Supplementary Online Content

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This supplementary material has been provided by the authors to give readers additional information about their work.
**eTable 1. Survey Questions Sent to State Officials**  
(Italicized questions are from legacy data and could be updated by the state; Bold Questions are new survey questions developed for the study)

| Question                                                                                      |
|---------------------------------------------------------------------------------------------|
| % of Population <10 Miles from High Level Pediatric Trauma Center.                          |
| % of Population 10–30 Miles from High Level Pediatric Trauma Center.                         |
| % of Population >30 Miles from High Level Pediatric Trauma Center.                           |
| % of Population <10 miles from High Level Adult or Pediatric Trauma Center.                  |
| % of Population 10–30 Miles from High Level Adult or Pediatric Trauma Center.                |
| % of Population >30 Miles from High Level Adult or Pediatric Trauma Center.                  |
| % of Population <10 Miles from High-Mid Level Adult or Pediatric Trauma Center.             |
| % of Population 10–30 Miles from High-Mid Level Adult or Pediatric Trauma Center.            |
| % of Population >30 Miles from High-Mid Level Adult or Pediatric Trauma Center.             |
| Does the State have trauma system legislation?                                              |
| Where is your trauma office "administratively" located?                                    |
| Does the State have a trauma system funding source(s)?                                     |
| Does the State trauma system receive federal funds?                                         |
| Is there an annual budget for the trauma system?                                            |
| Are any funds specifically for pediatric needs?                                            |
| Is there Trauma Program Accountability to State EMS Office (EMSO)?                          |
| Does the State trauma system include pediatric needs (i.e. children are addressed in the state statute)? |
| Does the State have enabling legislation to designate trauma centers?                        |
| Does the State have legislation to designate pediatric trauma centers?                       |
| Does the State have regulatory authority to limit the number of trauma centers?             |
| Is there a state trauma plan available?                                                     |
| What is the basis for the State trauma plan?                                                |
| Is there a Statewide Trauma Advisory Committee (TAC)?                                       |
| If yes, is there pediatric representation on the statewide TAC?                             |
| Are there Regional TACs?                                                                    |
| If yes, is there Pediatric Representation on the Regional TAC?                               |
| Does the State promote/organize participation in pediatric injury prevention?               |
| Is the State trauma program involved in injury prevention efforts?                          |
| Is State trauma program involved in Public Information & Education (PI&E)(not related to injury prevention)? |
| Does the state publicly report trauma registry data that includes pediatric trauma patients? |
| How is the State trauma data reported to the public?                                        |
| Is trauma included in the Statewide disaster plan?                                         |
| Does the State disaster plan include children?                                             |
| Does the State trauma program have its own Mass Casualty Incident (MCI) plan?                |

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| Question                                                                 |
|-------------------------------------------------------------------------|
| Does the State trauma system legislation/plan include simulation and modeling for injured children? |
| Is there a State Disaster Triage Guideline?                              |
| Does the State hold mass casualty drills that include children?         |
| If yes, how often?                                                      |
| Do hospitals within the state hold disaster drills that include children? |
| Do State disaster drills include surge planning for children?           |
| Are Trauma Center Levels designated by the State?                       |
| What is the method of Trauma Center designation/verification in the State? |
| Is there medical oversight for the State Trauma System?                 |
| Are CDC Field Triage Guidelines (2011) used in the State?               |
| Is there a State Trauma Destination (Bypass) Protocol in place?         |
| Is there a State Pediatric Trauma Destination (Bypass) Protocol in place? |
| Do the State hospitals have transfer agreements for unavailable resources? |
| Does the State have a Statewide PI Plan or Guide for Trauma?            |
| Are children's interests recognized in the Statewide PI Trauma plan?    |
| Is there a State Trauma Registry (TR)?                                  |
| If yes, is the TR used for Performance Improvement (PI)?                |
| If yes, does State TR include Children?                                 |
| Does the State have a separate pediatric report for trauma?             |
| Is the State TR electronically integrated with prehospital (EMS) data?   |
| Does the State EMS data include children?                               |
| Is the State EMS data used for pediatric PI?                            |
| What is the State Average Peds Ready Score for EDs that are Adult Trauma Centers? |
| What is the State Average Peds Ready Score for EDs that are Pediatric Trauma Centers? |
| What is the State average Pediatric Readiness (PR) Score for all EDs?    |
| Do the State Adult Trauma Center EDs have guidelines for recognition of child abuse? |
| Is there State legislation for Child Fatality Review that is instructive on child abuse? |
| If yes, is there a mandatory death review of childhood deaths resulting from abuse? |
| Does the State have shaken baby parent education legislation?            |
| If yes, give statute and year enacted?                                  |
| Do State hospitals use ALARA (As Low As Reasonably Achievable) guidelines? |
| Do State Adult Trauma Centers use ALARA guidelines for CT use in children? |
| If no, please explain.                                                  |
| Are injured children typically worked up by the referring hospital before transfer? |
| Does the referring hospital discuss how to transfer a child?            |
| Do State hospitals use telemedicine to communicate about pediatric trauma patients? |
| Does State have teleradiology sharing capability?                       |
| If yes, is it Statewide, system or hospital?                            |
| Question                                                                 | Answer                                                                                     |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Does the State have access to pediatric inpatient burn care beds?       | If yes, what are the resources for pediatric burn care?                                    |
| Does the State have access to pediatric inpatient rehabilitation needs? | If yes, what are the resources?                                                            |
| Is the State rehab facility Commission on Accreditation of Rehabilitation Facilities (CARF) accredited for Peds? |                                                                                           |
| Is the State rehab facility CARF accredited for adults?                |                                                                                           |
| Who directs the State rehab care?                                      |                                                                                           |
| Does the State outpatient rehabilitation model include pediatric trauma needs? | If yes, what are the resources?                                                            |
| Who directs the State outpatient rehab care?                           |                                                                                           |
| Does the State offer ACS RTTDC courses?                                |                                                                                           |
eFigure 1. Project Time line

Organized data from the NASEMS and GAO reports into a spreadsheet

Design survey and determined the state organizations/officials that should participate in completion; obtained contact information for key individuals

Nov 2017

State excel sheets finalized to send to state officials for data entry

22 Feb 2018

Follow up with states that did not answer

3 July 2018

Second request and final ask for states to fill out and return spreadsheet

Aug-Dec 2018

States abstracts sent out for confirmation by state officials

Survey Monkey created for state officials to fill out

July–Nov 2017

Jan 2018

Email sent to each state with excel spreadsheet, abstract and link to survey monkey

2 April 2018

Aug 2018

Follow up email asking states to verify state spreadsheet/abstract

15 Jan 2019

Data organized and analyzed. State survey results reviewed and compared with state abstract and spreadsheet. Data discrepancies reconciled

Introductory email sent to members of Delphi survey team or their parent organizations asking them to participate

May–July 2019

Nov 12, 2019

Delphi Survey Round 3 (at this point segmented into 6 domains)

Jan 2020

Delphi Survey Round 5 (FINAL)

Jan 14, 2020

Jan 2020 missing data reconciled where possible

Feb 21–23, 2020

2021

Score validation, study team finalized state abstracts

March 16, 2019

Delphi Survey Round 1 & 2

Nov 2019

Nov 2019–Jan 2020

Group call to review and discuss results of Round 3 survey

Feb 17, 2020

Delphi Survey Round 4

2020

Data analysis and first state scoring completed

Final report, Manuscript development
# eTable 2. Delphi Committee Members

(*Designates a member of the leadership team*)

| Name                          | Title                                                                 | Sector Representation                                        |
|-------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------|
| Amelia Collings, MD*          | General surgery resident at University of Louisville, MWPSC clinical research fellow | Pediatric trauma research                                   |
| Carrieann Drenton, MD         | Practicing emergency medicine physician Sutter Medical Center, Sacramento, CA | Emergency medicine (non-academic setting)                    |
| Mary Fallat, MD*              | Professor of surgery at University of Louisville                       | Pediatric trauma surgeon                                    |
| Peter Fischer, MD, MS         | Associate professor of surgery & anesthesia at University of Tennessee Health Science Center, Memphis, TN | Adult trauma & acute care surgeon; ACS-COT Representative; Geomapping |
| Tom Hartka, MD, MS            | Assistant professor of emergency medicine at University of Virginia Health Sciences, Charlottesville, VA | Emergency medicine (academic setting); Medical examiner; Biomechanics and crash research |
| Tiffany Lightfoot, RN, MS     | State Trauma Program Coordinator for Hawaii State Department of Health | Trauma Program Manager NASEMSO Representative               |
| Bindi Naik Mathuria, MD, MPH* | Associate professor of surgery & pediatrics at Baylor College of Medicine, Houston, TX | ACS-COT Future Trauma Leaders; Pediatric trauma surgeon     |
| Terry Mullins, MPH, MBA       | Chief of Arizona Department of Health Services, Bureau of EMS and Trauma | State EMS Director                                           |
| Christian Niedzwecki, DO, MS  | Associate professor of physical medicine & rehabilitation of Baylor College of Medicine, Houston, TX | Pediatric rehabilitation                                    |
| Katherine Remick, MD          | Associate professor pediatrics & surgery at Dell Medical School University of Texas, Austin, TX | Pediatric emergency medicine; EMS Director; NPRP            |
| Frederick Rivara, MD, MPH*    | Endowed chair of pediatric research in Department of pediatrics at the University of Washington, Seattle, WA | Pediatric and trauma research                               |
| Frederick Rogers, MD, MS, MA* | Professor of surgery at University of Pennsylvania, Philadelphia, PA | Rural trauma surgeon and trauma research                    |
| Morgan Scaggs, BHS, NRP       | Kentucky EMSC Project director                                         | EMSC representative                                          |
| Joey Scollan, DO              | NASEMSO medical director council representative                        | State EMS medical director                                  |
| Mary Wethington, MSN, RN, CEN, CPEN | Staff nurse at McKenna David Pediatric Emergency Center, instructor at University of Kentucky College of Nursing | Emergency Nurses Association representative, pediatric nurse |

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### eTable 3. Results From Delphi Scoring

| Variable                                                                                                                                                                                                 | Round 1 Weighted Average | Round 2 Weighted Average | Domain or Reason for Removal                                                                 | Round 4 Weighted Average | Round 5 Inclusion Consensus |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|------------------------------------------------------------------------------------------------|--------------------------|-----------------------------|
| Q1. Percentage of pediatric patients that live within 30mi of a high level (I or II) pediatric trauma center (data comes from GAO report)                                                            | 7.43                     | 6.6                      | The panel felt that access to any trauma center (adult or pediatric) was more important, and feasible, than access to specifically a high-level pediatric trauma center | -                        | -                           |
| Q2. The US GAO has provided a national report by state showing the percentages of children living in proximity to a PTC based on quartiles. The exact percentage of children living in proximity to a PTC should carry more or less weight based on quartiles (i.e. 0-24.9%, 25-49.9%, etc). Q2 | 7.36                     | 6.58                     | The expert panel felt that the exact percentage was more important than percentiles          | -                        | -                           |
| Q3. Percentage of pediatric patients that live within 30mi of either a high level (I or II) pediatric or adult trauma center Q3                                                                           | 7.64                     | 7.46                     | Access to Care                                                                                | 9.08                     | Yes                         |
| Q4. The US GAO has provided a national report by state showing the percentages of children living in proximity to either a high level (I or II) adult or PTC based on quartiles. The exact percentage of children living in proximity to either a high level (I or II) adult or PTC should carry more or less weight based on quartiles (i.e. 0-24.9%, 25-49.9%, etc). Q4 | 6.36                     | 7.23                     | The expert panel felt that the exact percentage was more important than percentiles          | -                        | -                           |
| Q5. Percentage of pediatric patients that live within 30mi of either a high or mid-level (I, II, or III) pediatric or adult trauma center (i.e. access to any Level I-III Adult or Pediatric Trauma Center).                                                        | 7.29                     | 6.92                     | Access to Care                                                                                | 9.08                     | Yes                         |
| Q6. The US GAO has provided a national report by state showing the percentages of children living in proximity to either a high or                                                                            | 6.93                     | 6.85                     | The expert panel felt that the exact percentage                                             | -                        | -                           |
mid-level (I, II, or III) adult or PTC based on quartiles. The exact percentage of children living in proximity to either a high or mid-level (I, II, or III) adult or PTC should carry more or less weight based on quartiles (i.e. 0-24.9%, 25-49.9%, etc).

https://i.imgur.com/VB5Zi32.png

| Question                                                                 | Value 1 | Value 2 | Domain                             | Score  | Answer |
|-------------------------------------------------------------------------|---------|---------|------------------------------------|--------|--------|
| Q7. There is state legislation for trauma system development.           | 9       | 8.86    | Legislation and Funding            | 8.15   | Yes    |
| Q8. Legislation, if present, specifically addresses injured children and includes rules regarding the specific needs of injured children - i.e., staff education, equipment | 8.42    | 7.07    | -                                  | -      | -      |
| Q9. State agencies, health department, or the trauma system participate in organized injury prevention efforts for children. | 8.93    | 7.5     | Injury Prevention and Recognition | 8.08   | Yes    |
| Q10. State disaster plan includes children                              | 9.36    | 9.64    | Disaster                           | 8.77   | Yes    |
| Q11. State holds mass casualty drills that include children             | 7.79    | 7.64    | Disaster                           | 8.77   | Yes    |
| Q12. Mass casualty drills include facilities planning for transfer of children to accommodate surge | 8.5     | 8.86    | Disaster                           | 8.77   | Yes    |
| Q13. Mass casualty drills include both a process for identifying children to be moved and verifying facilities receiving children as having appropriate resources to provide optimal care | 8.14    | 8.93    | Disaster                           | 8.77   | Yes    |
| Q14. State trauma system planning, simulation, and modeling includes children | 8.79    | 8.5     | Legislation and Funding            | 8.15   | Yes    |
| Q15. State has enabling legislation to designate pediatric trauma centers | 7.36    | 8.36    | Legislation and Funding            | 8.15   | Yes    |
| Q16. State has an EMS patient triage or destination determination protocol (e.g., Guidelines for Field Triage of Injured Patients) for injured children (nearest hospital versus appropriate trauma center) | 8.14    | 8       | Access to Care                     | 9.08   | Yes    |
| Q17. State-based trauma registry (TR) includes data on pediatric trauma patients | 9.85    | 9.21    | The expert panel felt that by publicly reporting | -      | -      |
| Question                                                                 | Score | Category                      | Count | Outcome |
|-------------------------------------------------------------------------|-------|-------------------------------|-------|---------|
| Q18. Trauma Registry data in the state is used for children's PI and is evaluated separately from adults | 7.79  | Quality Improvement and Trauma Registry | 8.77  | Yes     |
| Q19. A fraction of statewide budgeted funds is specifically dedicated to pediatric needs or interests | 7     | Legislation and Funding        | 8.15  | Yes     |
| Q20. There is mandatory pediatric representation on your state Trauma Advisory Council | 8.57  | Legislation and Funding        | 8.15  | Yes     |
| Q21. State publicly reports trauma data that includes children           | 8.43  | Quality Improvement and Trauma Registry | 8.77  | Yes     |
| Q22. State pediatric EMS data is used for EMS service or system PI and is evaluated separately from adults | 7.29  | Quality Improvement and Trauma Registry | 8.77  | Yes     |
| Q23. Hospitals in the state, in general, use as low as reasonably achievable (ALARA) guidelines for radiographic imaging | 7.36  | Pediatric Readiness            | 8.77  | Yes     |
| Q24. All levels of trauma center (adult, pediatric, or mixed) have education programs for their staff that include recognition of child abuse | 8.43  | Injury Prevention and Recognition | 8.08  | Yes     |
| Q25. State legislation is in place to review all child fatalities due to injury, including child abuse | 8     | Injury Prevention and Recognition | 8.08  | Yes     |
| Q26. Some hospitals in the state use telemedicine for communication with pediatric trauma centers including review of patient charts and images to determine the need for and assistance with transfer. | 6.6   | -                             | -     | -       |
| Q27. State has burn beds available for children                          | 7.29  | Access to Care                 | 9.08  | Yes     |
| Q28. State has inpatient rehabilitation beds available for children under 14 years old in a | 7.21  | Access to Care                 | 9.08  | Yes     |
pediatric rehabilitation unit (the unit can be within a rehabilitation facility but is specifically designated for children).

| Q29. Rehabilitation facilities utilize CARF (Commission on Accreditation of Rehabilitation Facilities) accreditation for pediatric rehabilitation | 6.79 | 6.5 | The weighted average fell below the set threshold of 7.0 and thus was eliminated | - | - |

| Q30. State requires transfer guidelines and defined processes/protocols be in place at each hospital | 7.71 | 8.29 | Pediatric Readiness | 8.77 | Yes |
**eTable 4. States Without Specific Pediatric Trauma System Assessment Score (PTSAS) Parameter**

| Domain                             | Parameter                                                                 | States not in compliance with PTSAS parameter |
|------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------|
| Disaster                           | State disaster plan includes children                                     | AL, FL, ME, MI, MN, MS, MO, MT, NH, NJ, NC, OH, SC, TX, WV |
|                                   | State holds mass casualty drills that include children                     | AL, FL, MI, NC, SC, VA, WV                   |
|                                   | Mass casualty drills include facilities planning for transfer of children to accommodate surge | AL, CA, FL, GA, ID, KS, ME, MS, MO, NE, NV, NH, NJ, NY, OH, OR, PA, SC, VA, WV, WV, WY |
|                                   | Mass casualty drills include both a process for identifying children to be moved and verifying facilities receiving children as having appropriate resources to provide optimal care | -                                             |
| Legislation and Funding            | There is state legislation for trauma system development                   | VT, DC                                        |
|                                   | There is mandatory pediatric representation on your state Trauma Advisory Council | AL, AZ, AR, GA, ID, IL, KS, MA, MI, MS, MO, NV, NJ, OK, RI, SD, VT |
|                                   | State trauma legislation specifically addresses injured children and includes planning, simulation, and modeling | AL, CA, CO, FL, ID, ME, MN, MO, MT, NM, OR, PA, RI, SC, SD, VT, WV, WI, WY |
|                                   | State has enabling legislation to designate pediatric trauma centers        | AL, CA, KS, ME, MT, NM, NC, ND, OK, OR, RI, SD, TN, TX, VT, WV, WV, DC |
|                                   | There are state funds designated for pediatric trauma care                 | AL, CO, DE, FL, GA, ID, IL, IN, IA, LA, MN, MS, MO, NV, NH, NJ, NM, NY, NC, ND, OH, OK, RI, SC, SD, TX, VT, WV, MI, WY, DC |
| Access to Care                     | State has an EMS patient triage or destination determination protocol (e.g., Guidelines for Field Triage of Injured Patients) for injured children (nearest hospital versus appropriate trauma center) | AL, AK, AZ, AR, CA, GA, ID, IN, KS, KY, ME, MN, MT, NE, NC, ND, OH, OR, RI, SD, UT, VT, VA, WI, WY, DC |
|                                   | State has access to inpatient rehabilitation beds available for children under 14 years old in a pediatric rehabilitation unit (the unit can be within a rehabilitation facility but is specifically designated for children) | AK, ID, RI, WY                                |
|                                   | State has access to burn beds available for children                       | CT, MS, NE, NJ, NY, PA, SD, VT, WV, WY        |
| Percentage of pediatric patients that live within 30mi of either a high level (I or II) pediatric or adult trauma center | AK, AR, MT, NM, SD, WY |
| --- | --- |
| Percentage of pediatric patients that live within 30mi of either a high or mid-level (I, II, or III) pediatric or adult trauma center | AK |
| Injury Prevention and Recognition | State legislation is in place to review all child fatalities due to injury, including child abuse | ID, MI, MN, MS, MO, NH, NM, NY, RI, WI |
| All levels of trauma center (adult, pediatric, or mixed) have education programs for their staff that include recognition of child abuse | AZ, AR, MN, NM, WA, WV, WI, DC |
| State agencies, health department, or the trauma system lead efforts in organized injury prevention for children | MS |
| Quality Improvement and Trauma Registry | Summary data from state-based trauma registry is publicly reported and includes pediatric trauma patients | AR, DE, FL, GA, ID, LA, ME, MI, NJ, NM, NC, RI, SD, TX, VT, VA, WV, DC |
| Trauma Registry data in the state is used for children's performance improvement (PI) and is evaluated separately from adults | AL, AR, CA, ID, IL, IN, ME, MS, MT, NE, NJ, NM, NC, OK, RI, TX, VT, VA, WV, WI, WY, DC |
| State pediatric EMS data is used for EMS service or system PI and is evaluated separately from adults | AL, AK, CT, GA, ID, KS, LA, NV, NJ, PA, SC, SD, TN, VA, WI, DC |
| Pediatric Readiness | The state measures pediatric readiness of its emergency departments | AL, CT, FL, GA, HI, ME, MA, MS, MO, NV, NM, NC, OH, OK, TN, TX |
| State requires transfer guidelines and defined processes/protocols be in place at each hospital | AK, AR, KS, LA, MN, MO, NE, NH, OH, RI, SC, SD, VT, WV, DC |
| Hospitals in the state, in general, use as low as reasonably achievable (ALARA) guidelines for radiographic imaging | AL, FL, IN, KY, MI, MS, MO, NM, OH, OK, RI, TX, VT, WA, DC |
eFigure 2. Regionalization Schemas With Mean Pediatric Trauma System Assessment Score (PTSAS) by Region

a) Emergency Medical Services for Children (EMSC); b) American College of Surgeons Committee on Trauma (ACS-COT); c) National Association of State EMS Officials (NASEMSO); d) U.S. Census Bureau; e) American Burn Association (ABA)
