23.1	20.0	33.3	20.0	20.0	6.7
4	0.0	2.8	33.3	52.8	11.1	13.9	22.2	13.9	47.2	2.8
5	4.0	10.7	26.7	48.0	10.7	13.5	37.8	16.2	24.3	8.1
6	0.0	0.0	11.1	77.8	11.1	11.1	11.1	11.1	61.1	5.6
7	0.0	7.4	7.4	77.8	7.4	7.1	35.7	10.7	46.4	0.0
8	10.3	10.3	13.8	51.7	13.8	17.2	24.1	10.3	37.9	10.3
9	8.8	5.9	20.6	55.9	8.8	16.2	25.0	16.2	33.8	8.8
10	7.7	7.7	7.7	69.2	7.7	15.4	23.1	30.8	23.1	7.7
Total	4.0	7.3	20.4	57.5	10.8	14.2	29.0	15.8	34.3	6.7
	Attend because courses are required									
Region	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree					
1	15.2	32.6	32.6	17.4	2.2					
2	20.8	37.5	14.6	16.7	10.4					
3	20.0	13.3	33.3	26.7	6.7					
4	22.2	33.3	13.9	22.2	8.3					
5	23.0	33.8	12.2	21.6	9.5					
6	11.1	16.7	38.9	27.8	5.6					
7	18.5	29.6	11.1	29.6	11.1					
8	24.1	31.0	20.7	10.3	13.8					
9	17.4	24.6	27.5	29.0	1.4					
10	15.4	46.2	23.1	15.4	0.0					
Total	19.5	30.7	21.1	21.9	6.9					

Considering your ability to attend trauma CME education, do agree or disagree with the following statements? Physician responses grouped by population density.

People/sq mile	Receive all continuing ed necessary					Attend courses to improve skill				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
0 - 100	6.3	43.8	25.0	21.9	3.1	6.3	12.5	28.1	46.9	6.3
100-250	6.7	21.7	33.3	35.0	3.3	6.8	13.6	20.3	52.5	6.8
250 - 1000	5.2	22.4	13.8	41.4	17.2	1.7	8.5	20.3	55.9	13.6
1000+	6.4	19.1	17.7	33.2	23.6	9.1	15.1	21.0	41.1	13.7
Total	6.2	22.2	20.3	33.8	17.6	7.3	13.6	21.4	45.8	11.9
People/sq mile	Practice provides financial support					Difficult to fit trauma CME in with other responsibilities				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
0 - 100	31.3	25.0	15.6	18.8	9.4	0.0	21.9	28.1	34.4	15.6
100-250	30.0	15.0	8.3	31.7	15.0	6.7	20.0	25.0	40.0	8.3
250 - 1000	30.5	20.3	5.1	28.8	15.3	6.8	25.4	20.3	39.0	8.5
1000+	29.1	19.1	9.1	26.8	15.9	8.2	28.8	19.2	32.0	11.9
Total	29.6	19.1	8.9	27.2	15.1	7.0	26.2	21.1	34.6	11.1
People/sq mile	Maintaining trauma skills important for practice					Courses are conveniently located				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
0 - 100	6.5	9.7	29.0	45.2	9.7	9.4	18.8	46.9	25.0	0.0
100-250	1.7	6.7	10.0	53.3	28.3	5.0	16.7	35.0	40.0	3.3
250 - 1000	5.1	11.9	15.3	37.3	30.5	1.7	19.0	39.7	32.8	6.9
1000+	9.5	13.1	14.0	41.6	21.7	2.3	12.6	32.9	44.1	8.1
Total	7.3	11.6	14.8	43.1	23.2	3.2	14.8	35.5	40.1	6.5
People/sq mile	Courses are conveniently timed					Utilized in state trauma CME to maintain skills				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
0 - 100	9.4	12.5	62.5	15.6	0.0	21.9	34.4	6.3	37.5	0.0
100-250	5.0	18.3	48.3	25.0	3.3	15.0	36.7	13.3	30.0	5.0
250 - 1000	1.7	24.1	37.9	32.8	3.4	8.5	27.1	13.6	42.4	8.5
1000+	4.5	18.5	38.3	34.2	4.5	15.5	25.5	17.3	35.5	6.4
Total	4.6	18.8	41.9	30.9	3.8	14.8	28.3	15.1	35.8	5.9
People/sq mile	Courses improve clinical abilities					Utilized out of state CME trauma courses				
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
0 - 100	0.0	0.0	26.7	60.0	13.3	9.4	50.0	12.5	28.1	0.0
100-250	5.1	3.4	15.3	67.8	8.5	13.3	23.3	16.7	38.3	8.3
250 - 1000	1.7	1.7	17.2	69.0	10.3	10.2	32.2	20.3	33.9	3.4
1000+	4.6	9.6	22.4	52.1	11.4	16.7	27.3	14.4	33.3	8.3
Total	3.8	6.6	20.8	57.9	10.9	14.4	29.4	15.5	33.8	6.8
People/sq mile	Attend because courses are required									
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree					
0 - 100	21.9	37.5	18.8	21.9	0.0					
100-250	21.7	30.0	26.7	18.3	3.3					
250 - 1000	19.0	27.6	22.4	24.1	6.9					
1000+	19.2	30.1	20.1	21.9	8.7					
Total	19.8	30.4	21.4	21.7	6.8					

### Statewide Barriers to EMS Education Reported by Physicians



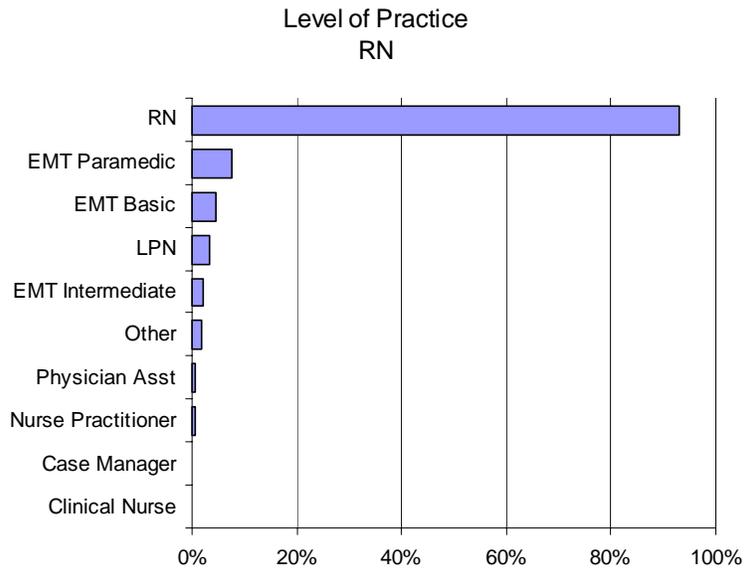
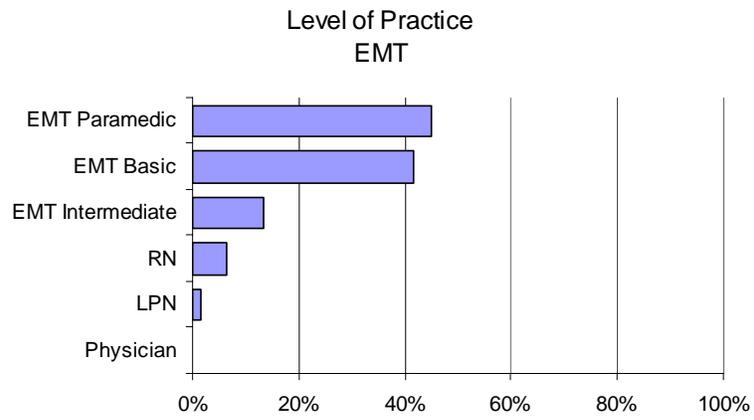
Barriers to education. Physicians ranked the barriers. The following table represents the percentage of barriers that were ranked number one within HSA Region.

Region	Location	Frequency	Time off	Financial	Admin Support	Usefulness	Not Required	At least one barrier chosen	n
1	4%	17%	44%	2%	2%	8%	17%	44	48
2	10%	13%	48%	4%	2%	10%	13%	43	48
3	13%	19%	44%	0%	0%	6%	6%	14	16
4	17%	6%	42%	8%	3%	11%	8%	32	36
5	12%	12%	36%	5%	1%	12%	14%	68	77
6	6%	33%	50%	0%	0%	6%	6%	18	18
7	14%	7%	38%	7%	0%	10%	7%	24	29
8	14%	7%	55%	3%	0%	7%	14%	27	29
9	11%	8%	38%	3%	0%	13%	18%	64	71
10	15%	8%	23%	8%	8%	15%	8%	11	13
	11%	12%	42%	4%	1%	10%	13%	345	385

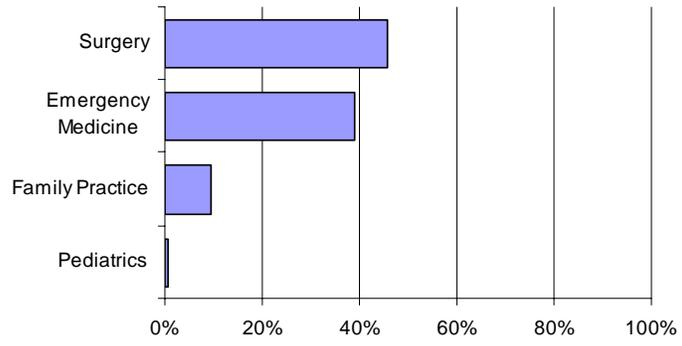
Barriers to education. Physicians ranked the barriers. The following table represents the percentage of barriers that were ranked number one within population density category.

People/sq mile	Location	Frequency	Time off	Financial	Admin Support	Usefulness	Not Required	At least one barrier chosen	n
0 – 100	12%	12%	39%	6%	0%	12%	12%	31	33
100-250	8%	16%	49%	3%	0%	10%	5%	56	61
250 - 1000	18%	10%	35%	3%	2%	8%	7%	50	60
1000+	10%	11%	42%	4%	1%	11%	17%	204	224
	42	44	159	15	4	40	49	341	378

# Employment



Level of Practice  
MD



### EMT Level of Practice by Region

Region	EMT Basic	EMT Intermediate	EMT Paramedic	LPN	RN	Physician	n
1	37%	9%	53%	4%	5%	1%	76
2	57%	12%	28%	3%	7%	0%	69
3	45%	25%	25%	4%	9%	0%	55
4	61%	19%	19%	2%	8%	0%	62
5	34%	7%	65%	0%	6%	1%	68
6	31%	3%	69%	1%	13%	0%	86
7	36%	15%	49%	1%	7%	0%	72
8	33%	13%	53%	0%	3%	0%	64
9	45%	19%	36%	0%	7%	0%	42
10	44%	14%	37%	0%	3%	0%	59
Total	42%	13%	45%	2%	7%	0%	653

### EMT Level of Practice by Population Density

People/sq mile	EMT Basic	EMT Intermediate	EMT Paramedic	LPN	RN	Physician	n
0 - 100	54%	13%	33%	1%	10%	0%	136
100-250	39%	16%	45%	3%	6%	1%	176
250 - 1000	42%	13%	41%	1%	5%	0%	165
1000+	33%	10%	60%	1%	6%	1%	156
Total	42%	13%	45%	2%	6%	0%	633

### Nursing Level of Practice by Region

Region	EMT Basic	EMT Intermediate	EMT Paramedic	LPN	RN	Nurse Practitioner	Clinical Nurse	Case Manager	Physician Asst	Other	n
1	6%	4%	9%	2%	89%	1%	1%	3%	0%	4%	94
2	5%	0%	12%	3%	95%	0%	0%	0%	3%	4%	77
3	3%	4%	4%	1%	97%	2%	0%	0%	0%	2%	93
4	5%	3%	5%	6%	90%	1%	0%	0%	0%	1%	103
5	6%	3%	9%	1%	98%	1%	0%	0%	0%	1%	101
6	4%	7%	0%	0%	96%	0%	0%	0%	0%	0%	28
7	4%	0%	5%	9%	90%	0%	0%	0%	2%	2%	110
8	6%	1%	4%	1%	96%	0%	0%	0%	1%	7%	70
9	3%	0%	15%	3%	87%	0%	1%	0%	1%	0%	144
10	2%	0%	4%	2%	100%	0%	0%	0%	0%	0%	46
Total	5%	2%	8%	3%	93%	1%	0%	0%	1%	2%	866

### Nursing Level of Practice by Population Density

People/sq mile	EMT Basic	EMT Intrm d	EMT Parame d	LP N	RN	Nurs e Pract	Clinica l Nurse	Cas e Mgr	Physicia n Asst	Othe r	n
0 - 100	6%	4%	6%	0%	95%	1%	0%	2%	0%	1%	134
100-250	4%	3%	7%	7%	91%	1%	1%	0%	1%	2%	184
250 - 1000	5%	2%	8%	5%	92%	0%	0%	0%	1%	3%	25

					%						7
1000+	3%	0%	8%	0%	94%	0%	0%	0%	1%	2%	26
Total	5%	2%	8%	3%	93%	1%	0%	0%	1%	2%	83

### MD Level of Practice by Region

Region	Surgery	Emergency Medicine	Family Practice	Pediatrics	n
1	52%	33%	0%	4%	48
2	42%	40%	10%	0%	48
3	31%	38%	31%	0%	16
4	36%	36%	8%	0%	36
5	43%	40%	12%	0%	77
6	28%	67%	11%	0%	18
7	52%	41%	10%	0%	29
8	52%	48%	0%	3%	29
9	51%	38%	8%	0%	71
10	69%	0%	31%	0%	13
Total	46%	39%	10%	1%	385

### MD Level of Practice by Population Density

People/sq mile	Surgery	Emergency Medicine	Family Practice	Pediatrics	n
0 - 100	15%	30%	42%	0%	33
100-250	33%	48%	18%	0%	61
250 - 1000	50%	40%	12%	0%	60
1000+	54%	38%	1%	1%	224
Total	46%	39%	9%	1%	378

### Nature of Primary and Secondary EMS Service EMT job by Region

Region	Primary Job				Secondary Job				n
	PT Paid	FT Paid	Pt Vol	FT Vol	PT Paid	FT Paid	Pt Vol	FT Vol	
1	8%	16%	7%	0%	33%	32%	22%	11%	76
2	1%	7%	9%	7%	17%	19%	33%	25%	69
3	5%	5%	7%	2%	15%	2%	33%	49%	55
4	5%	5%	5%	5%	19%	15%	34%	16%	62
5	16%	65%	21%	10%	12%	65%	16%	7%	68
6	24%	47%	24%	20%	15%	45%	16%	21%	86
7	10%	13%	3%	10%	17%	24%	22%	32%	72
8	6%	17%	3%	0%	34%	42%	8%	16%	64
9	31%	43%	19%	17%	21%	45%	12%	14%	42
10	37%	34%	37%	22%	29%	32%	22%	14%	59
Total	14%	25%	13%	9%	21%	32%	22%	20%	653

### EMT job by Population Density

People/sq mile	Primary Job	Secondary Job
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	PT Paid	FT Paid	Pt Vol	FT Vol	PT Paid	FT Paid	Pt Vol	FT Vol	n
0 - 100	13%	16%	13%	10%	18%	15%	36%	32%	136
100-250	18%	26%	18%	17%	19%	30%	20%	27%	176
250 - 1000	16%	19%	15%	9%	28%	25%	25%	21%	165
1000+	10%	40%	6%	1%	22%	59%	9%	4%	156
Total	14%	26%	13%	9%	22%	33%	22%	21%	633

### Nursing job by Region

Region	Primary Job				Secondary Job				n
	FT	PT	PRN	Other	FT	PT	PRN	Other	
1	76%	14%	4%	2%	1%	1%	2%	0%	94
2	71%	18%	8%	3%	1%	0%	0%	1%	77
3	73%	17%	8%	0%	0%	1%	0%	1%	93
4	73%	24%	2%	3%	0%	0%	1%	5%	103
5	74%	16%	13%	1%	74%	13%	12%	1%	101
6	75%	18%	4%	4%	75%	18%	4%	4%	28
7	70%	27%	1%	0%	2%	1%	3%	2%	110
8	66%	20%	17%	0%	0%	0%	3%	1%	70
9	65%	26%	7%	0%	65%	23%	5%	0%	144
10	80%	20%	2%	0%	78%	22%	0%	0%	46
Total	71%	21%	7%	1%	27%	7%	3%	1%	866

### Nursing job by Population Density

People/sq mile	Primary Job				Secondary Job				n
	FT	PT	PRN	Other	FT	PT	PRN	Other	
0 - 100	68%	25%	5%	1%	16%	5%	1%	1%	134
100-250	76%	22%	3%	1%	29%	7%	2%	1%	184
250 - 1000	74%	20%	6%	1%	23%	7%	4%	2%	257
1000+	68%	19%	10%	2%	35%	10%	5%	1%	262
Total	71%	21%	7%	1%	27%	8%	3%	1%	837

## Trauma Training Centers Survey

### Average Number of Hours Spent On Trauma During EMS Training

Region	1	2	3	4	5	6	7	8	9	10
1 <sup>st</sup> Responder	6	6	6	6	6	6	6	6	16	16
Basic	12	12	12	12	12	12	12	12	16	16
Intermediate		12	12	12	12	12	12	12	24	24
Paramedic	30	52	24	24	24	24	24	71	36	36
Refresher	4	4	4	4	NA	4	4	4	10	12
Others	None	PHTLS required	None	None	BTLS required	None	None	PHTLS required	None	None

### Comments by (by region) in response to question:

Question: What do you see as barriers in obtaining trauma education?

- 1: Poor turn out at in-services. Lack of interest, lack of time, lack of money.
- 2: No problems, good turn out.
- 3: Nothing will help.
- 4: We need help from the state, does not know how or what would help, only that improvement is needed.
- 5: Poor attendance, lack of interest.
- 6: Lack of commitment, poor study habits, lack of time, lack of money, and lack of local courses.
- 7: Like to see at least 8 hours of trauma and 2 hours of QI process added as a requirement to renew.
- 8: Feels blessed, mostly paid services, no real problems.
- 9: No comments.
- 10: We are doing fine no problems.

## Trauma Courses In Ohio

Data on number of trauma courses were obtained from state coordinators for each course for the year that was available. Complete data were not available for all courses.

Course	Contact person	Number of classes offered (2002 data except where noted)	Number of students Took courses (2002 data)	Number of instructors (2002 data except where noted)	Cost of Course (2002 data)	Location of Courses (2003)
TNCC	Nancie Bechtel	80 TNCC classes	1300 students	Approx 120	Approx \$200.00	Toledo, Columbus, Lima, Mansfield
ATLS	Mike Glenn	23 provider/refresh courses 1 instructor course	539	9 new instructors trained. Total not available	Attendings \$600 Residents \$450 Refreshers \$350 Auditors \$100	Akron, Cincinnati, Dayton, Toledo, Columbus
BTLS	Stef Sherman <a href="http://www.ohbtls.org/services.htm">http://www.ohbtls.org/services.htm</a> Steve Shaner	Classes "as requested" 27 courses listed on <a href="http://www.obtls.org">www.obtls.org</a>	Estimated: 2000 providers (2001 data)	Estimated 500-600 Instructors (2001 data)	Average=\$100 for provider course	Dayton, Canton, Wooster, Akron, Elyria, Delaware, Cleveland, Urbana, Dover
CATN	Nancie Bechtel	1	12	N/A	\$210	Columbus
ATCN	Mike Glenn	14	9	4 new instructors trained. Total of 7 in Ohio	\$215	Columbus, Toledo

PHTLS information not available

## Trauma Stakeholders' Meeting

There was a list of 11 questions presented for discussion that is presented below with the responses from the group. These questions were adapted from the questionnaires sent to the providers throughout the state to allow for a comparison of responses. Questions and a summary of responses are listed below.

1. Are trauma providers (MD's, RN's, EMS providers) in Ohio receiving the training and education necessary to provide quality trauma care?
  - Great disparity across the state
  - Most programs are only offered locally with the exception of BTLS, which is available in most areas.
  - Great opportunities available in Ohio, but not in the rural areas. How we fund and provide these programs rurally is a struggle ten times more difficult than in the urban area.
  - Available but costly, especially in the rural areas
  - ACS is dropping the CME for pediatric education, which is sending the wrong message. Especially at Trauma Centers that are being verified as Adult and Pediatric Centers.
  - There is a need for improved pediatric education across the State.
2. Are quality educational programs available in Ohio?
  - BTLS is available throughout Ohio, but this was challenged by several people who stated that there were still regions lacking this course. (Region 6).
  - ATLS course often had to use out of state instructors to teach. Why is this occurring? We need more in state instructors.
  - TNCC is an available more structured course than hospital based trauma education.
3. Does trauma training and education, or lack of it affect the patients outcome?
  - Overwhelming – YES!
  - Studies support that EMS comfort level increases after just a 4-hour course.
  - The state needs to establish a goal or standard for trauma education and then evaluate the outcome.
  - Need more studies to support if head injury training impacts outcome of patient.
4. Do employers value trauma certification courses? (ATLS, TNCC, BTLS, etc.)
  - Employers only value if it is demanded by an agency, then it is provided
  - Attorneys like to see these courses provided
  - Budget constraints, if an agency can afford it then it is OK.
  - Availability plays a role.
  - People making the budget decisions don't value these courses without an outside demand and this is true from a rural and urban perspective
  - Staff feels important even if they receive a small amount of reimbursement
5. Do Medical Directors advocate for Trauma education for EMS?
  - If the resources allow for this to occur

- Variable across the state. What is considered minimal level?
  - Depends upon the local RPAB
  - Depends upon the availability
  - Staffing of departments prohibit this
  - Depends upon the relationship of the Medical Director with the EMS agencies
  - BTLS and PHTLS are supported and structured
6. Do hospitals advocate for trauma education for Physicians and Nurses?
- If a hospital is a Verified Trauma Center it is provided because there is a requirement
  - Depends upon the Medical staff leadership and what they have agreed upon and require
  - Nurses - there is a great variance across the state
  - Many hospitals have requirements but they vary greatly from institution to institution
  - Hospitals try to protect their investments and avoid lawsuits
  - Standard courses throughout Ohio would support an established standard of care.
  - There are contract issues with Nursing who work as temporary staff
  - Not all hospitals advocate for nursing, just like with Doctors
  - Most of the dollars for trauma education go to the ED
  - Small rural hospitals have decreased resources and the perception is that they move the patient up through the system anyway so they don't need to educate
  - More money is spent on technical support than on doctors at rural hospitals
  - Many variations between the teaching and rural hospitals
7. Do Providers receive financial support for attending trauma courses?
8. Can courses be taken on duty time? (These answers are listed together for # 7 & 8)
- MD's Some receive compensation
  - Nurse's receive some reimbursement but it varies greatly – Needs to be a standard
  - EMS – there is money in the state grant funds for education and training
  - Many EMS are only paid for the program and not for their time to take the course.
  - Many EMS pay for their own education and spend their own time
  - Overall if the course is required, then the time to take the course is paid, otherwise it is not.
9. What are the specific barriers to trauma education for providers?
- Rural departments for EMS have more time issues because many of the staff has full or part-time other jobs
  - Staff is often not aware of what is available for education
  - Staffing issues do not allow for people to attend
  - Labor management issues for paid departments
10. Are trauma courses held:
- In accessible locations?

- At accessible times?
- No time is convenient or totally accessible to everyone – generally everyone agreed

11. How would you improve trauma education in the State of Ohio?

- Need consistent state standards
- Broaden the scope of practice for license holders – specifically EMS
- Share information and experience throughout the state
- Utilize newer technologies
- Utilize assisted learning processes
- Pediatric “hands-on” scenarios

## **Conclusions**

### EMS Survey

The EMS survey provided a glimpse into the perceptions and attitudes surrounding trauma education throughout the state. Responses came from all ten regions and were distributed evenly over rural, suburban and urban areas. EMT participants categorized themselves primarily as EMT Paramedic (45%), EMT Basic (42%), and EMT Intermediate (13%). Most providers indicated that trauma courses improved their ability to care for patients. A large majority (82%) stated that attending trauma courses improves trauma skills and 89% indicated that trauma courses improve clinical trauma care abilities on the job. A smaller number of respondents (38%) indicated that they attended trauma courses because they are required.

The survey revealed that the majority of EMS respondents have been able to complete a trauma education course during their career. Importantly, there was no significant relationship between taking trauma courses and population density. The results showed that location in a rural vs. urban community did not affect the number of respondents that completed trauma education courses. BTLS was the most common trauma course taken by respondents (73%) and 27 % reported completing PHTLS. Overall, 78% of providers stated they had taken at least one trauma course. Grouped by population density (rural, semi-rural, semi-urban, and urban), the percentages of participants completing at least one trauma course were 77%, 76%, 75%, and 84% respectively. Certification data were similar to the course data. Fifty-seven percent indicated they were certified in BTLS, 12% in PHTLS and 63% reported certification in at least one course. Eighty percent indicated they attend refresher courses to maintain skills. The results did not indicate when the education courses and certification had been accomplished or how recently the refresher courses had been completed. It is important to note that although a large proportion of the EMS population has completed some form of trauma education, most respondents considered their education to be inadequate for patient care. Less than half (42%) stated that they are receiving all education necessary to provide quality trauma care. Responses for this question were consistent among regions and did not differ significantly based on population density.

Regarding factors related to attendance of trauma courses, 64% stated that their department provides financial support to attend trauma courses. Less than half (46%) reported that they are required to attend trauma courses on off-duty time rather than normal working hours, and a smaller group (27%) stated that they attend courses while on work time. There was a significant relationship between population density and “attending trauma courses while on duty”. Urban respondents reported attending courses during working hours more frequently than rural providers. The data may require more evaluation but suggests some EMS providers opt to take courses on their own, while others do not have the option to attend while on duty. Accessibility to courses is another important factor affecting EMS and trauma education. About half of the respondents (52%) indicated that courses are held in locations that are conveniently located, and 64% indicated that courses are held at convenient times. The modest

increase in concern over location of education classes as a function of population density did not reach statistical significance by the criterion used in this study. Furthermore, 74% reported that they are able to obtain state required continuing education (CE) hours within the geographic region in which they live.

EMS respondents were asked to rank barriers to education from a list that included: location of course, frequency of course offerings, time off work to attend, financial support, administrative support, and usefulness of the course. Financial support to attend courses was cited as the number one barrier to obtaining trauma education, with 26% choosing it as the greatest obstacle. Frequency of course offerings, time off work to attend courses and location of the course were ranked as the next greatest barriers, respectively. When broken out by region, regions seven, four, and ten identified financial support as the primary barrier.

The survey data indicate that, overall, EMS providers value trauma education but feel that they are not receiving enough education to provide quality care. While a slight majority indicates that education courses are accessible and available within the region, many EMS providers indicated concern about the availability of educational programs. Financial support, time, and course location were identified as barriers to trauma education. Attending courses on or off-duty is another issue that may affect participation of courses and should be investigated further.

Comments from the surveys identified several issues and echoed findings from the data analysis. Volunteer EMS providers described many difficulties associated with attaining education. Several respondents discussed preferences for types of education stating that hands-on, practical, field oriented education programs were most preferred. Some comments indicated that instructors with EMS experience and those from trauma centers were preferred over local hospital instructors. Several participants indicated difficulties in getting time off work and driving long distances to attend courses. A few providers found 2-day courses on the weekends difficult to attend and preferred 1-day courses. Many asked for better and earlier notification of courses. Several participants noted that they don't hear about course offerings. Some suggested a central location for posting of courses such as a web-based calendar that would list all educational offerings across the state. There was a consistent message that attending education courses is more difficult for volunteer EMS providers. Volunteers often have full time jobs and cannot afford time off for trauma courses. Cost of courses for volunteers was also identified as a concern. They also described themselves as less aware of educational opportunities. A comment from a paramedic stated that EMT-P with high volume practice should have fewer trauma education requirements than providers who rarely see trauma. At least four respondents commented that trauma consistent guidelines and standards were needed throughout the state.

### Nurse Survey

Nurse respondents were primarily registered nurses (93%). Nurses' responses to the survey revealed that 67% of nurses had taken at least one trauma course and 60% hold

course certification. The Trauma Nursing Core Course (TNCC) was the most common course attended (50%) followed by BTLS (30%). The percentage of respondents that had taken at least one trauma course broken out by region showed a range of 35% (region 10) to 86% (region 2). Distribution by population density revealed rural areas 55%, semi-rural 51%, semi-urban 55% and urban 69% participants completing one trauma course. This relationship was not statistically significant.

Like their EMS counterparts, RN respondents agreed overwhelmingly (90%) that trauma courses improved their ability to care for patients in the clinical setting. Twenty-eight percent indicated they attend courses because they are required. Only 11% reported receiving education out of state but 50% were able to gain contact hours at hospitals other than their own. Despite the perception that courses are valuable, only 25% reported receiving all the continuing education necessary to provide quality trauma care. This percentage seems quite low especially when compared to the large percentage of nurses who indicate they value trauma education. Compared to EMS providers, nurses seem to value courses more, but have completed fewer courses and overwhelmingly feel they are not getting enough education. This suggests significant barriers exist for trauma nurses.

Respondents identified several barriers to trauma education. Results were reported by the percentage of nurses that ranked a given barrier as number one. Time off work to attend was most frequently cited as a barrier and was ranked number one by 33% of the population. Financial support was ranked number one by 24%. Less than half (46%) asserted that their hospital provided financial support for attending trauma courses. The trauma course survey revealed that courses are costly, supporting the finding of cost as a barrier. Courses cost approximately \$200.00 at a minimum. The issue of getting time off work was reported consistently across the ten regions and with a rather narrow range of 25%-43%. This finding suggests that securing time off work to attend is an issue throughout the state. Participants reported how often they attended courses during working hours (15%) and also indicated it was "difficult to fit trauma activities in with other duties" (43%). Rural and semi-rural nurses reported being financially supported by their organizations more often (65%, and 49% respectively) than their peers in more populated areas (semi-urban 39%, urban 44%). The data suggests that nurses place a high value on trauma education but do not feel hospitals provide financial and staff support to attend.

Accessibility of courses was also reported to be a concern in obtaining trauma education. Nineteen and 14% of respondents respectively selected frequency and location as obstacles to education. Rural and semi-rural providers ranked frequency and location of courses as a problem more often than their urban counterparts. Overall, 41% of respondents report courses as being conveniently located and only 28% rate courses as being conveniently timed. Regarding courses being in convenient locations, responses were divided as follows: 42% rural, 32% semi-rural, 36% semi-urban, and 51% urban agreed. Furthermore, these numbers were significant indicating a non-linear relationship between population density and location of courses being regarded as convenient. Nurses in the most rural areas and the most urban areas agreed that

courses were conveniently located compared to those in semi-urban and semi-rural. When data were evaluated based on region, the lowest ranking region (10) showed that only 17% nurses were satisfied with location of courses compared to the highest region (2) in which 59% of nurses indicated as such. In the nursing group, the survey results suggest that while important, location of courses is not as much of an obstacle as is obtaining hospital support in order to attend courses.

Nurse respondents identified several trauma education issues and many common threads emerged from the comments on surveys. Several nurses cited a lack of awareness of trauma courses. They described not having a way to know about courses and had not received any information about trauma courses recently. Many recommended improved and more advanced notification of trauma courses. One of the most frequent issues to be identified was the role of hospitals in supporting trauma education. The respondents indicated that since courses are not required, the institution does not pay for them. Many expressed frustration related to the amount of trauma education provided; they want more, but hospital do not provide the classes nor do they reimburse for any sort of education programs. Some nurses felt it was impossible to get the hospital to pay unless it was required for employment or by the state. Others commented that a major issue was that there was no compensation for becoming certified in courses. The hospital did not pay for courses and once attained, there was no increase in pay. Regarding types of education, there was a clear preference for “hands on” education. Some felt that TNCC was accessible but too expensive; others commented there had never been a TNCC course offered to them. One or two respondents felt that more advanced trauma training was necessary. There were a few compliments regarding trauma courses taken at larger hospitals and flight services. Several commented that more local course offerings are crucial to attendance. Travel is difficult and time consuming. Overall, there seems to be concern over cost, reimbursement and compensation, as well as improved communication about trauma courses.

### Physician Survey

Physician respondents represented mainly surgery (46%) and emergency medicine (39%) specialties. The largest group of respondents came from the urban group followed by 15% for semi-rural and semi-urban and 10% coming from the rural areas. Physician surveys indicated that ATLS is the most common specialty course completed. The results showed that 72% of physicians stated they had taken ATLS. The second most common course was BTLS (35%). Certification responses mirrored this finding with 54% and 21% stating they are currently certified in ATLS and BTLS respectively. Each of the remaining courses (PHTLS EAST, ASST, and ANTRC) was taken by 5% or less and likewise, 5% or less were certified in these courses. A total of 76% reported taking at least one trauma course. Overall, 51% replied that they were receiving all CE necessary. Of note, there was a significant relationship between population density and “receiving all continuing education necessary”. More physicians in the urban areas indicated they are receiving all CE necessary when compared with more rural practitioners. When responding to the statement “attending trauma courses improves

my clinical trauma care abilities on the job”, 69% indicated they agreed with this statement. This percentage was lower than those reported from EMS and RN.

Barriers identified by MD participants include: time off to attend courses, courses not being required, frequency of course offerings, location of courses, usefulness and financial support in that order. Time off from work to attend course was listed as the number one barrier (42%). “Not required” was cited by 13%, and “frequency”, “location” and “usefulness” were selected 12, 11, and 10% of the time respectively. The results imply that simply finding time to attend classes is a greater problem than the specifics of location and time of courses.

The comments section on MD surveys yielded information about attitudes surrounding trauma courses. A few respondents indicated dissatisfaction with ATLS courses stating they are too often surgically oriented” and a “shotgun approach” to trauma care and are not necessary for emergency medicine (EM) trained physicians. Other respondents, however, described ATLS as “an excellent course for all physicians that care for trauma patients. One respondent indicated a need for increased lead time for course announcements as schedules are made 3 months ahead. There was some evidence of discontent with the state trauma system. A few comments stated that EM physicians find the state trauma system confusing and don’t support current trauma legislation. One physician felt trauma training was not necessary for community physicians since trauma patients go to the large trauma centers. There was some evidence of discord between EM and surgeons regarding roles in trauma care. Some EM physicians indicate that trauma belongs in the EM realm and that verification should be done by EM not the ACS. This attitude could explain the lower percentage that indicated they valued trauma courses in improving their clinical practice. Specific comments on improving education listed more hands-on training and practice in simulation trauma scenarios.

### Training Centers Survey

Ohio training center data were difficult to obtain. One center was contacted in each region and the number of trauma hours for each level of EMT course was collected. The data revealed a similar number of trauma training hours in the basic, advanced and first responder areas. All regions reported the same number of trauma hours (12) with the exception of a center in regions 9 and 10, which reported 16 hours for the Basic EMT course. Paramedic levels showed more variation in trauma training hours with a range of 30 hours in the training center in region 1 to 71 trauma training hours in the center from region 8. Comments about trauma training were collected as well.

### Trauma Courses Survey

It was difficult to document every trauma course that was offered in the state because there is no central location that tracks courses. A majority of courses offered are listed on the website [www.traumasystems.com](http://www.traumasystems.com) and is maintained by the Ohio Committee on Trauma. However, courses are submitted by hospitals on a voluntary basis so not every

course is recorded. For some courses, there is one contact person for the entire state so data was easy to obtain. Most courses are held in metropolitan areas and often at trauma centers. BTLS courses may be offered at other locations but this information was not available. Cost of courses tends to be high and may inhibit attendance. Most courses can only educate a small number of students at one time. Some institutions offer courses on request, but from the surveys, it seems most providers are unaware of this. Better promotion and advertising of courses could, perhaps, increase attendance and locations outside the metropolitan areas.

### Stakeholders' Meeting

There is a great variance in the type, support, and availability of trauma education across the State of Ohio. There are, however, some common themes that emerged in reviewing the information obtained.

1. Structured programs such as ATLS, BTLS, TNCC, ATCN are generally more available, accepted as the minimum standard and supported by hospitals and trauma care providers.
2. Trauma education is supported, provided, and paid for if it is required by some agency of authority
3. Programs are more available and supported in urban vs. rural areas

### **Recommendations**

1. Develop a central website location for posting of trauma courses such as a web-based calendar that would list all educational offerings across the State of Ohio
2. Develop electronic system of notifying hospitals and EMS agencies when courses are available
3. Promote development of advanced level trauma courses for those who have been certified in basic level especially for nurses and EMS providers
4. Increase trauma hours at the state level for EMS or standardize training program trauma hours in courses across regions
5. Provide links for "visiting RN, MD, RN programs" between hospitals with less trauma volume and trauma centers with high volume to increase experience with trauma care
6. Develop consistent, minimum recommendations or standards for trauma education for all levels of caregivers
7. Encourage trauma centers to provide courses for presentation in semi-urban, semi-rural or rural areas
8. Develop state program that would enhance more widespread dissemination of courses
9. Develop video tapes, Power Point presentations or statewide teleconference education courses
10. Purchase software programs that teach trauma care through interactive case study. Distribute or make available to regions or hospitals or EMS agencies that request them

11. State Trauma Program develops interactive trauma scenarios applicable to Ohio and makes educational case studies available on-line
12. Develop quality improvement indicators for hospitals to evaluate their staff's knowledge base on trauma care
13. Pursue educational funds from federal agencies to improve trauma education programs
14. Develop list of web sites with trauma scenarios ([www.trauma.org](http://www.trauma.org) for example)
15. Offer hands-on, practical clinics to supplement video taped or slide presentations
16. Provide funding through grants or other means for nurses and EMS providers to increase training
17. Pilot a project in a region with high education concerns (EMS or RN or MS) and explore what works to improve accessibility
18. Educate hospitals about trauma education needs and programs available
19. Work with hospitals to find ways to integrate trauma training into on duty time
20. Charge Regional Physician Advisory Boards with developing a plan to improve education within regions
21. Promote trauma education in medical schools through TEAM program of ACS
22. Track educational courses through on the state level to identify regions that are lacking
23. Initiate dialog between emergency medicine and surgical specialties, perhaps through professional organizations, to address differences of opinions about trauma management and trauma care.
24. Begin a focus group in one region to trial ways to improve relationships between EM physicians and surgeons
25. Examine ways to enlist support from emergency physicians and others for the trauma system
26. Educate nurses about options in trauma education; many nurses don't seem aware of options
27. Conduct further study regarding needs for specific areas of Ohio
28. Repeat the portion of the study that surveyed the number of trauma courses in Ohio to gain a better perspective on the number of courses offered per year, locations, cost and number of instructors available
29. Repeat survey on training centers to identify what other types of trauma training occurs there
30. Perform a cost analysis of education programs provided by hospitals and/or state agencies
31. Enlist the help of professional organizations such as ENA, ACEP, Ohio ACSCOT to improve education within their group
32. Submit study results for publication to add to body of trauma literature

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<sup>1</sup> National Center for Injury Prevention and Control. Center for Disease Control. *Injury in the United States*. [online]. Available at <http://www.cdc.gov/ncipc/about/about.htm>

<sup>2</sup> MacKenzie, EJ et.al National Inventory of Hospital Trauma Centers *JAMA*. 2003;289:1515-1522.

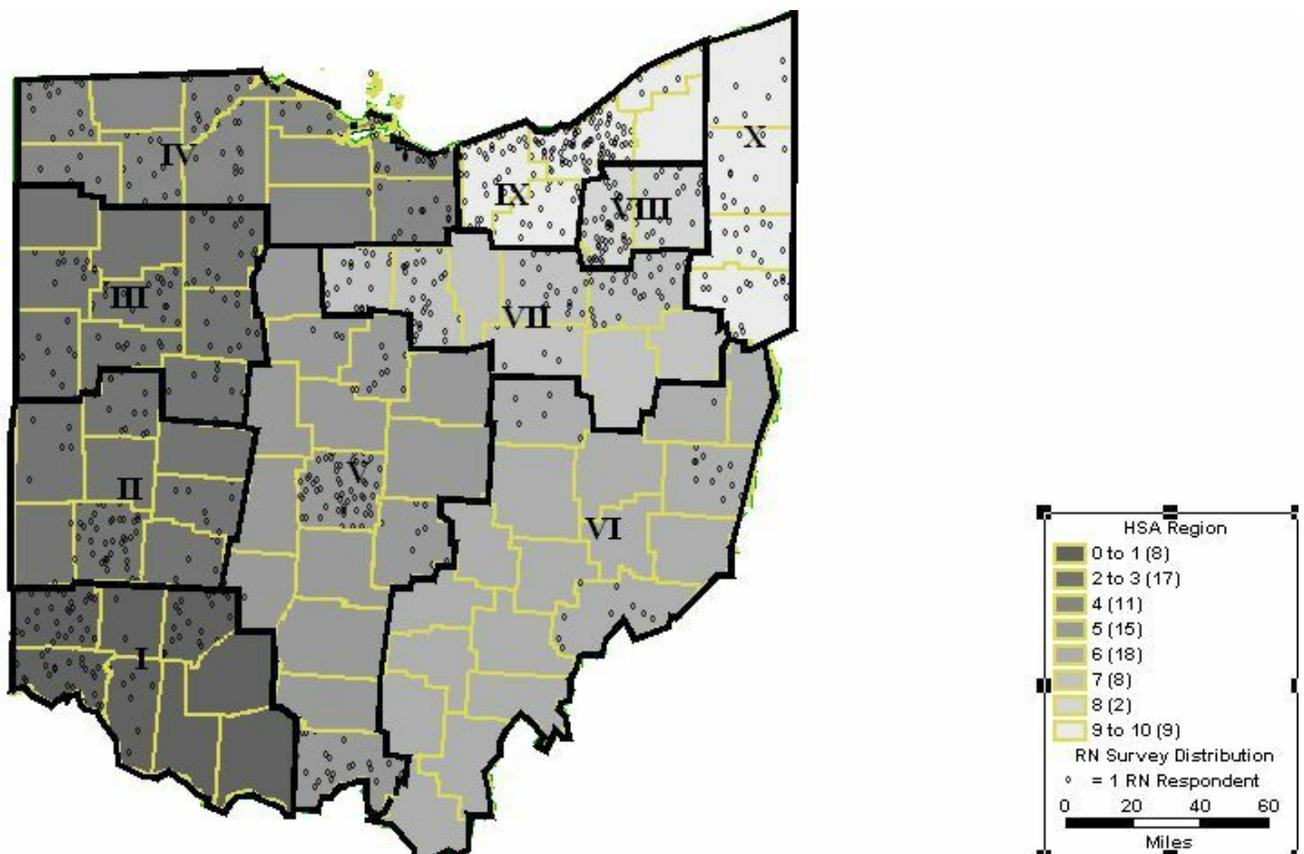
<sup>3</sup> Ohio Revised Code Chapters 3727 and 4765

<sup>4</sup> American College of Surgeons Committee on Trauma. Resources for Optimal Care of the Injured Patient 1999. American College of Surgeons, 1998

<sup>5</sup> ACS Website [www.facs.org](http://www.facs.org)

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- <sup>6</sup> American College of Surgeons Committee on Trauma. Resources for Optimal Care of the Injured Patient 1999. American College of Surgeons, 1998
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- <sup>13</sup> MacKenzie, EJ et.al National Inventory of Hospital Trauma Centers *JAMA*. 2003;289:1515-1522
- <sup>14</sup> American College of Surgeons Committee on Trauma. Resources for Optimal Care of the Injured Patient 1999. American College of Surgeons, 1998
- <sup>15</sup> Ohio Department of Public Safety, Division of EMS.  
[http://www.state.oh.us/odps/division/ems/ems\\_local/Training/brochures.htm](http://www.state.oh.us/odps/division/ems/ems_local/Training/brochures.htm)
- <sup>16</sup> MacKenzie, EJ et.al National Inventory of Hospital Trauma Centers *JAMA*. 2003;289:1515-1522
- <sup>17</sup> MacKenzie, EJ et.al National Inventory of Hospital Trauma Centers *JAMA*. 2003;289:1515-1522.
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[http://www.nhtsa.dot.gov/people/injury/ems/TRAUMA\\_SYSTEM/education.htm](http://www.nhtsa.dot.gov/people/injury/ems/TRAUMA_SYSTEM/education.htm)
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- <sup>21</sup> *Model Trauma Care System Plan*. [online]. US Department of Health and Human Services, Health Resources and Services Administration, Bureau of Human Resources Development, Division of Trauma and Emergency Medical Systems. Available at: <http://www.health.state.mn.us/traumasystem/modelplan.pdf>. Accessed May 20, 2003.
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## Appendix A Distribution of RN Survey Respondents by HSA Region and by County

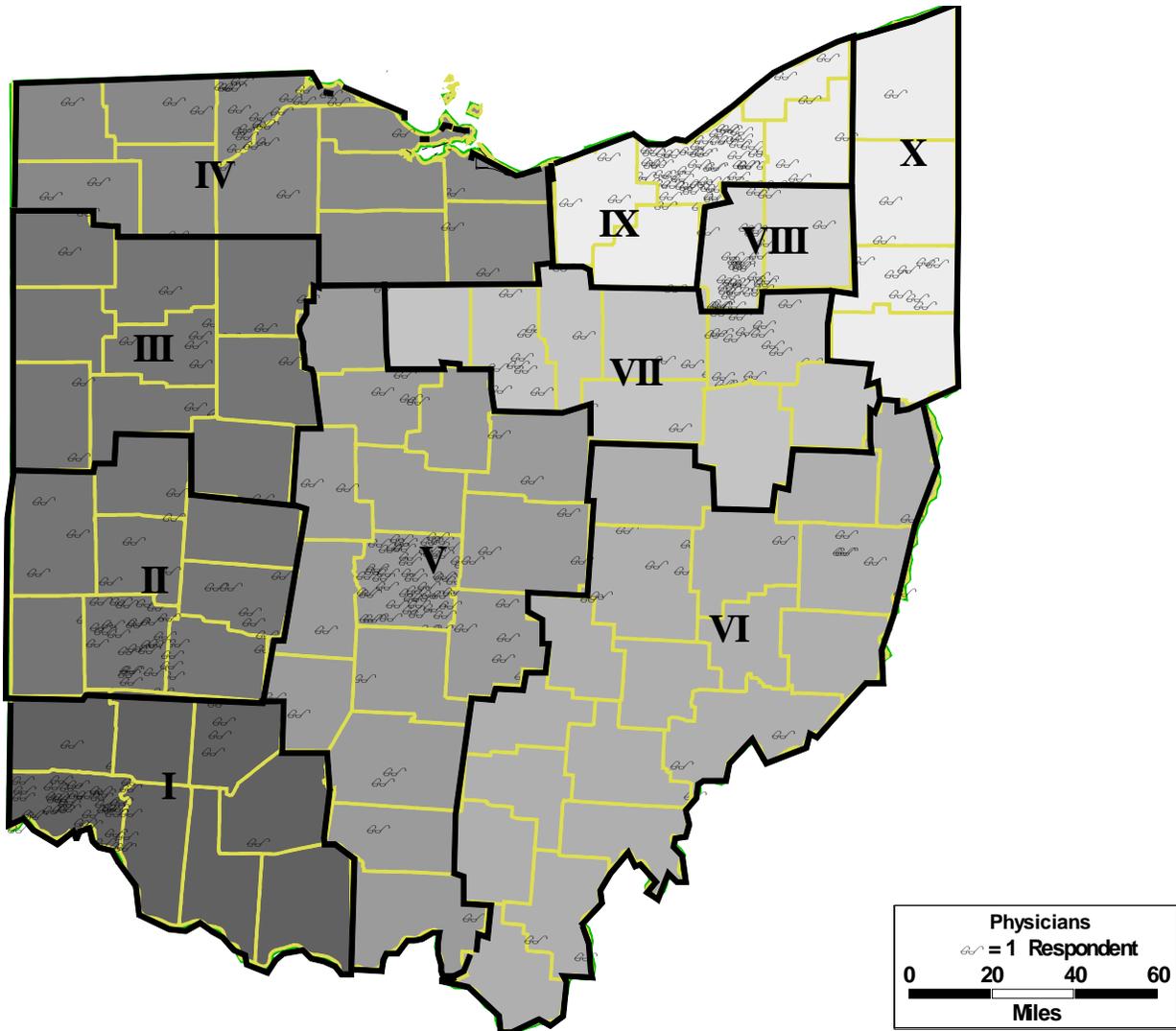


\* The dots are randomly distributed within the county border and do not represent exact locations within a county

\*\*The data was taken from the survey question that asked which county people were from.

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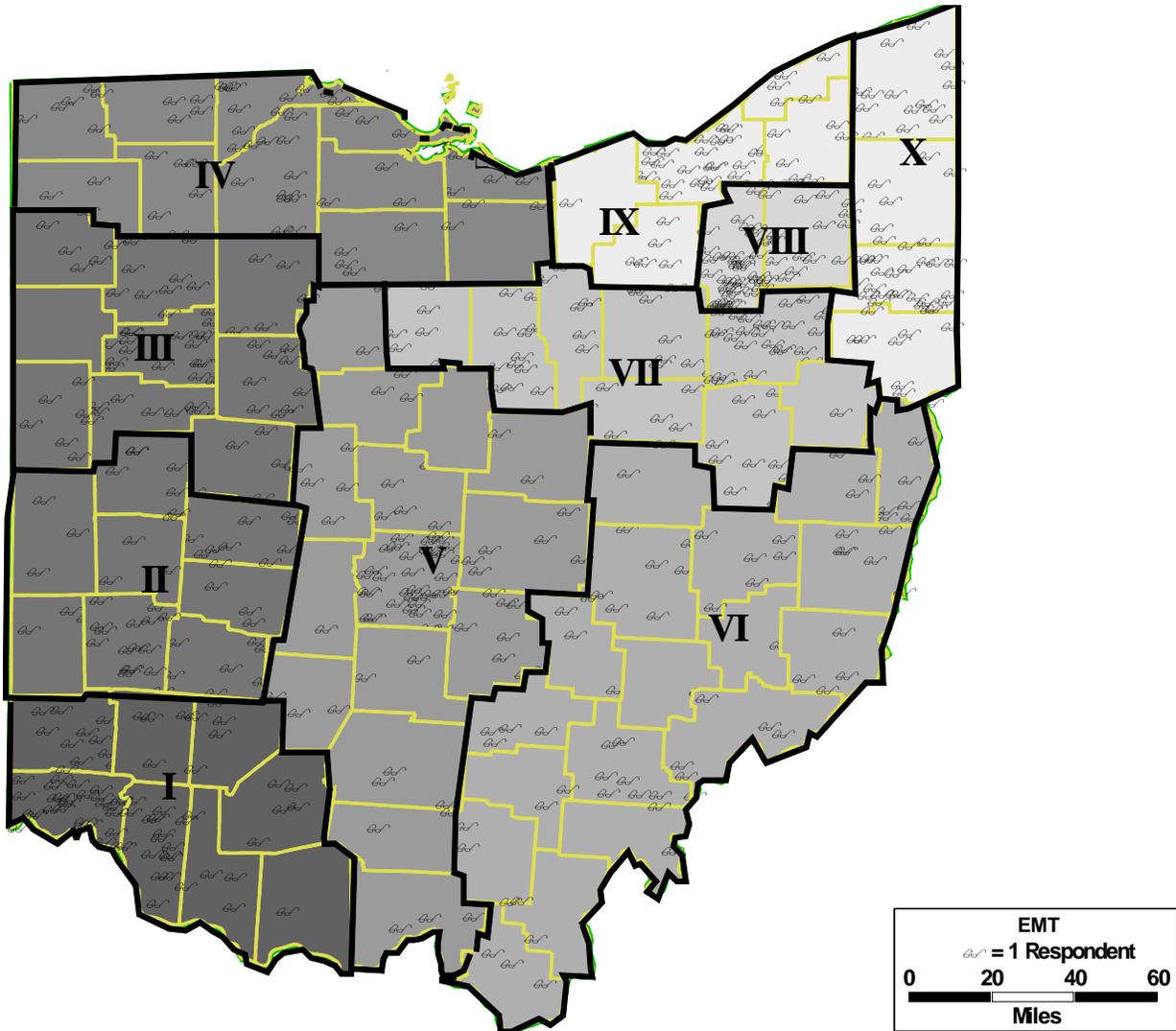
## Appendix B Distribution of Physician Survey Respondents by HSA Region and by County



\* The dots are randomly distributed within the county border and do not represent exact locations within a county

# Appendix C

## Distribution of EMT Survey Respondents by HSA Region and by County



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**Appendix D**  
**EMS Questionnaire**

[EMS Questionnaire](#)

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**Appendix E**  
Nurse Questionnaire

[RN Questionnaire](#)

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**Appendix F**  
Physician Questionnaire

[Physician Questionnaire.doc](#)