

EMS Board HB 138

Special Trauma Study #2

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Section 1

Introduction and Overview

The focus of HB-138 Trauma Study #2 was the identification of issues related to the care and management of pediatric trauma patients located along the border of Ohio. Survey tools for physicians, coordinators and providers were developed with emphasis on mutual aid concerns, transport of patients across state borders, pediatric education and equipment strengths and deficits. Also surveyed were the availability and review of a variety of pediatric resources such as pediatric polices, protocols, medications and certifications held by individual providers.

EMS agencies and their medical directors were identified utilizing State of Ohio pharmacy licenses. Agencies in Ohio regions 5 and 6 which fell within 20 miles of the state border were identified and contacted to participate in this research. The following is a review of the methodology utilized:

1. **West Virginia report** : Overview of EMS system in West Virginia
2. **EMS Medical Directors** : Medical directors were contacted by phone for the EMS agencies within the study area. Thirty-six physicians were identified, most of whom covered multiple agencies. Of these physicians 32 were contacted (88%) and completed the survey.
3. **Aeromedical Physicians** A survey of Chief medical officers for flight programs which routinely transport patients within the state of Ohio were contacted by mail. Surveys and a letter of explanation were sent to seven physicians. Five of the seven completed the survey (71%).

4. **EMS Coordinators** were identified in the designated border area and contacted by mail. A letter of explanation and survey was sent to each coordinator. A total 84 agencies were identified. The response rate was 66% (56/84).
5. **EMS Providers** Individual coordinator surveys identified the number of providers in their agency. Surveys were coded and sent to the coordinator for distribution. Most providers remained anonymous.
1459 surveys were distributed of which 366 were returned (25%).
6. **Run Sheet Data** 2 EMS agencies involved in the study provided run data of pediatric patients over a 6 month period. Transports were reviewed for a information on response time, transport time, pediatric disease processes encountered and skills and procedures utilized.

Section 2

Executive Summary

Overview

A list of EMS agencies located within 20 miles of the Ohio border in trauma regions V and VI were identified utilizing State of Ohio pharmacy records. The purpose of this study is to query these agencies medical directors, EMS coordinators and providers with regards to mutual aid concerns, inter-state transport of pediatric patients and the status of pediatric education and equipment in these areas.

Methodology

Telephone survey

36 medical control physicians were identified in the target area
32 physicians contacted (88%) by phone

Written Surveys

Aeromedical Physician Survey

5 of 7 chief medical officers completed the survey

EMS Coordinators Survey

85 EMS Coordinators identified in target area

8 page written survey mailed to each coordinator with letter explaining purpose of study

There is a 65% return rate on coordinator survey

Upon completion of coordinator survey:

Coordinator indicates # of providers in his or her agency

Follow-up survey then sent to those providers

EMS Provider Survey

Written survey distributed and 25% of the providers contacted completed the survey

Run Sheet Analysis

Run sheets were obtained from a 6 month period (pediatric only) from two agencies within the identified area. One agency is strictly volunteer and one agency paid. Data was obtained with regards to # of pediatric runs, response times, transport time and facility transported to.

Medical Control Physician Survey Summary

Mutual Aid

80% indicated their agencies have mutual aid agreements in place

42% indicated their agencies routinely transport patients to or from other states

88% indicated they do not believe their providers are required to have additional training or licensure to transport in other states

33% of physicians are certified EMS directors in other states (KY or WV)

86% of physicians indicated that their agencies are never 1st responders in other states

82% of physicians indicate that pediatric trauma patients are transported to the closest appropriate facility

Pediatric Policies and Protocols

54% indicated their agencies had dedicated pediatric protocols

75% indicated they have policies that facilitated transporting ill or injured children to the most appropriate facility (25% indicated the ED physician would make that determination)

50% of physicians indicated they review pediatric protocols on a regular basis and compare them to state or national standards

100% of physicians indicated they would appreciate help in review of pediatric protocols

100% of physicians indicated they have no policies for Children with Special Health Care Needs (CSHCN)

Education and Training

88% of physicians indicated that their providers need to have PALS as a minimum level of training

64% of physicians indicated that cost was a (negative) contributing factor to continuing education

Conclusions

Most physicians stated that if a pediatric patient was seriously injured EMS providers would call for air support. If not available they would transport to closest facility and the ED physician would then make arrangements for appropriate transfer

<10% of physicians indicated there were problems during the inter-state transfer of pediatric trauma patients and that was insurance issues

81% indicated they would be interested in applying for grant funding for their agencies

Most physicians spoke of their agencies limited exposure to sick children

Most physicians indicated that it was difficult to get volunteer agencies to spend time and money on training

All physicians stated more training and appropriate equipment would be beneficial

Aeromedical Physician Survey

71% response rate

Mutual Aid

60% do not have any formal mutual aid agreements

100% of the personnel may render care in other states

60% of the agencies are restricted to requests for interhospital transfers (no scene runs)

60% had no concerns with transports involving other states

40% were concerned with longer transport times and the service area being uncovered

Pediatric policies/education

14% of the total run volume is pediatrics
100% have pediatric policies
80% regularly reviewed and updated
60% of the crews are nurse/paramedic
100% NO protocols for children with special needs
40% felt crews were very comfortable with pediatrics

Conclusions

No mutual aid concerns
Lack of education regarding children with special needs

EMS Coordinator Survey Summary

65% response rate

Demographics

57.5% of agencies in the identified area are volunteer only (19.6% paid, 21.4% mix)
58.9% are fire department based
100% of agencies have access to computers with CD drive and internet access
Average response time- 6.85 minutes
Average transport time- 25.44 minutes
Helicopter service used most frequently- Medflight

Pediatric Policies and Protocols

80% have policies that facilitate transport of children to most appropriate facility
96.4% have protocols for pediatric patients
78.2% of agencies would like assistance from pediatric specialists developing protocols
20.4% have protocols for CSHCN

Educational Opportunities and Training

Location and cost sited as most important factor in continuing education
96.4% felt their service needed additional pediatric training courses
32.1% of agencies indicate they have applied for grant funding
93% indicate they would like to apply for funding for education and equipment

Equipment

12.5 % of BLS ambulances have all required equipment
27.3 % of ALS ambulances have all required equipment

Mutual Aid

90% of agencies indicate they have mutual aid agreements in place
50% of agencies indicate their providers render care in other states
30% of these indicate they complete additional training to do so

The majority felt there were no issues with mutual aid and interstate transfer
Concerns included leaving service area uncovered and longer transport times

Conclusions

Mutual aid issues were not a concern

There is a significant deficit of pediatric education and equipment for these agencies

EMS agencies in these areas are not prepared for children with special needs

Agencies would appreciate assistance with improving their pediatric care

EMS Provider Survey

Demographics

55.7% were Basics

The majority of providers who responded were between 35-45 years of age

32% had been a member of an EMS agency for 10-20 years

46.9% were volunteers

Previous Pediatric Education and Experience

84.1% care for pediatric patients 0-3 times per month

38% have had between 4-8 hours of pediatric education in the last 2 years

The majority of providers felt they needed education in pediatric assessment, trauma, respiratory emergencies and airway management

84.4% were most uncomfortable with children under 1 year of age

Cost and travel distance are the biggest barrier to pediatric education

95.8% felt their service had a need for additional pediatric training

Mutual Aid

88.7% have mutual aid agreements in place

49.8% of the providers in this series are contacted by pager

54.2% may provide care in another state if requested

The majority of providers have no issues with interstate or mutual aid

The most frequent concerns were medical legal issues, longer transport times and service area left uncovered

Conclusions

The majority of providers do not have concerns regarding interstate transports or mutual aid

EMS providers do not see a large number of pediatric patients

They are most uncomfortable with children under 1 year of age

The majority felt they needed more pediatric education in assessment, airway management and trauma

EMS Run Review

Demographics

195 run sheets were reviewed
Average response time was 7.41 minutes
Average time at the scene was 14.14
42.1% of the runs were trauma related

Mutual Aid

96.9% of the runs were within Ohio
5% of the runs involved mutual aid
0% activation of aeromedical in this series of runs

Pediatric Procedures

92 runs required no procedures
1 run required the use of BVM
1 intubation was performed
2 cases required CPR

Conclusions

Medical runs are more common than runs for trauma
Critical pediatric skills are used very infrequently
Interstate transport and mutual aid were not issues

Section 3

Dr Ann Dietrich's CV

ADDRESS Home: 6307 Deeside Drive
Dublin, OH 43017

Office: Children's Hospital
Division of Emergency Medicine
700 Children's Drive
Columbus, OH 43205

PHONE Residence (614) 764-2912
Residence FAX (614) 764-3782

Business (614) 722-4383
Business FAX (614) 722-4380

COLLEGES/UNIVERSITIES ATTENDED

Akron University, Akron, OH - B.S. 1981
Northeastern Ohio University College of Medicine –
M.D., 1985

APPOINTMENTS

Associate Professor, OSU	2000-present
Clinical Assistant Professor, OSU	1996-2000
Assistant Professor, OSU	1990-1996

MAJOR FIELD OF INTEREST

Pediatric head and cervical spine injuries

CERTIFICATION

National Board of Examiners	1986
American Board of Pediatrics	1989, recertified 2000-2006
Pediatric Emergency Medicine	1992, recertified 2000-2006

LICENSURE

OHIO Current to 4/2005 35055079

HONORS AND AWARDS

excellence – 1995

Ohio Basic Trauma Life Support award for teaching

2001

NEPF Editorial excellence in newsletter journalism

Best Single topic newsletter

Honorable mention

Trauma reports

NEPF Editorial Excellence in newsletter journalism

2000

Best Single topic newsletter

Third place

Pediatric Emergency reports

RESEARCH GRANTS

1. Trauma Research Project, Project No. HB138, Ohio Department of Public Safety, 07/01/02– 06/30/03, \$185,371
2. Post-concussive Symptoms in Children with Mild Head Injuries. R01-HD39834-01. Keith O. Yeates, PI, Ann M. Dietrich, Kathy Nuss, Jerome Rusin, H. Gerry Taylor, Martha Wright, Barbara Bangert. NICHD. Annual direct costs - \$600,000. 5/24/01-4/30/06
3. Pediatric Trauma Life Support – Working with the Ohio ACEP office and BTLS, designed a pediatric trauma course for prehospital providers. A chapter grant was received from ACEP in the amount of \$5,900 to complete the development of the book. The Pediatric BTLS is currently published through Brady.
4. Can clinical findings predict cervical spine fractures in pediatrics? A Samuel J. Roessler Memorial Scholarship Fund award of \$1,408 from Ohio State University was given to Christine Curran, first-year medical student, for full-time research on this project.

5. Stress responses in early life traumatic brain injury. A grant application was submitted to the Children's Hospital Research Foundation September 15, 1998. The investigators are Dr. Elizabeth Gilles, Dr. William Zipf, Dr. Keith O. Yeates, Dr. Ann Dietrich, Dr. Juliann Paolicchi, Dr. Ann Pakalnis, Dr. Mary McGregor, and Dr. Tara Smith. Closed 10/1/00 due to PI relocation.
6. Cerebral autoregulation in early life traumatic brain injury. The investigators are Dr. Elizabeth Gilles, Dr. Brian Coley, Dr. Kathryn Nuss, Dr. Keith O. Yeates, Dr. Ann Dietrich, Dr. Mary McGregor, Dr. Tara Smith, and Dr. Diane Begany. Approved by IRB. Closed 10/1/00 due to PI relocation.

COURSES TAUGHT

The Ohio State University

Medical Humanities Program Preceptorship. Medical student, November 2001-April 2002; February–April 2003.

Health Sciences Center, Master Public Health student, Public Health #685 Practicum, June-December 2002.

Ambulatory Care Sub-clerkship, Problem-based Learning Pathway. Medical students 2000, 2001, 2002

ICM General Clerkship Preceptorship. Medical students. 1998, 1999, 2000, 2001.

The Ohio State University/Children's Hospital

Pediatric Emergency Lecture. Medical Students (Year #3). Taught every 6 weeks over a 2-year period for 30-40 students per lecture.

General Clerkship/Introduction to Clinical Medicine III Course, 1991-1995, 1998-1999, and 2000-2001.

On average, teach 15 DOC students per month.

Samuel J. Roessler Research Fellowship:

1999 – 1 student

1995 – 3 students

1994 – 1 student

1993 – 1 student

Basic Trauma Life Support Course – 1991 through 1996

Pediatric Advanced Life Support Provider Course – 1991 through 2002

Pediatric Resident Trauma Course – 1992 through 2002

Resuscitation, Stabilization, and Transport Program Course – 1993

“Pediatrics”. Review course for nurses and paramedics - 1993

Course Presentations

1. “Rapid Review of Pediatrics”, “Childhood Illness” and “Test Taking Psychology” presented at Emergency Medicine Review Course for the Ohio Chapter of the American College of Emergency Physicians – 2002
2. “Rapid Review of Pediatrics”, presented at Emergency Medicine Review Course for the Ohio Chapter of the American College of Emergency Physicians – 2001

3. Emergency Medicine Review Course for the Ohio Chapter of the American College of Emergency Physicians – 2000
4. “Head and Neck Trauma”, Pediatric Trauma Course for PL-2 residents, Children’s Hospital, Columbus – 1999, 2003
5. Preceptor at Wright State University for Nurse Practitioner Course – 1998

OTHER PRESENTATIONS

1. “Transport Dilemmas”, Pediatric Emergency Medicine Grand Rounds, Children’s Hospital, Columbus, OH, March, 2003.
2. “A System to Detect an Unusual Increase in Emergency Department Visits.” Hayes JR, Groner JI, Cohen DM, Dietrich AD, Nuss KE, Zibners L, Bonsu B, Mihalov LK. Accepted: Pediatric Academic Societies Meeting, Poster Presentation, February 2003.
3. “Critical Concepts”, presented to MedFlight EMS, Columbus, OH, 2/2003.
4. “Managing Children with Pre-existing Conditions”, presented to Washington Fire EMS, 2/2003.
5. “Prehospital Declaration of Pediatric Death”, presented at Central Ohio Trauma System; Quarterly Trauma Education Session; “Controversial Issues in Pediatric Care”. Children’s Hospital, Columbus, OH, January 2003.
6. “CPR Advances”. Lounge and Learn, Children’s Hospital, Columbus, OH, January 2003.
7. “Critical Cases”, presented to MedFlight EMS, Columbus, OH, 11/2002.
8. “Pediatric Head Injuries”, presented to Washington Township OH EMS, 11/2002.
9. “Head Injuries in Pediatrics”, presented to Residents at Doctors Hospital, Columbus, OH, 9/2002.
10. “Evaluating a Child With Fever”, and “Pneumonia”, presented at Residency Program Advisory Committee Educational Day – 2002
11. “ER/Risk Management”, presented at Housestaff Conference, Children’s Hospital, Columbus, OH – 2001, 2002
12. “Case Studies in Transport Medicine”, Pediatric Emergency Medicine Seminar”, Children’s Hospital, Columbus, OH, 12/2001.
13. “Stabilizing and Packaging a Child for Transport”, presented to Doctor’s Hospital Emergency Department residents, Doctor’s Hospital, Columbus, OH – 2001
14. “Transport Medicine”, presented at Residency Program Advisory Committee Educational Day – 2001
15. “Pediatric Severe Head Injuries”, Pediatric Emergency Medicine Grand Rounds, Children’s Hospital, Columbus, OH, 9/2000.
16. “Direct Field Transfer vs. Hospital Stabilization of Pediatric Trauma Victims Transported by Air Ambulance”, presented at The Fifth International Conference on Pediatric Trauma - 2000
17. “Introduction to Pediatrics”, presented at Emergency Medicine Lecture Series – 2000
18. “MedFlight Pediatric Stabilization”, presented MedFlight, Columbus, OH - 2000
19. “Pediatric Pain Control”, Emergency Nurses Association - 1999
20. “Transport and Triage of Critically Ill or Injured Pediatric Patients”, American Health Consultants – 1999
21. “MedFlight Pediatric Stabilization”, presented MedFlight, Columbus, OH - 1999
22. “The Acute Recognition of Appendicitis”, presented at CME conference for Children’s Hospital, Columbus - 1999
23. “A Recipe for Fluids: Sugar, Water or Salt”, presented at The Partners in Children’s Health Subregional Programs, Children’s Hospital, Columbus – 1999
24. Skill sessions on pediatric ED procedures, presented at Scientific Assembly, American College of Emergency Physicians – 1998
25. “The Current Management of Pediatric Head Injuries”, 2nd Annual Pediatric Emergency Conference - 1998

26. "Emergency Management and Stabilization of the Potentially Critical Airway", 2nd Annual Pediatric Emergency Conference - 1998
27. "Pediatric Prehospital Care: What You Don't Know Can Hurt You", Ohio Chapter of ACEP - 1998
28. "Kids Are Unique", MedFlight Conference, Lima, Ohio - 1998
29. Orientation Program for Pediatric Transport - 1998
30. "Pediatric Assessment". MedFlight students - 1998
31. "Pediatric Assessment". OSU Emergency Medicine - 1997
32. "Pediatric Morbidity and Mortality". OSU Emergency Medicine - 1997
33. "Ohio Emergency Care and Trauma". Dayton Trauma Conference for EMS - 1997
34. "Transport of the Pediatric Emergency Patient". Trauma Conference Toledo, Ohio - 1997
OSU Emergency Medicine - 1996
35. "Pediatric Case Review". OSU Emergency Medicine - 1996
36. "Pediatric Head and Neck Trauma". OSU Emergency Medicine - 1996
37. "Pediatric Assessment". OSU Emergency Medicine - 1996
38. "Tertiary Care Services at Columbus Children's Hospital". Grant Hospital, Pediatric Trauma - 1996
39. "Pediatric Field Resuscitation Controversies". Resuscitation Conference - 1996
40. "Pediatric Radiographs and Visual Diagnosis". Ohio Chapter ACEP Emergency Medicine Review Course - 1996
41. "Pediatric Trauma". Teamwork in Action Symposium - 1996
42. "Introduction to Pediatric Emergencies". Ohio State University Residents and Attendings - 1996
43. "Controversies in Resuscitation". Regional Trauma Service - 1996
44. "Neurosurgery Emergencies". OSU Emergency Medicine - 1995
45. "Pediatric Assessment". OSU Emergency Medicine - 1995
46. "Pediatric Trauma". Pediatric Emergency Care Series - 1995
47. "Pediatric Head Trauma Case Review". Pediatric Emergency Care Series - 1995
48. "Airway & Respiratory Emergencies in Children". MedFlight personnel, Advanced Airway Program - 1995
49. "Pediatric Trauma". SkyMed Continuing Education - 1995
50. "Pediatric Assessment". SkyMed Continuing Education - 1995
51. "Pediatric Emergencies". OSU Emergency Medicine - 1994
52. "Tertiary Care Services at Columbus Children's Hospital". Riverside Methodist Hospital - 1994
53. "Pediatric Case Review on Eye Emergencies". Pediatric Emergency Care Series - 1994
54. "Pediatric Chest and Abdominal Injuries". Pediatric Emergency Care Series - 1994
55. "Pediatric Assessment". Prehospital care providers, BTLS Symposium - 1994
56. "Pediatric Cardiac Emergencies". Outreach program - case review, Clark County - 1994
57. "Pediatric Head Injury". Outreach program - case review, Ohio University College of Osteopathic Medicine,
Athens, Ohio - 1994
58. "Pediatric Head Injuries". Outreach program - case review, Grady Memorial Hospital - 1994
59. "Pediatric Cardiac Emergencies". Cardiac Symposium - 1994
60. "Management of Asthma on Transport". Neonatal/Pediatric Transport Conference - 1994
61. "Emergency Cases in the Office". Pediatric Pearls: Subspecialty Update Course for Clinicians - 1994
62. "Approach to the Pediatric Patient". OSU Emergency Medicine - 1994
63. "Pediatric Emergencies". OSU Emergency Medicine - 1993
64. Resuscitation, Stabilization, and Transport Program Course - 1993
65. "Transport Systems". Grand Rounds - 1993
66. "Tertiary Care Services at Columbus Children's Hospital". Doctors' Hospital - 1993
67. "Pediatric Medical Emergencies". Pediatric Emergency Care Series - 1993
68. "Recreational Injuries". Pediatric Emergency Care Series - 1993
69. "Pediatric Head Trauma". Pediatric Emergency Care Series - 1993
70. "Pediatrics". Review course for nurse's and paramedics - 1993
71. "Pediatric Head Trauma". Outreach program - case review, Urbana, Ohio - 1993
72. "Child Abuse". Outreach program - case review, Knox County Community Hospital - 1993
73. "Pediatric Head Injuries". Outreach program - case review, Morrow County - 1993
74. "Prehospital Pediatric Considerations". Emergency Medical Services Conference - 1993

75. "Head and Neck Trauma in Children". School Health Update Conference, Vern Riffe Center, Columbus – 1993
76. "Pediatric Trauma". SkyMed Continuing Education - 1993
77. "Pediatric Stabilization". SkyMed Continuing Education - 1993
78. "Pediatric Emergencies". OSU Family Medicine Department - 1992
79. "Head Injuries". OSU Family Medicine Department - 1992
80. "Introduction to Pediatric Emergencies". OSU Emergency Medicine - 1992
81. "Thoracic Injuries in Children". OSU Emergency Medicine - 1992
82. "Pediatric Morbidity and Mortality". OSU Emergency Medicine - 1992
83. "The Injured Child". Grand Rounds - 1992
84. "OSU/Children's Pediatric Emergencies". Grand Rounds - 1992
85. "Wrap-up Session Emergencies". Grand Rounds - 1992
86. "Pediatric Cardiac Emergencies". Pediatric Emergency Care Series - 1992
87. "Pediatric Head Injuries". Outreach program – case review, Morrow County - 1992
88. "Trauma". Pediatric Morbidity and Mortality Conference - 1992
89. "Case reviews". Pediatric Transport Preceptorship - 1992
90. "Shock in a Pediatric Patient". Emergency nursing Conference - 1992
91. "The Identification and Management of Shock in the Pediatric Patient" - 1992
92. "Shunt Dysfunction". SkyMed Continuing Education - 1992
93. "Air Transport Criteria". SkyMed Continuing Education - 1992
94. "Hypothermia, Drowning". SkyMed Continuing Education - 1992
95. "Head and Neck Trauma in Children". Pediatric Update Conference – 1992
96. "Approach to the Pediatric Patient". OSU Emergency Medicine - 1991
97. "Transport of Critically Ill Pediatric Patients". Pediatric Residents, morning lecture series - 1991
98. "Pediatric Head Injuries". Grand Rounds – 1991
99. "Pediatric Cardiac Emergencies". Pediatric Emergency Care Series – 1991
92. "Head and Neck Trauma in Children". School Health Update Conference, Vern Riffe Center, Columbus - 1991
93. "Emergency Stabilization". Nursing education - 1991
94. "Common Pediatric Emergencies". OSU Family Medicine Department - 1990
95. "The Pediatric Surgical Patient". OSU Emergency Medicine - 1990
96. "Trauma: Evaluation of the Pediatric Patient". Pediatric Residents, morning lecture series – 1990

REVIEWER/EDITOR

1. **Reviewer**, critically reviewed journals:

- a. Annals of Emergency Medicine
- b. Pediatrics

1. **Editor**

- a. Pediatric Emergency Medicine Report

PROFESSIONAL ACTIVITIES/COMMITTEES

1. Chair, State of Ohio Emergency Medical Services Regional Physician Advisory Board 2001-present
2. Editor, *Trauma Reports* 2000-present
3. Nominee, Ohio Chapter AAP, for appointment to the Pediatric Emergency Medicine 2000
4. Medical Director for Pediatric Emergency Medicine "Cutting Edge" Program, American Health Consultants 1999
5. Editor, *Pediatric Emergency Medicine Reports* 1998-present
6. Medical Director, Franklin County Firefighters Paramedic Program 1998-present
7. Associate Editor, *Pediatric Emergency Medicine Reports* 1997-1998
8. The Ohio State University Med III-IV Committee 1997-1998
9. Pediatric Medical Advisor, Medflight 1997-present

10. Pediatric Medical Advisor, Transport Team	1997-2001
11. Ohio Chapter ACEP Education Coordinator	1996-present
12. Basic Trauma Life Support Pediatric BTLS Task Force	1996-2000
13. State Medical Director, Basic Trauma Life Support	1995-2000
14. American College of Pediatric Emergency Medicine Committee	1995-present
15. Franklin County Firefighters/ EMS Education Advisory Board	1995-present
16. American Academy of Pediatrics National Task Force on Resident Education	1994-1996
17. Peer reviewer, <i>Annals of Emergency Medicine Reports</i>	1994-present
18. Regional Physicians Advisory Board	1994-present
19. Development Sub-Committee, The Ohio State University College of Medicine Ambulatory Education	
20. American College of Emergency Physicians Board	1994-present
21. Chairperson of Pediatric EMS Sub-Committee, Ohio Chapter of ACEP	1994-present
22. Pediatric Advanced Life Support Affiliate Faculty	1993-present
23. Pediatric Medical Advisor to Sharon Township EMS	1992-present
24. Basic Trauma Life Support Advisory Council	1991-2000
25. Basic Trauma Life Support Affiliate Faculty	1991-2000

BOOKS (edited)

1. Dietrich A, Shaner S, eds. *Basic Trauma Life Support*. Basic Trauma Life Support International 1995. Revised 2000.
2. Dietrich AM, Cohen DM. Musculoskeletal Stimuli book for Emergency Medicine. Ohio Chapter of the American College of Emergency Physicians. September 1999.
3. Dietrich A. *Pediatric Key Concept Cards*. Ohio Chapter American College of Emergency Physicians. 1998.
4. Dietrich A. *Peds Care Now – Pediatric Emergency Care Guide*. Premier Health Care Services, Inc. 1997.
5. Dietrich AM, Cohen D. In: Effen D, ed. *Pediatric Photo and X-ray Stimuli for Emergency Medicine*, Vol. 2. Ohio Chapter American College of Emergency Physicians. 1997.

BOOKS (chapters)

1. Dietrich A. Pediatric Emergencies. In: *Preparing for Written Board Examinations in Emergency Medicine*, 4th Edition. Emergency Medicine Educational Enterprises, Inc. 2001.
2. Dietrich A, Cohen DM, Hickey R. Pediatric Resuscitation. In: *Handbook of Cardiovascular Emergencies*, Second Edition. Lippincott, Williams, and Wilkins, Philadelphia. 2001
3. Dietrich A. Trauma in Children. In: *Basic Trauma Life Support Textbook*. Pediatric Basic Trauma Life Support. 1999.
4. Dietrich A. Pediatric Practice Questions. In: *Emergency Medical Services Manual, Neonatal Resuscitation*. American College of Emergency Physicians. Medtext Publishing. 1996.
5. Dietrich A. Pediatric Emergencies. In: Rund, Rosen, Barkin, Sternback, eds. *Essentials of Emergency Medicine Textbook*. Mosby-Year Book, Inc. 1996.
6. Dietrich A, Shaner S. *Pediatric Basic Trauma Life Support*. Ohio Chapter American College of Emergency Physicians. 1995.

7. Dietrich A. Circulation, Neurologic, Vital Signs, and Family Intervention. In: *EMSC Instructor's Manual*.

ARTICLES IN PEER-REVIEWED JOURNALS

(* student, resident, or fellow)

1. Knazik SR, Gausche-Hill M, Dietrich AM, et al. The Death of a Child in the Emergency Department. Accepted for publication by *Ann Emerg Med* 2002.
2. Effective Use of the Air Ambulance for Pediatric Trauma. Jeremy Larson MD, Ann Dietrich MD, Shahab Abdessalam M.D., and Howard Werman MD. Accepted for publication by *J Trauma* 2/2003.
4. Boswell HB, Dietrich A, Shiels WE, King D, Ginn-Pease M, Bowman MJ, Cotton WH. The accuracy of visual determination of neutral position of the immobilized pediatric cervical spine. *Pediatric Emerg Care* 17:10-14, 2001.
5. Nuss KE, Dietrich AM, Smith, GA. Effectiveness of a pediatric trauma team protocol. *Pediatr Emerg Care* 17(2): 96-100, 2001.
6. Mace SE, Gerardi MJ, Dietrich, AM, et al. Injury prevention and control in children. *Ann Emerg Med* 38(4): 405-414, 2001.
7. Abrunzo T, Gerardi M, Dietrich A, et al. The role of Emergency Medicine physicians in the care of the child in school. *Ann Emerg Med* (35)2:155-15, 2000
8. Losek JD, Endom E, Dietrich A, et al. Adenosine and pediatric supraventricular tachycardia in the emergency department: multicenter study and review. *Ann Emerg Med* 33(2): 185-191, 1999.
9. Augustine J, Dietrich A M. Emergency medicine in a managed care environment. *Managed Care Interface* 11(2): 58-67, 1998.
10. Smith GA, Dietrich AM, Garcia CT, Shields BJ. Injuries to children related to shopping carts. *Pediatrics* 97(2): 161-165, 1996.
11. *Strausbaugh S, Manley L, Hickey R, Dietrich A. Circumferential pressure as a rapid method to assess intraosseous placement. *Pediatr Emerg Care* 11(5):274-6, 1995.
12. Hickey RW, Cohen DM, *Strausbaugh S, Dietrich A. Pediatric patients requiring CPR in the prehospital setting. *Ann Emerg Med* 25(4): 495-501, 1995.
13. *Curran C, Dietrich A, Bowman MJ, et al. Pediatric cervical spine immobilization : Achieving neutral position. *J Trauma: Injury, Infection and Critical Care* 39(4): 729-732, 1995.
14. Smith G, Dietrich A, Garcia CT, Shields S. Epidemiology of shopping cart-related injuries to children: An analysis of national data for 1990 to 1992. *Arch Pediatr Adolesc Med* 149: 1207-1210, 1995.
15. Dietrich A, *James C, King D, Ginn-Pease M, Cecalupo A. Head Trauma in children with congenital coagulation disorders. *J Pediatr Surg* 29(1): 28-32, 1994.
16. Wells T, Mortensen M, Dietrich A, et al. Comparison of the pharmacokinetics of Naproxen tablets and suspension in children. *J Clin Pharm* 34:30-33, 1994.
17. *Getschman S, Dietrich A, Franklin W, Allen H. Intraosseous adenosine: as effective as peripheral or central administration. *Arch Ped Adolesc Med* 148:616-19, 1994.

18. Dietrich A, Mortensen M, Wheller J. Cardiac toxicity in an adolescent following chronic Lithium and Imipramine therapy. *J Adolesc Health* 14(5):394-397, 1993.
19. Dietrich A, Bowman M, Ginn-Pease M, Kosnik E, King D. Pediatric head injuries: can clinical factors reliably predict an abnormality on computed tomography? *Ann Emerg Med* 22(10): 1535-40, 1993.
20. Franklin W, Dietrich A, Hickey R, Brookens M. Anomalous left coronary artery masquerading as infantile bronchiolitis. *Pediatr Emerg Care* 8(6):338-42, 1992.
21. Dietrich A, Ginn-Pease M, Bartkowski H, King D. Pediatric cervical spine fractures, predominantly subtle presentations. *J Pediatr Surg* 26:995-1000, 1991.
22. Dietrich A, Mortensen M. Presentation and management of an acute caffeine overdose. *Pediatr Emerg Care* 6(4):206-98, 1990.

REVIEWS AND ABSTRACTS

1. Cohen D, Garcia C, Dietrich A. Miniature C-arm imaging – a rapid and simple way to detect foreign bodies in the emergency department. *Ann Emerg Med* Jan 1995.
2. Curran C, Dietrich A, Bowman MJ, et al. Pediatric cervical spine immobilization: Achieving neutral position. *Ann Emerg Med* 23(2):612, 1994.
3. Grossman L, Fisher L, Dietrich A, et al. Decreasing inappropriate ED use. *Am J Dis in Child* 146(4):33, 1992.
4. Grossman L, Fisher L, Dietrich A, et al. Can primary care referrals in the ED improve follow-up? *Am J Dis in Child*;146(4):514, 1992.
5. Dietrich A, et al. Cervical spine injuries: present until proven otherwise. *Pediatr Trauma & Acute Care* 1991 Sept:33.

TEACHING MATERIAL

Emergency Medicine Quiz Questions for a Comprehensive Review. Ohio Chapter American College of Emergency Physicians. September 2000, Columbus, OH. CD ROM

Children's Hospital
Columbus, OH
1993-present

President
PAA Executive Committee
June 2001–June 2003

FORMER POSITIONS AND ACADEMIC APPOINTMENTS:

President, Medical Staff
Children's Hospital January 2002–January 2003

Vice President, Medical Staff
Children's Hospital 2001

Medical Staff Officer Secretary
Children's Hospital
Columbus, Ohio 2000

Private Pediatrician
Associated Pediatrics, Inc.
Westerville, Ohio 1997 – 2002

Interim Chief
Division of Emergency Medicine
Medical Director, Emergency Services
Children's Hospital
Columbus, Ohio March 1997 – March 1998

Medical Director, Teleservices
Children's Hospital
Columbus, OH 1997-1998

Medical Director
Children's Hospital Urgent Care
Columbus, OH 1992-1996

Pediatrician
East Pasco Health Clinic
Public Health Department
Dade City, FL 1988-1989

Pediatrician
East Pasco Medical Center
7050 Gall Blvd
Zephyrhills, FL 1988-1989

Staff Physician
Children's Hospital Hematology Clinic
Columbus, OH 1988

LICENSURE:

State Medical Board	Ohio	#35-05-4366	07/2004
Drug Enforcement Agency		#BM1302227	01/2006

BOARD CERTIFICATION:

The American Board of Pediatrics	1998	#043052
Re-certified: 03/1998		
Expiration Date: 2004		
Pediatric Emergency Medicine Sub Board	1994	#212283

OTHER CERTIFICATION:

Pediatric Advance Life Support, Provider	05/2004
Advanced Cardiac Life Support, Provider	10/2003
Advanced Trauma Life Support, Provider	03/2004
Advanced Burn Life Support, Provider	02/2009

PROFESSIONAL AFFILIATIONS:

Fellow, American Academy of Pediatrics
Member, Central Ohio Pediatric Society
Member, Association of Pediatric Program Directors

OTHER PROFESSIONAL ACTIVITIES:

Children's Hospital

Pharmacy and Therapeutics Committee	1993 – 1995
Cost-effective Task Force Chair	1993 – 1995
Physician Satisfaction Task Force	1997 – present
Continuing Medical Education Committee	1995 - 1997
CME Subcommittee on Faculty Development	1995 - present
Medical Executive Committee	1997 – 12/31/2003
Immediate Past President, Medical Staff Office	1/1/2003 – 12/31/2003
Vice President, Medical Staff Office	2001
President, Medical Staff	2002
Credentials Committee	1997 - present
President, Pediatric Academic Association	7/1/2002 –
Pediatric Academic Association – Executive Committee	2003 – 2007
College of Medicine Pediatric Interest Group,	1994 – present
Pediatric Academic Association Marketing Committee	1992 - 1997
Children's Hospital Board	
Trustee, Children's Hospital Advisory Board	

Section of Emergency Medicine

Transport Committee

1993 - 1995

Quality Improvement Committee

1991 – present

PUBLICATIONS:

Smith GA, Mihalov L, Shields BJ. Diagnostic Aids in the Differentiation of Pyloric Stenosis from Severe Gastroesophageal Reflux During Early Infancy: The Utility of Serum Bicarbonate and Serum Chloride. *Amer J Emerg Med* 17: 28-31, 1999.

An abstract of this article was featured in the following publication as a key reference:
2000 Year Book of Emergency Medicine, Mosby-Year Book (In Press)

Sells LL, Mihalov, LK. Topical Anesthetics and Tissue Adhesives: A New Generation in Pediatric Wound Management. *Pediatric Emergency Medicine Reports, Volume 4, Number 9, September, 1999.*

ND Yeager, RF English, LK Mihalov, MK Kuzma, JD Mahan. Procedure Documentation in Pediatric Residency Programs: State of the Art and View of the Future. Presented at the Pediatric Academic Society Annual Meeting, Boston, MA, May, 2000.

SellsLL, MihalovL, EckleN, et al. "The Experience and Perceptions of Trauma Team Members with Family Presence during Pediatric Trauma Resuscitations." Poster presented at the American Academy of Pediatrics Annual Meeting, Section on Emergency Medicine, Chicago, Illinois, October, 2000.

OTHER PROFESSIONAL ACTIVITIES:**Ohio State University**

College of Medicine Pediatric Interest Group

AOA Honor Medical Society, 1989 - present

College of Medicine - Med I - PBL Facilitator

College of Medicine - Admissions Committee, 1995 - present

CLINICAL ACTIVITIES:

General Pediatric Practice

Associated Pediatrics Inc.

Westerville, OH

Revised: May, 2003

CURRICULUM VITAE

JONATHAN I. GRONER, M.D.

Current Professional Appointments

The Ohio State University College of Medicine and Public Health
Clinical Associate Professor of Surgery, 2002-Present

The Ohio State University College of Medicine and Public Health:
Assistant Professor, Clinical Surgery, 1999-2002

Children's Hospital:
Trauma Medical Director, 1999-Present

Children's Hospital:
Surgical Director, Pediatric Intensive Care Unit, June 2000-2001

Personal Information

	Place of birth:	Highland Park, Illinois
Date of birth:		December 15, 1959
Married:		Cathy J. Levine – 1988
Children:		Max Groner- 1989 Jesse Groner- 1992
Home:		908 Grandon Avenue Bexley, Ohio 43209 614-235-7478
Office:		Department of Pediatric Surgery Children's Hospital 700 Children's Drive ED341 Columbus, Ohio 43205 614-722-3919 Fax: 614-722-3903 e-mail: gronerj@chi.osu.edu

Education

B.S.	Northwestern University Evanston, Illinois	1978-1982
M.D.	Northwestern University Evanston, Illinois	1980-1984

Postgraduate Training

Internship in General Surgery Medical College of Wisconsin Milwaukee, Wisconsin	1984-1985
Residency in General Surgery Medical College of Wisconsin Milwaukee, Wisconsin	1985-1991
Residency in General Surgery John Radcliffe Hospital Oxford, England	January-June 1990
Fellowship in Research Department of Surgery Children's Hospital of Philadelphia Philadelphia, Pennsylvania	1987-1989
Postdoctoral Research Fellow in Cancer and Nutrition The University of Pennsylvania School of Medicine Philadelphia, Pennsylvania	1988-1989
Assistant Chief Resident in Pediatric Surgery Children's Hospital Columbus, Ohio	1991-1992
Chief Resident in Pediatric Surgery Children's Hospital Columbus, Ohio	1992-1993

Board Certification

National Board of Medical Examiners, #297406	1985
American Board of Surgery, #37757	1992
American Board of Surgery, Recertification, #37757	2000

Board Certification – Cont.

American Board of Surgery
Pediatric Surgery, # 612 1994

Special Certifications

Advanced Cardiac Life Support 1985

Advanced Trauma Life Support Provider 1986
Recertified 1990, 1994, 1998

Advanced Trauma Life Support Instructor Course 1999
ATLS Instructor, Ohio State University May, 1999
ATLS Instructor, Ohio State University July, 1999
ATLS Instructor, Ohio State University October 26 & 27, 2001
ATLS Instructor, ACEP office June 14, 2002
ATLS Instructor, Ohio State University July 26 & 27, 2002
ATLS Course Director, COTS office, Cols, Ohio April 25, 26, 2003

Advanced Burn Life Support 1994

Pediatric Advanced Life Support Provider Course 2001

Licensure

Wisconsin: No. 26983 (inactive) 1985
Pennsylvania: No. 040053-E (inactive) 1987
Ohio: No. 3506153 1992

Teaching Appointments

Clinical Instructor of Surgery 1991-1993
Department of Surgery
Ohio State University College of Medicine
and Public Health

Assistant Professor of Clinical Surgery 1999-2002
Department of Surgery
Ohio State University College of Medicine
And Public Health

Clinical Associate Professor of Surgery 2002-Present
Department of Surgery
Ohio State University College of Medicine
and Public Health

Hospital and Administrative Appointments

Medical Staff (Active) Department of Pediatric Surgery Children's Hospital Columbus, Ohio	1993-Present
Clinical Attending Staff Ohio State University Hospital Columbus, Ohio	1999-Present
Community Associate Staff The Arthur G. James Cancer Hospital and Research Institute Columbus, Ohio	1997-1999
Attending Associate Staff The Arthur G. James Cancer Hospital and Research Institute Columbus, Ohio	1999-Present
Clinical Attending Staff The Arthur James Cancer Hospital and Research Institute Columbus, Ohio	1999-Present
Consulting Staff Riverside Methodist Hospital Columbus, Ohio	1994-Present
Consulting Staff Mount Carmel Hospital Columbus, Ohio	1994-Present
Provisional Staff Grant Medical Center Columbus, Ohio	1994-Present
Consulting Staff St. Ann's Hospital Westerville, Ohio	1993-Present
Acting Trauma Medical Director Children's Hospital Columbus, Ohio	1998-1999

Honors and Awards

Milwaukee Academy of Surgery:
Resident Paper Competition 1987
First Prize

Medical Societies

National:

American Academy of Pediatrics: Surgery Specialty Fellow
American Academy of Pediatrics: Section on Injury & Poison Prevention
American College of Surgeons (Fellow)
American Medical Association
American Pediatric Surgical Association
American Pediatric Surgical Association-Trauma Committee
American Public Health Association
American Society for Parenteral and Enteral Nutrition
American Trauma Society
Eastern Association for the Surgery of Trauma
National Association of EMS Physicians
Society of Laparoendoscopic Surgeons

State and Local:

Ohio Committee on Trauma, American College of Surgeons
Ohio Chapter, American College of Surgeons
Ohio State Medical Association
Columbus Surgical Society
Columbus Medical Association
Central Ohio Pediatric Society
Robert M. Zollinger/Ohio State University Surgical Society

Committees

State:

Central Ohio Trauma System Foundation Board
President 2001-Present
Central Ohio Trauma System Foundation Board 1999-2001
Secretary, Treasurer
Central Ohio Trauma System Finance Committee 1999-2001
Chairman
Central Ohio Trauma System Columbus Metropolitan
Medical Response System Committee 1999-Present
Ohio Department of Health Trauma Rules and Regulations Committee 2001
Central Ohio Trauma System, Education/Prevention Committee 1999-2001
Ohio Society for Parenteral and Enteral Nutrition 1994-1996
Chairman, Scholarship Committee

Committees continued

<i>Children's Hospital:</i>	
Bloodborne Pathogens Exposure Task Force	1996-1997
Child Passenger Safety Committee	1997-Present
Continuing Medical Education Committee	1994-1997
Critical Care Committee	1998-1999
Disaster Committee	1993-2000
Disaster Committee- <i>Co-Chairman</i>	2000-Present
EMTEK Physician Order Entry Steering Committee	1997-2000
Head Trauma Collaborative Group	1998-2001
Human Subjects Research Committee	1999-Present
Library Committee	1999-Present
2000 Medical Leadership Program	2000-2001
Medical Staff Nominating Committee	1998-Present
Physicians' Healthcare Network Committee	1997-2000
Physician Satisfaction Service Team	1998-2000
PICU Working Group	1999-Present
Operating Room Block Time Committee	1998-Present
Transfusion Committee	1996-Present
Trauma Committee, <i>Chair</i>	1998-Present
Trauma Performance Improvement Committee	1997-Present
Trauma Performance Improvement Committee, <i>Chair</i>	1998-Present
Trauma Research Committee, <i>Chair</i>	1998-2002
Utilization Management Committee	1997-1998
<i>Ohio State University:</i>	
Undergraduate Medical Education Committee	2000-Present

Appointments

Acting Trauma Medical Director <i>Children's Hospital, Columbus, Ohio</i>	1998-1999
Trauma Medical Director <i>Children's Hospital, Columbus, Ohio</i>	1999-Present

Major Research Interests

Trauma and Injury Prevention
Nutrition

Research Support

<i>Nutrition Center Pilot Project Program:</i>	<i>\$8,000.00</i>
<u>“Intestinal Motor Activity in Neonatal Short Bowel Syndrome”</u>	
1988-1989 Children’s Hospital of Philadelphia	
 <i>Surgical Associates Research & Education Foundation:</i>	 <i>\$5,000.00</i>
“Comparison of Energy Expenditure with Injury Severity Score in Childhood Trauma”	
1988-1989 Children’s Hospital of Philadelphia	
 <i>NIH Grant – National Cancer Institute Training Grant in Cancer and Nutrition #2-T32-CA09430</i>	
“Intestinal Motor Activity in Neonatal Short Bowel Syndrome”	
1988-1989	
 <i>Food and Drug Administration, IND: 42898</i>	
<i>CHRF Protocol No: 96HS041</i>	
“The Use of Cholecystokinin Octapeptide to Prevent Parenteral Nutrition-Associated Cholestasis”	
November 1997-2000	
 <i>Ohio Department of Public Safety GR-1 Agreement # 0941.0:</i>	 <i>\$55,351.00</i>
<i>CHRF Protocol No: 99HSE020</i>	
<u>“Moving Children Safely II”</u>	
October 1, 1998-September 30, 1999	Principal Investigator
 <i>Ohio Department of Public Safety</i>	 <i>\$160,000.00</i>
<u>“Car Seats Close to Home”</u>	
October 1, 1999-September 30, 2000	Principal Investigator
 <i>Ohio Department of Public Safety GR-1 Agreement #01086.0:</i>	 <i>\$70,000.00</i>
<i>CHRF Protocol</i>	
“Moving Children Safely III”	
January 5, 2000-September 30, 2000	Principal Investigator
 <i>Ohio Department of Public Safety GR-1 Agreement #1461:</i>	 <i>\$178,547.00</i>
<i>CHRF Protocol No:</i>	
“Car Seats Close to Home”	
October 1, 2000-September 30, 2001	Principal Investigator
 <i>Ohio Department of Public Safety GR-1</i>	 <i>\$156,014.00</i>
<i>CHRF Protocol No:</i>	
“Car Seats Close to Home”	

Participation in Major Academic Meetings- continued

Groner JI, Telford GL, Krepel CJ, Condon RE, Edmiston CE: "The Efficacy of Oral Antibiotics in Reducing Colon Mucosal Associated Aerobic and Anaerobic Microflora." Presented at the International Congress on Intra-Abdominal Infections, Hamburg, Germany, 1987.

Groner JI, Altschuler SM, Ziegler MM, O'Neill JA Jr: "Recovery of Small Intestinal Myoelectric Activity in the Young Piglet Following Abdominal Surgery." Presented at the 3rd Annual Society for Surgery of the Alimentary Tract/Ross Residents and Fellows Research Conference, New Orleans, Louisiana, May 1988.

Groner JI, Furlan LE, Brown MF, Altschuler SM, Cohen DE, Ziegler MM: "The Effect of Cisapride on Small Intestinal Myoelectric Activity in the Young Piglet." Presented at the American Motility Society, Asilomar, California, October 1988.

Groner JI, Brown MF, Stallings VA, Ziegler MM, O'Neill JA Jr: "Resting Energy Expenditure in Children Following Major Operative Procedures." Presented at the Surgical Section of the American Academy of Pediatrics, San Francisco, California, October 1988.

Groner JI, Broussard DL, Furlan LE, Ziegler MM, Altschuler SM: "Migrating Myoelectric Activity in the Neonatal Piglet Small Intestine Following Bowel Resection." Presented at the 9th Annual Pediatric Surgical Residents' Conference, Boston, Massachusetts, November 1988.

Groner JI, Broussard DL, Nathan TR, Altschuler SM, Ziegler MM: "Small Intestinal Motility in a Newborn Model of Short Bowel Syndrome." Presented at the Annual Meeting of the American Pediatric Surgical Association, Baltimore, Maryland, May 1989.

Teich S, Groner JI: "A Synthetic Meshed Polymer for the Treatment of Newborns with Severe Partial Thickness Skin Loss Due to Epidermolysis Bullosa." Presented at the Pan Pacific Regional Meeting of the International Society for Burn Injuries, Maui, Hawaii, February 1993.

Groner JI, Marlow J, Teich S: "Groin Laparoscopy for the Evaluation of the Contralateral Groin in Pediatric Hernia Repair." Presented at the IV International Congress for Endosurgery in Children, Orlando, Florida, May 1995.

Teich S, Groner JL: "Optimal Management of Epidermolysis Bullosa in Infants with Severe Perinatal Skin Loss." Presented at the Surgical Section of the American Academy of Pediatrics, San Francisco, California, October 1995.

Groner JI: "Endotoxin and Transient Hypoxia Cause Severe Acidosis in the Piglet." Presented at the Surgical Section of the American Academy of Pediatrics, Boston, Massachusetts, October 1996.

Participation in Major Academic Meetings- continued

Meric F, Teitelbaum DH, Geiger JD, Harmon CM, Groner JI: "Latex Sensitization in General Pediatric Surgical Patients: A Call for Increased Screening of Our Patients." Presented at the Surgical Section of the American Academy of Pediatrics, New Orleans, Louisiana, November 1997.

Cook CH, Melvin WS, Groner JI, Allen E, King D: "A Cost Effective Thoracoscopic Treatment Strategy for Pediatric Spontaneous Pneumothorax." Presented at the 1998 Scientific Session of the Society of American Gastrointestinal Endoscopic Surgeons (SAGES), Washington State Convention Center, Seattle, April 1998.

Nikokirakis MC, Groner JI, Zipf WB, Davis J, Burke R, Gilles EE: "Cortisol Levels After Moderate-Severe TBI in Young Children Predict Early Posttraumatic Seizures and Acute Outcome." Presented at Pediatric Academic Societies & American Academy of Pediatrics Joint Meeting, Hynes Convention Center, in Boston, Massachusetts, May 13, 2000.

Hill JS, Dietrich AM, Groner JI, Brown WD, Davis J, Gilles EE: "Neuron Specific Enolase Predicts Injury Severity After Moderate to Severe Trauma Brain Injury in Young Children." Presented at Pediatric Academic Societies & American Academy of Pediatrics Joint Meeting, Hynes Convention Center, Boston, Massachusetts, May 13, 2000.

Abdurrahman O, Groner JI: "Recognition of Shock in the Pediatric Trauma Patient: An Ongoing Challenge." Presented at the American Academy of Pediatrics 2000 Annual Meeting, Chicago, Illinois, October 28-November 1, 2000.

Groner JI, Kosnik LM, Bowen W, Hayes JR: "Hazards of Home: An Analysis of Pediatric Gun Injuries." Presented at the American Public Health Association Annual Meeting, Boston, Massachusetts, November 12-16, 2000.

Coury D, Haley K, Hayes J, Yeates K, Groner JI: "ADHD and Injury Risk." Presented at the Pediatric Academic Societies Meeting, Baltimore, Maryland, April 28, 2001.

Hirschfeld J, Groner JI, Keys B, Hayes J: "Effectiveness of Car Seat Training Provided at Children's Hospital." Presented at the Pediatric Academic Societies Meeting, Baltimore, Maryland, May 1, 2001.

Groner JJ, Hayes JR, Bowen W, Munczinski DR. "The Increasing Risk of Pediatric Injury from Motorized Recreational Vehicles." Poster presentation at annual meeting of the American Public Health Association, Atlanta, Georgia, October 23, 2001.

Nelles M, Armen S, Miller M, Groner JJ. "Snowboard Spleen and Other Hazards of Adolescent Snowboarding." Poster presentation at annual meeting of the American Public Health Association, Philadelphia, Pennsylvania, November 11, 2002

Participation in Major Academic Meetings- continued

Hayes JR, Groner JJ. "Is There a TRISS for Pediatric Trauma?". Poster presentation at annual meeting of Pediatric Academic Societies, Seattle, Washington, May 3-6, 2003.

Hayes JR, Groner JJ, Cohen DM, Dietrich AM, et al. "A System to Detect an Unusual Increase in Emergency Department Visits". Poster presentation at annual meeting of Pediatric Academic Societies, Seattle, Washington, May 3-6, 2003.

Groner JJ, Isariyawongse JP, Isariyawongse BK et al. "Demographic and Environmental Factors Predict Pediatric Pedestrian Injuries In An Urban Setting." Poster presentation at annual meeting of the American Pediatric Surgical Association, Fort Lauderdale, Florida, May 25-28, 2003.

Participation in Local Meetings

Groner JJ: "Pediatric Trauma Case Studies." Presented at the Emergency Care Series, Children's Hospital, Columbus, Ohio, April 1998.

Groner JJ: "Hazards of Home: An Analysis of Pediatric Firearm Injuries." Presented at The Center for Injury Research and Policy, Children's Hospital, Columbus, Ohio, November 16, 2001.

Kuhn Ann, Hayes J, Bowen W, Caniano D, Groner J: Seat belts save lives, reduce injuries and lower hospital charges. Presented at the Columbus Surgical Society's presidential symposium, Columbus, Ohio, February 9, 2002.

Corpron C, Groner J, Roberts G, Haley K, Taheri P, Caniano D: Pediatric trauma services: A profit center. Presented at the Columbus Surgical Society's presidential symposium, Columbus, Ohio, February 9, 2002.

Martin A, Clark C, Corpron C, Chapman J, Martin L, Coffee C, Caniano D, Groner J: Delayed diagnosis of injuries in pediatric trauma patients. Presented at the Columbus Surgical Society's presidential symposium, Columbus, Ohio, February 9, 2002.

Nelles M, Miller M, Armen S, Groner J: Snowboard Spleen" and Other Hazards of Adolescent Snowboarding. Presented at the 23rd Annual Children's Hospital Research Forum, Columbus, Ohio, June 6, 2002.

Corpron C, Roberts G, Haley H, Taheri P, Caniano D, Groner J: Pediatric Trauma Services: A Profit Center. Presented at the 23rd Annual Children's Hospital Research Forum, Columbus, Ohio, June 7, 2002.

Martin A, Clark C, Corpron C, Chapman J, Martin L, Coffey C, Caniano D, Groner J: Delayed Diagnosis of Injuries in Pediatric Trauma Patients. Presented at the 23rd Annual Children's Hospital Research Forum, Columbus, Ohio, June 7, 2002.

Invited Lectures

Groner JJ: "Seat Belt Injuries in Children." Presented at the 1st Annual Ohio Pediatric Trauma Symposium, Rainbow Babies & Children's Hospital, Cleveland, Ohio, October 1998.

"Pediatric Abdominal Injuries and Pediatric Seat Belt Injuries." Presented at Genesis HealthCare System, Zanesville, Ohio, October 28, 1998.

"Pediatric Surgical Abdomen: Pediatric Seat Belt Injuries." Presented at the Pediatric Liaison Network Meeting, Pediatric Potpourri, Children's Hospital, Columbus, Ohio, December 8, 1998.

"Abdominal Catastrophes" Presented at the Lounge and Learn Series, Children's Hospital, Columbus, Ohio, January 29, 1999.

Invited Lectures - Continued

"Primary Seat Belt Legislation" Presented at the Capital Kids Campaign News Conference, Ohio Department of Public Safety, Columbus, Ohio, February 16, 1999.

"What's New with Pediatric Trauma." Presented at the Medflight of Ohio and Ohio State University Medical Center, Columbus, Ohio, April 10, 1999.

"Concealed Weapons, H.B. 165" Testimony before the House Criminal Justice Committee, 123rd General Assembly, Columbus, Ohio, April 27, 1999.

"Acute Abdomen." Presented at Grant Hospital Family Practice Resident lecture, Grant

Hospital, Columbus, Ohio, August 4, 1999.

“Pediatric Trauma- Initial Stabilization.” Presented at Transport Training Class, Children’s Hospital, Columbus, Ohio, August 11, 1999.

“Pediatric Blunt Abdominal Trauma.” Presented at Association of Perioperative Registered Nurses Conference, St. Ann’s Hospital, Columbus, Ohio, September 14, 1999.

Groner JJ: “Don’t Sweat the Small Things- Unless it’s a Pediatric Trauma Patient.” Presented at the Peninsula Regional Medical Center and the Division of Trauma 10th Annual Trauma Conference, Topics in Trauma. Roland E. Powell Convention Center, Ocean City, Maryland, September 30-October 1, 1999.

Groner JJ: “Seat Belt Injuries in Children.” Presented at 2nd Annual Ohio Pediatric Trauma Symposium, The Children’s Medical Center, Dayton, Ohio, November 5, 1999.

“Firearm Safety- Testimony on HB526” Testimony before the House Criminal Justice Committee, 123rd General Assembly, Columbus, Ohio, April 11, 2000.

“Gun Safety” Presented at the Prevention Institute. Clarion Hotel, Worthington, Ohio, March 10, 2000.

Invited Lectures - Continued

“Pediatric Blunt Abdominal Trauma” Presented at Trauma Rounds, St. Rita’s Medical Center, Lima, Ohio, April 25, 2000.

“Initial Resuscitation of Pediatric Trauma Patient” Presented at the St. Ann’s Emergency Physician Staff Meeting, St. Ann’s Hospital, Columbus, Ohio, April 28, 2000.

“Don’t Sweat the Small Things-Unless It’s a Pediatric Trauma Patient” Presented at Southern Ohio Medical Center, Portsmouth, Ohio, May 5, 2000.

“Don’t Sweat the Small Things-Unless It’s a Pediatric Trauma Patient” Presented at Children’s Teleconferencing Programs/Ohio State Health Network, Columbus, Ohio, June 2, 2000.

“First Monday 2000- Unite to End Gun Violence” Presented at Ohio State University College of Law, Columbus, Ohio, October 2, 2000.

“Firearm Safety- An Overview” Presented at Ohio State School of Public Health Grand Rounds, Columbus, Ohio, October 13, 2000.

“Don’t Sweat the Small Things-Unless It’s a Pediatric Trauma Patient” Presented at Dayton Children’s Medical Center, Dayton, Ohio, November 1 & November 2, 2000.

“Common Neonatal Surgical Problems” Presented at *Infants at Risk...An Interdisciplinary Approach to Neonatal Care Conference*, Children’s Hospital, Columbus, Ohio, November 6, 2000.

“Don’t Sweat the Small Things-Unless It’s a Pediatric Trauma Patient” Presented at Southeastern Ohio Regional Medical Center, Cambridge, Ohio, November 29, 2000.

“Firearm Safety – An Overview” Presented at Presbyterian Women Gathering, Boulevard Presbyterian Church, Columbus, Ohio, January 27, 2000.

“Firearm Safety” Presented at Mother’s Day Rally, Statehouse, Columbus, Ohio, May 13, 2001.

“Fluid Resuscitation in Pediatric Trauma” Presented at Genesis HealthCare System, Zanesville, Ohio, May 30, 2001.

“Fluid Resuscitation in Pediatric Trauma” Presented at Children’s Hospital, Columbus, Ohio, June 27, 2001.

Opponent testimony on HB274 bill-Right to carry concealed weapons, July 11, 2001, Statehouse, Columbus, Ohio, July 11, 2001

“First Monday 2001- “Gun violence and its impact on society”. Presented at Ohio State University College of Law, Columbus, Ohio, October 1, 2001.

Invited Lectures – Continued

“Protecting our Children: Injury prevention and the trauma program at Children’s Hospital” Presented at Children’s Hospital, talk to financial professionals, Columbus, Ohio, October 16, 2001.

“Pneumothorax” Presented at Pediatric Surgery Seminar, Children’s Hospital, Columbus, Ohio, February 27, 2002.

“Hazards of the Home: An Analysis of Pediatric Firearm Injuries” Presented at Trauma Grand Rounds at Children’s Hospital, Columbus, Ohio, February 27, 2002.

“Hazards of the Home: An Analysis of Pediatric Firearm Injuries” Presented at Toledo Children’s Hospital Trauma Services Spring Update Conference, Toledo, Ohio, March 8, 2002.

“Hazards of the Home: An Analysis of Pediatric Firearm Injuries” Presented at Trauma

Symposium, Cincinnati Children's Hospital, April 19, 2002.

"Trauma Alerts 2002" Presented at Trauma Grand Rounds at Children's Hospital, Columbus, Ohio, May 22, 2002.

"Hazards of the Home: An Analysis of Pediatric Firearm Injuries" Presented at Gun Summit Conference, Cleveland, Ohio, June 7, 2002.

"Hazards of the Home: An Analysis of Pediatric Firearm Injuries" Presented at ODOH, EMS Division of Fire, Columbus, Ohio, August 21, 2002

Opponent Testimony on HB274 Bill – Right to Carry Concealed Weapons, Statehouse, Columbus, Ohio, September 3, 2002

"Pediatric Trauma Centers, Do They Make A Difference". Presented at Trauma Care Symposium Sponsored by Grant Medical Center, Adams Mark Hotel, Columbus, Ohio, November 14, 2002.

"Pediatric Trauma Centers: Do They Make A Difference" Presented at Trauma Grand Rounds at Children's Hospital, Columbus, Ohio, November 27, 2002.

Opponent testimony on HB274 bill-Right to carry concealed weapons, Ohio Senate Criminal Justice Committee, Statehouse, Columbus, Ohio, December 4, 2002.

"Lethal Injection: A Stain on The Face of Medicine" Presented to the Unitarian Universalist Church of Columbus, Ohio, February 7, 2003.

"Firearm Injuries". Presented to Little Hocking EMS personnel, Belpre, Ohio, April 30, 2003.

"Seatbelt Injuries". Presented to Belle Valley EMS personnel, Zanesville, Ohio, May 14, 2003.

Invited Lectures - Continued

"Damage Control: What Is It? Who Invented It?". Presented at Statewide Trauma Symposium Sponsored by Children's Hospital, Greater Columbus Convention Center, Columbus, Ohio, May 16, 2003.

"Pediatric Motorized Recreation Vehicles Injuries" Presented at the public field hearing concerning all terrain vehicles sponsored by the Consumer Product Safety Commission, Morgantown, West Virginia, June 5, 2003.

National Meetings and Instructional Courses

“Leading Your Trauma Center Into the 21st Century” Bishop and Associates, Holiday Inn, Dallas, Texas, March 5, 1999.

“Trauma and Critical Care 1999” American College of Surgeons, Las Vegas, Nevada, March 22-24, 1999.

“Eastern Association for the Surgery of Trauma- 2000 Meeting” Sanibel Harbour Resort, Ft. Myers, Florida, January 11-16, 2000. (Attended Trauma Director’s Workshop)

“Trauma and Critical Care 2000” American College of Surgeons, Las Vegas, Nevada, March 20-22, 2000.

“Sixth Annual Zollinger Postgraduate Course in Surgery” The Ohio State University, Department of Surgery, Columbus, Ohio, September 14-16, 2000.

“Eastern Association for the Surgery of Trauma- 2001 Meeting” Westin Innisbrook Resort, Tampa Bay in Palm Harbor , Florida, January 10-13, 2001. (Attended Trauma Director’s Workshop)

“Trauma and Critical Care 2001” American College of Surgeons, Las Vegas, Nevada, March 19-21, 2001.

“Trauma and Critical Care 2002” American College of Surgeons, Las Vegas, Nevada, March 25-27, 2002.

“Eastern Association for the Surgery of Trauma- 2003 Meeting” Sanibel Harbour Resort & Spa, Fort Myers, Florida, January 14-17, 2003. (Attended Trauma Director’s Workshop), Invited Discussant for research paper.

“Trauma and Critical Care 2003” American College of Surgeons, Las Vegas, Nevada, March 24-26, 2003.

National Meetings and Instructional Courses - Continued

“Management of Penetrating Colorectal Injuries in the Pediatric Population” Presented at the annual meeting of The American Society of Colon and Rectal Surgeons, New Orleans, LA, June 21-26, 2003

Bibliography

Book Chapters

1. Groner JJ, Ziegler MM: Management of Cloacal Exstrophy. Newborn Surgery

(Puri P, ed.) London. Heinemann Medical Books 1996, pp.461-465.

2. King DR, Groner JI: Renal Neoplasms. In Pediatric Surgery-Third Edition (Ashcraft KW, ed.) W. B. Saunders Co., Philadelphia, PA 2000, pp 859-874.
3. Dietrich AM, Groner JI: Trauma In Children. Basic Trauma Life Support for the EMT-B and First Responders, Update 2/e. Prentice Hall Career and Technology. (In Press)

Bibliography

Book Chapters – Cont.

4. Groner JI, Ziegler MM: Cloacal Exstrophy. Newborn Surgery. (In Press) **(Puri P, ed.)**
7. Groner JI: Ectopia and Sternal Defects. In Operative Pediatric Surgery **(Ziegler MM et al, ed) McGraw-Hill, Philadelphia, PA 2003.**
8. King DR, Groner JI, Teich S. Mediastinal Cysts and Tumors. In Operative Pediatric Surgery- (Ziegler MM et al, ed) McGraw-Hill, Philadelphia, PA, 2003.

Articles in Peer-Reviewed Medical Journals

1. Groner JI, Schumann R, Lang IM, Telford GL: Fentanyl and Alfentanil Initiate the Migrating Myoelectric Complex but not the Vomiting response in the Canine Small Intestine. Current Surgery 45:209-212, 1988.
2. Groner JI, Telford GL, Krepel CJ, Condon RE, Edmiston CE: The Efficacy of Oral Antibiotic in Reducing Colonic Mucosal Associated Aerobic and Anaerobic MicroFlora. Archives of Surgery 124:281-284, 1989.
3. Groner JI, Brown MF, Stallings VA, Ziegler MM, O'Neill JA Jr: Resting Energy Expenditure in Children Following Major Operative Procedures. Journal of Pediatric Surgery 24:825-828, 1989.
4. Groner JI, Altschuler SM, Ziegler MM: The Newborn Piglet: A Model of Neonatal Gastrointestinal Motility. Journal of Pediatric Surgery 25:315-318, 1990.

Articles in Peer-Reviewed Medical Journals – Cont.

5. Groner JI, Teich S, Schauer GM, King DR: Congenital Diaphragmatic Hernia and Profound Prematurity: Report of a Survivor. Journal of Pediatric Surgery 30:1370-1372, 1995.
6. Groner JI, Teich S, Marlow JP: Groin Laparoscopy: A New Technique for Contralateral Groin Evaluation in Pediatric Inguinal Hernia Repair. Journal of the

American College of Surgeons 181:168-170, 1995.

7. Groner JJ, Teske DW, Teich S: Dicephalus Dipus Dibrachius: An Unusual Case of Conjoined Twins. *Journal of Pediatric Surgery* 31:1698-1700, 1996.
- 8. Groner JJ: Endotoxin and Transient Hypoxia Cause Severe Acidosis in the Piglet.**
***Journal of Pediatric Surgery* 32:1123-1125, 1997.**
9. Shaffer JP, Allen E, Luquette M, Groner JJ, Rusin J: Massive Hemoptysis in a Child with Histoplasmosis. *Pediatric Pulmonary* 24:57-60, 1997.
10. Meric F, Teitelbaum DH, Geiger JD, Harmon CM, Groner JJ: Latex Sensitization in General Pediatric Surgical Patients: A Call for Increased Screening of Patient.
Journal of Pediatric Surgery 33:1108-1111, 1998.
11. Cook CH, Melvin WS, Groner JJ, Allen E, King DR: A Cost-Effective Thoracoscopic Treatment Strategy for Pediatric Spontaneous Pneumothorax. *Surgical Endoscopy* 13:1208-1210, 1999.
12. Coley BD, Mutabagani K, Martin LC, Zumberge N, Cooney DR, Caniano DA, Besner GE, Groner JJ, Sheils WE: Focused Abdominal Sonography for Trauma (FAST) in Children with Blunt Abdominal Trauma. *The Journal of Trauma* 48: 902-906, 2000.
13. Kuhn, MA, Groner JJ: Fluid Resuscitation in the Pediatric Trauma Patient. *Trauma Reports*. Vol. 2, No. 5, September-October, 2001.
14. Hayes JR, Groner JJ: Should Level I Trauma Centers be rated NC-17? Letter to the Editor.
The Journal of Trauma 52: 189-190, 2002.
15. Groner JJ. Lethal Injection: A Stain on the Face of Medicine.
BMJ 325:1026-1028, 2002.
16. Groner JJ. Lethal Injection and The Medicalization of Capital Punishment in The United States. *Health and Human Rights: An International Journal* 6(1): 65-79, 2002

Other Publications

1. Groner JI: Complicated Pneumonias: A modern approach to an old disease. *Pediatric Directions. Children's Hospital*, Winter 2000.
2. Groner JI: The Trauma Program at Children's Hospital. *Critical Measures. Children's Hospital*, Spring 2000.
3. Groner JI: The Trauma Program at Children's Hospital. *Critical Measures. Children's Hospital*, Winter 2000-2001.
4. **Groner JI: Helmet safety for Central Ohio kids. *Columbus Parent*. September 2001.**
5. **Groner JI: Pediatric firearm injuries – A preventable tragedy. *Critical Measures*. Fall 2001**
6. Groner JI: “Pediatric Firearm Injuries – A preventable tragedy.” *Critical Measures, Children's Hospital*, June 25, 2001
7. Groner JI: “Helmet Safety for Central Ohio Kids.” *Central Ohio Pediatric Society pediatric supplement*, June 25, 2001

Published Abstracts

Groner JI, Furlan LE, Brown MF, Altschuler SM, Cohen DE, Ziegler MM: The Effect of Cisapride on Small Intestinal Myoelectric Activity in the Young Piglet. *Gastroenterology* 95:868, 1988.

Coury DL, Haley K, Hayes JR, Yeates KO, Groner JI: ADHD and injury risk. *Pediatric Research* 49:19A, 2001.

Newspaper Articles or Opinion Pieces

1. Groner JI: “Does the Violence stop this way?” *The Plain Dealer* (Cleveland), December 11, 1995, p.9B
2. Groner JI: “Young ‘Superpredators’ are right-wing myths.” *The Columbus Dispatch*, June 7, 1996, p. 9A.
3. Groner JI: “Boutique Hospitals in Ohio Unhealthy.” *The Columbus Dispatch*, October 10, 1998, p.13A
4. Groner JI: “Car-Seat Legislation Would Save Kids’ Lives.” *The Columbus Dispatch*, September 7, 2001, p. 12A

5. Groner JJ: "Boutique Would Hinder Trauma Care." *The Columbus Dispatch*, June 1, 2002, p. 9A

Section 4

Literature Review

Nationally the care of children provided by EMS has assumed a position of importance, in part because of the identification of major weaknesses within the EMS systems evaluated.¹ Deficiencies in age appropriate equipment, training and on-going training are the most common areas cited as needing improvement. The assessment and institution of care on critically ill or injured children is challenging in all aspects. Pediatric patients account for only about 5-10% of all EMS runs, and only a small percentage of these transports require advanced skills.^{2,3,4} Therefore, the skills and expertise required to manage critical pediatric patients are rarely utilized. This issue is magnified in the rural setting where the run volume is lower. In addition, the initial training received in pediatric emergency care varies by training center, but may be less than 10 hours in some regions.⁵ The provision of continuing education in the management of childhood emergencies has also been identified as deficient in many settings.^{1,5} In addition some areas lack pediatric specific protocols and education regarding appropriate triage of critically ill or injured children.^{1,5} Fisher, et al demonstrated that admitted pediatric asthma patients had received inadequate prehospital care with 26% of the children not receiving supplemental oxygen and 30% hypoxic on arrival to the emergency department. None of the hypoxic children had received albuterol aerosols en route to the facility.⁶ Scribano et al identified the underutilization of oxygen and medications in an urban EMS system.⁷ Orf, et al demonstrated that children transported by helicopter EMS in their series routinely had endotracheal tubes inserted which were too small and commonly inserted too deep.⁸ Qazi et al in a study conducted by Children's Hospital Medical Center of Akron, Ohio found that the use of EMT-P judgement alone of the need for a trauma team activation for pediatric blunt trauma patients is not sufficiently sensitive to be of clinical use.⁹

In response to these concerns, a number of studies have been conducted to identify the most frequent type of pediatric transports encountered by EMS. Babl, et al showed that a limited number of chief complaints comprise the majority of PALS transports.¹⁰ Based on this series, consultations with pediatric emergency medicine experts, and the available research the Pediatric Education Task force developed a comprehensive list of major topics and skills for inclusion in the curricula of EMS providers.¹¹ Numerous national studies and Peckinpaugh, et al from Ohio have shown the value of institution of advance continuing educational programs and provision of pediatric equipment to prehospital providers.¹² In addition, in a national survey of registered emergency medical service providers, Glaeser et al found that the majority of EMS providers strongly support the need for required education in pediatrics. These providers identified the age group from birth to 3 years as the priority for an educational focus and cited difficulties with cost, travel distance and availability of pediatric education as the limiting factors in their ability to maintain proficiency in the management of pediatric emergencies. More than 75% of all EMTs who responded supported a state or national mandate for pediatric education.¹³

The Pediatric Technical Assessment Team (PTAT) visited the state of Ohio and performed a comprehensive assessment of the state of pediatric EMS in the state of Ohio. The assessment criteria used are derived from the standards that have been used in the NHTSA TAT process. The PTAP is based on the assumption that emergency medical services should be fully integrated within the EMS system and that pediatric care will be as good as the whole EMS system. The first recommendation was that the EMS Board should “coordinate efforts with the RPABs and appropriate agencies to identify pediatric resources (e.g. training, equipment, personnel, and facilities) to enable the state to optimize the utilization of these resources in daily operations and in times of disaster.” A second recommendation was the use of available data sources to develop a data driven approach to training EMS. Other recommendations included the EMS board develop and promulgate a voluntary pediatric minimum equipment list for ambulances and implement plans to link existing data sets, particularly EMS, trauma registry, rehabilitation registry and vital statistics.

There is currently no literature available on pediatric trauma patients transported across state lines or mutual aid agreements for EMS agencies across state borders. Svensen, et al did show that the death rate for pediatric trauma patients was higher in rural areas that had less hospital services.¹⁴ This series also demonstrated that access to 24-hour emergency department services and availability of ALS improved outcome.¹⁴

In conclusion the area of pediatric education, skills and on-going education is a major concern both nationally and locally. The establishment of consistent pediatric resources for prehospital providers which provides access to age appropriate equipment, education and facilitates enhancement of pediatric skills is critical. There is a paucity of research and literature available regarding EMS mutual aid, pediatric trauma patients transported across state borders and the impact these operational issues have on the outcome of a child with a traumatic injury.

Bibliography

1. Graham CJ, Stuemky J, Lera TA. Emergency medical services preparedness for pediatric emergencies. *Pediatr Emerg Care* 1993;9(6):329-31.
2. Seidel JS, Hornbein M, Yoshiyama K, et al. Emergency medical services and the pediatric patient: Are needs being met? *Pediatrics* 1984;73:769-771.
3. Tsai A, Kallisen G. Epidemiology of pediatric prehospital care. *Ann Emerg med* 1987;16:284-291.
4. Johnston C, King WD. Pediatric prehospital care in a southern regional emergency system. *Southern Med J* 1988;81:1473-1475.
5. Zaritsky A, French JP, Schafermeyer R, et al. A statewide evaluation of pediatric prehospital and hospital emergency services. *Arch Pediatr Adolesc Med* 1994;1(148):76-81.
6. Fisher JD, Vinci RJ. Prehospital management of pediatric asthma requiring hospitalization. *Pediatr Emerg Care* 1995;11(4):217-19.
7. Scribano PV, Baker MD, Holmes J, et al. Use of out-of-hospital interventions for the pediatric patient in an urban emergency medical services system. *Acad Emerg Med* 2000;7(7):745-50.
8. Orf J, Thomas S, Ahmed W, et al. Appropriateness of endotracheal tube size and insertion depth in children undergoing air medical transport. *Pediatr Emerg Care* 2000;16(5):321-7.
9. Qazi K, Kempf JA, Christopher NC, et al. Paramedic judgment of the need for trauma team activation for pediatric patients. *Acad Emerg Med* 1998;5(10):1002-7.
10. Babl FE, Vinci RJ, Bauchner H, et al. Pediatric pre-hospital advanced life support care in an urban setting. *Pediatr Emerg Care* 2001;17(1):5-9.
11. Gausche M, Henderson DP, Brownstein D, et al. Education of out-of-hospital emergency medical personnel in pediatrics: report of a national task force. *Ann Emerg Med* 1998;31(1):58-63.
12. Peckinpaugh K, Izsak E, Lindstrom D, et al. The advanced pedi-bag program: A hospital-EMS partnership to implement prehospital training, equipment, and protocols. *Pediatr Emerg Care* 2000;16(6):409-12.
13. Glaeser P, Linzer J, Tunik M, et al. Survey of nationally registered emergency medical services providers: pediatric education. *Ann Emerg Med* 2000;36(1):33-8.

14.Svenson J, Spurlock C, Nypaver M. Factors Associated with the higher traumatic death rate among rural children. *Ann Emerg Med* 1996;27(5):625-632.

Section 5

EMS Medical Director Survey
Sample survey

Background

Name _____
EMS Agency _____
Contact Number _____
Board Certifications _____

Pediatric Policies/protocols

Do you have policies/protocols that facilitate transporting ill or injured children to the most appropriate hospital/medical facility?

Yes No

Does your service/services have protocols in place for the assessment and emergency management of pediatric patients?

Yes No

Are these protocols reviewed and updated regularly by comparing to state or national standards?

Yes No

Would you like help reviewing and preparing pediatric protocols from pediatric emergency medicine specialists?

Yes No

Recommended State Minimum Patient Care Guidelines

Are you currently using some form of the recommended State Minimum Patient care guidelines? (pediatric)

Yes No

Do you find that the recommended State Minimum Patient Care Guidelines meet your needs?

Yes No, why not _____

Children with Special Health Care Needs (CSHCN)

Are there sufficient training opportunities and resources to assure that your personnel can effectively manage emergencies in children with special health care needs (e.g. tracheotomies, central lines, etc.)

Yes No

Does your service have protocols in place for the assessment and emergency management of CSHCN?

- Yes No

Are personnel trained and updated on these protocols? (if available)

- Yes No

Education and Training

Where do your providers go for continuing education opportunities (check all that apply)

- Outside approved education site
 Internal departmental approved education site
 Accredited EMS training location
 Other _____

What factors determine your continuing education site? (check all that apply)

- Course materials
 Cost
 Location
 Instructors
 Other _____

Check which courses your EMS providers need for special training

- PEPP (Pediatric Education for Prehospital Providers)
 P-BTLS (Pediatric Basic Trauma Life Support)
 PALS (Pediatric Advanced Life Support)
 ACLS (Advanced Cardiac Life Support)
 AMLS (Advanced Medical Life Support)
 Special Geriatric Training

Are there any areas of weakness regarding pediatric trauma that you feel your EMS providers need further education?

Has your service ever applied for funding for grants offered by the EMS office for pediatric training?

- Yes No

Are you interested in applying for grant funding for your EMS agency?

- Yes No

What pre-hospital continuing education courses are available to providers in your service within a reasonable driving distance? (check all that apply)

- PALS
- PEPP
- P-BTLS
- Other_____

Mutual Aid Agreements

Does your agency have any mutual aid agreements in place?

- Yes No

If yes, which of the following agencies do you have agreements with? (check all that apply)

- Other local EMS agencies
- Other private ambulance companies
- EMS agencies in other counties
- EMS agencies in other states. Please list_____

How are you contacted by your providers? _____

Are you a certified EMS medical director in other states? If so, which?

Are your EMS Providers allowed to render care in other states?

- Yes No

If yes, do/they they complete additional training to be allowed to deliver care in another state?

- Yes
- No

Who serves as medical control if they respond to a different state?

- EMS agency medical director
- Receiving hospital
- Other

Does your agency ever primarily respond to another state? (or do you have to be requested?)

Who covers your service area when you assist in another state?

- Other local EMS agencies
- Private ambulance service

- Another county EMS service
- Other_____

When you transport a pediatric trauma patient to what facility do you transport?

- Closest appropriate facility
- Hospital in the state the patient is injured in
- Hospital in county your agency is based in
- Hospital requested by patient
- Other_____

Which of the following are issues you've encountered when responding to, or transporting pediatric trauma patients in other states?

- Concern over medical-legal issues
- Discrepancies in standards of care
- Discrepancies in the qualifications of the responders between states
- Longer transport times
- Service area left uncovered
- Other_____

Who is responsible for signing mutual aid agreements?

- Medical director
- EMS chief
- EMS Coordinator
- City Officials
- Other_____

Any special concerns, which have arisen regarding EMS care from transporting patients to and from other state?

Additional comments

Medical Director Survey for Aeromedical Programs

Sample Survey

The following questions pertain to interstate transport of Pediatric patients.

1. Does your agency have any formal mutual aid agreements in place?
 Yes
 No

2. If yes, Which agencies do you have agreements with (check all that apply)?
 Other aeromedical programs in your state
 Aeromedical programs in other states
 EMS agencies
 Other_____

3. Are your personnel allowed to render care in other states?
 Yes
 No

4. If yes, Which states. (Check all that apply)
 Kentucky
 West Virginia
 Pennsylvania
 Other_____

5. If yes to question #4, are there restrictions to rendering patient care in other states? (Check all that apply)
 Restricted to interhospital transports by request (receiving or sending facility)
 Only when requested at a scene by an in-state agency
 No restrictions
 Other_____

6. Do your personnel need to be certified or licensed to transport in another state?
 Yes
 No

7. Who serves as medical control when your crew transports to another state?
 Aeromedical agency medical director

- Receiving facility
- Other_____

8. When you transport a pediatric trauma patient in another state to what facility do you transport?

- Closest appropriate facility
- Hospital in the state patient is injured in
- Hospital requested by patient's family
- Other_____

9. Which of the following are issues you've encountered when responding to pediatric transport requests in other states? (Check all that apply)

- Concern over medical-legal issues
- Discrepancy in care between states
- Longer transport times
- Service area left uncovered
- No concerns
- Never respond outside of home state
- Other_____

The Following Questions Pertain to Pediatric Education at Your Program

10. Please indicate the percentage of pediatric transports your service does annually. (Please **Do not** include transports done with specialty crews.)
%_____

11. What percentage of those pediatric transports are transported across state lines for medical care? %_____

12. Please indicate your agency's crew configuration.

- Nurse-Paramedic
- Nurse-Nurse
- Nurse-MD
- Paramedic-Paramedic
- Varies according to request
- Other_____

13. Does your service have pediatric protocols?

- Yes
- No

14. If yes, are these protocols stand-alone protocols, or supplements to adult protocols.
- Stand-alone
 - Supplements to adult protocols
 - No specific pediatric protocols
15. Does your service have protocols for the care of **Children with Special Health Care Needs?** (trach's G-tubes, ventilators etc.)
- Yes
 - No
16. Are pediatric protocols regularly reviewed and updated by pediatric physicians?
- Yes
 - No
 - Not applicable (no pediatric protocols)
17. Are your protocols reviewed and updated regularly by comparing to state or national guidelines?
- Yes
 - No
 - Not applicable (no pediatric protocols)
18. Do pediatric specialists regularly review pediatric transports?
- Yes
 - No
19. How many continuing education hours are devoted to pediatric care annually at your agency? (excluding initial orientation)
- 0-3
 - 4-6
 - 6-10
 - >10 hours annually
20. Do you feel that the number of hours indicated above is adequate for your crew?
- Yes
 - No
21. Please summarize your perception of your crew's comfort level with pediatric patients.
- They seem **very** comfortable with pediatric care and disease processes
 - They seem somewhat comfortable with caring for children

They are occasionally **uncomfortable** with pediatric care
22. They find pediatric care challenging and are frequently uncomfortable

Name_____

Agency_____

Thank you for taking the time to complete this survey. You will receive a summary of our results at the completion of this study.

Ann Dietrich MD

Kathy Warlick RN

Code _____

EMS COORDINATORS SURVEY
(State of Ohio HB-138)

Sample

1. Is your agency?
All Volunteer _____
All Paid _____
Mix of volunteer and paid _____

2. Number of EMS Providers in your department (all levels) _____

3. Type of service (mark one)
 Fire Department
 Private
 Hospital Based
 3rd Service
 Other _____

4. Does your service have access to a computer?
 Yes
 No
With CD Drive
 Yes
 No
Internet Access
 Yes
 No

5. Primary Coverage
Population _____
Square Miles _____

6. Number of patient Transport Vehicles
BLS _____
ALS _____

7. Number of non-transport EMS vehicles (e.g. Chief's vehicle)
BLS _____
ALS _____

8. What is the average response time upon receiving notification of an

- EMS emergency? _____
9. What is your average patient transport time? _____
10. What helicopter service do you use most frequently?
- Medflight
 - Care Flight
 - University Air Care
 - St. Vincent/MCO Life Flight
 - Metro Life Flight
 - University Cleveland
 - Toledo Hospital
 - Other _____
11. Who has authority to request helicopter service?
- Law enforcement
 - Hospital based medical director
 - Scene commander
 - Other _____

THE FOLLOWING QUESTIONS PERTAIN TO YOUR AGENCY'S PEDIATRIC POLICIES AND PROTOCOLS

12. Do you have policies/protocols that facilitate transporting ill or injured children to the *most appropriate* hospital or medical facility?
- Yes
 - No
13. Does your service have protocols in place for the assessment and emergency management of pediatric patients?
- Yes
 - No
14. If Yes, are these protocols reviewed and updated regularly by comparing to state or national standards/guidelines?
- Yes
 - No
15. Would you like help reviewing and preparing pediatric protocols from emergency medicine specialists?
- Yes
 - No

16. Are you currently using some form of the recommended *State Minimum Patient Care Guidelines*?
- Yes
 - No
17. If you are using these guidelines, do they meet your needs?
- Yes
 - No
 - Not applicable
18. Does your service have protocols in place for the assessment and emergency management of Children with Special Health Care Needs (CSHCN)?
- Yes
 - No
19. Are there sufficient training opportunities and resources to assure that your personnel can effectively manage emergencies in CSHCN. (e.g. tracheotomies, central lines, gastrostomy tubes, ventilators, etc)
- Yes
 - No
20. If protocols are available, are your personnel trained and updated regularly?
- Yes
 - No

**THE FOLLOWING QUESTIONS PERTAIN TO YOUR AGENCY'S
EDUCATIONAL OPPORTUNITIES AND TRAINING**

21. Where do you go for continuing education opportunities? (check all that apply)
- Outside approved education site (i.e. Hospital)
 - Internal departmental approved education site
 - Accredited EMS Training location
 - Other
22. What factors determine your continuing education site? (check all that apply)
- Course materials
 - Cost
 - Location
 - Instructors

Other _____

23. Which courses would you would like to have available for your providers.
- PEPP (Pediatric Education for Prehospital Providers)
 - P-BTLS (Pediatric Basic Trauma Life Support)
 - PALS (Pediatric Advanced Life Support)
 - PHTLS (Prehospital Trauma Life Support)
 - ACLS (Advanced Cardiac Life Support)
 - AMLS (Advanced Medical Life Support)
24. What pre-hospital pediatric continuing education courses are available to providers in your service that are within a reasonable driving distance?
- PALS
 - PEPP
 - P-BTLS
 - Other _____
25. What percentage of your personnel have been certified or taken a pediatric course? _____%
26. Does your service have a need for additional pediatric training courses?
- Yes
 - No
27. What, if any barriers have you experienced in obtaining pediatric continuing education for your personnel? (check all that apply)
- Costs too much
 - Travel distance too far
 - Facilities not cooperative
 - Medical director not interested
 - Lack of cooperation from tertiary centers
 - Not available
 - No barriers
28. Has your service ever applied for funding of grants offered by the EMS office for pediatric training?
- Yes
 - No
29. Would you be interested in applying for grant funding for pediatric education and equipment?
- Yes
 - No

Recommended pediatric equipment for ambulances (BLS & ALS) are listed below. Please review the list and place a check in the appropriate box to indicate whether that piece of equipment is carried on *EVERY* ambulance in your service.

30. Pediatric Basic Life Support

- Oral airways: infant thru adult (sizes 0-5)
- Self-inflating bag-valve-mask resuscitator with reservoir and without pop-off valves in 450 and 1000 ml size
- Oxygen masks: infant, child and adult
- Non-rebreather mask: pediatric and adult
- Stethoscope
- Nasogastric tubes, 8-16 Fr
- Backboard
- Cervical Immobilization device
- Blood pressure cuff: infant and child size
- Portable suction with regulator
- Suction catheters: tonsil tip and 6-14 Fr
- Extremity splints: pediatric sizes
- Bulb syringe
- Obstetric pack
- Thermal absorbent blanket
- Burn pack- standard pack (towels or gel burn sheet acceptable)
- Water soluble lubricant

Optional

- Infant care seat
- Nasopharyngeal airways
- Glasgow coma score reference
- Pediatric trauma score reference
- Stuffed toy

31. Pediatric Advanced Life Support

- Transport monitor
- Defibrillator with adult paddles able to deliver 5-360 joules
- Pediatric monitoring electrodes
- Laryngoscope with straight blades size 0-2 and curved blade size 2-4
- Pediatric endotracheal tube stylets
- Endotracheal tubes- uncuffed 2.5-6, cuffed 6-8
- Magill forceps-pediatric and adult
- Nebulizer

- Intravenous catheters- size 24-16 gauge
- Length –weight based drug dose chart or tape
- Needles 20-25 gauge
- Resuscitation drugs and intravenous fluids that meet local standards and practice

Optional

- Blood glucose monitoring system
- CO2 monitoring system

32. Does your service have any specific pediatric equipment needs?

**THE FOLLOWING QUESTIONS PERTAIN TO MUTUAL AID
(RECIPROCITY) WITHIN YOUR SERVICE AREA**

33. Does your agency have any mutual aid agreements in place?

- Yes
- No

34. Which of the following (if any) do you have agreements with. (check all that apply)

- Other local EMS agencies
- Other private ambulance companies
- EMS agencies in other COUNTIES (which counties?) _____
- EMS agencies in other STATES (which state?) _____

35. Who is responsible for signing the mutual aid agreement?

- Medical director
- Chief
- EMS Coordinator
- City or county officials
- Verbal agreement only
- Other _____

**THE FOLLOWING QUESTIONS PERTAIN TO INTERSTATE TRANSPORT
AND RESPONSE POLICIES**

36. Are your EMS providers allowed to render medical care in other states?

- Yes
- No

37. *If yes*, do they complete additional training to be allowed to deliver care in another state?
- Yes
 - No
 - Not applicable (never respond or transport to another state)
38. Who serves as medical control *IF* you respond or transport a patient to a different state?
- EMS agency medical director
 - Receiving hospital
 - Not applicable (never respond or transfer to another state)
 - Other _____
39. Do you have to be requested to respond to another state?
- Yes
 - No
 - Not applicable (never respond outside OHIO)
40. Who covers your service area *IF* you assist in another state?
- Other local EMS agencies
 - Private ambulance service
 - Outside county EMS agency
 - Other _____
 - Not applicable(never respond to another state)
41. When you transport a critically ill or injured pediatric patient, to what facility do you transport?
- Closest appropriate facility
 - Hospital in the *state* the patients injured in
 - Hospital in the *county* your agency is based in
 - Hospital requested by patient or family
 - Other _____
42. Which of the following are issues you've encountered when responding to, or transporting critically ill or injured pediatric patients in other states?
- Concern over medical-legal issues
 - Discrepancies in standards of care between states
 - Discrepancies in the qualifications of responders between states
 - Longer transport times
 - Service area left uncovered
 - No issues
 - Other _____

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS SURVEY

Name & Title _____
Phone # _____
E-mail address (if available) _____

Comments:

EMS Providers Survey

Sample

Background:

Please mark your appropriate level.

- Basic
- Intermediate
- Paramedic

How old are you?

- <25 years
- 25-35 years
- 35-45 years
- 46 years or older

How many years have you been a member of an EMS agency?

- < 5 years
- 5-10 years
- 10-20 years
- 20-30 years
- 31 years or more

Are you paid for your services as an EMT-Paramedic?

- Yes
- No

Education (mark the highest grade completed)

- High School
- College
- Other _____

Type of EMT/Paramedic Service (mark one)

- Fire Department
- Private
- Hospital-Based
- 3rd Service
- Volunteer
- Other _____

Previous pediatric education and experience

Where have you received the most training/knowledge of emergency care pertaining to infants/children? (Choose One)

- Initial EMS training
- Refresher training

- Continuing education
- Field experience
- Other _____

How many times during a typical month do you care for pediatric patients in the out-of-hospital EMS setting? (choose one)

- 0 to 3 times
- 4 to 6 times
- 7 to 15 times
- more than 15 times

What is the total number of education hours you have had in the past two years which cover pediatric topics? (choose one)

- 0 to 3 hours
- 4 to 8 hours
- 9 to 15 hours
- more than 15 hours

On the scale below, how do you feel when confronted with a critical pediatric emergency call? (1 being the most comfortable and 4 the least comfortable)

My education is adequate	1	2	3	4
My equipment is adequate	1	2	3	4
My confidence is adequate	1	2	3	4
My medical director is adequate	1	2	3	4
My pediatric protocols are adequate	1	2	3	4
My EMS system is adequate	1	2	3	4

On the scale below, how do you feel when confronted on a run with a child with special health care needs (e.g. tracheostomies, central lines, gastrostomy tubes, ventilators, etc.) ? (1 being the most comfortable and 4 the least comfortable)

My education is adequate	1	2	3	4
My equipment is adequate	1	2	3	4
My confidence is adequate	1	2	3	4
My medical director is adequate	1	2	3	4
My pediatric protocols are adequate	1	2	3	4
My EMS system is adequate	1	2	3	4

Identify your need for continuing education in the following pediatric topics (1 for essential and 4 for non-essential)

Airway management	1	2	3	4
Bag-valve-mask	1	2	3	4
Newborn delivery	1	2	3	4
Pediatric assessment by age	1	2	3	4
Cardiac arrest	1	2	3	4

Trauma	1 0	2 0	3 0	4 0
Child Abuse	1 0	2 0	3 0	4 0
SIDS	1 0	2 0	3 0	4 0
Poisonings	1 0	2 0	3 0	4 0
Respiratory emergencies	1 0	2 0	3 0	4 0
Seizure	1 0	2 0	3 0	4 0
Vascular Access	1 0	2 0	3 0	4 0
Other _____	1 0	2 0	3 0	4 0

If you had to manage a critical pediatric case on your next run, what age of child would most concern you? (Choose one)

- less than 1 year
- 1 to 3 years
- 4 to 10 years
- 11 to 18 years

In the following areas do you feel well-prepared (1) or unprepared (4)

Pediatric Assessment Skills	1 0	2 0	3 0	4 0
Bag-valve-mask	1 0	2 0	3 0	4 0
Pediatric intubation	1 0	2 0	3 0	4 0
Pediatric vascular access	1 0	2 0	3 0	4 0

Education & Training

Do you have access to a computer with a CD drive?

- Yes
- No

Do you have access to the internet?

- Yes
- No

Where do you go for continuing education opportunities? Check all that apply.

- Outside approved education site
- Internal departmental approved education site
- Accredited EMS Training location
- Other _____

What are the barriers you have experienced in obtaining pediatric continuing education? (Check all that apply)

- Costs Too Much
- No Support From Employer
- Travel Distance Too Far
- Pediatric Facilities Not Cooperative
- Medical Director Not Interested
- No Barriers

- Not Available
- Other _____

What factors determine your continuing education site? Check all that apply

- Course materials
- Cost
- Location
- Instructor(s)
- Other _____

Does your service have a need for additional pediatric training courses?

- | | |
|--------------------------|--------------------------|
| Yes | No |
| <input type="checkbox"/> | <input type="checkbox"/> |

Mutual Aid

Does your EMS agency have any mutual aide agreements in place?

- Yes
- No

If yes, proceed to the following questions. If no, thank you for your time and patience to complete this survey.

Which of the following agencies do you have mutual aid agreements with (check all that apply)?

- Other local EMS agencies
- Other private ambulance agencies
- EMS agencies in other counties
- EMS agencies in other states
 - West Virginia
 - Kentucky

How are you contacted?

Are you licensed to provide care in any other states?

- Yes
- No

Name of state _____

Are you allowed to provide medical care for a patient in another state if requested?

- Yes
- No

Does your agency ever primarily respond to another state?

- Yes
- No

Who serves as medical control when you respond to a different state?

- EMS agency medical director
- Receiving hospital
- Other

Who covers your service area when you assist in another state?

- Other local EMS agencies
- Private ambulance service
- Another counties EMS agencies
- Other

When you transport a pediatric trauma patient in another state to what facility do you transport?

- Closest appropriate facility
- Hospital in the state the patient is injured in
- Hospital in county your agency is based in
- Hospital requested by the patient
- Other _____

Which of the following are issues you've encountered when responding to pediatric trauma patients in other states (check all that apply)?

- Concern over medical legal issues
- Discrepancies in standards of care between the states
- Discrepancies in the qualifications of the responders between states
- Longer transport times
- Service area left uncovered
- Other

Run Data
Sample

1. Agency description
 - Paid agency
 - Volunteer agency
2. Response time:
3. Time call received _____
Time at scene _____
Time left scene _____
Time at hospital _____
Time back in service _____
4. Accumulated time of entire run (from initial call till return to service) _____
5. Destination
 - All Ohio run
 - Scene response to another state
 - Ohio patient taken to another state
Which state _____
 - Out of state patient brought to Ohio
Which state _____
6. Mutual aid to another agency
 - Yes (name _____)
 - No
 - unknown
6. Age of patient _____ Date of birth _____
7. Insurance

- Medicaid
- Private
- Unknown

8. Chief Complaint

- Trauma
- Medical
- Other_____

9. Diagnosis

- Croup
- Asthma
- Wheezing
- Foreign Body
- Other respiratory illness
- Cardiac
- GI
- Dehydration/fever
- Infectious
- Neurological
- Multiple trauma
- Isolated head trauma
- Isolated extremity trauma
- Abrasions/Lacerations
- Other_____

10. Procedures done

- Cardiac monitoring
- Pulse oximetry
- Oxygen delivery
- IV
- Fluid bolus
- Aerosol
- NG/OG
- BVM
- Intubation
- IO
- CPR
- CID
- Backboard
- Splint

- Wound care/bandaging
- Other_____

Aeromedical activated? Yes No

Patient transported? Yes No

Section 6

EMS Study – West Virginia Report

There are 72 hospitals in West Virginia, and approximately 507 first responders, 4,948 EMT-B, and 1,311 paramedics. The West Virginia EMS-C had determined by 1999 that all of the following were in place. The state has pediatric equipment guidelines for ambulances, pediatric equipment guidelines for ED's, a method to assess availability of pediatric equipment on ambulances, pediatric emergency protocols for prehospital providers, interfacility transport guidelines, facility categories for pediatric intensive care and a pediatric EMS advisory committee. They also determined that there were pediatric emergency training programs available to prehospital providers.

Emergency medical services licensure

According to 16-4C-6a “ambulances based outside this state, except that emergency medical service personnel aboard any such ambulance receiving a patient within this state for transportation to a location within this state shall comply with the provisions of this article” “except in the event of a catastrophe or emergency when the ambulances normally staffed by certified emergency personnel based in the locality of the catastrophe are insufficient to render the services required”

Service reciprocity agreements for mutual aid

EMS agencies within West Virginia are authorized “ in their discretion to enter into and renew any service reciprocity agreements, for any period as they may deem advisable, with the appropriate emergency medical service providers, county, municipal or other governmental units or in counties contiguous to the state of West Virginia, in the state of Ohio, the commonwealth of Pennsylvania, the state of Maryland, the commonwealth of Virginia or the commonwealth of Kentucky, in order to establish and carry into effect a plan to provide mutual aid across state lines, through the furnishing of properly certified personnel and equipment for the provision of emergency medical services in this state upon written approval by the commissioner.” The commissioner is authorized to enter into service reciprocity agreements with appropriate officials in other states for the purpose of providing EMS services to individuals in West Virginia properly certified in their state. A formal agreement between the commissioner and an authorized individual needs to be in effect prior to the service being provided. **Individual certification of other state EMS is not required for purposes of providing service to West Virginia citizens following the creation of the agreement.**

Restriction for provision of EMS services by out-of-state EMS personnel or providers of EMS

“The commissioner may issue an order on his or her own motion upon written request of any emergency medical service provider or county commission in this state, to restrict an out-of-state provider of emergency medical services or an out-of-state emergency medical service personnel to a particular geographic area of the state of West Virginia or prohibit the provider or personnel from providing emergency medical services within the borders of this state when in the opinion of the commissioner the services are not required or do not meet the standards set forth herein or those established by the rules”.

Legal recognition EMT-B/EMT-P in West Virginia

Any individual who possesses EMT-B certification from another state may qualify for legal recognition as an EMT-B in the state of West Virginia submitting an application. Legal recognition may also be granted to EMT-B from states that the office of EMS has a formal agreement with and the applicant completes the written and practical exams or equivalents as required by the commissioner. The applicant must also have more than six months remaining before expiration on their current certification and they meet all requirements as specified by the commissioner. The same process applies to EMT-Ps.

The following Ohio agencies are also licensed in West Virginia

Ambulance/Ambulette Service
Woodsfield, Ohio 43794

EMT Ambulance
Canton, Ohio

EMT STAT
St Clairesville, Ohio

Lifeteam EMS Inc
East Liverpool, Ohio

Portsmouth Ambulance Service
Portsmouth, Ohio

Tri County Ambulance
East Liverpool, Ohio

Section 7

EMS Medical Directors Survey

Overview

A list of EMS agencies located within 20 miles of the Ohio border in regions V and VI was identified using State of Ohio pharmacy records. Medical directors for these agencies were contacted and asked to participate in the following survey.

Methodology

A survey tool was designed which focused on mutual aid, pediatric education and pediatric equipment for EMS agencies in Region V and VI. 36 medical control physicians were identified in the target area. Physicians were contacted by phone and the survey was completed by the study coordinator. The study was designed to take only 15 minutes to complete.

Participation

Thirty-two physicians were successfully contacted by phone (88%), either at their work place or at home.

Survey Results

Pediatric Policies/Protocols

Does your service have protocols in place for the assessment and emergency management of pediatric patients?

- Yes 54%
- No 46%
- Comments-Several of those who said no indicated that they had pediatric references following the adult protocols.

Do you have policies/protocols that facilitate transporting ill or injured children to the most appropriate hospital/medical facility?

- Yes 75%
- No 25%
- Comments: Those who said no indicated that their agencies transported to the closest facility or utilized air support as necessary. The emergency room physician made the decision whether or not to transport to a trauma center.

Are these protocols reviewed and updated regularly by comparing to state or national standards/guidelines?

- Yes 50%

- No 50%
- Comments: Those who said yes overwhelmingly said they did so on an annual basis.

Would you like help reviewing and preparing pediatric protocols from pediatric emergency medicine specialists?

- Yes 100%

Recommended State Minimum Patient Care Guidelines

Are you currently using some form of the recommended State Minimum Patient Care guideline?

- Yes 60%
- No 32%
- Not sure 8%

Do you find that the recommended State Minimum Patient Care Guidelines meet your needs?

- Yes 60%
- No 40%
- Comments: Those who said yes indicated they modified the state minimum patient care guidelines and then used them as their protocols.

Children with Special Health Care Needs (CSHCN)

Are there sufficient training opportunities and resources to assure that your personnel can effectively manage emergencies in children with special health care needs (e.g.

tracheotomies, central lines, gastrostomy tubes, and ventilators)?

Does your service have protocols in place for the assessment and emergency management of CSHCN?

Are personnel trained and updated on these protocols?

- No 100%
- Comments: No one had specific protocols or procedures. Most said they would use adult protocols if necessary.

Education and Training

Where do your providers go for continuing education opportunities in pediatric trauma and EMS?

- Outside approved education site 50%
- Internal departmental approved education site 33%
- Accredited EMS training location 22%
- Other 3% indicated that physicians (themselves) do it

What factors determine their continuing education site?

- Course materials <1%
- Cost 64%
- Location 18%
- Instructors <1%
- Other 16% not sure

Check which courses your EMS provider's need for special training.

- PEPP 10%
- P BTLS 0%

- PALS 88%
- ACLS 22%
- Other 3% indicated they had all that they need

Are there any areas of weakness regarding pediatric trauma that you feel your EMS providers need further education?

- Virtually all respondents indicated that education is always necessary. ALL indicated that the most serious issue was the minimal number of seriously ill or injured children that were seen. This contributed to a lack of comfort and expertise.

Has your service ever applied for funding for grants offered by the EMS office for pediatric training?

- Yes 26%
- No 46%
- Not sure 28%

Are you interested in applying for grant funding for your EMS agency?

- Yes 81%
- No 9%
- Not sure 10%

Mutual Aid Agreements

Does your EMS agency have any mutual aid agreements in place?

- Yes 80%
- Not sure 20%

- Comments: Most physicians were not sure about this question. Many thought they were all informal agreements but referred this question to the EMS coordinators.

Which of the following agencies do you have mutual aid agreements with?

- Other local EMS agencies 87%
- Other private ambulance companies
- EMS agencies in other counties
- EMS agencies in other states
- Other-not sure 13%

How are you contacted?

- Most indicated that the EMS agency contacts them when necessary thru the hospital. Several said that they give out home phone number or pager.

Are your EMS providers allowed to render medical care in other states?

- Yes 42% while transporting patients from Ohio to other hospitals (primarily Wheeling)
- No 5%
- 53% do not think their agencies ever transport outside the state.

Are you a certified EMS medical director in other states?

- Yes 33% West Virginia or Kentucky

Do you/they complete additional training to be allowed to deliver care in another state?

- Yes 12% indicated extra paperwork
- No 88%

Who serves as medical control when they respond to a different state?

- EMS agency medical director 12%
- Receiving hospital 37%
- Function on protocol 63%
- Comments: These statistics reflect medical control in general.

Does your agency ever primarily respond to another state? (or do you have to be requested)

- Yes 13%
- No 86%
- Comments: Those who responded yes were referring to patients transferred by request or need to another state

When you transport a pediatric trauma patient to what facility do you transport? (% indicates multiple response)

- Closest appropriate facility 82%
- Hospital in the state the patient is injured in
- Hospital in county your agency is based in
- Hospital requested by patient 14%
- Other 6% not sure

Comments: Most stated that if the pediatric patient is seriously hurt the EMS providers would call for air support. If not available they would transport the patient to the closest facility and the emergency physician would then make arrangements if necessary for transport to a tertiary hospital.

Which of the following are issues you've encountered when responding or transporting pediatric trauma patients in other states (check all that apply)

Concern over medical legal issues

Discrepancies in standards of care between states

Discrepancies in the qualifications of the responders between states

Longer transport times

Service area left uncovered

• **Comments: None of the agencies were 1st responders in other states.**

Only 10% of physicians indicated any problem when transferring a patient to another state and that was insurance coverage.

Who is responsible for signing the mutual aid agreement?

• 100% not sure

Any special concerns which have arisen regarding EMS care to pediatric trauma patients transported to and from other states?

Comments: No one expressed any concern over this issue. It appears that within this group transfer across state lines is not an issue except perhaps future insurance concerns.

General comments on pediatric trauma care:

Most spoke of limited exposure to sick children

Difficult to get volunteers to spend time and money on training

Paid agencies do much better in keeping up with training.

All said more training and equipment would be beneficial.

Analysis of EMS Medical Directors Survey

Mutual Aid Issues:

This was not a concern and presented no barriers to patient care for EMS medical directors and practicing physicians along the Ohio border of Region V and VI.

Pediatric Policies:

The physicians identified only 50% of their agencies as having pediatric specific policies and procedures, and none of the agencies had policies for CSHCN. All of the medical directors felt that consultation with a pediatric subspecialist for review of their policies and procedures would be beneficial.

The lack of policies and procedures for CSHCN clearly identifies a deficit in the regions queried.

Education and Training:

All of the physicians felt that pediatric education was critical, especially because of the low volume of critical pediatric patients managed by each agency. The majority of these agencies were rural and/or volunteer, and listed money and distance as significant obstacles for education. **In addition, the majority of EMS medical directors in these regions were unaware of resources currently available for their agencies through the state of Ohio. The medical directors also felt that the volunteer agencies were**

at a disadvantage when compared to paid agencies for pediatric equipment and training.

Barriers

The study coordinator experienced difficulty in contacting individual physicians.

Numerous phone calls were required to make contact with each physician. Most physicians were medical directors for multiple agencies (some not within the target area).

Once contacted all were cooperative and expressed difficulty with: 1) keeping current with changes in the EMS system and 2) time constraints.

Aeromedical Physician Survey Results

Overview

The chief medical officers were identified whose flight programs routinely transport pediatric patients in the state of Ohio. A survey was designed to identify any mutual aid, pediatric trauma resources or equipment issues that the aeromedical programs may have experienced.

Methodology

Seven programs were identified that routinely transport pediatric patients in Ohio.

The chief medical officers were contacted by mail and asked to complete a survey regarding the current status of pediatric education and equipment, mutual aid issues and any other areas of concern.

A letter describing the study and soliciting support was sent to each program.

Participation

Of the seven physicians contacted five responded (71%).

Survey Results

Does your agency have any formal mutual aid agreements?

- No-60%
- Yes-40% (primarily other aeromedical programs)

Are your personnel allowed to render care in other states?

- Yes-100%

In order of frequency: (multiple response)

- West Virginia- 100%
- Kentucky- 80%
- Pennsylvania 80%
- Michigan 40%
- Indiana 40%
- Other 20%

Are there restrictions to rendering care in other states?

- 40% have no restrictions (may do scene runs)
- 60% restricted to requests for interhospital requests

Do personnel need to be licensed or certified to transport within another state between facilities? or on a scene run (when applicable).

- No-100%

Who serves as medical control when you transport to or within another state?

- 80%- aeromedical agency medical director or designee
- 20%- on board physician

When you transport a pediatric trauma patient IN another state to what facility do you transport?

- 80%- closest appropriate facility
- 20%- must return to Ohio to the most appropriate facility

Which of the following are issues you've encountered when responding to pediatric transport requests in other states (% indicates multiple response option)

- 60%- no concerns
- 40%- longer transport times and service area left uncovered
- 20%- concern over medical-legal issues
- 20%- discrepancy in medical care between states

Do you have any issues regarding mutual aid with any state?

- 80%-no
- 20%- yes (One agency expressed concern over Pennsylvania program flying into their area and transporting patient back over their own Level 1 hospital

Average number of pediatric transports per program

- 14% of total transports

Percentage of those above, which are transported over states lines for medical care

- < 5%

Crew configuration:

- Nurse/paramedic- 60%
- Nurse/nurse- 20%
- Nurse/MD- 20%

Does your service have pediatric protocols?

- 100%-yes
 - Stand alone-40%
 - Supplement to adult protocols-60%

Does your service have protocols for Children with Special Health Care Needs?

- 100%- No

Are pediatric protocols regularly reviewed and updated by pediatric physicians?

- 80%-yes
- 20%-no

Are protocols reviewed and updated regularly by comparing to state or national guidelines?

- 80%-yes
- 20%-no

Do pediatric specialists regularly review pediatric transports?

- 100% Yes

How many continuing education hours are annually devoted to pediatric care at your agency?

- 40% - indicated 0-3 hours/year
- 60% - indicated >10 hours/year

All physicians stated that they felt the number of hours indicated above were adequate for their crews.

40% of the physicians surveyed thought their crews were very comfortable with pediatric care.

60% of the physicians indicated their crews were usually comfortable with pediatric care

Pediatric certification programs required by the agencies:

- 100% PALS
- 20% PEPP
- 40% NRP

Comments:

Need for continued pre-hospital education and training

Need for increased education and equipment (not indicated for who), appropriate

legislation that would improve pediatric pre-hospital transport

Increased education for both aeromedical crews as well as improvement of system

utilization for pediatric transports

Analysis of Aeromedical Physician Survey

Mutual Aid

The majority of the physicians felt that mutual aid was not an issue. The physicians were concerned with the length of the transports and leaving the primary service area uncovered.

Pediatric Policies/ protocols and education

All flight programs have general pediatric policies and protocols, but there was a deficiency of protocols for CSHCN. With all of the programs reporting about 15% of their runs to be pediatric, there was a diversity of continuing education in pediatrics for the programs. Since all of the physicians felt that their pediatric education was adequate a more reproducible measure needs to be developed.

Barriers

None

Section 8

Coordinator Survey Results

Overview

A list of EMS agencies located within 20 miles of the Ohio border in regions V and VI was identified using State of Ohio pharmacy records. EMS Coordinators were contacted by mail and asked to participate in this survey.

Methodology

Eighty-five EMS coordinators were identified in target area. An eight page written survey was mailed to each coordinator with a letter explaining the purpose of the study. The participants were contacted five times if they failed to respond. A total of 56 surveys (65%) were completed. Some coordinators left sections of the survey unanswered which resulted in variations in the results. One county did not participate (Harrison) even after repeated attempts to contact the agencies.

Participation

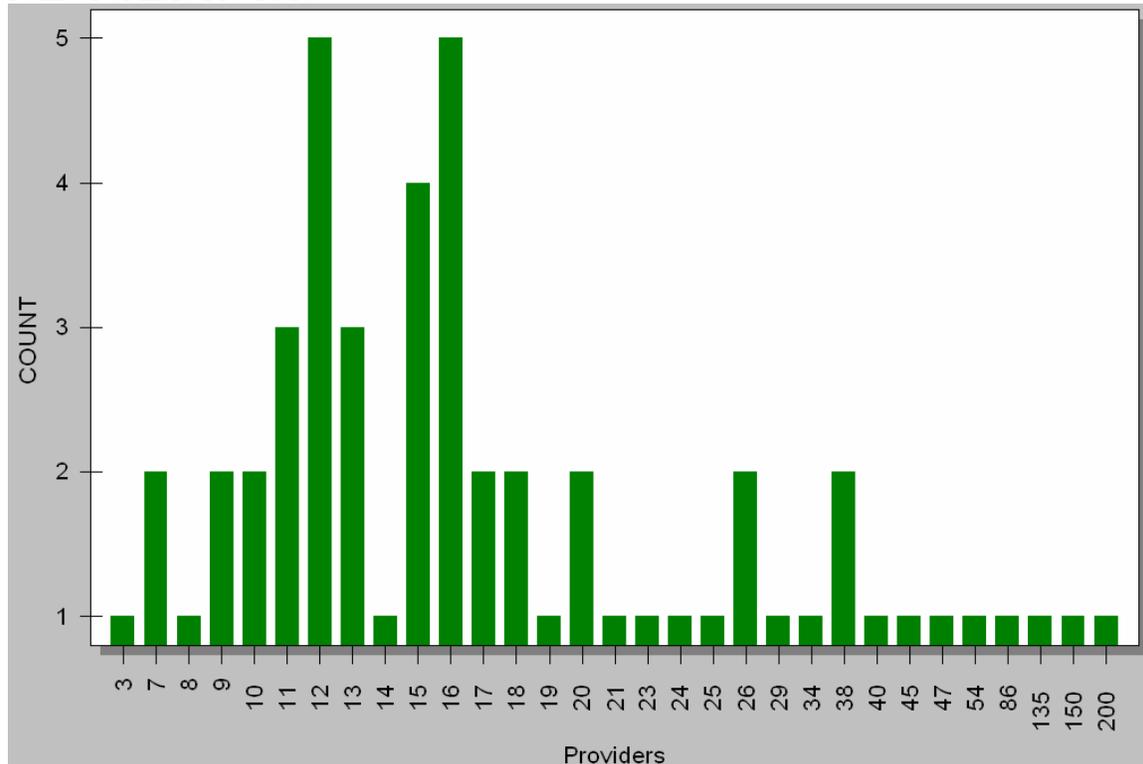
65% of the EMS coordinators completed the survey

Coordinator Survey Summary

Number of surveys entered: 56

Agencies:	Frequency	Percent (%)
Volunteer	32	57.1
Paid	11	19.6
Mix	12	21.4
Missing Data	1	1.8
Total	56	100.0

Number of EMS Providers:



#Surveys: 54

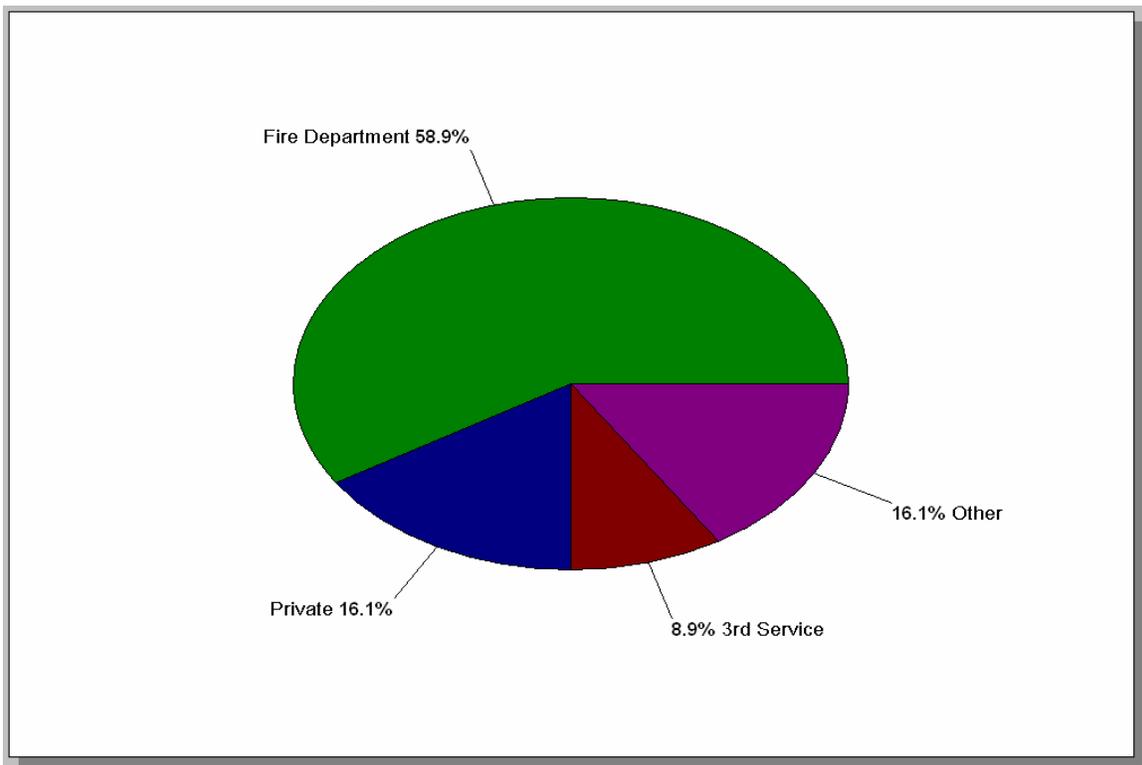
Average # Providers: 28.13

Median # Providers: 16.00

Type of Service:	Frequency	Percent (%)
Fire Department	33	58.9
Private	9	16.1
3 rd Service	5	8.9
Other	9	16.1
Total	56	100.0

Types of other service

Government	(2)
Joint fire district	(1)
Private fire department	(1)
Township	(2)
Volunteer EMS	(2)
Government taxed based county operation	(1)
	9



Access to a Computer:

- Yes: 56 100%
- No: 0 0

CD Drive:

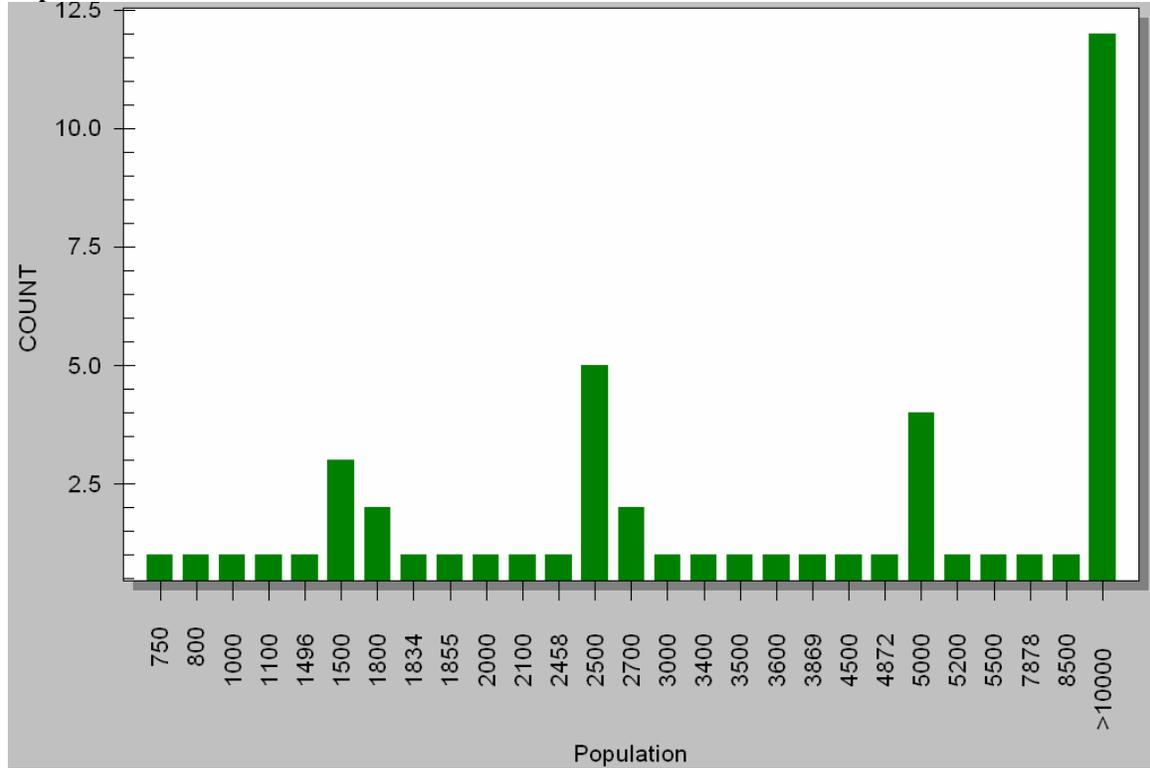
- Yes: 56 100%
- No: 0 0

Internet:

- Yes: 55 98.2%
- No: 1 1.8%

Primary Coverage:

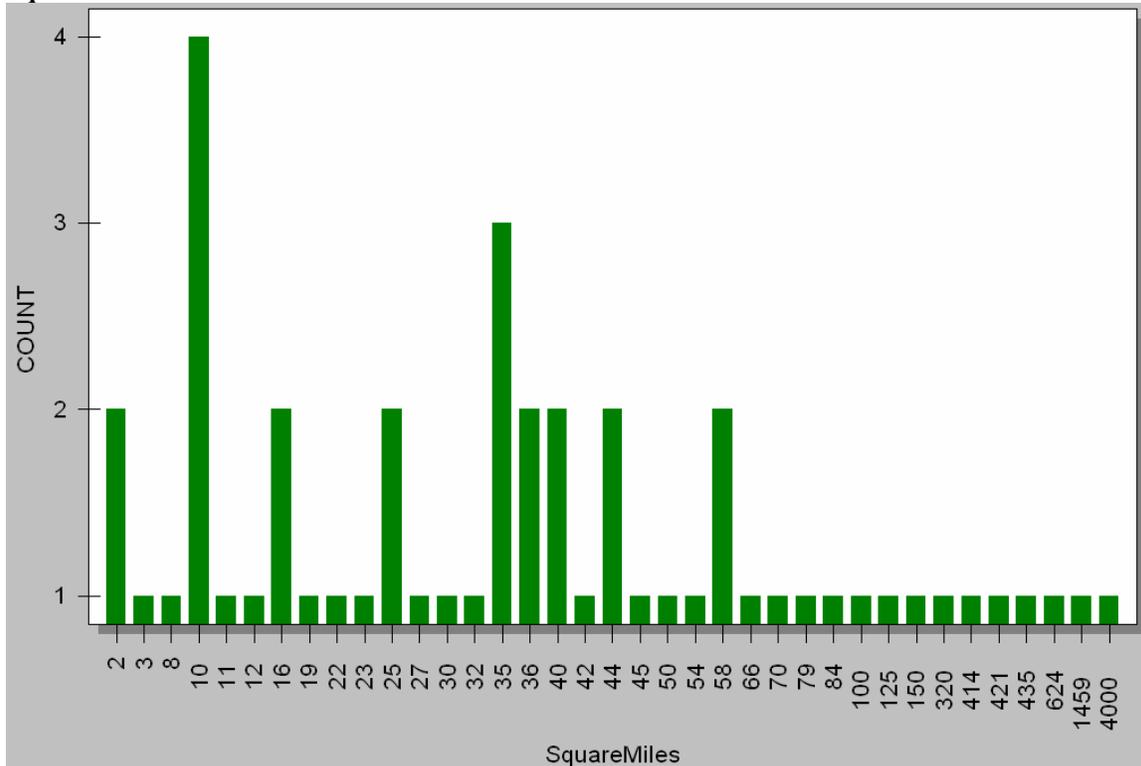
Population



#Surveys: 49

Average Population: 4800.0
Median Population: 3500.0

Square Miles:



#Surveys: 49

Average Square Miles: 190.04

Median Square Miles: 36.0

Number of Patient Transport Vehicles:

BLS	Frequency	Percent (%)
0	33	58.9
1	11	19.6
2	7	12.5
3	1	1.8
5	1	1.8
16	1	1.8
30	1	1.8
100	1	1.8
Total	56	100.0

Average # BLS transport vehicles: 3.29

ALS	Frequency	Percent (%)
0	10	17.9
1	12	21.4
2	17	30.4
3	6	10.7
4	2	3.6

7	1	1.8
10	2	3.6
15	1	1.8
20	2	3.6
25	1	1.8
26	1	1.8
50	1	1.8
Total	56	100.0

Average # ALS transport vehicles: 4.55

Number of Non-transport EMS Vehicles:

BLS non transport	Frequency	Percent (%)
0	40	72.7
1	9	16.4
2	3	5.6
3	1	1.8
5	2	3.6
Total	55	100.0

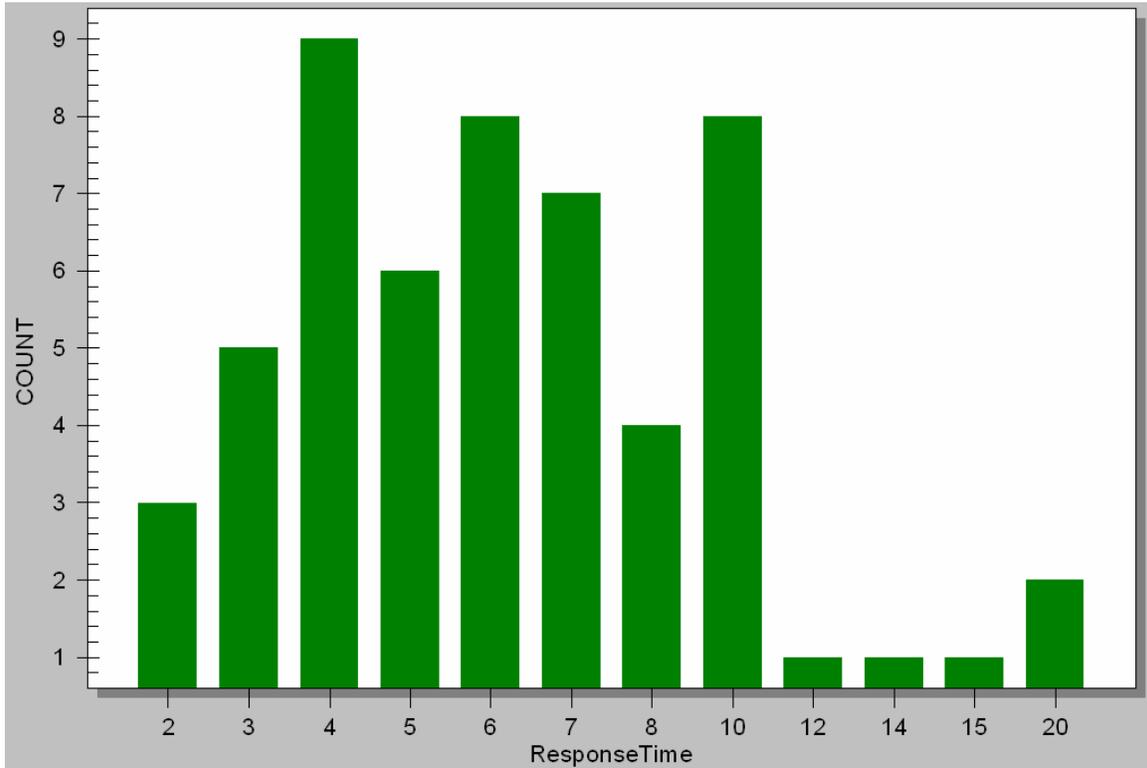
Data from 1 survey missing

ALS non transport	Frequency	Percent (%)
0	45	81.8
1	10	18.2
Total	55	100.0

Average response time:

Response time	Frequency	Percent (%)
2	3	5.5
3	5	9.1
4	9	16.4
5	6	10.9
6	8	14.5
7	7	12.7
8	4	7.3
10	8	14.5
12	1	1.8
14	1	1.8
15	1	1.8
20	2	3.6
Total	55	100.0

Data from 1 survey missing



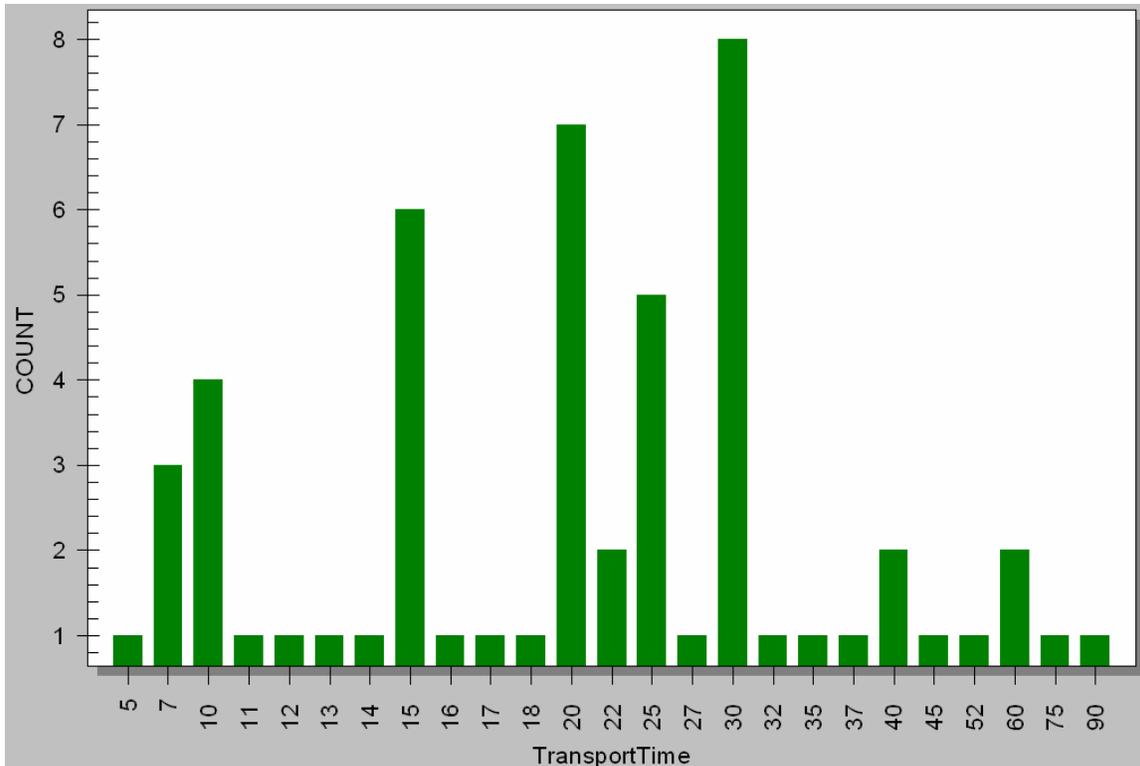
Surveys: 55

Average all agencies: 6.85 minutes

Average transport time:

Transport time	Frequency	Percent (%)
5	1	1.8
7	3	5.5
10	4	7.3
11	1	1.8
12	1	1.8
13	1	1.8
14	1	1.8
15	6	10.9
16	1	1.8
17	1	1.8
18	1	1.8
20	7	12.7
22	2	3.6
25	5	9.1
27	1	1.8
30	8	14.5
32	1	1.8

35	1	1.8
37	1	1.8
40	2	3.6
45	1	1.8
52	1	1.8
60	2	3.6
75	1	1.8
90	1	1.8
Total	55	100.0



Surveys: 55

Average Transport Times All Agencies: 25.44

Helicopter Service Used Most Frequently:

Service	Frequency
Medflight	30
Care Flight	1
University Air Care	0
St. Vincent/MCO Life Flight	0
Metro Life Flight	3
University Cleveland	0
Toledo Hospital	0
Other	
Health Net	7
Lifelight Pittsburgh	3
Stat Medevac	23
Huntington Helicopter	1

Authority to request helicopter service:

Authority	Frequency
Law Enforcement	4
Hospital Based Medical Director	9
Scene Commander	47
Other	
Any EMS personnel on scene	8
EMS in charge at scene	4

PEDIATRIC POLICIES AND PROTOCOLS

Do you have policies/protocols that facilitate transporting ill or injured children to the most appropriate hospital or medical facility?

Q12	Frequency	Percent (%)
Yes	45	80.4
No	11	19.6
Total	56	100.0

Does your service have protocols in place for the assessment and emergency management of pediatric patients?

Q13	Frequency	Percent (%)
Yes	54	96.4
No	2	3.6
Total	56	100.0

If yes, are these protocols reviewed and updated regularly by comparing to state or national standards/guidelines?

Q14	Frequency	Percent (%)
Yes	46	88.5
No	6	11.5
Total	52	100.0

Data from 2 of the surveys who responded “yes” to question 13 were blank for this question.

Would you like help reviewing and preparing pediatric protocols from emergency medicine specialists?

Q15	Frequency	Percent (%)
Yes	43	78.2
No	12	21.8
Total	55	100.0

Data from 1 survey missing

Are you currently using some form of the recommended State Minimum Patient Care Guidelines?

Q16	Frequency	Percent (%)
Yes	43	79.6
No	11	20.4
Total	54	100.0

Data from 2 surveys missing

If you are using these guidelines, do they meet your needs?

Q17	Frequency	Percent (%)
Yes	39	95.1
No	2	4.9
Total	41	100.0

Data from 2 of the surveys who responded “yes” to question 16 were blank for this question.

Does your service have protocols in place for the assessment and emergency management of CSHCN?

Q18	Frequency	Percent (%)
Yes	11	20.4
No	43	79.6
Total	54	100.0

Data from 2 surveys missing

Are there sufficient training opportunities and resources to assure that your personnel can effectively manage emergencies in CSHCN?

Q19	Frequency	Percent (%)
Yes	10	17.9
No	46	82.1
Total	56	100.0

If protocols are available, are your personnel trained and updated regularly?

Q20	Frequency	Percent (%)
Yes	5	71.4%
No	5	28.6%
Total	10	100.0%

EDUCATIONAL OPPORTUNITIES AND TRAINING

Where do you go for continuing education opportunities?

Location	Frequency
Outside approved education site	49
Internal departmental approved education site	30
Accredited EMS training location	48
Other	
Hospitals	1
Internet	2
OAEMS Conferences	2

Other not listed

3

What factors determine your continuing education site?

Factor	Frequency
Course Materials	28
Cost	39
Location	42
Instructors	24
Other	
Availability of personnel	2

Which courses would you like to have available for your providers?

Courses	Frequency
PEPP	39
P-BTLS	49
PALS	33
PHTLS	37
ACLS	25
AMLS	31

What pre-hospital pediatric continuing education classes are available to providers in your service that are within a reasonable driving distance?

Courses available	Frequency
PALS	41
PEPP	11
P-BTLS	21
OTHER	3

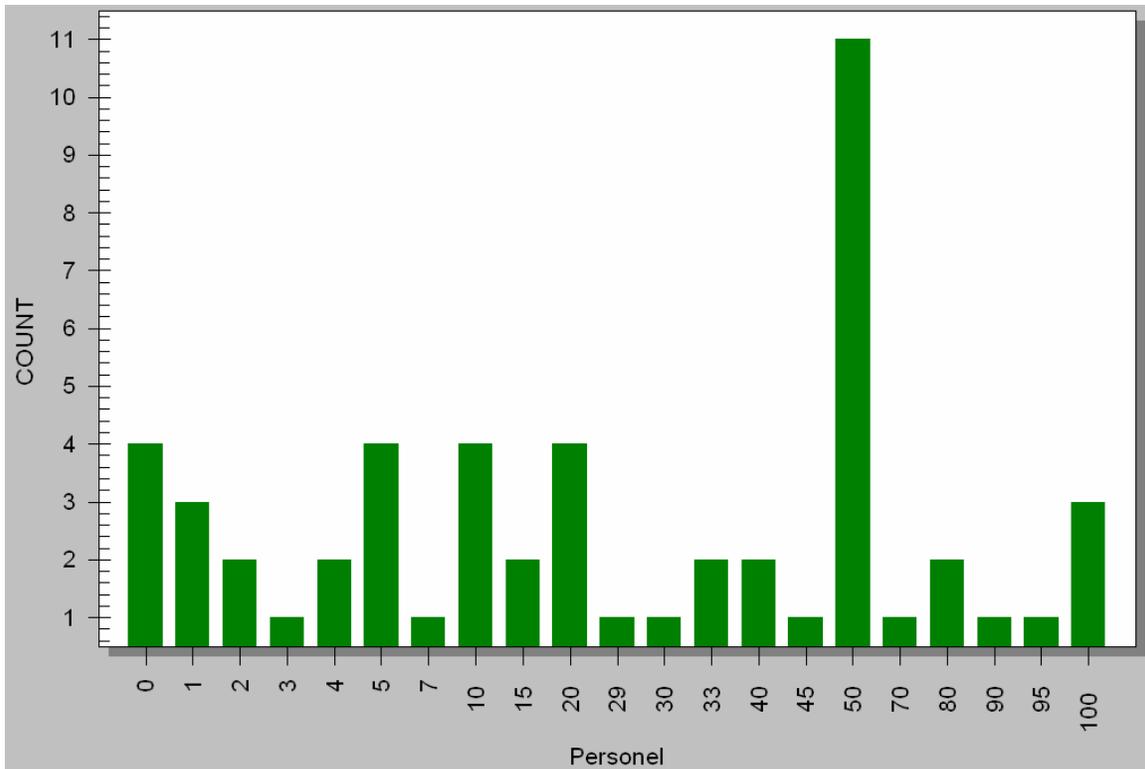
What percentage of your personnel have been certified or taken a pediatric course?

% Personnel	Frequency	Percent (%)
0	4	7.5
1	3	5.7
2	2	3.8
3	1	1.9
4	2	3.8
5	4	7.5
7	1	1.9
10	4	7.5
15	2	3.8
20	4	7.5

29	1	1.9
30	1	1.9
33	2	3.8
40	2	3.8
45	1	1.9
50	11	20.8
70	1	1.9
80	2	3.8
90	1	1.9
95	1	1.9
100	3	5.7

Total 52 100.0

Data from 4 surveys missing



Data from 3 surveys missing

Average %: 32.26

Does your service have a need for additional pediatric training courses?

Q26	Frequency	Percent (%)
Yes	53	96.4
No	2	3.6
Total	55	100.0

Data from 1 survey missing

What, if any barriers, have you experienced in obtaining pediatric continuing education for your personnel?

Barriers	Frequency
Costs too much	28
Travel distance too far	40
Facilities not cooperative	3
Medical director not interested	1
Lack of cooperation from tertiary centers	2
Not available	21
No barriers	8

Has your service ever applied for funding of grants offered by the EMS office for pediatric training?

Q28	Frequency	Percent (%)
Yes	18	32.1
No	38	67.9
Total	56	100.0

Would you be interested in applying for grant funding for pediatric education and equipment?

Q29	Frequency	Percent (%)
Yes	50	92.6
No	4	7.4
Total	54	100.0

Data from 2 surveys missing

EQUIPMENT

BLS:

Equipment <u>REQUIRED</u>	Frequency	Percent (%)
Oral Airways	53	94.6
Self inflating bag etc.	50	89.3
Oxygen masks	42	92.9
Non-rebreather mask	51	91.9
Stethoscope	50	89.3
Nasogastric tubes	25	44.6
Backboard	48	85.7
Cervical Immob Device	50	89.3
BP cuff	52	92.9
Portable suction	51	91.1
Suction catheters	45	80.4

Extremity splints	38	67.9
Bulb syringe	49	87.5
Obstetric pack	52	92.9
Thermal absorbent blanket	36	64.3
Burn pack	49	87.5
Water soluble lubricant	48	85.7

OPTIONAL

Infant car seat	24	42.9
Nasopharyngeal airways	36	64.3
GCS reference	39	69.6
Pediatric trauma score reference	31	55.4
Stuffed toy	39	69.6

BLS Equipment	Frequency	Percent (%)
All required equipment present (100%)	7	12.5
Missing one (have 94%)	17	30.4
Missing two (have 88%)	14	25.0
Missing three (have 82%)	6	10.7
Missing four (have 76%)	5	8.9
Missing five (have 71%)	1	1.8
Missing six (have 65%)	1	1.8
Missing seven (have 59%)	0	0.0
Missing eight (have 53%)	1	1.8
Missing nine (have 47%)	0	0.0
Missing ten (have 42%)	1	1.8
Missing eleven (have 35%)	0	0.0
Missing twelve (have 29%)	0	0.0
Missing thirteen (have 24%)	0	0.0
Missing fourteen (have 18%)	3	5.4
TOTAL	56	100.0

All optional equipment present (100%)	8	14.3
Missing one (have 80%)	15	26.8
Missing two (have 60%)	15	26.8
Missing three (have 40%)	9	16.1
Missing four (have 20%)	7	12.5
Missing five (have 0%)	2	3.6
TOTAL	56	100.0

Four agencies had all required and optional BLS equipment

ALS Equipment	Frequency	Percent (%)
<u>REQUIRED</u>		
Transport monitor	41	74.5
Defibrillator	46	83.6
Pediatric monitoring electrodes	34	61.8
Laryngoscope with blades	51	92.7
Pediatric ET tubes	49	89.1
ET tubes uncuffed	50	90.9
Magill forceps	46	83.6
Nebulizer	38	69.1
IV catheters	47	85.5
Length/Weight dose chart	29	52.7
Needles	37	67.3
Resuscitation drugs & IV fluid	42	76.4
<u>OPTIONAL</u>		
Blood glucose monitoring system	43	78.2
C02 monitoring system	25	45.5

Data from one survey missing

ALS Equipment	Frequency	Percent (%)
All required equipment present (100%)	15	27.3
Missing one (have 92%)	6	10.9
Missing two (have 83%)	13	23.6
Missing three (have 75%)	3	5.5
Missing four (have 66%)	6	10.9
Missing five (have 58%)	2	3.6
Missing six (have 50%)	3	5.5
Missing seven (have 42%)	2	3.6
Missing eight (have 33%)	3	5.5
Missing nine (have 25%)	1	1.8
Missing ten (have 17%)	1	1.8
TOTAL	55	100.0
All optional equipment present (100%)	19	34.5
Missing one (have 50%)	30	54.5
Missing two (have 0%)	6	10.9
TOTAL	55	100.0

12 Agencies had all required and optional ALS equipment.

Does your service have any specific pediatric equipment needs?

- Yes: 23 41.1%

MUTUAL AID

Does your agency have any mutual aid agreements in place?

Q33	Frequency	Percent (%)
Yes	50	90.9
No	5	9.1
Total	55	100.0

Data from one survey missing

Which of the following if any do you have agreements with?

Agency	Frequency
Other local EMS agencies	50
Other private ambulance companies	13
EMS agencies in other counties	14
Counties listed: Gallia, Jackson, Adams, Harrison, Monroe, Vinton, Meigs	
EMS agencies in other states	
West Virginia	10
Kentucky	2
Pennsylvania	1

Who is responsible for signing the mutual aid agreement?

Person	Frequency
Medical Director	4
Chief	35
EMS Coordinator	7
City or County Officials	6
Verbal agreement only	6
Other	4

INTERSTATE TRANSPORT AND RESPONSE POLICIES

Are your EMS providers allowed to render care in other states?

Q36	Frequency	Percent (%)
Yes	26	50.0
No	26	50.0
Total	52	100.0

Data from 4 surveys missing

If yes, do they complete additional training to do so?

Q37	Frequency	Percent (%)
------------	------------------	--------------------

Yes	8	30.8
No	18	69.2
Total	26	100.0

Who serves as medical director **IF** you respond or transport a patient to a different state?

Medical control	Frequency
EMS agency medical director	10
Receiving hospital	31
Other	2

Do you have to be requested to respond to another state?

Q39	Frequency	Percent (%)
Yes	35	89.7
No	4	10.3
Total	39	100.0

Data from 17 surveys missing

Who covers your service area **IF** you assist in another state?

Coverage	Frequency
Other local EMS agencies	50
Private Ambulance service	3
Outside county EMS agency	3
Other	
Second squad from own agency	1
Do not go unless we can cover our own area	1
Other not listed	1

When you transport a critically ill or injured pediatric patient, to what facility do you transport?

Transport facility	Frequency
Closest appropriate facility	50
Hospital in the state the patient is injured in	0
Hospital in the county your agency is based in	5
Hospital requested by family or patient	10
Other	1

Which of the following are issues you've encountered when responding or transporting critically ill or injured pediatric patients in other states?

Issues	Frequency
Concern over medical-legal issues	3
Discrepancies in standards of care between states	2
Discrepancies in the qualifications of responders between states	1
Longer transport times	14
Service area left unattended	9
No issues	23
Other Issues	4

Coordinator Survey Analysis

Demographics

The majority of agencies were volunteer (57.1%) and part of fire departments (58.9%) with EMS capabilities. All agencies that responded have access to computers, most with internet capability. They cover an average of 190 square miles with approximately 28 EMS providers to care for a population of 4800.

Equipment

The majority of agencies have a total of two patient transport vehicles, either BLS or ALS. **Only 12.5% of agencies have 100% of the state recommended BLS equipment.**

Equipment most frequently listed as not available included a NG tube and extremity splint. Of more concern are the 11% of agencies missing appropriate pediatric sized bag-valve-masks. In addition 10% of the agencies reported they did not have a stethoscope and 20% did not have suction catheters.

ALS squads appear to be more prepared with 27.3% having all required equipment on board. However only 74.5% have transport monitors and even less had pediatric electrodes and defibrillator capabilities.

Of particular importance, only 52.7% had length/weight dose charts and only 76.4% had resuscitation drugs and IV fluids. 41% of EMS Coordinators indicated the need for pediatric specific equipment.

Response and Transport Time

The average response time was under 7 minutes indicating an ability to rapidly mobilize

and a strong commitment to expedient care from the rural volunteer agencies. The average transport time to the closest hospital was 25.4 minutes.

This is a lengthy transport time, especially for a child that is critically ill or injured.

The scene commander is most frequently cited as the person responsible for activating aeromedical support with Medflight the preferred provider in the surveyed area.

Pediatric Policies and Protocols

96% of the agencies surveyed have general pediatric policies that are updated regularly by comparing to state or national standards. All of those with protocols feel that they meet their agencies needs.

The majority of EMS coordinators surveyed (80%) DID NOT have protocols for children with special needs and felt unprepared to manage these children.

Most agencies indicated they would appreciate assistance preparing protocols from pediatric emergency medicine specialists.

Educational Opportunities and Training

Pediatric education and training in rural Ohio remain a challenge for providers. Distance and cost remain significant obstacles for volunteers. Most attend programs at outside approved educational sites (usually conferences) or accredited EMS education sites.

PALS is the most frequent course taken but the coordinators have a strong interest in PEPP and P-BTLS.

On average only 32% of EMS providers have taken a pediatric training course.

96% of EMS Coordinators feel they need more pediatric training but find cost and travel to be prohibitive.

92% of coordinators would be interested in applying for grant funding to obtain pediatric equipment and training.

Mutual Aid and Interstate Transport

In general, the EMS coordinators did not feel there were issues with mutual aid or interstate transport of pediatric trauma patients.

The two most frequently expressed concerns were long transport times and leaving the service area uncovered.

The majority of EMS agencies have mutual aid agreements with other local EMS agencies. The chief is usually responsible (60%) for signing mutual aid agreements. Half of the EMS providers in the target area are allowed to care for patients in other states. Local EMS agencies cover for each other during long transport times. The majority of EMS agencies transport pediatric patients to the closest appropriate facility.

Barriers

There was tremendous difficulty getting coordinators to complete the survey. In some instances, a total of 5 surveys with letters of explanation were sent to individual agencies. Frequently the name of the coordinators completing the survey were not the individual identified on the pharmacy records. Many of the surveys were not fully completed.

Section 9

EMS Provider Survey Results

Overview

In this section of the study, the EMS providers were identified by their agency EMS coordinators. Each provider was then sent a survey which queried the provider regarding level of certification, number of years in EMS, pediatric educational opportunities, and clinical and mutual aid concerns, if any.

Methodology

As part of the EMS coordinators survey, the coordinators identified EMS providers affiliated with their agency. From this information, an accurate count of the number of providers in their agency was ascertained. The provider surveys were coded and sent to each coordinator for distribution to the providers. A self-addressed stamped envelope for each survey was included to facilitate a higher return rate. A letter explaining the survey goals was included.

Participation

A total of 1459 survey was sent. A return rate of 25% was realized (366/1459).

Provider Survey Summary

Background Information

Please mark your appropriate level

	Frequency	Percent (%)
Basic	204	55.7
Intermediate	48	13.1
Paramedic	112	30.6
Missing data	2	0.6
Total	366	100.0

How old are you?

	Frequency	Percent (%)
< 25 years	35	9.6
25-35 years	131	35.8
35-45 years	107	29.2
46 years or older	93	25.4
Total	366	100.0

How many years have you been a member of an EMS agency?

	Frequency	Percent (%)
<5 years	103	28.2
5-10 years	84	23.0
10-20 years	119	32.6
20-40 years	51	14.0
31 years or more	8	2.2
Total	365	100.0

Data from 1 survey missing

Are you paid for your services as an EMT-Paramedic?

	Frequency	Percent (%)
Yes	187	53.1
No	165	46.9
Total	352	100.0

Data from 14 surveys missing

Education (highest grade completed)

	Frequency	Percent (%)
High School	158	43.4
College	178	48.9
Other	31	8.5
Total	364	100.0

Data from 2 surveys missing

Type of EMT-Paramedic Service

	Frequency
Fire Department	164
Private	60
Hospital Based	3
3 rd Service	28
Volunteer	160
Other	48
Aeromedical, district, County/government, rescue squad	

Previous Pediatric Education and Experience

Where have you received the most training/knowledge of emergency care pertaining to infants/children?

	Frequency
Initial EMS training	102
Refresher training	51
Continuing education	145
Field experience	28
Other	14
Clinics/hospitals, college, lpn training Family members, PALS, PEPP, Teaching C.E., working in ER	

How many times during a typical month do you care for pediatric patients in the out of hospitals EMS setting?

	Frequency	Percent (%)
0-3 times	306	84.1
4-6 times	51	14.0
7-15 times	7	1.9
more than 15 times	0	0.0
Total	364	100.0

Data from 2 surveys missing

What is the total number of education hours you have had in the past 2 years that cover pediatric topics?

	Frequency	Percent (%)
0-3 hours	91	25.1
4-8 hours	139	38.4
9-15 hours	80	22.1
more than 15 hours	52	14.4
Total	362	100.0

Data from 4 surveys missing

On the scale below, how do you feel when confronted with a critical pediatric emergency call?

1 = most comfortable, 4 = least comfortable

Number who chose each:

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
My education is adequate	55	179	117	12
My equipment is adequate	124	152	64	23
My confidence is adequate	59	184	102	17
My medical director is adequate	135	155	52	17
My pediatric protocols are adequate	116	177	58	11
My EMS system is adequate	119	171	50	23

Average of responses:

My education is adequate	2.24
My equipment is adequate	1.96
My confidence is adequate	2.21
My medical director is adequate	1.86
My pediatric protocols are adequate	1.90
My EMS system is adequate	1.94

On the scale below, how do you feel when confronted on a run with a child with special health care needs (E.g. Tracheotomies, central lines, ventilators, gastrostomy tubes etc.)?

1 = most comfortable, 4 = least comfortable

Number who chose each:

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
My education is adequate	38	124	128	70
My equipment is adequate	69	133	105	48
My confidence is adequate	43	141	111	61
My medical director is adequate	106	132	83	29
My pediatric protocols are adequate	83	145	93	32
My EMS system is adequate	82	154	78	39

Average of responses:

My education is adequate	2.64
My equipment is adequate	2.37
My confidence is adequate	2.53
My medical director is adequate	2.10
My pediatric protocols are adequate	2.21
My EMS system is adequate	2.21

Please identify any needs you may have for continuing education in pediatric topics

1 = essential, 4 = not essential

Number who chose each:

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Airway management	154	137	46	21
Bag-valve-mask	88	147	75	39
Newborn delivery	144	134	60	14
Pediatric assessment by age	122	156	63	4
Cardiac arrest	175	118	48	11
Trauma	194	112	46	5
Child abuse	137	126	70	19
SIDS	135	139	61	18
Poisoning	132	169	47	6
Respiratory emergencies	178	130	38	7
Seizures	132	157	61	5
Vascular access	155	126	57	12
Other				

Average of responses:

Airway management	1.82
Bag-valve-mask	2.19
Newborn delivery	1.84
Pediatric assessment by age	1.85
Cardiac arrest	1.70
Trauma	1.61
Child abuse	2.06
SIDS	1.89
Poisoning	1.80
Respiratory emergencies	1.64
Seizures	1.83
Vascular access	1.79
Other	1.60

Complicated delivery, medical/legal issues,
 Haz mat involved, med doses, special health needs,
 Peds with MRDD.

If you had to manage a critical pediatric case on your next run, what age child would most concern you?

	Frequency	Percent (%)
Less than 1 year	302	84.4
1 to 3 years	41	11.5
4 to 10 years	12	3.4
11 to 18 years	4	0.8
Total	358	100.0

Data from 8 surveys missing

In the following areas do you feel prepared (1) or unprepared (4)?
 Number who chose each:

	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Pediatric assessment skills	88	213	55	6
Bag-valve-mask	175	150	32	4
Pediatric incubation	79	143	92	46
Pediatric vascular access	41	124	112	77

Average of responses:

Pediatric assessment skills	1.94
Bag-valve-mask	1.63
Pediatric incubation	2.29
Pediatric vascular access	2.64

Previous Pediatric Education and Experience

Do you have access to a computer with a CD drive?

	Frequency	Percent (%)
Yes	333	91.0
No	33	9.0
Total	366	100.0

Do you have access to the Internet?

	Frequency	Percent (%)
Yes	327	89.6
No	38	10.4
Total	365	100.0

Data from 1 survey missing.

Where do you go for continuing education opportunities?

	Frequency
Outside approved education site	205
Internal department approved education site	219
Accredited EMS training location	237
Other	
Hospital	10
Fire department	2
Internet	5
Literature/own reading	2
Medical school	1
OAEMS Conferences	1
SEORM	1
Shawnee State University	2

What are the barriers (if any) that you have experienced in obtaining pediatric education?

	Frequency
Costs too much	111
No support from employee	51
Travel distance too far	164
Pediatric facilities not cooperative	13
Medical director not interested	21
No barriers	98
Not available	79
Other	25

What factors determine your continuing education site?

	Frequency
Course materials	118
Cost	167
Location	274
Instructions	130
Other	
Amount of people	1
Availability of classes	1
Childcare for my children	1
Date and time	7
Employer not providing	1
Don't have enough time personally	14
Topics	1

Does your service have a need for additional pediatric training courses?

	Frequency	Percent (%)
Yes	345	95.8
No	15	4.2
Total	360	100.0

Data from 6 surveys missing

Mutual Aid

Does your agency have any mutual aid agreements in place?

	Frequency	Percent (%)
Yes	315	88.7
No	40	11.3
Total	355	100.0

Data from 11 surveys missing.

If yes, which of the following agencies do you have mutual aid agreements with?

	Frequency
Other local EMS agencies	283
Other private ambulance companies	81
EMS agencies in other counties	117
EMS agencies in other states	
KY	6
WV	48

How are you contacted for runs?

	Frequency
Radio	159
Pager	263
Phone	97
Other	9

Are you licensed to provide care in any other state?

	Frequency	Percent (%)
Yes	73	20.4
No	285	79.6
Total	358	100.0

Data from 8 surveys missing.

If yes, name of state: FL, IL, KY, WV, MD, PA,
All, National Registry

Are you allowed to provide medical care in another state if requested ?

	Frequency	Percent (%)
Yes	186	54.2
No	157	45.8
Total	343	100.0

Data from 23 surveys missing.

Does your agency ever respond to another state?

	Frequency	Percent (%)
Yes	125	34.8
No	234	65.2
Total	359	100.0

Data from 7 surveys missing.

If you respond to another state, who serves as medical director?

	Frequency
EMS agency medical director	87
Receiving hospital	83

If you respond to another state, who covers your service area?

	Frequency
Other local EMS agencies	167
Private ambulance service	29
Another county EMS agency	28
Other	
Our own back up squad	18
Call in off duty volunteers	4
District coverage	2
Potentially no coverage	1

When you transport a pediatric patient, to what facility do you transport?

	Frequency
Closest appropriate facility	275
Hospital in the state the patient is injured in	5
Hospital in the county your agency is based in	18
Hospital requested by patient or family	128
Other	
Children's Hospital	4
Depends on the condition of patient/level of injury	4

Which of the following are issues you've encountered when responding or transporting pediatric patients across state borders?

	Frequency
Concerns over medical/legal issues	60
Discrepancies in standards of care between states	40
Discrepancies in the qualifications of the responders between states	26
Longer transport times	83
Service area left uncovered	51
No issues	145
Other	9

Analysis of EMS Provider Surveys

Demographics

Within the limitations of this study (25% response rate) , the majority of providers (>50%) work with volunteer fire departments. The majority are basic EMTs (55.7 %), with an average age of 30 years and have been practicing clinically for approximately 10 years.

Pediatric Education/Training and Experience

Most providers obtain their pediatric education (40%) from continuing education programs, although 44% of respondents indicated that distance was a barrier. Low volumes of pediatric transports remain a concern with 84% indicating that they transport fewer than 3 pediatric patients in a month. Despite these low volumes most indicated a high level of confidence in their medical directors, policies and protocols.

The areas of greatest concern when transporting pediatric patients were vascular access and intubation skills.

Over 90% of respondents indicate they have access to computers, making on-line education a viable alternative.

Over 95% indicated a need for increased pediatric education but overwhelmingly stated that travel and money remain obstacles for them.

Mutual Aid/Interstate Transport

88% of providers indicate that their agency has mutual aid agreements with other local

agencies.

Transport across state lines does not appear to cause concern other than the potential of longer transport times and leaving their service area uncovered.

Barriers

Because we did not have individual names and addresses for providers in target area we were dependent on the EMS coordinators listed on the pharmacy license to distribute the surveys to their providers. Multiple letters were sent to the coordinators after they received the provider surveys if we received no response.

Our final effort to increase participation was to offer free education at their facility if we received over 75% response rate. Seven agencies qualified for this offer, but only 2 agencies actually took advantage of this offer, and we went to Little Hocking and Belle Valley Fire Departments. We were somewhat surprised at the lack of interest in free education with CEU's at their own department in light of the fact that many responses indicated the need for education, and the difficulty they expressed with travel constraints. Many of the provider surveys were incomplete, with respondents only selecting certain questions to answer.

Section 10

RUN SHEET DATA

Overview

Pediatric run sheets were obtained from two agencies which lie within the target area of 20 miles from the Ohio border. We requested and received pediatric run sheets for a 6 month period (June through December 2002) from 1 volunteer agency and 1 paid agency.

Methodology

The run sheets were divided into volunteer and paid agencies. Each transport was reviewed for response time, transport time, destination, mutual aid issues, age and diagnosis. Also reviewed was the activation of aeromedical services.

Participation

One volunteer agency and one paid agency contributed pediatric run sheets. A total of 195 transports were analyzed. All charts remain confidential according to HIPPA guidelines.

Run Sheet Data

- 195 Run sheets reviewed
 - Paid agencies 125 64.1%
 - Volunteer agencies 68 34.9%
 - Blank 2 1.0%

	Average (minutes)	Minimum (minutes)	Maximum (minutes)
Response time	7.41	0.0	39.0
Time at scene	14.14	0.0	55.0
Transport time	40.44	2.0	248.0
Return time	23.59	1.0	70.0
Accumulated time of entire run	58.70	1.0	255.0

DESTINATION	Frequency	%
All Ohio run	185	96.9
Scene response to another state	0	0.0
Ohio patient taken to another state		
West Virginia	4	2.1
Out of state patient brought to Ohio		
West Virginia	2	1.0

Missing data: 4 surveys

Mutual aid:

- Yes 9 5.0%
- No 172 95.0%
- Missing data: 14

Age of Patient	Frequency	Percent
0 – 12 months	21	10.8%
13 months – 24 months	16	8.2%
2 years	14	7.2%
3 years	10	5.1%
4 years	9	4.6%
5 years	13	6.7%
6 years	9	4.6%

7 years	15	7.7%
8 years	10	5.1%
9 years	11	5.6%
10 years	8	4.1%
11 years	9	4.6%
12 years	12	6.2%
13 years	12	6.2%
14 years	26	13.3%
Total	195	100.0%

Average Age: 6.9
 Minimum: 0.0 (3 weeks)
 Maximum: 14.0

Insurance	Frequency	Percent
Medicaid	86	44.3%
Private	22	11.3%
Unknown	86	44.3%
Total	194	100.0%
Missing data:	1	

CHIEF COMPLAINT	Frequency	Percent (%)
Trauma	82	42.1
Medical	103	52.8
Other		
Burn	1	0.5
Child Abuse	1	0.5
Psych	1	0.5
Surgical	3	1.5
Other not given	4	2.0

DIAGNOSIS	
Croup	1
Asthma	3
Wheezing	6
Foreign Body	5
Other Respiratory Illness	12
Cardiac	1
GI	15
Dehydration/Fever	6
Infectious	14
Neurological	35
Seizure	14
Multiple Trauma	1
Isolated Head Trauma	10
Isolated Extremity Trauma	23
Abrasions/Lacerations	17
Other	39
Dog Bite	1
Allergic Reaction	1
Bee Sting	1
Burn	2
Cardiac Arrest	1
Cervical Fracture	1
Chest Pain	1
Child Abuse	2
Colic	1
Fall	3
Football Injury/Stinger	3
Hernia	1
Indigestion	1
Ingestion	4
Kidney	1
Muscle Tremors	1
Near Drowning	1
Overdose	1
Psych	6
R/O Ingestion	1
R/O Seizure	1
Testicular Torsion	1
R/O Testicular Torsion	1

PROCEDURE	
Cardiac monitoring	23
Pulse Oximetry	15
Oxygen delivery	33
IV	48
Fluid Bolus	0
Aerosol	2
NG/OG	3
BVM	1
Intubation	1
IO	0
CPR	2
CID	13
Backboard	11
Splint	7
Wound care/bandaging	10
Other	
Check glucose	3
Ice/Cold pack	3
Psych	1
Removal of shoe stuck on foot	1
None	92

Aeromedical Activated

- Yes 0 0%
- No 195 100%

Patient Transported

- Yes 152 77.9%
- No 43 22.1%

Analysis of Run Sheet Data

Mutual Aid Issues

Less than 5% of transport requests required the use of mutual aid. This does not appear to be an issue for this region at this time.

Transport Time

Average accumulated time for a pediatric transport was 58.70 minutes. The rural location of these agencies contributed to a longer patient contact and transport time. Education on stabilization of critical pediatric patients would be critical based on these long out of hospital times.

Diagnosis/ Treatment

Medical conditions were the most frequent diagnoses with neurological disorders (17%) the most common.

In addition to education on stabilization of pediatric trauma patients, EMS providers need education on common pediatric medical complaints (respiratory, neurologic, GI illnesses).

Children under the age of 2 constituted the largest percentage of children transported (26.2%). With children 12 to 14 years of age the second largest group (25.7%).

Education on the recognition of illness and stabilization in children under the age of 2 years should be a priority.

With the exception of one full arrest due to drowning, the majority of trauma injuries (11%) were isolated extremity injuries.

Each agency has very few encounters with major pediatric trauma.

47% of the patients transported required no intervention. In this group of patients BVM was only required once and the same patient was intubated.

Based on this review of run sheets, there appears to be very few seriously ill or injured patients requiring transport in the target area.

This lends itself to a higher level of discomfort for providers and less experience with the assessment and management of critically ill or injured pediatric patients.

However, agencies which are located in rural areas are also more critical in the resuscitation of a critically ill or injured child, because of the longer transport times to definitive care.

Transport Across State Borders

This was not identified as an issue by this series of runs. Less than 4% of patients were transported across state lines. Of those 6 total patients, 4 were transported to a psychiatric facility in West Virginia.

Barriers

None

Section 11

Conclusions and Recommendations

Mutual Aid Issues:

This was not a concern and presented no barriers to patient care for EMS medical directors and practicing physicians along the Ohio border of Region V and VI. The chief medical officer for the aeromedical agencies, EMS coordinators and EMS providers also felt that this was not a major issue, but were concerned about the length of time for the transports and leaving their service areas uncovered. All respondents to the survey agree, the majority of EMS agencies transport pediatric patients to the closest appropriate facility, especially if the child is critically ill or injured.

Recommendation

Although currently not an issue, the EMS environment needs to be continued to be monitored along the Ohio border, for adequate resources to support mutual aid, especially in the event of a mass casualty event in this area.

Pediatric Policies

There was a discrepancy regarding the existence and updating of EMS agency pediatric policies between physicians and EMS coordinators. According to the EMS coordinators, 96% of the agencies have general pediatric policies that are updated regularly by comparing to state or national standards. All of those with protocols feel that they meet their agencies needs.

The lack of policies and procedures for CSHCN clearly identifies a deficit in the

regions queried. The majority of EMS coordinators surveyed (80%) DID NOT have protocols for children with special needs and felt unprepared to manage these children. All of the medical directors and the EMS coordinators felt that consultation with a pediatric subspecialist for review of their policies and procedures would be beneficial.

Recommendation

This area lacks resources and training for the care of children with special health care needs. Educational programs and resources should be provided to assist with the care of these children. The availability of access to pediatric emergency medicine physicians for consultation regarding specific pediatric policy issues would be welcomed by the EMS medical directors and EMS coordinators in these regions.

Equipment

Only 12.5% of agencies have 100% of the state recommended BLS equipment.

With critical items such as appropriate pediatric sized bag-valve-masks, listed by 11% of the agencies as missing. In addition 10% of the agencies reported they did not have a stethoscope and 20% did not have suction catheters.

ALS squads appear to be more prepared with 27.3% having all required equipment on board. However only 74.5% have transport monitors and even less had pediatric electrodes and defibrillator capabilities.

Of particular importance, only 52.7% had length/weight dose charts and only 76.4% had resuscitation drugs and IV fluids. 41% of EMS Coordinators indicated

the need for pediatric specific equipment.

Recommendation

A significant number of volunteer and rural agencies still lack basic pediatric equipment. A system needs to be developed to provide equipment and interval checks with these agencies, that does not involve significant time commitments from these agencies and personnel. A pediatric center in each region that served to coordinate resources and provide expertise for equipment recommendations, grant writing skills and education regarding use of the equipment would significantly improve resources in these areas and enhance pediatric care.

Educational Opportunities and Training

All of the physicians felt that pediatric education was critical, especially because of the low volume of critical pediatric patients managed by each agency. The majority of these agencies were rural and/or volunteer, and the EMS medical directors, EMS coordinators and providers all listed money and distance as significant obstacles for education.

In addition, the majority of EMS medical directors in these regions were unaware of resources currently available for their agencies through the state of Ohio. 92% of coordinators would be interested in applying for grant funding to obtain pediatric equipment and training. The medical directors also felt that the volunteer agencies were at a disadvantage when compared to paid agencies for pediatric equipment and training.

The EMS coordinators reported an average transport time to the closest hospital of 25.4 minutes. This is a lengthy transport time, especially for a child that is critically ill or injured and should be considered when developing pediatric educational

opportunities for providers in these areas. Low volumes of pediatric transports remain a concern for EMS providers with 84% indicating that they transport fewer than 3 pediatric patients in a month. The areas of greatest concern when transporting pediatric patients were vascular access and airway management skills. Over 90% of respondents indicate they have access to computers, making on-line education a viable alternative.

Recommendations

Pediatric education is critical in these areas. Long transport times and low volumes of pediatric patients make these areas vulnerable to inadequate skills and resources to providing optimal care. The EMS medical directors, EMS coordinators and providers are all strongly committed to providing excellent pediatric care, but lack an infrastructure to support them. An integrated system which supports continuing pediatric education and access to skill training at a reasonable cost is important to the providers in these areas.

