AD_____

AWARD NUMBER: W81XWH-17-2-0010

TITLE: Multi-institutional Multidisciplinary Injury Mortality Investigation in the Civilian Pre-Hospital Environment (MIMIC)

PRINCIPAL INVESTIGATOR: Dr. Brian Eastridge

RECIPIENT:
National Trauma Institute d/b/a Coalition for National Trauma Research
San Antonio, TX 78230

REPORT DATE: April 2019

TYPE OF REPORT: Annual

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Approved for Public Release;
Distribution Unlimited

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REPORT DOCUMENTATION PAGE

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1. REPORT DATE	**2. REPORT TYPE**	**3. DATES COVERED**
April 2019	Annual	20 Mar 2018 - 19 Mar 2019

4. TITLE AND SUBTITLE

Multi-institutional Multidisciplinary Injury Mortality Investigation in the Civilian Pre-Hospital Environment (MIMIC)

5a. CONTRACT NUMBER

5b. GRANT NUMBER
W81XWH-17-2-0010

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

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5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

AND ADDRESS(ES)

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8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

10. SPONSOR/MONITOR'S ACRONYM(S)

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12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution Unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The purpose of this project is to focus efforts on a comprehensive review of 3,000 civilian prehospital injury deaths. A multidisciplinary study group will apply the framework and methodology that was developed to identify causes and mechanisms of death and estimate potential survivability. The study will describe the epidemiology of pre-hospital mortality in the context of trauma system development and estimate impact on society. The results will assist in the development of a blueprint for a sustained effort at public health injury mitigation strategies in the pre-hospital environment, identifying high priority areas for injury prevention, trauma systems performance improvement, and opportunities for advancements in research and development.

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			**17. LIMITATION OF ABSTRACT**	**18. NUMBER OF PAGES**	**19a. NAME OF RESPONSIBLE PERSON**
a. REPORT	**b. ABSTRACT**	**c. THIS PAGE**			USAMRMC
Unclassified	Unclassified	Unclassified	Unclassified	365	**19b. TELEPHONE NUMBER** *(include area code)*

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INTRODUCTION: Narrative that briefly (one paragraph) describes the subject, purpose and scope of the research.

Advances in care in both trauma centers and trauma systems have substantially reduced death and disability associated with injury. However, there remains a substantial opportunity to further reduce deaths in the pre-hospital setting. Potential liabilities in civilian and military pre-hospital care must be identified and remediated in order to reduce the number of potentially preventable deaths on the battlefield and in the civilian environment. The purpose of this proposal is to develop a coordinated, multidisciplinary, multi-institutional effort within the civilian clinical sector to identify and characterize the causes of mortality from trauma in the pre-hospital setting and to identify potential high yield areas for research and development in pre-hospital medical care, injury prevention, and trauma systems. This effort will conduct a review of 3,000 pre-hospital deaths in six areas of the country to develop a more comprehensive understanding of the epidemiology of pre-hospital deaths and their potential survivability with the ultimate goal of identifying liabilities in our current trauma system and improving survival of both civilian and military casualties.

1. **KEYWORDS:** Provide a brief list of keywords (limit to 20 words).

Prehospital deaths, survivability, preventable deaths, trauma systems, system improvements

2. **ACCOMPLISHMENTS:** The PI is reminded that the recipient organization is required to obtain prior written approval from the awarding agency grants official whenever there are significant changes in the project or its direction.

What were the major goals of the project?
List the major goals of the project as stated in the approved SOW. If the application listed milestones/target dates for important activities or phases of the project, identify these dates and show actual completion dates or the percentage of completion.

Objective #1: Develop a framework and methodology for evaluating (i) the causes and pathophysiologic mechanisms of pre-hospital deaths; (ii) the appropriateness of EMS response and care delivered; and (iii) the potential for survivability under both optimal clinical circumstances and within the context of the actual pre-hospital environment.

Major Task 1: Adapt Protocol for Submission and Determination	Months	Completion Date	% Complete
Subtask 1: Prepare Regulatory Documents and Research Protocol for Study	1-3	1/25/2018	100%
Coordinate with Sites for IRB protocol determination as NHR	1-3	2/7/2018	100%
Coordinate with Sites for Military 2nd level IRB review (ORP/HRPO)	1-6	N/A	N/A
Submit amendments, and protocol deviations as needed	As Needed		N/A
Milestone Achieved: Local IRB determination at UTHSCSA	3	01/31/2018	100%

Milestone Achieved: HRPO acknowledgement for all protocols and local IRB determination as NHR through Sites	6	12/28/2016	100%
Major Task 2: Development of the review criteria	Months	Completion Date	% Complete
Subtask1: Develop consensus regarding definitions and rules	1-3	09/13/2017	100%
Subtask 2: Delivery of review criteria, definitions, and procedures to the government for recommendations and approval.	4	09/18/2017	100%
Milestone Achieved: Government recommendations and approval of review criteria, definitions, and procedures	4	10/11/2017	100%
Objective #2: Organize and standardize a multidisciplinary, multi-institutional network of experts who will apply the methodology described above to identify the causes of pre-hospital deaths due to trauma and estimate the potential for survivability. Study Group members will be trained to ensure standardization of assessments within and across panels.			
Major Task 1: Provide training to Study Group members	Months	Completion Date	% Complete
Subtask 1: Hold series of meetings by teleconference	3	01/07/2019	100%
Milestone Achieved: Completed Study Group training	3	01/07/2019	100%
Objective #3: Using the methodology and network of experts described above, define the causes and pathophysiologic mechanisms of 3,000 pre-hospital deaths occurring in 6 regions of the country, and estimate the potential for survivability by mechanism of injury (e.g. blunt versus penetrating), geographic location of the injury (urban, suburban, rural, wilderness), the maturity of the local trauma system, and age of the decedent.			
Major Task 1: Abstract data for all cases and enter into REDCap	Months	Completion Date	% Complete
Subtask 1: Perform AIS Coding	2-24		15%
Major Task 2: Perform mortality reviews at each ME site	Months	Completion Date	% Complete
Subtask 1: Schedule Study Group Teams Reviews	4-30		11%
Milestone Achieved: All panel reviews completed and data submitted	33		0%
Objective #4: Describe the epidemiology of pre-hospital mortality in the context of trauma system development and estimate its impact on society. The societal impact of pre-hospital deaths will be measured in terms years of potential life lost and lost productivity. Most important, estimates of potential cost savings will be derived based on the analysis of potential survivability.			
Major Task 1: Data Analysis	Months	Completion Date	% Complete
Subtask 1: Coordinate with Sites & Data Core for monitoring data collection and data quality	4-36		25%
Subtask 2: Perform all analyses according to specifications, share output and finding with all investigators	6-39		0%
Milestone Achieved: Report results from data analysis			0%
Objective #5: Develop a blueprint for a sustained effort at public health injury mitigation strategies in the pre-hospital environment, identifying high priority areas for injury prevention, trauma systems performance improvement as well as opportunities for advancements in research and development.			

Major Task 1: Steering Committee analysis and results dissemination planning	Months	Completion Date	% Complete
Subtask 1: Work with data core and dissemination of findings (abstracts, presentation, publications, DOD, blueprint)	36-42		0%
Milestone Achieved: Dissemination materials produced	42		0%

What was accomplished under these goals?

For this reporting period describe: 1) major activities; 2) specific objectives; 3) significant results or key outcomes, including major findings, developments, or conclusions (both positive and negative); and/or 4) other achievements. Include a discussion of stated goals not met. Description shall include pertinent data and graphs in sufficient detail to explain any significant results achieved. A succinct description of the methodology used shall be provided. As the project progresses to completion, the emphasis in reporting in this section should shift from reporting activities to reporting accomplishments.

Obj 1: Develop a framework and methodology for evaluating (i) the causes and pathophysiologic mechanisms of pre-hospital deaths; (ii) the appropriateness of EMS response and care delivered; and (iii) the potential for survivability under both optimal clinical circumstances and within the context of the actual pre-hospital environment.

Major Task 1: Adapt Protocol for Submission and Determination

Progress: Completed in Year 1

- The data dictionary and CRF were finalized and system testing began. ***05-Jun-2018***
- The MIMIC Steering Committee finalized the Opportunities for Improvements list to be included in Profiler. **23-Jun-2018**

Major Task 2: Development of the Review Criteria

Progress: Completed in Year 1

Obj. 2: Organize and standardize a multidisciplinary, multi-institutional network of experts who will apply the methodology

- The current MIMIC review team consists of eighty reviewers from various disciplines including trauma surgery, pediatric trauma surgery, orthopedic surgery, neurosurgery, forensic pathology, prehospital care, EMS, and trauma systems. Representatives from both military and civilian sectors are represented on each review team. All MIMIC reviewers completed a survey via SurveyMonkey. The goal of the survey was to collect demographic and background information from each reviewer to ensure that we created multidisciplinary, multi-institutional, and diverse team compositions. The study team creates 13 team panels. Each panel has 6 team members: four surgeons, one Emergency Medicine/EMS member, and one Forensic member.

- Survey created and distributed to Reviewers to ensure multidisciplinary, multi-institutional team composition. **29-Oct-2018**

- Training/Testing Phase
    - Phase 1 testing we released 15 pilot cases to the Steering Committee for reviews in the Profiler system. **23-Aug-2018**
    - Feedback was incorporated into Profiler and 35 pilot cases were abstracted to be released to the entire Review Team. **27-Sept-2018**
    - During Phase 2 testing we released 35 cases to the entire review team. **10-Dec-2018**

Major Task 1: Provide training to Study Group members

Progress: All reviewers completed training through various opportunities.

- Profiler system training was held for reviewers at The American Association for the Surgery of Trauma (AAST) annual meeting **27-Sept-2018**
- Profiler system training held for Medical Examiners on the Review Team at National Association of Medical Examiner (NAME) Conference **15-Oct-2018**

Subtask 1: Hold series of meetings by teleconference

- GoToMeeting webinar training for all MIMIC Reviewers regarding the Profiler system **07-Jan-2019**

Obj. 3: Using the methodology and network of experts, define the causes and pathophysiologic mechanisms of 3,000 pre-hospital deaths.

- The geographic database of all EMS air and ground base stations, and all hospitals with trauma center level designation for all six sites was completed. **01-Jun-2018**
- Subject selection was finalized for all six sites. **8-Dec-2018**
- Data requests have been submitted to receive NEMSIS data from each of the six states.
- As of **04-Apri-2019**, 990 out of 3,000 cases have been abstracted.

Major Task 1: Abstract data for all cases and enter into REDCap

Progress: New Mexico, Maryland, Connecticut, and Oklahoma continue to work on data abstraction. Iowa has completed data abstraction, and DC continues to ramp up for data abstraction. AIS coding, ICD coding, and geographic coding continues to be completed as each case is entered into REDCap.

- Data abstractors from four out of the six ME sites (Connecticut, Iowa, District of Columbia, and Maryland) completed REDCap training at the 2018 NAME conference. **15-Oct-2018**
- REDCap training was held for data abstractors in New Mexico. **28-Nov-2018**
- REDCap training was held for data abstractors in Oklahoma. **05-Mar-2019**

Subtask 1: Perform AIS coding

- AIS coding continues as cases are abstracted into REDCap.
- As of **04-Apr-2018,** AIS coding has been completed for 427 cases.

Major Task 2: Develop Profiler Review System to Conduct Online Case Reviews

Progress: The development of the Profiler system has been completed. Slides on Profiler are attached in the Appendix. The study team is available to present the Profiler review system. Please let us know if you would like us to provide a demo in-person, or via webinar.

Subtask 1: Develop Profiler Review System

- Development was completed and all Profiler changes were finalized.
- Edits were made in Profiler to improve user experience and include new DOD lexicon.

Subtask 2: Conduct Profiler System Testing

- 1st round testing was launched. **23-Aug-2018**
- 2nd round testing was launched. **10-Dec-2018**

Major Task 3: Perform online mortality reviews

Progress: Case reviews are currently in progress by all 13 review team panels. To date, 340 cases have been sent out to reviewers to determine survivability.

Subtask 1: Disseminate Cases to review Team Monthly

- Live study cases were launched for case review. **16-Jan-2019**
- The launch of 20 cases to each team panel for Round 1 cases reviews was completed. Round 1 consists of a total of 260 cases. **Jan 16-Mar 7, 2019**
- The launch of Round 2 case reviews has begun. At the time of this report, 80 out of 260 have been launched for Round 2. **25-Mar-2019**
- For cases that did not reach consensus during Round 1 case reviews, an online adjudication process was launched. **08-Mar-2019**

Obj. 4: Describe the epidemiology of pre-hospital mortality in the context of trauma system development and estimate its impact on society. The societal impact of pre-hospital deaths will be measured in terms years of potential life lost and lost productivity. Most important, estimates of potential cost savings will be derived based on the analysis of potential survivability.

- Progress: No progress at the time of this report

Obj. 5: Develop a blueprint for a sustained effort at public health injury mitigation strategies in the pre-hospital environment, identifying high priority areas for injury prevention, trauma systems performance improvement as well as opportunities for advancements in research and development.

- Progress: No progress at the time of this report

If the project was not intended to provide training and professional development opportunities or there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe opportunities for training and professional development provided to anyone who worked on the project or anyone who was involved in the activities supported by the project. "Training" activities are those in which individuals with advanced professional skills and experience assist others in attaining greater proficiency. Training activities may include, for example, courses or one-on-one work with a mentor. "Professional development" activities result in increased knowledge or skill in one's area of expertise and may include workshops, conferences, seminars, study groups, and individual study. Include participation in conferences, workshops, and seminars not listed under major activities.

Nothing to Report

How were the results disseminated to communities of interest?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe how the results were disseminated to communities of interest. Include any outreach activities that were undertaken to reach members of communities who are not usually aware of these project activities, for the purpose of enhancing public understanding and increasing interest in learning and careers in science, technology, and the humanities.

Nothing to Report

What do you plan to do during the next reporting period to accomplish the goals?
If this is the final report, state "Nothing to Report." Describe briefly what you plan to do during the next reporting period to accomplish the goals and objectives.

- Continue with data abstraction, AIS coding, ICD coding, and GIS coding on study cases.
- Continue working on case reviews.
- Conduct preliminary analysis on Round 1 case reviews.
- Submit abstract to 2019 NAME conference.
- MIMIC presentation at the NTI Board Meeting

4. **IMPACT:** Describe distinctive contributions, major accomplishments, innovations, successes, or any change in practice or behavior that has come about as a result of the project relative to:

What was the impact on the development of the principal discipline(s) of the project?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe how findings, results, techniques that were developed or extended, or other products from the project made an impact or are likely to make an impact on the base of knowledge, theory, and research in the principal disciplinary field(s) of the project. Summarize using language that an intelligent lay audience can understand (Scientific American style).

Nothing to Report

What was the impact on other disciplines?
If there is nothing significant to report during this reporting period, state "Nothing to Report."
Describe how the findings, results, or techniques that were developed or improved, or other products from the project made an impact or are likely to make an impact on other disciplines.

Nothing to Report

What was the impact on technology transfer?

If there is nothing significant to report during this reporting period, state "Nothing to Report."

Nothing to Report

What was the impact on society beyond science and technology?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe how results from the project made an impact, or are likely to make an impact, beyond the bounds of science, engineering, and the academic world on areas such as:

- *improving public knowledge, attitudes, skills, and abilities;*
- *changing behavior, practices, decision making, policies (including regulatory policies), or social actions; or*
- *improving social, economic, civic, or environmental conditions.*

Nothing to Report

5. **CHANGES/PROBLEMS:** The PD/PI is reminded that the recipient organization is required to obtain prior written approval from the awarding agency grants official whenever there are significant changes in the project or its direction. If not previously reported in writing, provide the following additional information or state, "Nothing to Report," if applicable:

A revised Statement of Work was submitted to the DOD. The development of the Profiler review system to conduct online case reviews was added as a Major Task. System testing was completed in January 2019, and case reviews on the study set began. The study team expects that case reviews will be completed timely since all reviews will be conducted online.

At the onset of the study, the team was planning to conduct all case reviews in person using designated teams traveling to various ME locations to review a set of death cases. Dr. Eastridge and the study team have been working with Dr. Ellen Mackenzie to utilize "Profiler," an online review system. The Profiler system was finalized, and cases reviews began in January 2019. The project case reviews are now moving at a great pace.

Changes that had a significant impact on expenditures

Describe changes during the reporting period that may have had a significant impact on expenditures, for example, delays in hiring staff or favorable developments that enable meeting objectives at less cost than anticipated.

Nothing to Report

Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents

Significant changes in use or care of human subjects

Not applicable

Significant changes in use or care of vertebrate animals

Not applicable

Significant changes in use of biohazards and/or select agents

Not Applicable

6. PRODUCTS: List any products resulting from the project during the reporting period. If there is nothing to report under a particular item, state "Nothing to Report."

- **Publications, conference papers, and presentations**
  Report only the major publication(s) resulting from the work under this award.

  - Dr. Brian Eastridge presented at the National Association of Medical Examiners (NAME) Conference. Presentation entitled "Medical Examiner Role in Trauma System Development." Oct-2018
  - Improving the Military- Civilian Taxonomy and Process to Determine Prehospital Injury Survivability. Abstract submitted to the 2019 MHSRS Conference. Mar-2019

Journal publications. *List peer-reviewed articles or papers appearing in scientific, technical, or professional journals. Identify for each publication: Author(s); title; journal; volume: year; page numbers; status of publication (published; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).*

- **Medrano NW, Villarreal CL, Price MA, MacKenzie E, Nolte KB, Phillips MJ, Stewart RM, Eastridge BJ**. Multi-Institutional Multi-Disciplinary Injury Mortality Investigation in the Civilian Pre-hospital Environment (MIMIC): A methodology for reliably measuring pre-hospital time and distance to definitive care. Trauma Surgery and Acute Care Open. *Accepted pending publication*.

Books or other non-periodical, one-time publications. *Report any book, monograph, dissertation, abstract, or the like published as or in a separate publication, rather than a periodical or series. Include any significant publication in the proceedings of a one-time conference or in the report of a one-time study, commission, or the like. Identify for each one-time publication: author(s); title; editor; title of collection, if applicable; bibliographic information; year; type of publication (e.g., book, thesis or dissertation); status of publication (published; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).*

Nothing to report

Other publications, conference papers and presentations. *Identify any other publications, conference papers and/or presentations not reported above. Specify the status of the publication as noted above. List presentations made during the last year (international, national, local societies, military meetings, etc.). Use an asterisk (*) if presentation produced a manuscript.*

- Dr. Brian Eastridge presented MIMIC at the NTI Board Meeting. **16-April-2018**
- Dr. Brian Eastridge presented MIMIC at the Trauma Hemostasis and Oxygenation Research (THOR) Conference. **Jun 2018**
- Profiler system training was held for reviewers at The American Association for the Surgery of Trauma (AAST) annual meeting **27-Sept-2018**
- Profiler system training held for Medical Examiners on the Review Team at National Association of Medical Examiner (NAME) Conference **15-Oct-2018**
- Data abstractors from four out of the six ME sites (Connecticut, Iowa, District of Columbia, and Maryland) completed REDCap training at the 2018 NAME conference. **15-Oct-2018**
- REDCap training was held for data abstractors in New Mexico. **28-Nov-2018**
- REDCap training was held for data abstractors in Oklahoma. **05-Mar-2019**

- **Website(s) or other Internet site(s)**

List the URL for any Internet site(s) that disseminates the results of the research activities. A short description of each site should be provided. It is not necessary to include the publications already specified above in this section.

Nothing to Report

- **Technologies or techniques**

Identify technologies or techniques that resulted from the research activities. Describe the technologies or techniques were shared.

Nothing to Report

- **Inventions, patent applications, and/or licenses**

Identify inventions, patent applications with date, and/or licenses that have resulted from the research. Submission of this information as part of an interim research performance progress report is not a substitute for any other invention reporting required under the terms and conditions of an award.

Nothing to Report

- **Other Products**

  Identify any other reportable outcomes that were developed under this project. Reportable outcomes are defined as a research result that is or relates to a product, scientific advance, or research tool that makes a meaningful contribution toward the understanding, prevention, diagnosis, prognosis, treatment and /or rehabilitation of a disease, injury or condition, or to improve the quality of life. Examples include:

  - MIMIC project logo was developed
  - Article published by the National Trauma Institute entitled "*MIMIC Study Breaks New Ground: Geospatial Mapping of Trauma System Response Resources*"
  - MIMIC article on training provided at the AAST Conference was published in the NTI Newsletter

7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

What individuals have worked on the project?

Provide the following information for: (1) PDs/PIs; and (2) each person who has worked at least one person month per year on the project during the reporting period, regardless of the source of compensation (a person month equals approximately 160 hours of effort). If information is unchanged from a previous submission, provide the name only and indicate "no change".

Personnel	***Role***	***Percent Effort***
Brian Eastridge	PI	20% Mar-Dec 2018
Amy Flores	Controller	20% Jan-Oct 2018 5% Nov -Mar 2019
Lizette Villarreal	Program Manager	60% Jan-Jun 2018 65% July-Aug 2018 63% Sept 2018 41% Oct-Dec 2018 55% Jan 2019 56% Feb-Mar 2019
Monica Phillips	Research Operations Director	50% Jan-Jun 2018 40% July-Sept 2018 30% Oct 2018 20% Nov 2018-Mar 2019
Michelle Price	Research Director	20% Jan-Jun 2018

		10% July 2018-Mar 2019
Sharon Smith	Project Administrator	20% Jan-Sept 2018 10% Oct-Dec 2018 15% Jan-Mar 2019
Nick Medrano	GIS Analyst	100% Apr 2018-Mar 2019
Ana Guerrero	Executive Assistant	10% Sept 2018-Mar 2019
New Mexico Subaward	***Role***	***Percent Effort***
Kurt B. Nolte	PI/Co-I	15%
Joseph Hunt	Forensic Radiologist	3.51%
Sarah Lathrop	Epidemiologist	11%
Garon Bodor	Research Coordinator	40%
Johns Hopkins University subaward	***Role***	***Percent Effort***
Ellen Mackenzie	PI/Co-I	15%
Daniel Scharfstein	Lead Statistician	10%
Craig Remenapp	Study Manager	35% Replaced Kevin Quach
Kevin Quach	Data Analyst	No longer at JHU
Greg Mettee	Research Assistant	15%

Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

If the active support has changed for the PD/PI(s) or senior/key personnel, then describe what the change has been. Changes may occur, for example, if a previously active grant has closed and/or if a previously pending grant is now active. Annotate this information so it is clear what has changed from the previous submission. Submission of other support information is not necessary for pending changes or for changes in the level of effort for active support reported previously. The awarding agency may require prior written approval if a change in active other support significantly impacts the effort on the project that is the subject of the project report.

Nothing to Report

What other organizations were involved as partners?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe partner organizations – academic institutions, other nonprofits, industrial or commercial firms, state or local governments, schools or school systems, or other organizations (foreign or domestic) – that were involved with the project. Partner organizations may have

provided financial or in-kind support, supplied facilities or equipment, collaborated in the research, exchanged personnel, or otherwise contributed.

Provide the following information for each partnership:
Organization Name:
Location of Organization: (if foreign location list country)
Partner's contribution to the project (identify one or more)

- *Financial support;*
- *In-kind support (e.g., partner makes software, computers, equipment, etc., available to project staff);*
- *Facilities (e.g., project staff use the partner's facilities for project activities);*
- *Collaboration (e.g., partner's staff work with project staff on the project);*
- *Personnel exchanges (e.g., project staff and/or partner's staff use each other's facilities, work at each other's site); and*
- *Other.*

The six states below have contributed death data to the project for the total review of 3,000 prehospital death cases.

Organization Name	Location of Organization	Contribution to the Project
Oklahoma Office of the Medical Examiner	901 North Stonewall Oklahoma City, OK 73117	Death data
Washington DC Office of the Medical Examiner	401 E. Street SW Washington, DC 20024	Death data
Maryland Office of the Medical Examiner	900 W. Baltimore Street Baltimore, MD 21223	Death data
New Mexico Office of the Medical Examiner	1101 Camino de Salud NE Albuquerque, NM 87102	Death data
Iowa Office of the Medical Examiner	5244C Roy Carver Pavilion Iowa City, IA 52242	Death data
Connecticut Office of the Medical Examiner	11 Shuttle Road Farmington, CT 06032	Death data

8. SPECIAL REPORTING REQUIREMENTS

COLLABORATIVE AWARDS: For collaborative awards, independent reports are required from BOTH the Initiating Principal Investigator (PI) and the Collaborating/Partnering PI. A duplicative report is acceptable; however, tasks shall be clearly marked with the responsible PI and research site. A report shall be submitted to **https://ers.amedd.army.mil** for each unique award.

QUAD CHARTS: If applicable, the Quad Chart (available on https://www.usamraa.army.mil) should be updated and submitted with attachments.

Quad Chart Attached

9. APPENDICES: Attach all appendices that contain information that supplements, clarifies or supports the text. Examples include original copies of journal articles, reprints of manuscripts and abstracts, a curriculum vitae, patent applications, study questionnaires, and surveys, etc.

- MIMIC project logo was developed
- Final Case Report Form
- Dr. Brian Eastridge presented MIMIC at the NTI Board Meeting.
- Profiler system training was held for reviewers at The American Association for the Surgery of Trauma (AAST) annual meeting
- Profiler system training held for Medical Examiners on the Review Team at National Association of Medical Examiner (NAME) Conference
- Data abstractors from 4 out of the six ME sites (Connecticut, Iowa, District of Columbia, and Maryland) completed REDCap training at the 2018 NAME conference
- Survey created and distributed to Reviewers to ensure multidisciplinary, multi-institutional team composition
- REDCap training was held for data abstractors in New Mexico
- Article published by the National Trauma Institute entitled "*MIMIC Study Breaks New Ground: Geospatial Mapping of Trauma System Response Resources*"
- MIMIC article on training provided at the AAST Conference was published in the NTI Newsletter
- GoToMeeting webinar training for all MIMIC Reviewers regarding the Profiler system
- REDCap training was held for data abstractors in Oklahoma
- Medrano NW, Villarreal CL, Price MA, MacKenzie E, Nolte KB, Phillips MJ, Stewart RM, Eastridge BJ. Multi-Institutional Multi-Disciplinary Injury Mortality Investigation in the Civilian Pre-hospital Environment (MIMIC): A methodology for reliably measuring pre-hospital time and distance to definitive care. Trauma Surgery and Acute Care Open. *2019; 4:e000309. doi:10.1136/tsaco-2019-000309.*
- Improving the Military- Civilian Taxonomy and Process to Determine Prehospital Injury Survivability. Abstract submitted to the 2019 MHSRS Conference
- Profiler Demonstration Slides
- MIMIC Adjudication Process Training PowerPoint for Reviewers

Multi-institutional Multidisciplinary Injury Mortality Investigation in the Civilian Pre-Hospital Environment (MIMIC)

BA150629
W81XWH-17-2-0010

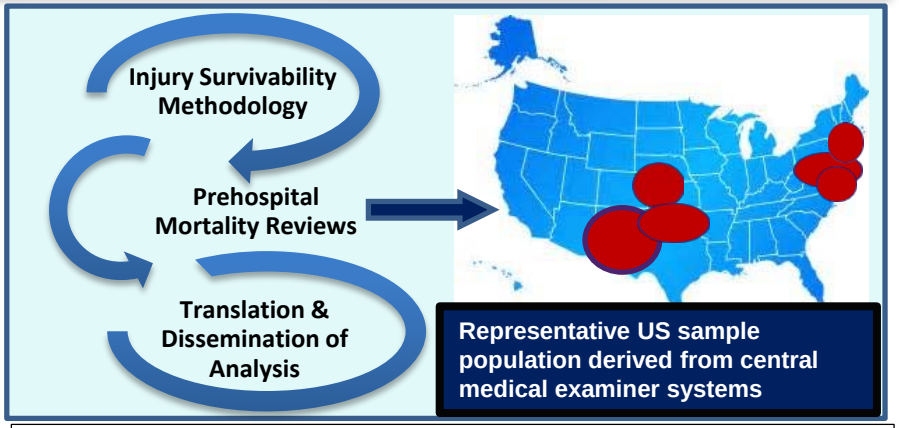
PI: Brian Eastridge **Org:** National Trauma Institute **Award Amount:** $3,979,380

Study/Product Aim(s)

- Develop a framework and methodology for evaluating (i) the causes and pathophysiologic mechanisms of pre-hospital deaths; (ii) the appropriateness of EMS response and care delivered; and (iii) the potential for survivability under both optimal clinical circumstances and within the context of each individual injury event.
- Develop a blueprint for a sustained effort at public health injury mitigation strategies including injury prevention, trauma systems, and acute care.

Approach

The framework and methodology will be established by a multi-institutional network of experts who will apply the methodology in review and analysis of 3,000 pre-hospital death cases at six Medical Examiner sites including those serving urban, rural, and frontier environments.



Accomplishment: Study case reviews by all 13 team panels consisting of eighty reviewers was launched in January 2019. To date, 340 cases have been sent to reviewers.

Timeline and Cost

Activities CY	17	18	19	20
Adapt Protocol for Submission; Develop review criteria				
Provide training to reviewers; Abstract data				
Perform mortality reviews; Data analysis				
Analysis and results dissemination				
Estimated Budget ($K)	**$1,026**	**$1,198**	**$1,225**	**$546**

Updated: (18 April 2019)

Goals/Milestones

CY17 Goal – Methodology determined, reviewers trained, data abstraction and reviews begin
☑ Protocol submitted; methodology determined
CY18 Goals – Virtual Reviews commence
☑ Data abstraction
☑ Reviews in progress
CY19 Goal – Virtual Reviews continue
☑ Data abstraction
☑ Reviews in progress
CY20 Goal – Data analysis, result dissemination
☐Report results from data analysis
☐Dissemination materials produced

Comments/Challenges/Issues/Concerns

- Nothing to Report

Budget Expenditure to Date

- Projected Expenditure: $1,441,436
- Actual Expenditure: $1,685,119 (as of 03-19-19)

MIMIC

CRF00

MIMIC ID number	_____
ME Case ID number	_____
Region	◯ D.C. ◯ Maryland ◯ New Mexico ◯ Iowa ◯ Oklahoma ◯ Connecticut
Location of pronounced death	◯ At scene ◯ In transport (inluding DoA)
Information available to review (select all that apply)	☐ Medical Examiner Report ☐ CT Scan Report ☐ Field Investigator Report ☐ X-Ray Report ☐ EMS Run Report ☐ Police Report ☐ Hospital Record ☐ Traffic Investigation Report ☐ Other 1 ☐ Other 2 ☐ Other 3
Upload Medical Examiner Report	
Specify type of forensic exam	◯ Full Autopsy ◯ Partial Autopsy ◯ External Exam Conducted by Forensic Pathologist ◯ External Exam Conducted by Field Investigator
Upload CT Scan Report	
Upload Field Investigator Report	
Upload X-Ray Report	
Upload EMS Run Report	
Upload Police Report	
Upload Hospital Record	
Upload Traffic Investigation Report	
Specify Other 1 Report	_____
Upload Other 1 Report	

Specify Other 2 Report	
Upload Other 2 Report	
Specify Other 3 Report	
Upload Other 3 Report	
Notes:	

Form Statistics

Form submitted by	
Form submitted timestamp	
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Patient Demographics

1. Sex	◯ Female ◯ Male ◯ Unknown
2. Date of birth	_____ (Use date control OR enter date in MM-DD-YYYY format (hyphens only, no slashes))
3. Age at time of death	◯ Years ◯ Days
Years	_____ ((years))
Days	_____ ((days))
4. Is the deceased of Latino or Hispanic origin?	◯ Hispanic or Latino ◯ Not Hispanic or Latino ◯ Unknown ◯ Not reported
5. What race is the deceased? Please choose one or more of the following:	☐ American Indian or Alaska Native ☐ Asian ☐ Black or African-American ☐ Native Hawaiian or Other Pacific Islander ☐ White ☐ Unknown ☐ Not Reported
6. Is height known?	◯ Yes ◯ No
Height (cm)	_____
7. Is weight known?	◯ Yes ◯ No
Weight (kg)	_____
8. BMI (Calculated)	_____

The calculated BMI indicates an error in height or weight. Please check the numbers provided for questions 6 and 7.

9. Please indicate the patient's personal medical history of the following conditions:

None	☐ No Comorbidities

Select all that apply.

- ☐ Advanced Directive Limiting Care
- ☐ Alcohol use disorder
- ☐ Angina Pectoris
- ☐ Anticoagulant Therapy
- ☐ Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder (ADD/ADHD)
- ☐ Bleeding Disorder
- ☐ Cerebrovascular Accident (CVA)
- ☐ Chronic Obstructive Pulmonary Disease (COPD)
- ☐ Chronic Renal Failure
- ☐ Cirrhosis
- ☐ Congenital Anomalies
- ☐ Congestive Heart Failure
- ☐ Currently Receiving Chemotherapy for Cancer
- ☐ Current Smoker
- ☐ Dementia
- ☐ Diabetes Mellitus
- ☐ Disseminated Cancer
- ☐ Functionally Dependent Health Status
- ☐ Hypertension
- ☐ Mental/Personality Disorder
- ☐ Myocardial Infarction (MI)
- ☐ Peripheral Arterial Disease (PAD)
- ☐ Prematurity
- ☐ Steroid Use
- ☐ Substance Abuse Disorder
- ☐ Other History #1
- ☐ Other History #2
- ☐ Other History #3

(specify other #1): _____

(specify other #2): _____

(specify other #3): _____

Notes: _____

This Notes Field Is For MCC Use Only. _____

Form Statistics

Form submitted by _____

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Form last modified timestamp

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Injury Location

Date and Location of Injury	
Is any information on 'Location of Injury' available?	◯ Yes ◯ No
1. Is exact date of injury known?	◯ Yes ◯ No
Date of Injury	_____ (Use date control OR enter date in MM-DD-YYYY format (hyphens only, no slashes))
Provide details to support approximate date of injury	_____
2. Time of injury known?	◯ Yes ◯ No
Time of injury (military time)	_____ (Type in time (HH:MM) or use time control above)
3. Location of Injury	
Street Number	_____
Street Name	_____
City	_____

State

- ◯ AZ - Arizona
- ◯ AR - Arkansas
- ◯ CO - Colorado
- ◯ CT - Connecticut
- ◯ DE - Delaware
- ◯ IL - Illinois
- ◯ IA - Iowa
- ◯ KS - Kansas
- ◯ LA - Louisiana
- ◯ ME - Maine
- ◯ MD - Maryland
- ◯ MA - Massachusetts
- ◯ MN - Minnesota
- ◯ MO - Missouri
- ◯ NE - Nebraska
- ◯ NH - New Hampshire
- ◯ NJ - New Jersey
- ◯ NM - New Mexico
- ◯ NY - New York
- ◯ OK - Oklahoma
- ◯ PA - Pennsylvania
- ◯ RI - Rhode Island
- ◯ SD - South Dakota
- ◯ TX - Texas
- ◯ UT - Utah
- ◯ VT - Vermont
- ◯ VA - Virginia
- ◯ WV - West Virginia
- ◯ WI - Wisconsin
- ◯ Washington D.C.
- ◯ Mexico

Zipcode

_____

4. Other description of location of injury

_____

5. Latitude of Injury (GPS coordinates)

_____

6. Longitude of Injury (GPS coordinates)

_____

7. Type of place where injury occurred

- ◯ Street
- ◯ Highway
- ◯ Home
- ◯ School
- ◯ Work
- ◯ Park
- ◯ Playground
- ◯ Nursing Home/Long-term care facility
- ◯ Other
- ◯ Unknown

8. Description of the place where injury occurred

_____

Date and Location where Decedent was First Found

9. Date when Decedent was first found (MM-DD-YYYY)

_____
(Use date control OR enter date in MM-DD-YYYY format (hyphens only, no slashes))

10. Is the time when Decedent was first found known?

◯ Yes
◯ No

Time Decendent was first found (military time)

_____
(Type in time (HH:MM) or use time control above)

11. Is the location where 'Decedent was First Found' same as the 'Location of Injury'?

◯ Yes
◯ No
◯ Unknown

12. Is any information on 'Location where Decedent was First Found' available?

◯ Yes
◯ No

13. Location where Decedent was First Found

Street Number

_____

Street Name

_____

City

_____

State

◯ AZ - Arizona
◯ AR - Arkansas
◯ CO - Colorado
◯ CT - Connecticut
◯ DE - Delaware
◯ IL - Illinois
◯ IA - Iowa
◯ KS - Kansas
◯ LA - Louisiana
◯ ME - Maine
◯ MD - Maryland
◯ MA - Massachusetts
◯ MN - Minnesota
◯ MO - Missouri
◯ NE - Nebraska
◯ NH - New Hampshire
◯ NJ - New Jersey
◯ NM - New Mexico
◯ NY - New York
◯ OK - Oklahoma
◯ PA - Pennsylvania
◯ RI - Rhode Island
◯ SD - South Dakota
◯ TX - Texas
◯ UT - Utah
◯ VT - Vermont
◯ VA - Virginia
◯ WV - West Virginia
◯ WI - Wisconsin
◯ Washington D.C.
◯ Mexico

Zipcode

_____

14. Description of location where Decedent was first found

_____

15. Latitude of Decedent (GPS coordinates)

_____

16. Longitude of Decedent (GPS coordinates)

_____

17. Type of place where decedent was first found

◯ Street
◯ Highway
◯ Home
◯ School
◯ Work
◯ Park
◯ Playground
◯ Nursing Home/Long-term care facility
◯ Other
◯ Unknown

18. Description of the place where decedent was first found

_____

Date and Location where Death was Pronounced

19. Date when Death was pronounced (MM-DD-YYYY)

_____
(Use date control OR enter date in MM-DD-YYYY format (hyphens only, no slashes))

20. Time when Death was pronounced (military time)

_____
(Type in time (HH:MM) or use time control above)

21. Is the location where 'Death was Pronounced' same as any of the aforementioned locations?

◯ Yes
◯ No

22. Which of the aforementioned location is the same as where 'Death was Pronounced'

☐ Location of Injury
☐ Location where Decedent was first found

23. Location where Death was Pronounced

Street Number

_____

Street Name

_____

City

_____

State	◯ AZ - Arizona ◯ AR - Arkansas ◯ CO - Colorado ◯ CT - Connecticut ◯ DE - Delaware ◯ IL - Illinois ◯ IA - Iowa ◯ KS - Kansas ◯ LA - Louisiana ◯ ME - Maine ◯ MD - Maryland ◯ MA - Massachusetts ◯ MN - Minnesota ◯ MO - Missouri ◯ NE - Nebraska ◯ NH - New Hampshire ◯ NJ - New Jersey ◯ NM - New Mexico ◯ NY - New York ◯ OK - Oklahoma ◯ PA - Pennsylvania ◯ RI - Rhode Island ◯ SD - South Dakota ◯ TX - Texas ◯ UT - Utah ◯ VT - Vermont ◯ VA - Virginia ◯ WV - West Virginia ◯ WI - Wisconsin ◯ Washington D.C. ◯ Mexico
Zipcode	_____
24. Other description of location of where death was pronounced for Decedent	_____
25. Latitude where death was pronounced (GPS coordinates)	_____
26. Longitude where death was pronounced (GPS coordinates)	_____
27. Type of place where death was pronounced	◯ Street ◯ Highway ◯ Home ◯ School ◯ Work ◯ Park ◯ Playground ◯ Nursing Home/Long-term care facility ◯ Other ◯ Unknown
28. Description of the place where death was pronounced	_____

Form Statistics	
Form submitted by	_____
Form submitted timestamp	_____
Form last modified by	_____
Form last modified timestamp	_____
Form first completed timestamp	_____

Injury Cause and Circumstances

1. Injury Type (select all that apply)

- ☐ Penetrating
- ☐ Blunt
- ☐ Explosive
- ☐ Thermal (including electrocution)
- ☐ Unknown

2. Agent of Wounding (select all that apply)

- ☐ Ballistic, High Velociy (e.g. rifle)
- ☐ Ballistic, Low Velociy (e.g. handgun)
- ☐ Ballistic, Shotgun
- ☐ Explosion
- ☐ Fall from Level Ground
- ☐ Fall from height
- ☐ Motor Vehicle , Passenger
- ☐ Motor Vehicle , Driver
- ☐ Motor Vehicle , Pedestrian
- ☐ Motor Vehicle , Cyclist
- ☐ Motorcycle
- ☐ Bicycle
- ☐ All-terrain vehicle crash
- ☐ Aircraft - helicopter
- ☐ Aircraft - fixed wing
- ☐ Train
- ☐ Cut, pierce or stab
- ☐ Struck by or against
- ☐ Machinery/Equipment agricultural related
- ☐ Machinery/Equipment non-agricultural related
- ☐ Explosion
- ☐ Electrical
- ☐ Animal
- ☐ Sports Related
- ☐ Traumatic Asphyxia
- ☐ Other
- ☐ Unknown

Specify other agent

_____

If fall, Specify Height (ft)

_____

If motor vehicle, vehicle type

- ◯ Car (sedan/coupe)
- ◯ SUV
- ◯ Light truck
- ◯ Heavy truck
- ◯ Commercial truck
- ◯ Motorcycle
- ◯ ATV
- ◯ Watercraft
- ◯ Unknown
- ◯ Other

If motor vehicle, vehicle manufacturer

- ◯ Acura
- ◯ Alfa Romeo
- ◯ AM General
- ◯ American Motors
- ◯ Audi
- ◯ Austin/Austin Healey
- ◯ Bluebird
- ◯ BMW
- ◯ Brockway
- ◯ BSA
- ◯ Buick/Opel
- ◯ Cadillac
- ◯ Chevrolet
- ◯ Chrysler
- ◯ Coda
- ◯ Daewoo
- ◯ Datsun/Nissan
- ◯ Diahatsu
- ◯ Diamond Reo/Reo
- ◯ Dodge
- ◯ Ducati
- ◯ Eagle
- ◯ Eagle Coach
- ◯ Fiat
- ◯ Ford
- ◯ Freightliner
- ◯ FWD
- ◯ Gillig
- ◯ GMC
- ◯ Grumman
- ◯ Harley-Davidson
- ◯ Honda
- ◯ Hyundai
- ◯ Imperial
- ◯ Infiniti
- ◯ International Harvester/Navistar
- ◯ Isuzu
- ◯ Iveco/Magirus
- ◯ Jaguar
- ◯ Jeep/Kaiser-Jeep/Willys-Jeep
- ◯ Kawasaki
- ◯ Kenworth
- ◯ Kia
- ◯ Lancia
- ◯ Land Rover
- ◯ Lexus
- ◯ Lincoln
- ◯ Mack
- ◯ Mazda
- ◯ MCI
- ◯ Mercedes-Benz
- ◯ Mercury
- ◯ Merkur
- ◯ MG
- ◯ Mitsubishi
- ◯ Moto-Guzzi
- ◯ Norton
- ◯ Oldsmobile
- ◯ Peterbilt
- ◯ Peugeot
- ◯ Plymouth
- ◯ Pontiac
- ◯ Porsche
- ◯ Renault
- ◯ Saab
- ◯ Saturn
- ◯ Scion
- ◯ Smart
- ◯ Sterling

- ◯ Subaru
- ◯ Suzuki
- ◯ Thomas Built
- ◯ Toyota
- ◯ Triumph
- ◯ Unknown Make
- ◯ Victory
- ◯ Volkswagen
- ◯ Volvo
- ◯ White/Autocar White/GMC
- ◯ Yamaha
- ◯ Yugo
- ◯ Other Domestic Manufacturers
- ◯ Other Import
- ◯ Other Make
- ◯ Not Reported

Specify other vehicle manufacturer

_____

If motor vehicle, vehicle model

_____

If motor vehicle, vehicle year

_____

If cut, pierced or stabbed, specify object

- ◯ Axe
- ◯ Can-opener
- ◯ Chisel
- ◯ Dagger
- ◯ Edge of stiff paper
- ◯ Fork
- ◯ Garden tool
- ◯ Glass
- ◯ Handsaw
- ◯ Hoe
- ◯ Ice-pick
- ◯ Knife - hunting
- ◯ Knife - kitchen
- ◯ Knife - utility
- ◯ Knife - other
- ◯ Machete
- ◯ Nail
- ◯ Needle
- ◯ Papercutter
- ◯ Pitchfork
- ◯ Rake
- ◯ Scissors
- ◯ Screwdriver
- ◯ Sewing machine
- ◯ Shovel
- ◯ Sword
- ◯ Tin can lid
- ◯ Other

Specify other knife

_____

Specify other object (stab)

_____

If struck, specify how	◯ Struck against stationary object ◯ Struck by moving object (including falling object) ◯ Stepped on object ◯ Other ◯ Unknown
If struck against stationary object, specify object	_____
If struck by moving object (including falling object), specify object	_____
If stepped on object, specify object	_____
If other object, specify other	_____
If explosive, specify explosive device	_____
If electrical, specify electrical source	_____
If animal, what type?	◯ Alligator ◯ Bear ◯ Canid ◯ Cow ◯ Felid ◯ Horse ◯ Insect - bee, wasp or hornet ◯ Insect - non-venomous arthropod ◯ Insect - other ◯ Shark ◯ Spider ◯ Venomous snake or lizard ◯ Other
Specify canid	◯ Coyote ◯ Dingo ◯ Dog ◯ Wolf
Specify felid	◯ Cheetah ◯ Cougar ◯ House cat ◯ Jaguar ◯ Leopard ◯ Lion ◯ Tiger
Specify other insect	_____
Specify other animal	_____

If sports, what sports?	_____
3. Manner of Death	◯ Suicide ◯ Homicide ◯ Accident ◯ Undetermined ◯ Unknown
4. Weather Conditions (select all that apply)	☐ Clear skies ☐ Rain ☐ Rain and thunderstorm ☐ Snow or ice ☐ High winds ☐ Unknown
5. Presence of Protective Equpiment	◯ Unknown ◯ Yes ◯ No
6. Specify protective equipment present (select all that apply)	☐ Helmet ☐ Lap Belt ☐ Shoulder Belt ☐ Child Restraint ☐ Personal Floatation Device ☐ Eye Protection ☐ Protective Clothing ☐ Airbag ☐ Other ☐ Unknown
Specify other	_____
Was the airbag deployed?	◯ Yes ◯ No ◯ Unknown
7. Work-related	◯ Yes ◯ No ◯ Unknown
8. Mass Casualty Incident (defined as 5 or more people)	◯ Yes ◯ No ◯ Unknown
9. Other Scene Danger	_____
10. Was Blood Alcohol Content Assessed?	◯ Yes ◯ No
Blood Alcohol Content (0.XX%)	_____
11. Drug Test Performed?	◯ Yes ◯ No

12. Toxicology Screen (select all that apply)	☐ No drugs detected ☐ Heroin ☐ Cocaine ☐ Fentanyl ☐ Methamphetamine ☐ LSD ☐ Ecstasy ☐ Ketamine ☐ Other 1 ☐ Other 2 ☐ Other 3 ☐ Unknown
Specify other #1	_____
Specify other #2	_____
Specify other #3	_____
13. Include verbatim the circumstances of injury from available sources of information.	_____

Form Statistics

Form submitted by	_____
Form submitted timestamp	_____
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Form last modified timestamp	_____
Form first completed timestamp	_____

First Discovery and Response

1. Event Witnessed	◯ Yes ◯ No ◯ Unknown
2. Select responders involved. (select all that apply)	☐ Bystander ☐ Police ☐ Fire ☐ EMS ☐ Unknown ☐ Other
Bystander	
Date of bystander arrival (MM-DD-YYYY)	_____ (Use date control OR enter date in MM-DD-YYYY format (hyphens only, no slashes))
Is bystander arrival time known?	◯ Yes ◯ No
Time of Bystander Arrival (military time)	_____ (Type in time (HH:MM) or use time control above)
Interventions Applied by Bystander	☐ None ☐ CPR ☐ Tourniquet ☐ AED ☐ Other ☐ Unknown
Specify tourniquet type	◯ Emergency Medical Tourniquet ◯ Special Operations Forces Tourniquet ◯ Military Emergency Tourniquet ◯ Combat Application Tourniquet ◯ Mechanical Advantage Tourniquet ◯ Racheting Medical Tourniquet ◯ Other
Specify other	_____
Specify other	_____
Extrication by Bystander	◯ Yes ◯ No ◯ Unknown
Police	

Date of police arrival (MM-DD-YYYY)

_____
(Use date control OR enter date in MM-DD-YYYY format (hyphens only, no slashes))

Is time of police arrival known?

◯ Yes
◯ No

Time of Police Arrival (military time)

_____
(Type in time (HH:MM) or use time control above)

Interventions Applied by Police

☐ None
☐ CPR
☐ Tourniquet
☐ AED
☐ Other
☐ Unknown

Specify tourniquet type

◯ Emergency Medical Tourniquet
◯ Special Operations Forces Tourniquet
◯ Military Emergency Tourniquet
◯ Combat Application Tourniquet
◯ Mechanical Advantage Tourniquet
◯ Racheting Medical Tourniquet
◯ Other

Specify other

_____

Specify other

_____

Extrication by Police

◯ Yes
◯ No
◯ Unknown

Fire

Date of fire arrival (MM-DD-YYYY)

_____
(Use date control OR enter date in MM-DD-YYYY format (hyphens only, no slashes))

Is time of Fire Arrival known?

◯ Yes
◯ No

Time of Fire Arrival (military time)

_____
(Type in time (HH:MM) or use time control above)

Interventions Applied by Fire

☐ None
☐ CPR
☐ Tourniquet
☐ AED
☐ Other
☐ Unknown

Specify tourniquet type	◯ Emergency Medical Tourniquet ◯ Special Operations Forces Tourniquet ◯ Military Emergency Tourniquet ◯ Combat Application Tourniquet ◯ Mechanical Advantage Tourniquet ◯ Racheting Medical Tourniquet ◯ Other
Specify other	_____
Specify other	_____
Extrication by Fire	◯ Yes ◯ No ◯ Unknown
EMS	
Date of EMS arrival (MM-DD-YYYY)	_____ (Use date control OR enter date in MM-DD-YYYY format (hyphens only, no slashes))
Is time of EMS arrival known?	◯ Yes ◯ No
Time of EMS Arrival (military time)	_____ (Type in time (HH:MM) or use time control above)
Interventions Applied by EMS	☐ None ☐ CPR ☐ Tourniquet ☐ AED ☐ Other ☐ Unknown
Specify tourniquet type	◯ Emergency Medical Tourniquet ◯ Special Operations Forces Tourniquet ◯ Military Emergency Tourniquet ◯ Combat Application Tourniquet ◯ Mechanical Advantage Tourniquet ◯ Racheting Medical Tourniquet ◯ Other
Specify other	_____
Specify other	_____
Extrication by EMS	◯ Yes ◯ No ◯ Unknown
Other Responder	

Specify Other Responder	_____
Date of [fdr_other_sp501] arrival (MM-DD-YYYY)	_____ (Use date control OR enter date in MM-DD-YYYY format (hyphens only, no slashes))
Is time of [fdr_other_sp501] arrival known?	◯ Yes ◯ No
Time of [fdr_other_sp501] arrival (military time)	_____ (Type in time (HH:MM) or use time control above)
Interventions Applied by [fdr_other_sp501]	☐ None ☐ CPR ☐ Tourniquet ☐ AED ☐ Other ☐ Unknown
Specify tourniquet type	◯ Emergency Medical Tourniquet ◯ Special Operations Forces Tourniquet ◯ Military Emergency Tourniquet ◯ Combat Application Tourniquet ◯ Mechanical Advantage Tourniquet ◯ Racheting Medical Tourniquet ◯ Other
Specify other	_____
Specify other	_____
Extrication by [fdr_other_sp501]	◯ Yes ◯ No ◯ Unknown
3. Is destination from scene known?	◯ Yes ◯ No
Destination from Scene	◯ Healthcare Facility ◯ Mortuary ◯ OCME (Office of the Chief Medical Examiner) ◯ Other
If Healthcare Facility, specify the name of the destination facility	_____
Specify other	_____

If Healthcare Facility, specify trauma center level	◯ Non-trauma center ◯ Level 1 ◯ Level 2 ◯ Level 3 ◯ Level 4
4. Mode of Transport from Scene	☐ EMS Ground transport (ambulance) ☐ EMS Air transport (helicopter) ☐ Fixed Wing (Airplane) ☐ Law Enforcement Vehicle ☐ Paramedic Intercept ☐ Private Vehicle ☐ Specialty Care Transport ☐ Other ☐ Unknown
Specify other	_____
5. Is date of departure from scene known?	◯ Yes ◯ No
Date of departure from scene	_____ (Use date control OR enter date in MM-DD-YYYY format (hyphens only, no slashes))
6. Is time of departure from scene known?	◯ Yes ◯ No
Time of departure from scene (military time)	_____ (Type in time (HH:MM) or use time control above)
If Healthcare Facility, date of arrival at Healthcare Facility	_____ (Use date control OR enter date in MM-DD-YYYY format (hyphens only, no slashes))
If Healthcare Facility, time of arrival at Healthcare Facility	_____ (Type in time (HH:MM) or use time control above)

Form Statistics

Form submitted by	_____
Form submitted timestamp	_____
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Form last modified timestamp	_____

Form first completed timestamp _____

Nature And Severity Of Injuries: Head or Neck

Head or Neck

Primary source of information
- ◯ Medical Examiner Report
- ◯ CT Scan Report
- ◯ Field Investigator Report
- ◯ X-Ray Report
- ◯ EMS Run Report
- ◯ Police Report
- ◯ Hospital Record
- ◯ Traffic Investigation Report
- ◯ Other

Injury Description

_____

AIS Predot (enter 6-digit descriptor)

_____

AIS Severity (enter 1-6 or 9 if unknown)
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 9

Military AIS Score
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 9

Form Statistics

Form submitted by

_____

Form submitted timestamp

_____

Form last modified by

_____

Form last modified timestamp

_____

Form first completed timestamp

_____

Nature And Severity Of Injuries: Face

Face

Primary source of information
- ◯ Medical Examiner Report
- ◯ CT Scan Report
- ◯ Field Investigator Report
- ◯ X-Ray Report
- ◯ EMS Run Report
- ◯ Police Report
- ◯ Hospital Record
- ◯ Traffic Investigation Report
- ◯ Other

Injury Description

_____

AIS Predot (enter 6-digit descriptor)

_____

AIS Severity (enter 1-6 or 9 if unknown)
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 9

Military AIS Score
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 9

Form Statistics

Form submitted by

_____

Form submitted timestamp

_____

Form last modified by

_____

Form last modified timestamp

_____

Form first completed timestamp

_____

Nature And Severity Of Injuries: Thorax

Thorax

Primary source of information
- ◯ Medical Examiner Report
- ◯ CT Scan Report
- ◯ Field Investigator Report
- ◯ X-Ray Report
- ◯ EMS Run Report
- ◯ Police Report
- ◯ Hospital Record
- ◯ Traffic Investigation Report
- ◯ Other

Injury Description

_____

AIS Predot (enter 6-digit descriptor)

_____

AIS Severity (enter 1-6 or 9 if unknown)
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 9

Military AIS Score
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 9

Form Statistics

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Nature And Severity Of Injuries: Abdomen or Pelvic Contents

Abdomen or Pelvic Contents

Primary source of information
- ◯ Medical Examiner Report
- ◯ CT Scan Report
- ◯ Field Investigator Report
- ◯ X-Ray Report
- ◯ EMS Run Report
- ◯ Police Report
- ◯ Hospital Record
- ◯ Traffic Investigation Report
- ◯ Other

Injury Description

_____

AIS Predot (enter 6-digit descriptor)

_____

AIS Severity (enter 1-6 or 9 if unknown)
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 9

Military AIS Score
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 9

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Nature And Severity Of Injuries: Extremities or Pelvic Girdle

Extremities or pelvic girdle

Primary source of information

- ◯ Medical Examiner Report
- ◯ CT Scan Report
- ◯ Field Investigator Report
- ◯ X-Ray Report
- ◯ EMS Run Report
- ◯ Police Report
- ◯ Hospital Record
- ◯ Traffic Investigation Report
- ◯ Other

Injury Description

_____

AIS Predot (enter 6-digit descriptor)

_____

AIS Severity (enter 1-6 or 9 if unknown)

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 9

Military AIS Score

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 9

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Nature And Severity Of Injuries: External

External

Primary source of information
- ◯ Medical Examiner Report
- ◯ CT Scan Report
- ◯ Field Investigator Report
- ◯ X-Ray Report
- ◯ EMS Run Report
- ◯ Police Report
- ◯ Hospital Record
- ◯ Traffic Investigation Report
- ◯ Other

Injury Description

_____

AIS Predot (enter 6-digit descriptor)

_____

AIS Severity (enter 1-6 or 9 if unknown)
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 9

Military AIS Score
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 9

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Nature And Severity Of Injuries Summary

Injury Severity Score (ISS)	
New Injury Severity Score (NISS)	
Military Injury Severity Score (MISS)	
Notes	

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Geographic Access

Is geographic access data available?
◯ Yes
◯ No

GEOGRAPHIC ACCESS TO EMS AND TRAUMA CARE

Proximity to nearest treatment centers

Injury location (city): [inj_city]

Rurality
◯ Rural
◯ Urban Cluster
◯ Urban Area

Nearest EMS

Average Dispatch Time Ground
_____ ((minutes))

Ground Time
_____ ((minutes))

Ground Distance
_____ ((miles))

Average Time at Scene Ground
_____ ((minutes))

Average Dispatch Time Air
_____ ((minutes))

Air Time
_____ ((minutes))

Air Distance
_____ ((miles))

Average Time At Scene Air
_____ ((minutes))

Nearest Trauma Center I

Ground Time
_____ ((minutes))

Ground Distance

_____
((miles))

Total Ground Time

_____
((minutes))

Total Ground Distance

_____
((miles))

Air Time

_____
((minutes))

Air Distance

_____
((miles))

Total Air Time

_____
((minutes))

Total Air Distance

_____
((miles))

Nearest Trauma Center II

Ground Time

_____
((minutes))

Ground Distance

_____
((miles))

Total Ground Time

_____
((minutes))

Total Ground Distance

_____
((miles))

Air Time

_____
((minutes))

Air Distance

_____
((miles))

Total Air Time

_____
((minutes))

Total Air Distance

_____
((miles))

Nearest Trauma Center III

Ground Time

_____
((minutes))

Ground Distance

_____
((miles))

Total Ground Time

_____
((minutes))

Total Ground Distance

_____
((miles))

Air Time

_____
((minutes))

Air Distance

_____
((miles))

Total Air Time

_____
((minutes))

Total Air Distance

_____
((miles))

Nearest Trauma Center IV

Is this applicable?

◯ Yes
◯ No

Ground Time

_____
((minutes))

Ground Distance

_____
((miles))

Total Ground Time

_____
((minutes))

Total Ground Distance

_____
((miles))

Air Time

_____
((minutes))

Air Distance

_____
((miles))

Total Air Time

_____
((minutes))

Total Air Distance

_____
((miles))

Nearest Non-trauma Center

Is this applicable?

◯ Yes
◯ No

Ground Time

_____
((minutes))

Ground Distance

_____
((miles))

Total Ground Time

_____
((minutes))

Total Ground Distance

_____
((miles))

Air Time

_____
((minutes))

Air Distance

_____
((miles))

Total Air Time

_____
((minutes))

Total Air Distance

_____
((miles))

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EMS Care

Primary Role of the Unit

Type of Dispatch Delay

Type of Response Delay

Type of Scene Delay

Type of Transport Delay

Level of Care of This Unit

Vehicle Dispatch Location

Vehicle Dispatch GPS Location

Crew Member Level

Dispatch Notified Date/Time

Unit Notified by Dispatch Date/Time

Unit Arrived on Scene Date/Time

Arrived at Patient Date/Time

Transfer of EMS Patient Care Date/Time

Unit Left Scene Date/Time

Arrival at Destination Landing Area Date/Time

Patient Arrived at Destination Date/Time

Destination Patient Transfer of Care Date/Time	
Last Name	
First Name	
Middle Initial/Name	
Gender	
Race	
Age	
Age Units	
Date of Birth	
First EMS Unit on Scene	
Other EMS or Public Safety Agencies at Scene	
Type of Other Service at Scene	
Date/Time Initial Responder Arrived on Scene	
Number of Patients at Scene	
Mass Casualty Incident	
Triage Classification for MCI Patient	
Incident Location Type	
Scene GPS Location	

Incident Census Tract	
Date/Time of Symptom Onset	
Possible Injury	
Cause of Injury	
Mechanism of Injury	
Trauma Center Criteria	
Vehicular, Pedestrian, or Other Injury Risk Factor	
Main Area of the Vehicle Impacted by the Collision	
Location of Patient in Vehicle	
Use of Occupant Safety Equipment	
Airbag Deployment	
Height of Fall (feet)	
OSHA Personal Protective Equipment Used	
ACN System/Company Providing ACN Data	
ACN Incident ID	
ACN Call Back Phone Number	
Date/Time of ACN Incident	
ACN Incident Location	

ACN Incident Vehicle Body Type

ACN Incident Vehicle Manufacturer

ACN Incident Vehicle Make

ACN Incident Vehicle Model

ACN Incident Vehicle Model Year

ACN Incident Multiple Impacts

ACN Incident Delta Velocity

ACN High Probability of Injury

ACN Incident PDOF

ACN Incident Rollover

ACN Vehicle Seat Location

Seat Occupied

ACN Incident Seatbelt Use

ACN Incident Airbag Deployed

Cardiac Arrest

Cardiac Arrest Etiology

Resuscitation Attempted By EMS

Arrest Witnessed By

CPR Care Provided Prior to EMS Arrival	
Who Provided CPR Prior to EMS Arrival	
Any Return of Spontaneous Circulation	
Date/Time of Cardiac Arrest	
Date/Time Resuscitation Discontinued	
Reason CPR/Resuscitation Discontinued	
Date/Time of Initial CPR	
Medical/Surgical History	
Current Medications	
Alcohol/Drug Use Indicators	
Patient Care Report Narrative	
Date/Time Vital Signs Taken	
SBP (Systolic Blood Pressure)	
DBP (Diastolic Blood Pressure)	
Heart Rate	
Pulse Oximetry	
Respiratory Rate	
Respiratory Effort	

End Tidal Carbon Dioxide (ETCO2)

Glasgow Coma Score-Eye

Glasgow Coma Score-Verbal

Glasgow Coma Score-Motor

Glasgow Coma Score-Qualifier

Total Glasgow Coma Score

Temperature

Revised Trauma Score

Protocols Used

Medication Administered Prior to this Unit's EMS Care

Medication Given

Medication Dosage

Medication Dosage Units

Date/Time Procedure Performed

Procedure Performed Prior to this Unit's EMS Care

Procedure

Number of Procedure Attempts

Procedure Successful

Procedure Complication	
Response to Procedure	
Vascular Access Location	
Indications for Invasive Airway	
Date/Time Airway Device Placement Confirmation	
Airway Device Being Confirmed	
Airway Device Placement Confirmed Method	
Airway Complications Encountered	
Suspected Reasons for Failed Airway Management	
Date/Time Decision to Manage the Patient with an Invasive Airway	
Destination/Transferred To, Name	
Destination GPS Location	
Incident/Patient Disposition	
EMS Transport Method	
Reason for Choosing Destination	
Type of Destination	
Hospital Capability	
Destination Team Pre-Arrival Alert or Activation	

Date/Time of Destination Prearrival Alert or Activation	
Disposition Instructions Provided	
Emergency Department Disposition	
First ED Systolic Blood Pressure	
Emergency Department Recorded Cause of Injury	
Emergency Department Procedures	
Emergency Department Diagnosis	

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ICD Coding

ICD 10 Code	
ICD 10 Description	
NEISS Product Code	

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AF01

Check all forms that have been fully completed	☐ CRF00 ☐ Patient Demographics ☐ Injury Location ☐ Injury Cause and Circumstances ☐ First Discovery and Response ☐ Nature and Severity of Injuries ☐ Geographic Access ☐ EMS Care
Are there special considerations on this decedent's injuries that may require a special reviewer?	◯ Yes ◯ No
What type of special reviewer will this decedent required?	☐ Neurosurgeon ☐ Orthopedic surgeon
Is the data on the decedent complete and ready to be transferred to the profiler?	◯ Yes ◯ No
Panel Assignment	◯ 1 ◯ 2 ◯ 3 ◯ 4 ◯ 5 ◯ 6 ◯ 7 ◯ 8 ◯ 9 ◯ 10 ◯ 11 ◯ 12 ◯ 13 ◯ 14
Forensic reviewer	◯ David Fowler - MD (Fowlerd@ocmemd.org) ◯ Greg Davis - UAB (gdavis@uabmc.edu) ◯ James Gill - CT (jgill@ocme.org) ◯ Joseph Hunt - NM (JLHunt@salud.unm.edu) ◯ Kurt Nolte - NM (KNolte@salud.unm.edu) ◯ Edward Mazuchowski - IA (edward.l.mazuchowski.mil@mail.mil) ◯ Marcus Nashelsky - DC (marcus-nashelsky@uiowa.edu) ◯ Roger Mitchell - DC (roger.mitchell@dc.gov) ◯ Stacy Drake - HOU (Stacy.A.Drake@uth.tmc.edu) ◯ test

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Mimic

Multiinstitutional Multidisciplinary Injury Mortality Investigation in Civilian PreHospital Environment

PI: Brian Eastridge, MD

CoPI: Ellen MacKenzie, PhD

CoPI: Kurte Nolte, MD

Top 5 Leading Causes of Death (per age category) in US

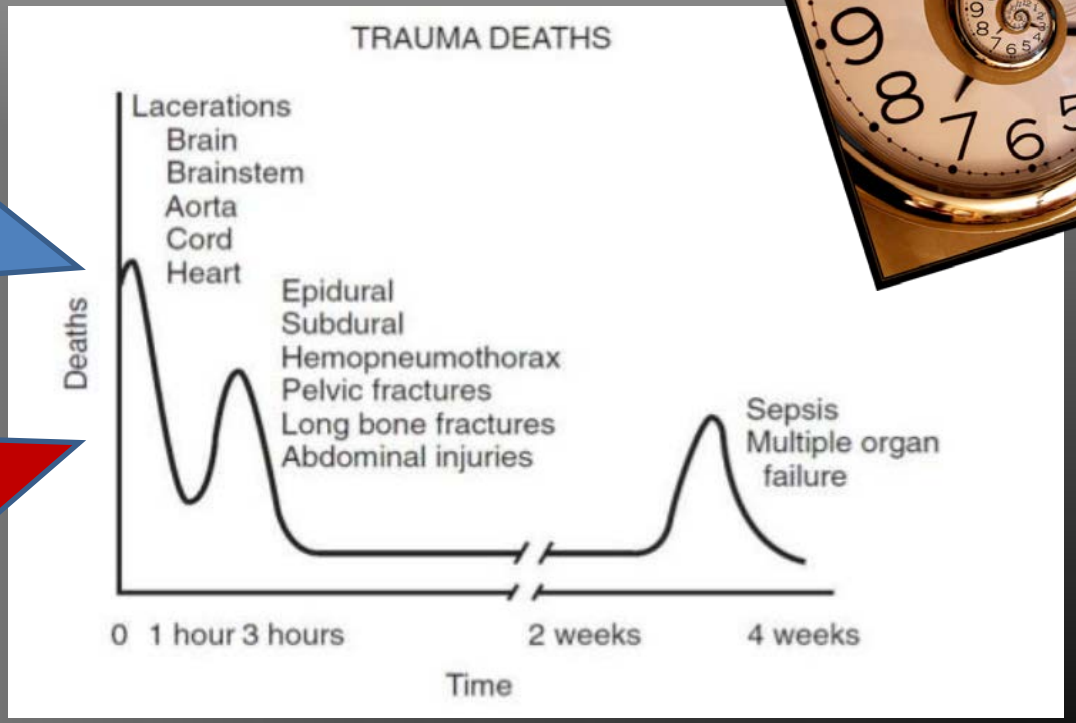
Rank	<1	1-4	5-9	10-14	15-24	25-34	35-44	45-54	55-64	65+	Total
1	Congenital Anomalies 4,746	Unintentional Injury 1,216	Unintentional Injury 730	Unintentional Injury 750	Unintentional Injury 11,836	Unintentional Injury 17,357	Unintentional Injury 16,048	Malignant Neoplasms 44,834	Malignant Neoplasms 115,282	Heart Disease 489,722	Heart Disease 614,348
2	Short Gestation 4,173	Congenital Anomalies 399	Malignant Neoplasms 436	Suicide 425	Suicide 5,079	Suicide 6,569	Malignant Neoplasms 11,267	Heart Disease 34,791	Heart Disease 74,473	Malignant Neoplasms 413,885	Malignant Neoplasms 591,699
3	Maternal Pregnancy Comp. 1,574	Homicide 364	Congenital Anomalies 192	Malignant Neoplasms 416	Homicide 4,144	Homicide 4,159	Heart Disease 10,368	Unintentional Injury 20,610	Unintentional Injury 18,030	Chronic Low. Respiratory Disease 124,693	Chronic Low. Respiratory Disease 147,101
4	SIDS 1,545	Malignant Neoplasms 321	Homicide 123	Congenital Anomalies 156	Malignant Neoplasms 1,569	Malignant Neoplasms 3,624	Suicide 6,706	Suicide 8,767	Chronic Low. Respiratory Disease 16,492	Cerebro-vascular 113,308	Unintentional Injury 136,053
5	Unintentional Injury 1,161	Heart Disease 149	Heart Disease 69	Homicide 156	Heart Disease 953	Heart Disease 3,341	Homicide 2,588	Liver Disease 8,627	Diabetes Mellitus 13,342	Alzheimer's Disease 92,604	Cerebro-vascular 133,103

Data Source: National Vital Statistics System, National Center for Health Statistics, CDC.
Produced by: National Center for Injury Prevention and Control, CDC using WISQARS™.

Background/Scientific Rationale
Pre-Hospital Mortality Civilian

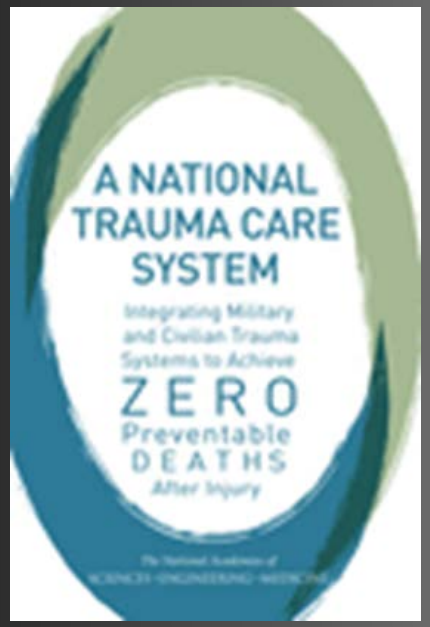
Potential Survivability Poorly Defined

NASEM Report Emphasis



Case Fatality Rate (CFR) ~ 4.1% /
2-5 % Hospital Mortality Potentailly Preventable

A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths after Injury



What are the numbers of Preventable Deaths in civilian trauma?

The Aim

Without an aim, there is no system (Deming).

Recommendation 1: The White House should set a national aim of achieving zero preventable deaths after injury and minimizing trauma-related disability.

- The 75th Ranger Regiment demonstrated that achieving zero preventable deaths is **an achievable goal** when leadership takes ownership of trauma care and data is used for continuous reflection and improvement.

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

12

NASEM Zero Preventable Death Specific ME Recommendations

Gap:

Linkages are incomplete or entirely missing among prehospital care; hospital-based acute care; rehabilitation; and medical examiner data.

“A critical but often neglected source of data—particularly in civilian systems—is autopsy reports on trauma deaths, which could be used to determine the preventability of fatalities based on a common, accepted lexicon.”

Recommendation 5:

The Secretary of Health and Human Services and the Secretary of Defense, together with their governmental, private, and academic partners, should work jointly to ensure that military and civilian trauma systems collect and share common data spanning the entire continuum of care

Purpose of this proposal is to develop a coordinated, multidisciplinary, multi-institutional effort within the civilian clinical sector to identify and characterize the causes of pre-mortality from trauma

Identify potential high yield areas for research and development in pre-hospital medical care, injury prevention, and trauma systems.

mimic

Multiinstitutional Multidisciplinary Injury Mortality Investigation in Civilian PreHospital Environment

PIs:Eastridge, Nolte, MacKenzie

Funded by Department of Defense (4,000 K)

Study Hypotheses/Aims
Purpose

- Advances in care in both trauma centers and trauma systems have substantially reduced death and disability associated with injury
- Substantial opportunity to further reduce deaths in pre-hospital setting.
  - Potential liabilities in civilian and military pre-hospital care must be identified and remediated in order to reduce the number of potentially preventable deaths on the battlefield and in the civilian environment.

Goal and Strategy

Develop a framework and methodology for evaluating the causes and pathophysiologic mechanisms of pre-hospital deaths

Describe the epidemiology of all pre-hospital injury deaths for defined populations

- Age: 0-14; 15-24; 25-54; 55-74; 75 and older
- Type: Blunt vs. Penetrating vs. Other Sharp Forces
- Geography: Urban/Suburban; Rural/Wilderness
- Major focus of pathophysiology associated with death

Develop blueprint for a sustained effort at public health injury mitigation strategies in the pre-hospital environment

Identifying high priority areas for injury prevention, trauma systems performance improvement and research and development.

Study Population

Inclusion Criteria:

1. Pre-hospital deaths (at scene, en route to hospital or DOA – defined as no vitals upon arrival at hospital)
2. Due to a blunt, penetrating or other sharp force

Exclusion Criteria:

1. Non-mechanical causes: poisoning, incl. drug overdoses, asphyxia, drowning,
2. Decomposed remains only (not fully fleshed with distinguishable organs)

Study Setting
Six Regions in the Country

(all have a centralized ME system and use an electronic case management system to collect uniform data on all deaths)

1. **State of Connecticut**. Serves a population of 3.6 million. They perform approximately 2,200 autopsy examinations at a single, centralized facility annually.
2. **Johnson County, Iowa.** Serves a population of 142,000. In 2014 JCME accepted jurisdiction of 380 deaths and performed 118 autopsies.
3. **State of Maryland.** Serves a population of approximately 6.0 million residents . They perform 4,220 autopsies at the single, centralized facility annually.
4. **State of New Mexico.** Serves a population of 2.0 million. They perform approximately 2,100 full autopsy examinations annually
5. **State of Oklahoma.** Serves a population of 3.8 million and conducts investigation of roughly 4,000 deaths annually.
6. **The District of Columbia.** Serves a population of 659,000. They perform approximately 1,110 examinations annually.

mimic

Estimates of Number of Injury Deaths

(Blunt, Firearm and Other Sharp Forces)

OCME	2012	2013	2014	Total
Connecticut	684	621	692	1997
Johnson Co, Iowa	133	128	110	371
Maryland	1509	1200*	1200*	3909
Oklahoma	1044	1153	1007	3204
New Mexico	823	778	906	2507
Washington, DC	232	267	254	753
Total	**4,425**	**4,147**	**4,169**	**12,741**

* Estimates

Methods

Collaborate with selected centralized OCME sites to identify 3,000 cases that meet criteria

Research Coordinators at each OCME will abstract defined set of data on each case and enter these data into REDCap

Data will then be used for following:

- Assign AIS injury codes (centrally by expert) and compute ISS, NISS … Abstractors will be trained on best way to describe each injury in detail
- ICD 10 injury codes and external causes of injury codes
- Geospatial mapping
- NEMSIS cross-referencing

Specific data from CRFs will be used to populate an on-line ‘Case PROFILER’ that will summarize the pertinent information about each case and provide electronic access to specific documents (e.g. ME summary, EMS run sheet) for electronic case review

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Methods

Steering Committee (Military and Civilian) to define definitions and process

Expert review panels (~ 50 Military and Civilian reviewers) (5 individuals each) will be identified and trained (Trauma Surgery, Emergency Medicine, Neurosurgery, Orthopedic Surgery, Forensic Pathology, EMS, Trauma Systems)

Panels will each review a certain number of cases using the PROFILER and assign a determination of survivability to each case – members of the panels will review cases independently (on-line without discussion with other panels members)

Discrepancies in determination of survivability will be identified by Coordinating Center and the panel will discuss these cases (either in person or via webex) and a second vote taken – ideally to reach consensus for each case

mimic

Injury Survivability Methodology

Prehospital Mortality Reviews

Translation & Dissemination of Analysis

Representative US sample population derived from central medical examiner systems

Adequate Forensic Record

ME cases to include may involve any of the following:

- External examination***
- CT virtual autopsy
- Internal examination
- Toxicology
- Photographs
- Investigator reports***
- Medical examiner report

Medical Anatomic Survivability

Medically Non-Survivable (MNS)

- Decapitation
- Torso dismemberment
- Brain evisceration
- Blunt ventricular rupture
- Liver evisceration
- Cardiac evisceration
- Open pelvis with communication/hemi-pelvectomy
- Transection spinal cord C3 and above

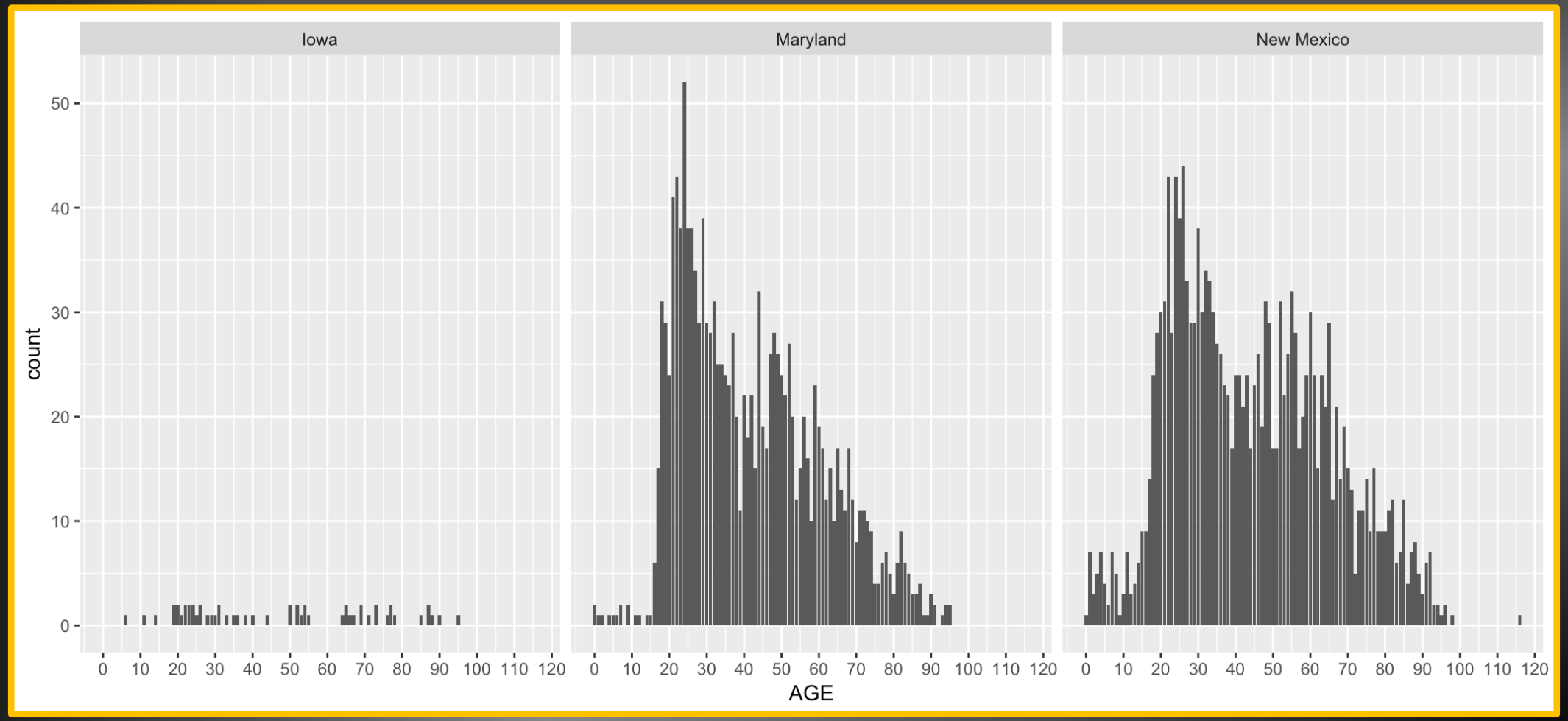
Medically Potentially Survivable / Medically Survivable

- All other

Mortality Data

	Iowa	Maryland	New Mexico
Accident	42	634	790
Homicide	1	410	308
Suicide	12	332	529
Undetermined	1	24	49

Mortality Histogram



Urban Area/Urban County/Rural

R - Rural
UA - Urban Area
UC - Urban County

Location of Death

Urban Areas (UAs) of 50,000 or more people;
Urban Clusters (UCs) of at least 2,500 and less than 50,000 people.
Rural (R) outside Urban

	Iowa	Maryland	New Mexico
R	12	243	454
UA	35	696	684
UC	9	457	520
NA	0	4	18

Injury Type

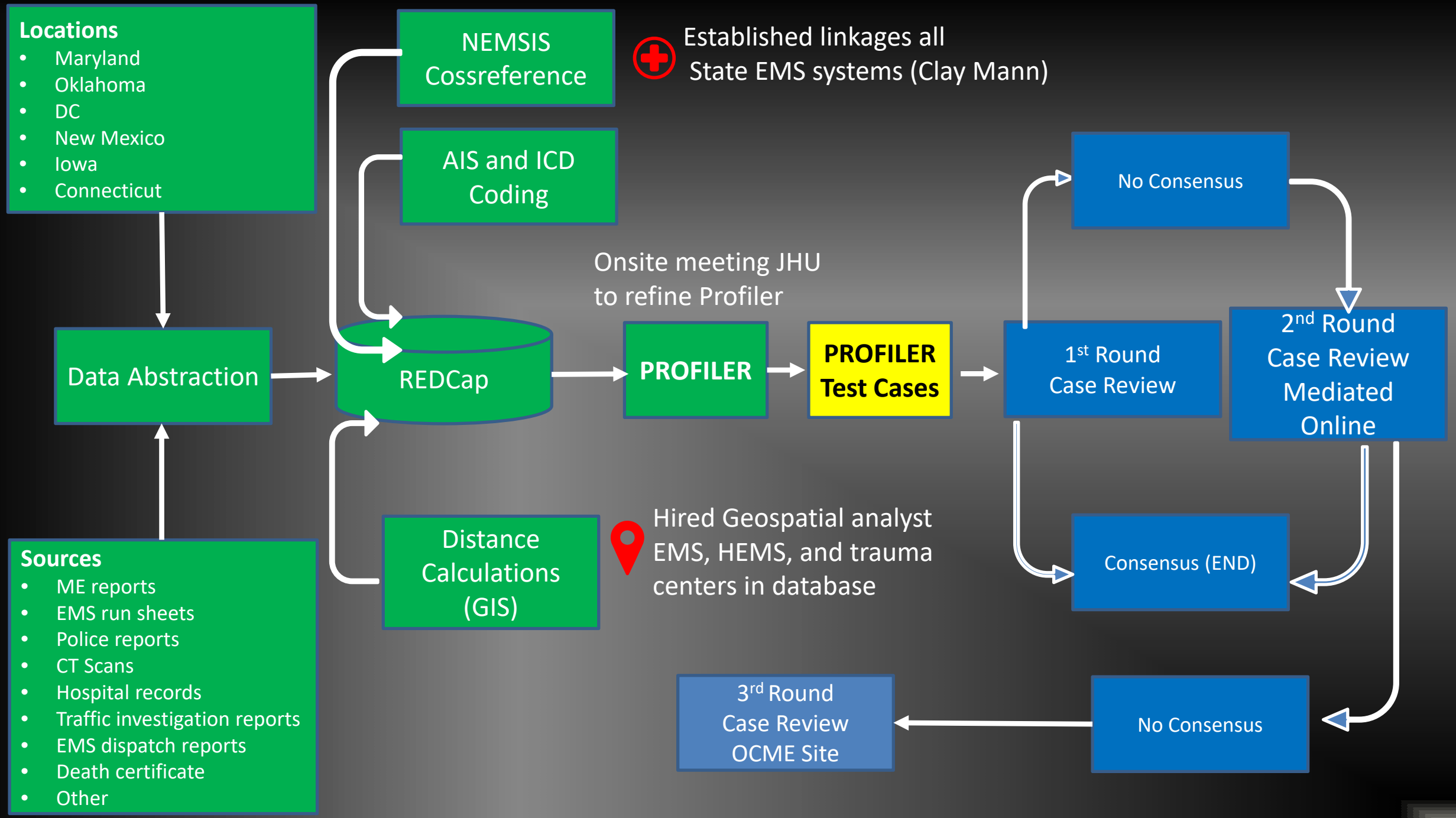
	Iowa	Maryland	New Mexico
Blunt	36	741	838
Other	6	24	26
Penetrating	12	632	777
Thermal	2	3	35

Cause of Death

	Iowa	Maryland	New Mexico
Blunt Trauma (Head)	23	21	182
Blunt Trauma (Other)	8	66	618
GSW (Head)	9	239	483
GSW (Other)	3	352	232
Multiple Injuries	0	555	12
Other	13	167	149

Manner of Death

	Accident	Homicide	Suicide	Undetermined
Blunt Trauma (Head)	183	37	1	5
Blunt Trauma (Other)	609	35	28	20
GSW (Head)	1	144	575	11
GSW (Other)	4	363	201	19
Multiple Injuries	450	61	43	13
Other	219	79	25	6


Locations
Maryland
Oklahoma
DC
New Mexico
Iowa
Connecticut
NEMSIS Cossreference
Established linkages all State EMS systems (Clay Mann)
AIS and ICD Coding
Onsite meeting JHU to refine Profiler
Data Abstraction
REDCap
PROFILER
PROFILER Test Cases
No Consensus
1st Round Case Review
2nd Round Case Review Mediated Online
Sources
ME reports
EMS run sheets
Police reports
CT Scans
Hospital records
Traffic investigation reports
EMS dispatch reports
Death certificate
Other
Distance Calculations (GIS)
Hired Geospatial analyst EMS, HEMS, and trauma centers in database
Consensus (END)
3rd Round Case Review OCME Site
No Consensus

PROFILER

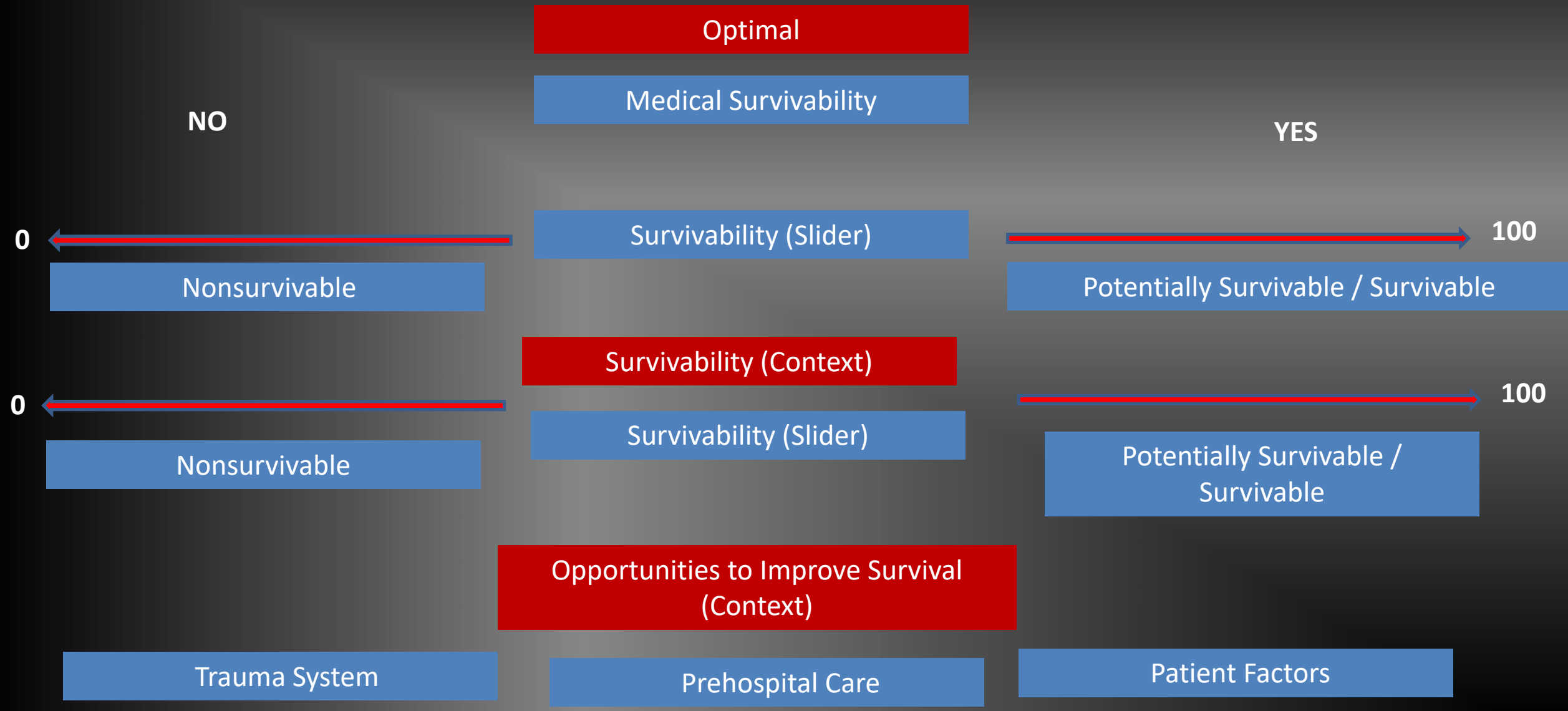
ME Case:

- External examination***
- CT virtual autopsy
- Internal examination
- Toxicology
- Photographs
- Investigator reports***
- Medical examiner report

Auxillary Data Sources:

- Emergency Medical Services
- Injury List
  - AIS Coded

Survivability Determination



Multiinstitutional Multidisciplinary Injury Mortality Investigation in the Civilian Pre-Hospital Environment (MIMIC)

BA150629

W81XWH-17-2-0010

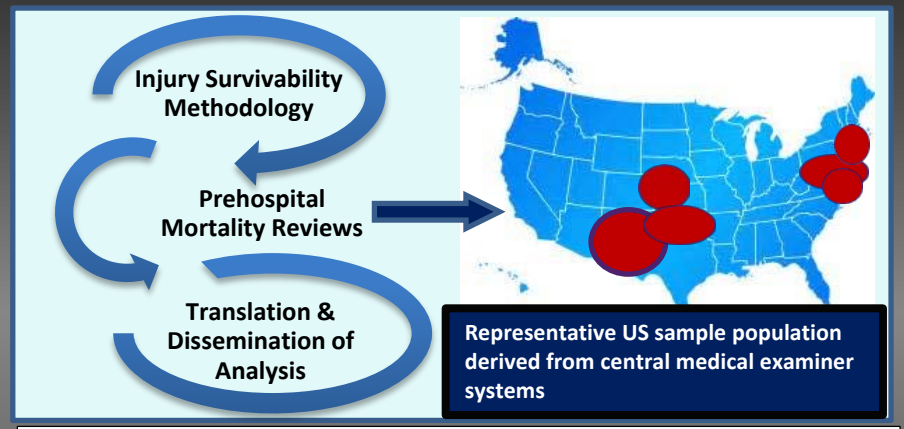
PI: Brian Eastridge **Org:** National Trauma Institute **Award Amount:** $3,979,380

Study/Product Aim(s)

- Develop a framework and methodology for evaluating (i) the causes and pathophysiologic mechanisms of pre-hospital deaths; (ii) the appropriateness of EMS response and care delivered; and (iii) the potential for survivability under both optimal clinical circumstances and within the context of each individual injury event.
- Develop a blueprint for a sustained effort at public health injury mitigation strategies including injury prevention, trauma systems, and acute care.

Approach

The framework and methodology will be established by a multi-institutional network of experts who will apply the methodology in review and analysis of 3,000 pre-hospital death cases at six Medical Examiner sites including those serving urban, rural, and frontier environments.



Accomplishment: Protocol has been submitted.
Investigator group and Steering Committee have determined a virtual review process (Profiler) will be used.
Draft data dictionary and CRF have been developed

Timeline and Cost

Activities	CY 17	18	19	20
Adapt Protocol for Submission; Develop review criteria				
Provide training to reviewers; Abstract data				
Perform mortality reviews; Data analysis				
Analysis and results dissemination				
Estimated Budget ($K)	**$1,026**	**$1,198**	**$1,225**	**$546**

Updated: (3 Jul 2017)

Goals/Milestones

CY17 Goal – Methodology determined, reviewers trained, data abstraction and reviews begin

☑ Protocol submitted; methodology determined

CY18 Goals – Virtual Reviews commence

☐Data abstraction

☐Reviews in progress

CY19 Goal – Virtual Reviews continue

☐Data abstraction

☐Reviews in progress

CY20 Goal – Data analysis, result dissemination

☐Report results from data analysis

☐Dissemination materials produced

Comments/Challenges/Issues/Concerns

- Trauma vs. Medical Examiner nomenclature; differing ME databases

Budget Expenditure to Date

Projected Expenditure: $431,327

Actual Expenditure: $355,361 (as of 8/30/17)

Supplemental Funding

- NHTSA $100,000 (October 2018)
- NHTSA Office of Emergency Medical Services

  Develop realistic and relevant modeling strategies aimed at identifying potential opportunities for improvement that could improve health outcomes for those injured in motor vehicle crashes

Greater System Benefits

Trauma

- Performance improvement
  - Engineering
  - Medical devices / procedures
  - EMS value validation
  - Injury Prevention
- Collaboration between trauma and ME communities

Medical Examiner

- Funding for advanced radiological imaging
- Improve mechanistic information
- Interaction between trauma and ME communities
- Bridge the gap between ME and trauma care providers data sets

CNTR

Coalition for National Trauma Research

Special Thanks

Lizette Villarreal

Monica Phillips

MIMIC Reviewer Training

NAME Meeting

October 15, 2018

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  Jocelyn and Joe Straus Endowed Chair in Trauma Research
  University of Texas Health Science Center at San Antonio
- Co-PI: Kurt Nolte, MD
  Professor of Pathology
  University of New Mexico
  Director of Radiology-Pathology Center for Forensic Imaging
  Chief Medical Investigator, Office of the Medical Investigator
  Ellen MacKenzie, PhD
  Dean, Johns Hopkins Bloomberg School of Public Health
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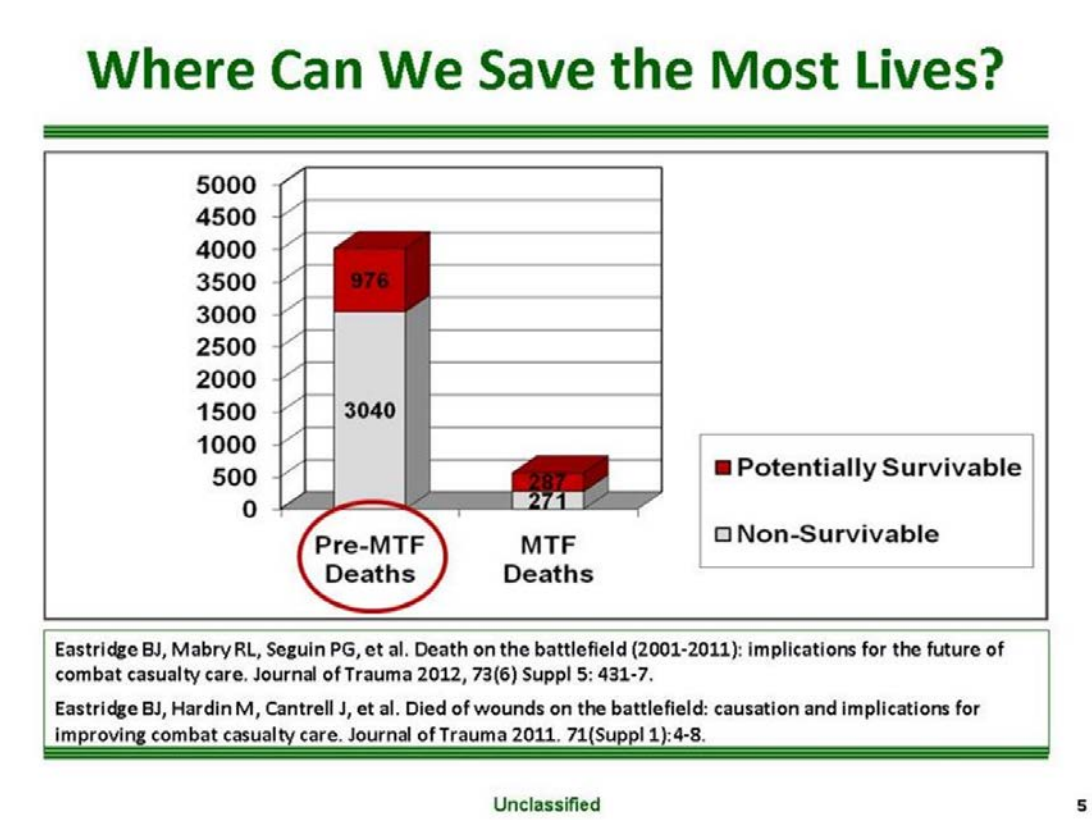

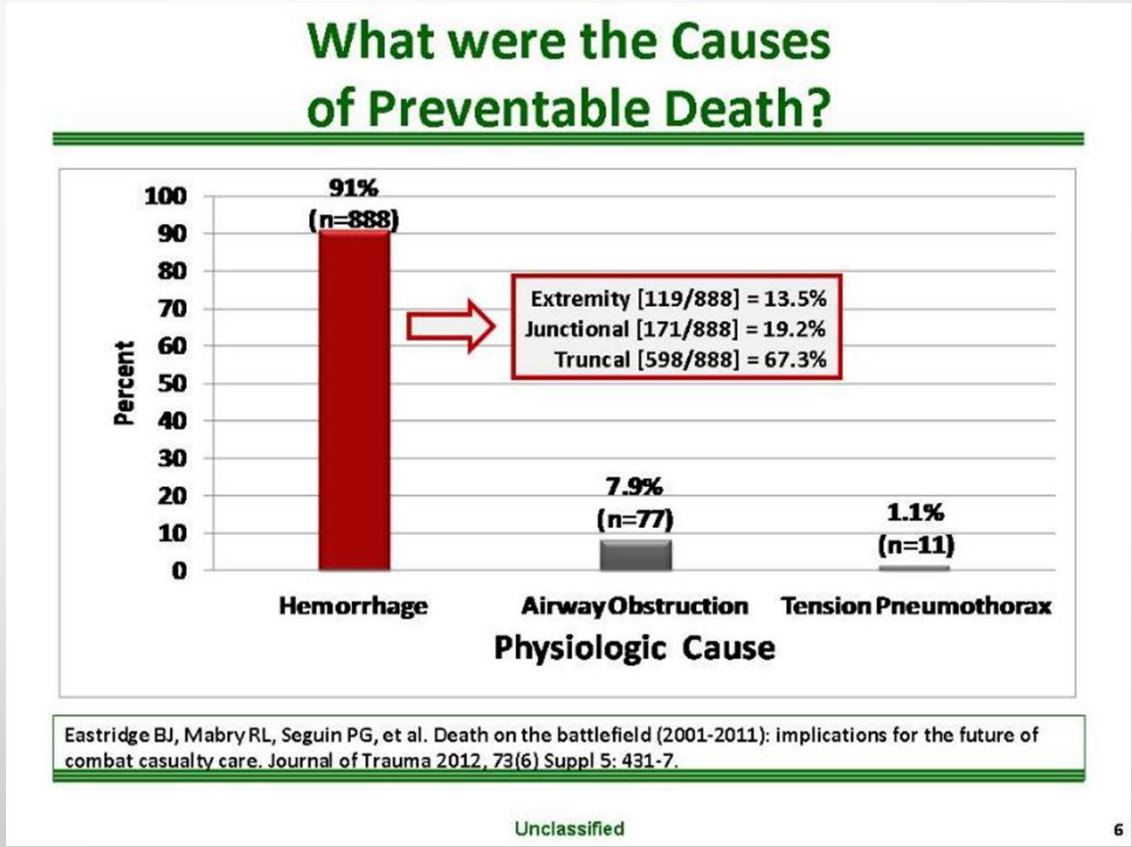

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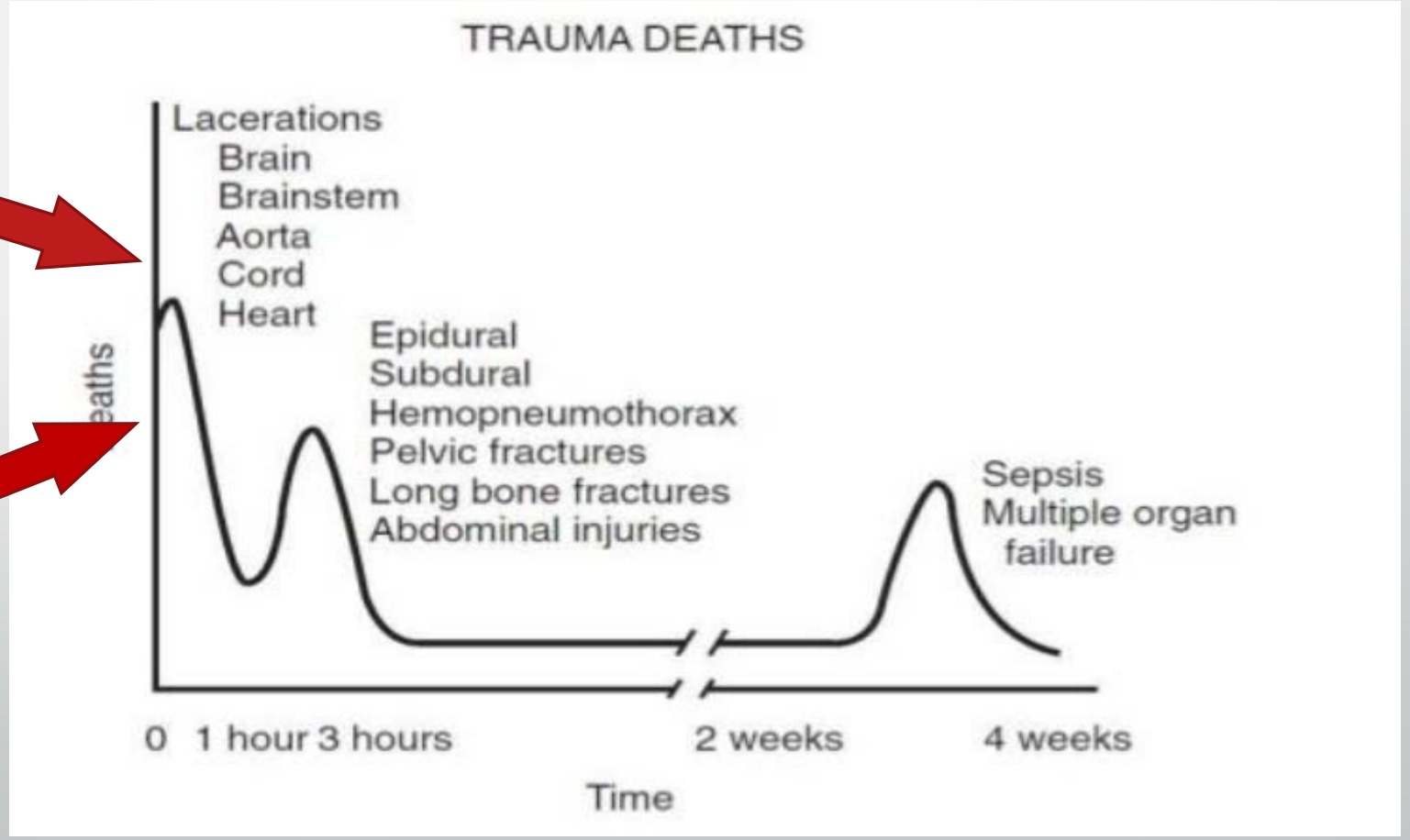

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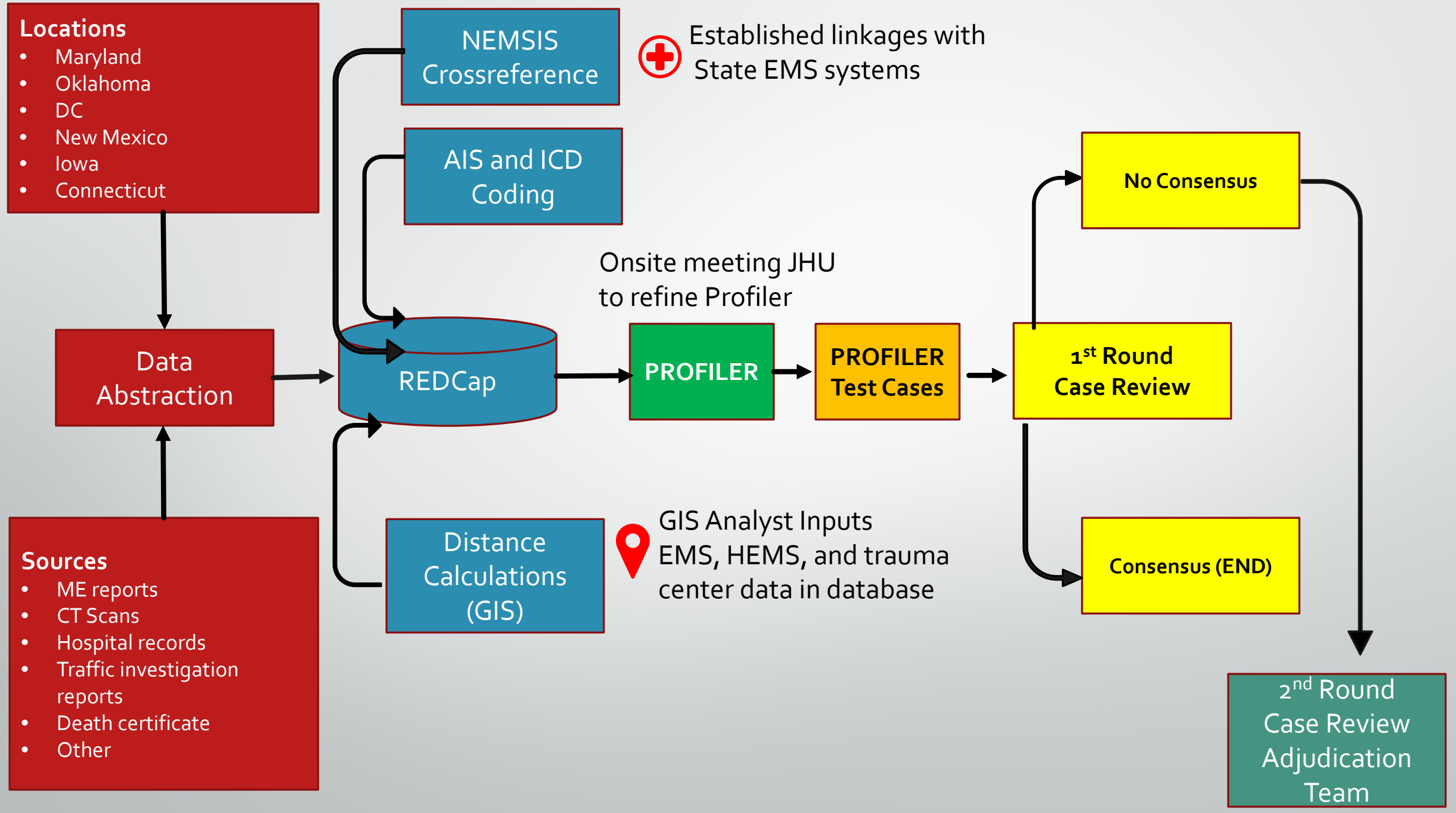
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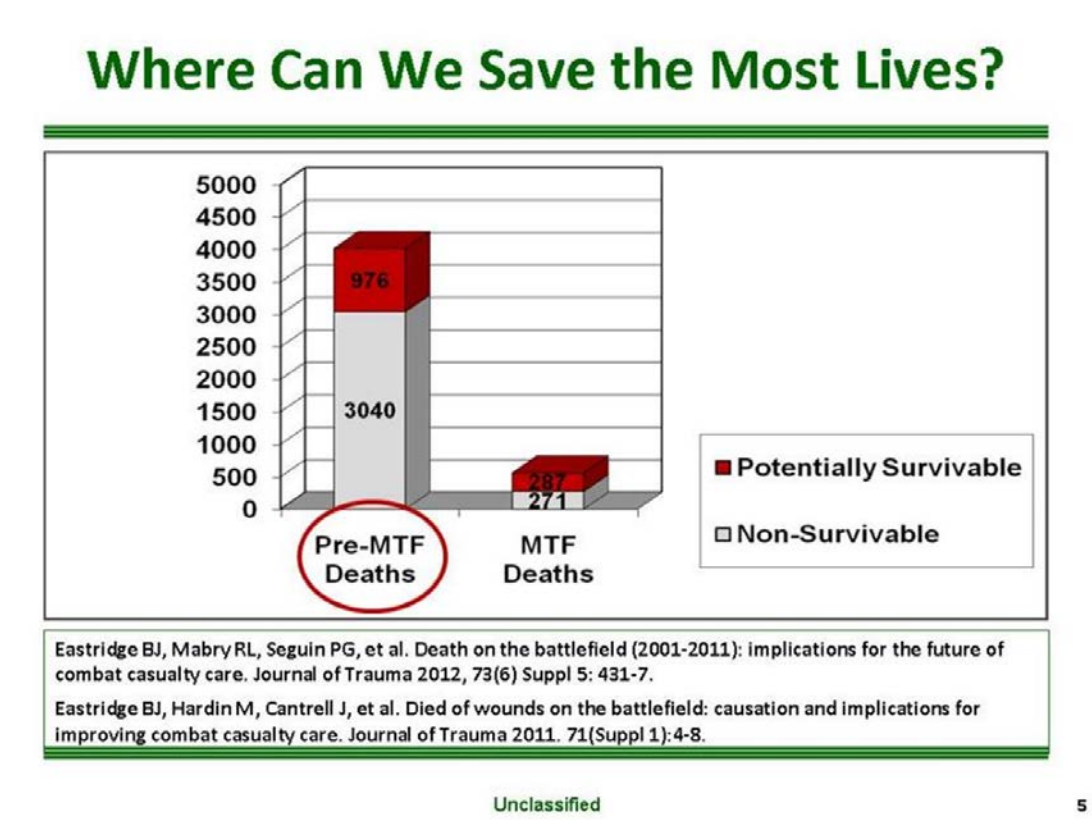

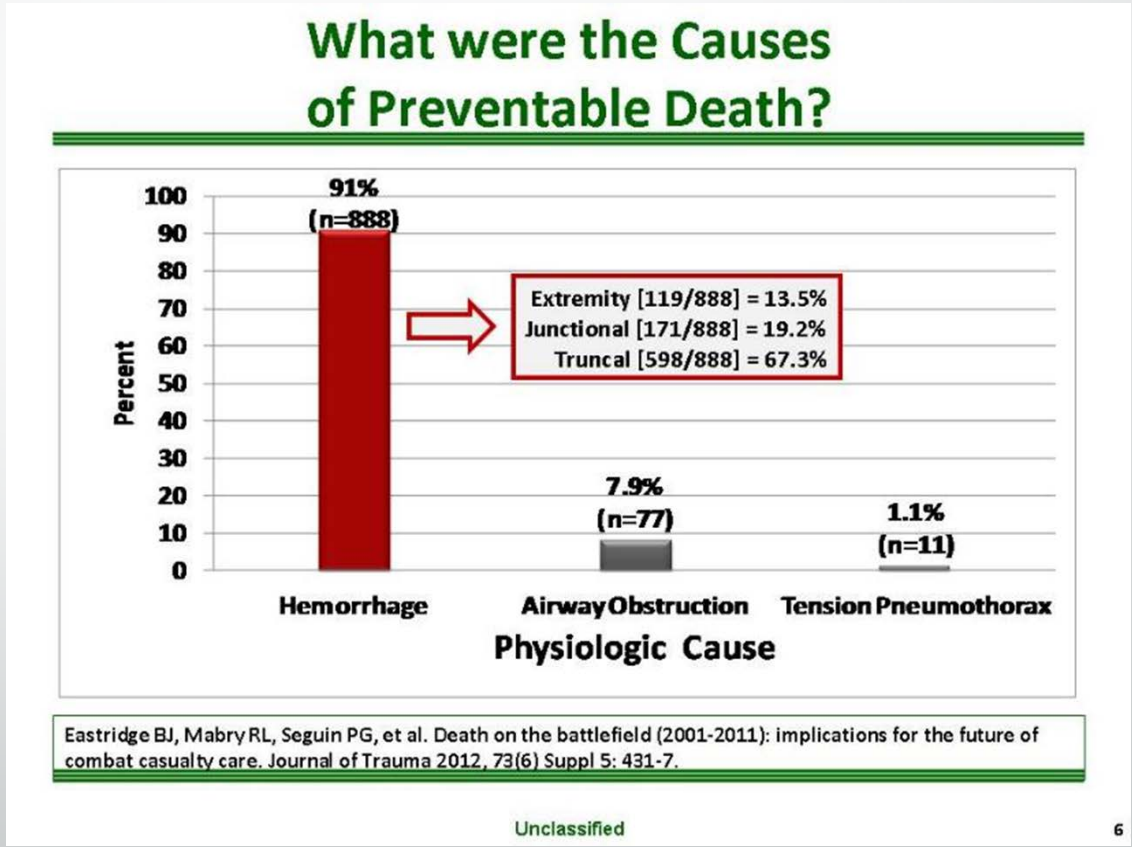

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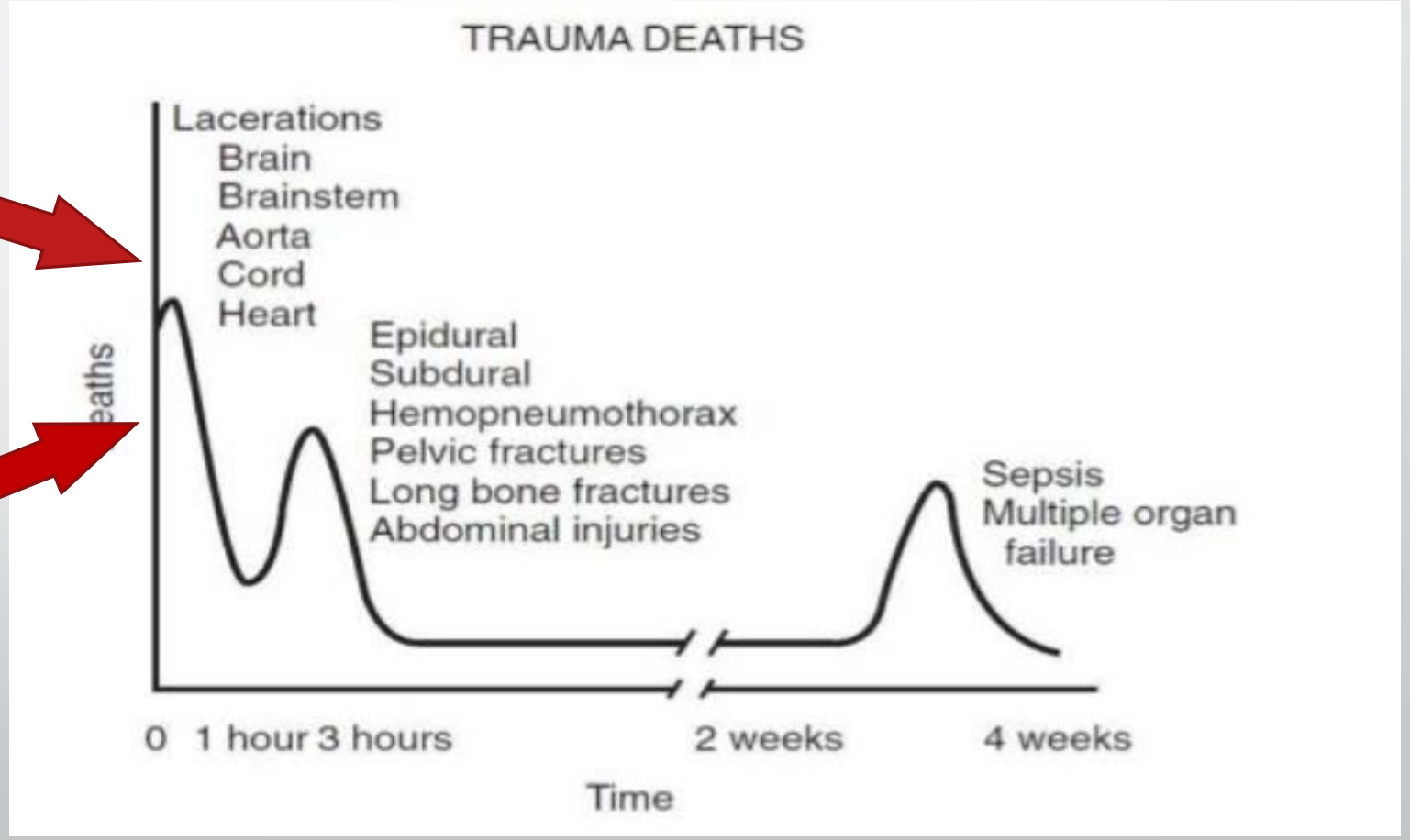

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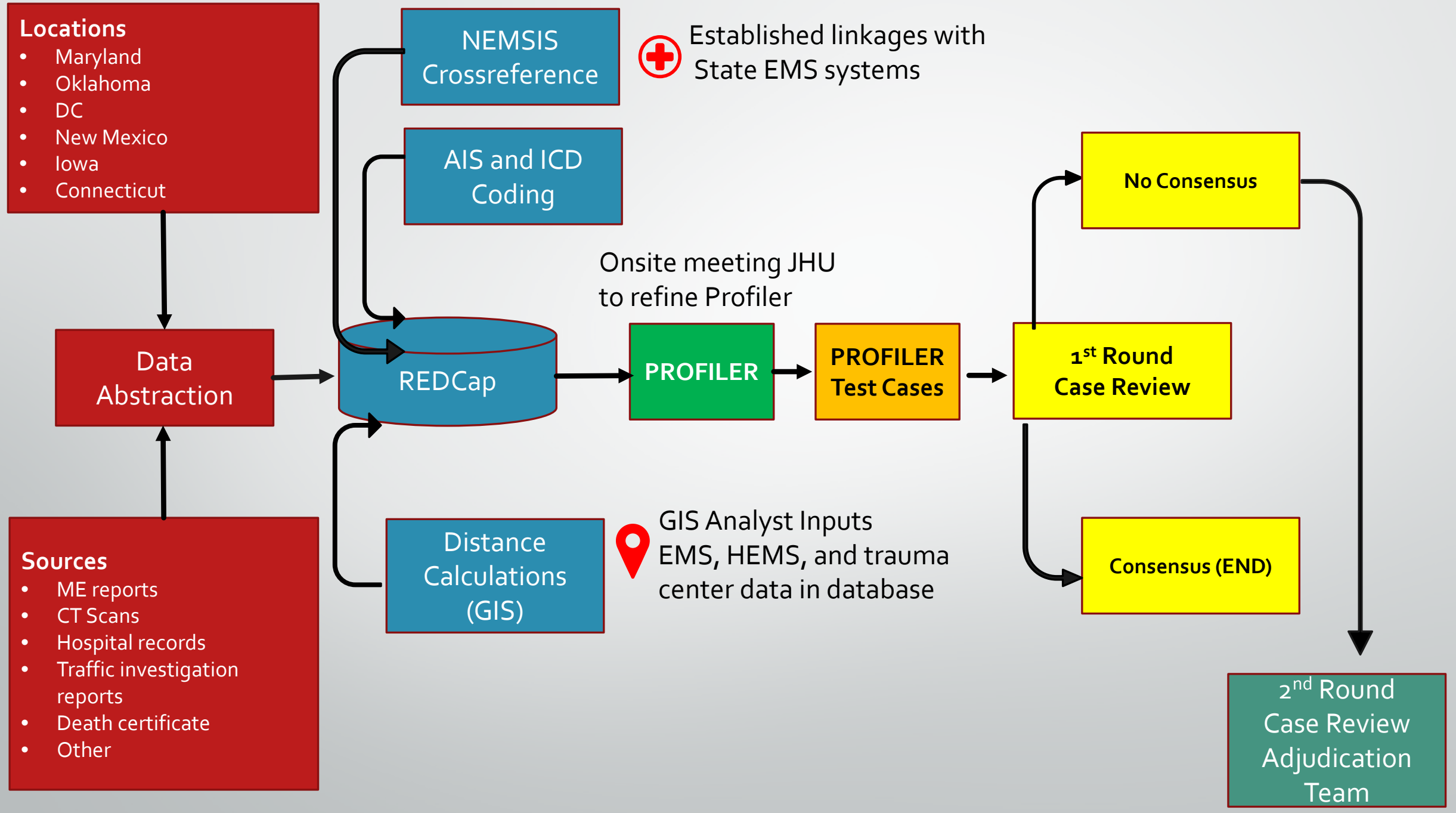
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MIMIC Data Abstraction Training

NAME Meeting

October 15, 2018

Training Staff

- **Lizette Villareal**

  Project Manager – National Trauma Institute

- **Craig Remenapp**

  METRC Senior Study Manager – Johns Hopkins

- **Nick Medrano**

  GIS Analyst – National Trauma Institute

PROJECT OVERVIEW

Investigators

- **PI:** **Brian Eastridge, MD**

  Division Chief, Trauma and Emergency General Surgery

  University of Texas Health Science Center at San Antonio
- **Co-PI:** **Kurte Nolte, MD**

  Chief Medical Investigator

  New Mexico Office of the Medical Investigator
- **Co-PI:** **Ellen MacKenzie, PhD**

  Dean, Johns Hopkins Bloomberg School of Public Health

Study Hypotheses

- **Substantial opportunity to further reduce deaths in pre-hospital setting.**
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System Benefits

Trauma

- Performance improvement
  - Engineering
  - Medical devices / procedures
  - EMS value validation
  - Injury Prevention
  - Collaboration between trauma and ME communities

Medical Examiner

- Funding for advanced radiological imaging
- Improve mechanistic information
- Interaction between trauma and ME communities
- Bridge the gap between ME and TS data sets

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Six Regions in the Country

(Centralized ME systems and utilizing electronic case management system to collect uniform data on all deaths)

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(Blunt, Firearm and Other Sharp Forces)

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New Mexico	823	778	906	2507
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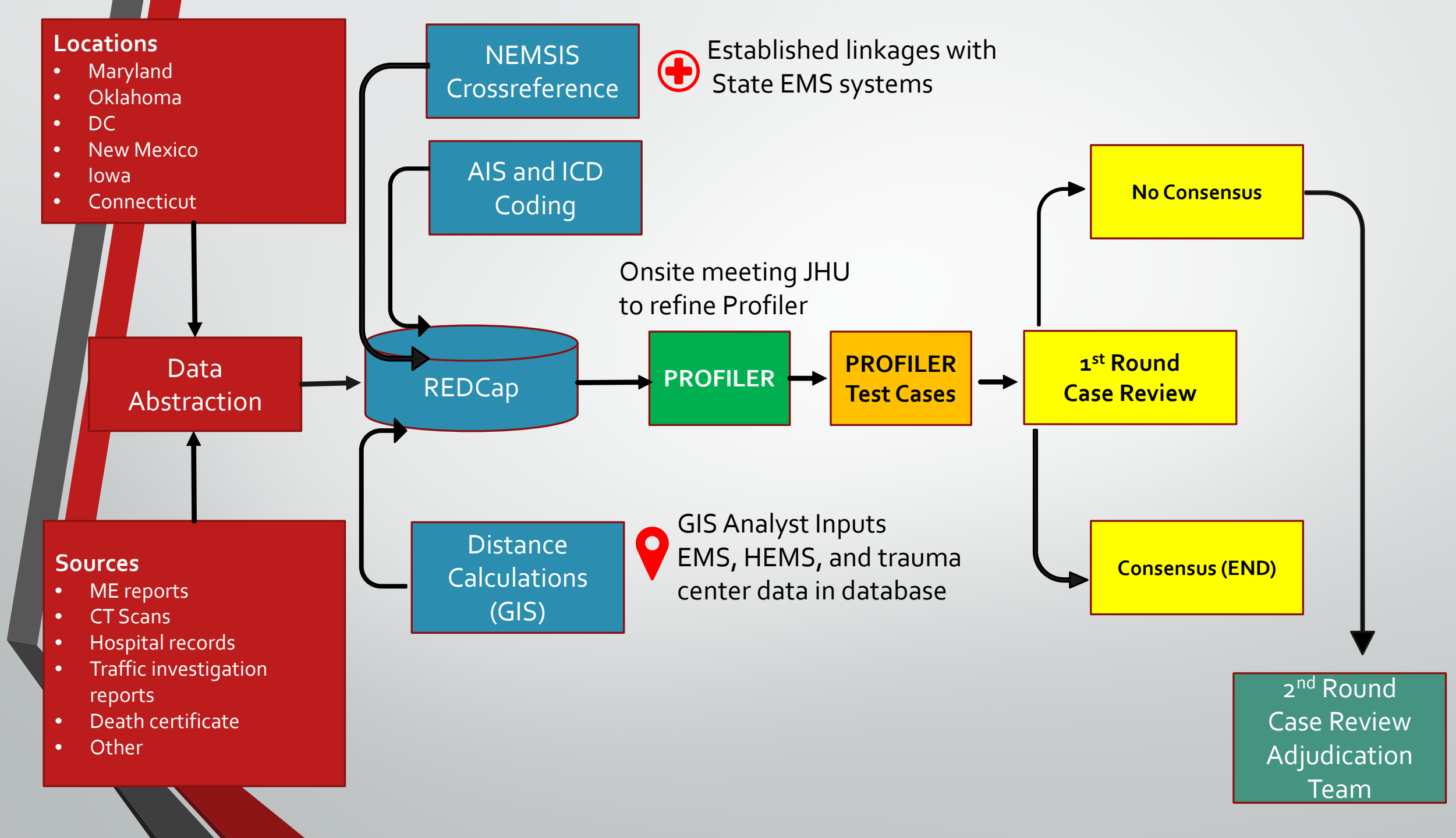
Total	**4,425**	**4,147**	**4,169**	**12,741**

* Estimates

Forensic Record

ME cases may involve any of the following:

- Medical Examiner Report
  - Full Autopsy
  - Partial Autopsy
  - External Exam
- Radiographs
- Toxicology
- Photographs
- Investigator Reports


Locations
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NEMSIS Crossreference
Established linkages with State EMS systems
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Onsite meeting JHU to refine Profiler
Data Abstraction
REDCap
PROFILER
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1st Round Case Review
No Consensus
Consensus (END)
Sources
ME reports
CT Scans
Hospital records
Traffic investigation reports
Death certificate
Other
Distance Calculations (GIS)
GIS Analyst Inputs EMS, HEMS, and trauma center data in database
2nd Round Case Review Adjudication Team

TIMELINE

MIMIC Timeline

- **October 2018**
  - NAME Abstractor and ME Profiler Training
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  - Complete Team Assignments
  - Launch Study Cases

Data Abstraction Timeline

	Project Year 2				Project Year 3				Total
Target Enrollment (per quarter)	Q1 (Jun-Aug)	Q2 (Sept-Nov)	Q3 (Dec-Feb)	Q4 (Mar-May)	Q1 (Jun-Aug)	Q2 (Sept-Nov)	Q3 (Dec-Feb)	Q4 (Mar-May)	
Connecticut		50	100	100	100	56			406
Iowa		34							34
Maryland		100	150	150	150	150	143		843
Oklahoma		50	100	100	76				326
New Mexico	50	150	200	200	200	200	105		1,105
D.C.		50	100	100	91				341
Target Enrollment (cumulative)	**50**	**434**	**650**	**650**	**619**	**406**	**248**		**3,055**

NAVIGATING THE REDCap SYSTEM

Navigating the REDCap System

- Login to REDCap

FORMS

1. CRF00
2. Patient Demographics
3. Injury Location
4. Injury Cause and Circumstances
5. First Discovery and Response

REDCap User Interface

- Records Status Dashboard
- Forms
- Form Completion

Data Dictionary

- Accessing the Data Dictionary
- Study Variables Included

REVIEW CASE EXAMPLE

Form: CRF00

Upload Documents

- *Medical Examiner Report*
- *Field Investigator Report*
- *CT Scan Report- include actual images*
- *Toxicology*

What do your Documents look like?

- Does your site have CT scans and images?
- What document do your foresee finding the most information?
- All variables should be taken from the source documents

Form: Patient Demographics

- Sex
- DOB
- Race
- Height/Weight
- Comorbidities

Look in:

- *Medical Examiner Report*
- *Field Investigator Report*

Form: Injury Location

- Date and Time (military)
  - Injury
  - Decedent Found
  - Death Pronounced
- Location of Injury
  - GPS Coordinates (preferred)
  - Street Address
  - Intersection
  - Mile Marker

Look in:

- *Field Investigator Report*

Injury Location – GPS Coordinates

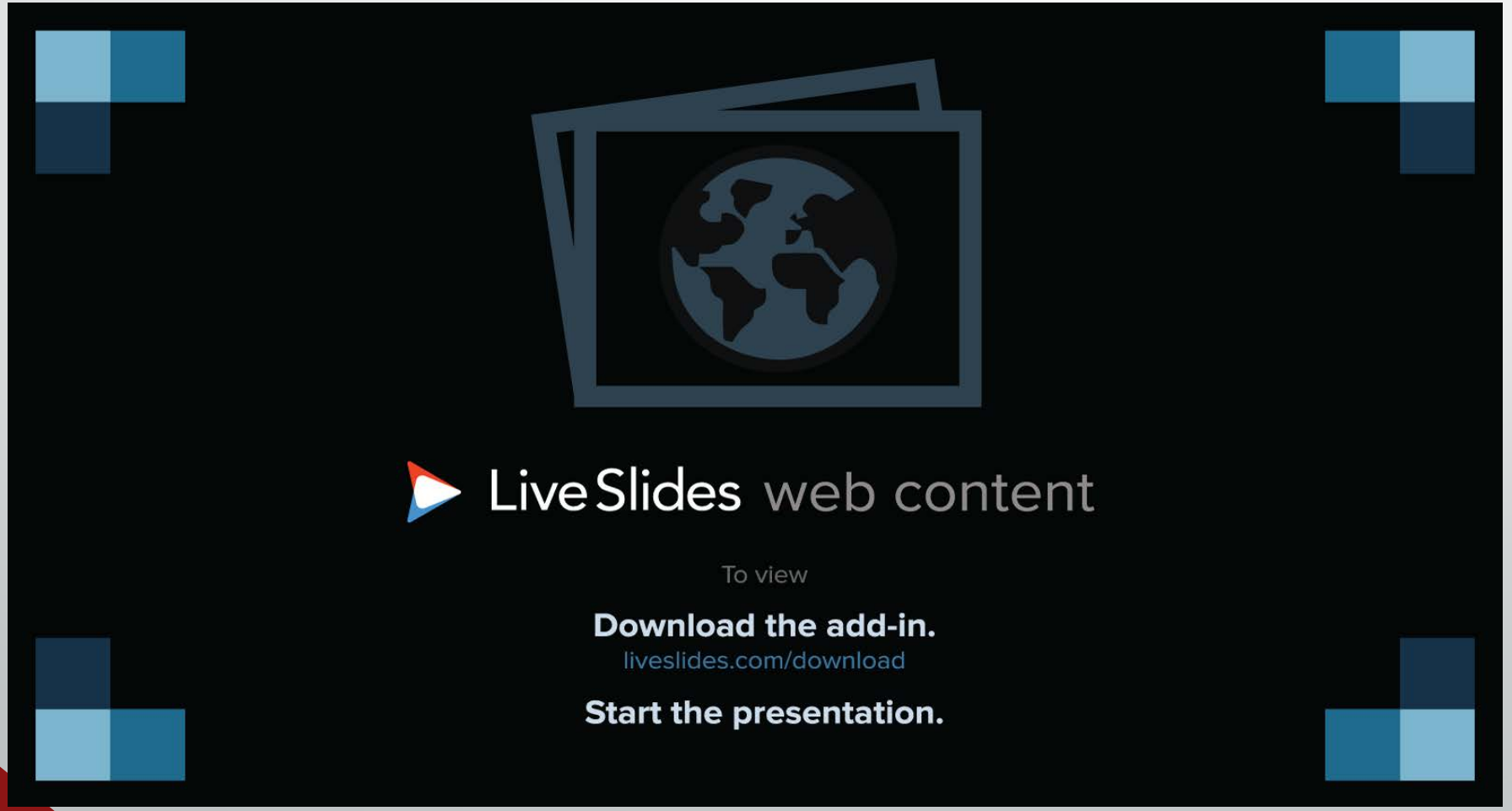
MUST Use Decimal Degrees (DD):
Positive Latitude & Negative Longitude

FORMAT	LATITUDE	LONGITUDE
***Decimal Degrees (DD)**	**34.19257**	**-106.06417**
Degrees Minutes Seconds (DMS)	34˚ 11’ 33.3	106 3’ 51.0
Degrees Decimal Minutes (DMM)	34˚ 11.554	106˚ 3.850

Injury Location – GPS Coordinates

Converter

www.geoplaner.com



Form: Injury Cause and Circumstances

- Type of Injury
- Manner of Death
- Weather
- Toxicology
- Verbatim Circumstances*

Look in:

- *Medical Examiner Report*
- *Field Investigator Report*
- *Toxicology Report*

Form: First Discovery and Response

- Responder Involved
  - Include even if no interventions applied
- Interventions Applied

Look In:

- *Medical Examiner Report*
- *Field Investigator Report*
- *EMS Report*
- *Police Report*

REVIEW CASE EXAMPLE

TIPS AND TRICKS SHEET

ENTER CASES!

Multi-institutional Multi-Disciplinary Injury Mortality Investigation in the Civilian Pre-Hospital Environment (MIMIC)

In an effort to determine the level of experience and expertise of each reviewer involved in the MIMIC project, we are asking each of you to complete a brief survey. The information gained from this survey will assist the research team in managing case assignments and ensure that we have a coordinated, multidisciplinary, multi-institutional review team.

1. Name

2. Institution/ Agency

3. Age in Years

4. Race

- ◯ American Indian or Alaska Native
- ◯ Asian
- ◯ Black or African American
- ◯ Other (please specify)
- ◯ Native Hawaiian or other Pacific Islander
- ◯ White
- ◯ Prefer not to report

5. Are you of Hispanic or Latino origin or descent?

- ◯ Yes, Hispanic or Latino
- ◯ No, not Hispanic or Latino
- ◯ Prefer not to report

6. Do you have military experience?

- ☐ Yes
- ☐ No

If yes, how long did you serve in military?

7. If you have military experience, were you in a medical unit?

- [ ] Yes
- [ ] Not applicable; No military experience
- [ ] No
- [ ] Yes (please specify)

8. Describe your current position:

- [ ] Trauma Surgeon
- [ ] Orthopedic Surgeon
- [ ] Forensic Pathologist
- [ ] Emergency Medicine Physician
- [ ] Neurosurgeon
- [ ] EMT/Paramedic
- [ ] Other (please specify)

9. How many years of experience do you have in the field?

10. Areas of expertise:

- [ ] Prehospital/ EMS Systems
- [ ] Hospital Based Practice
- [ ] Trauma Systems
- [ ] Pathology
- [ ] Other (please describe)

11. Have you played a role in your state or local trauma/ EMS system (e.g. involvement on advisory committees; served as medical director; etc.)?

- ( ) Yes
- ( ) No

12. Do you treat pediatric patients as part of your practice?

- ( ) Yes
- ( ) No

13. Have you had (or do you currently have) direct experience as a pre-hospital provider?

- ( ) Yes
- ( ) No

14. Do you currently practice in a verified/designated trauma center?

- ◯ Yes
- ◯ No

If yes, what level?

15. Comments/ Other relevant information related to your role as a reviewer

MIMIC Data Abstraction Training

New Mexico

November 28, 2018

Project Staff

- **Lizette Villareal**

  Project Manager – National Trauma Institute

- **Craig Remenapp**

  METRC Senior Study Manager – Johns Hopkins

- **Nick Medrano**

  GIS Analyst – National Trauma Institute

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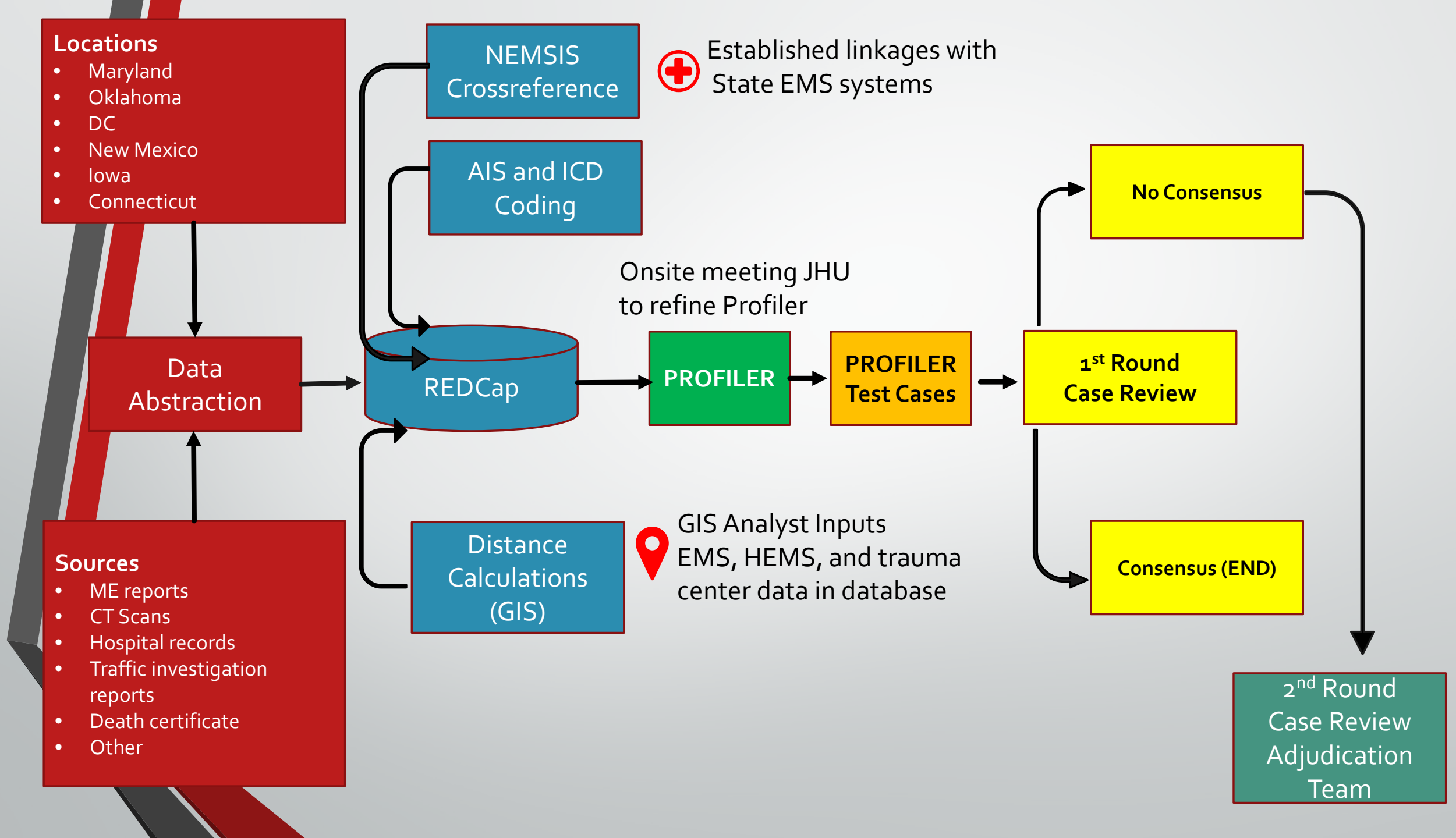
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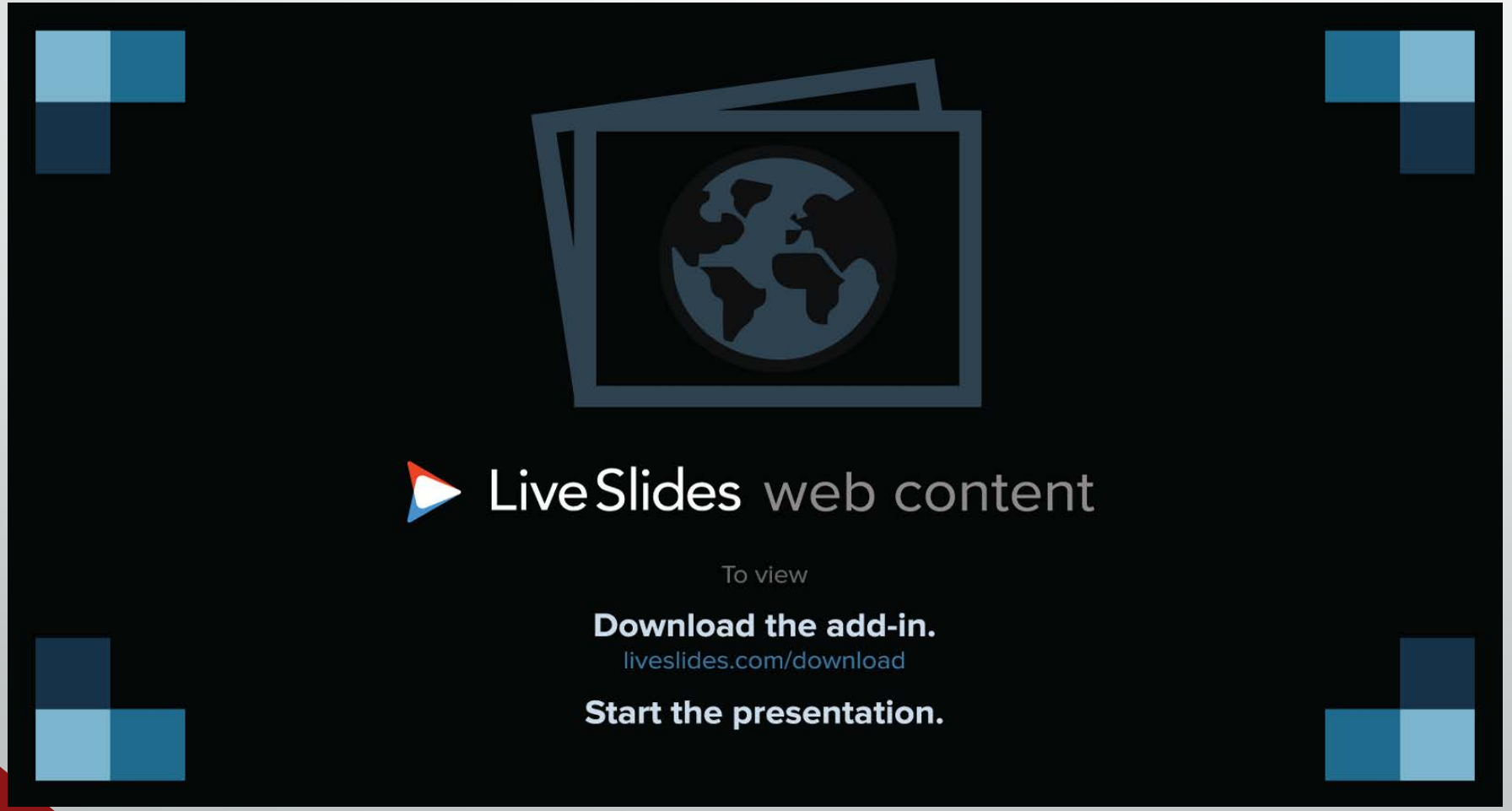

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- *Police Report*

REVIEW CASE EXAMPLE

TIPS AND TRICKS SHEET

Understanding Case Reviews in Profiler

Case Review Methods

- Steering Committee (Military and Civilian) defined definitions and process
- Expert review panels (~ 90 Military and Civilian reviewers) (5 individuals each) will be identified and trained (Trauma Surgery, Emergency Medicine, Neurosurgery, Orthopedic Surgery, Forensic Pathology, EMS, Trauma Systems)
- Panels will each review a certain number of cases using the PROFILER and assign a determination of survivability to each case – members of the panels will review cases independently
- Discrepancies in determination of survivability will be identified and non-consensus will be reviewed by an adjudication team

Profiler

1) Open medical examiner case in Profiler
2) Review case
   - Injury severity
   - Injury cause / circumstance
   - Discovery / first response
   - EMS
   - Access to EMS / Trauma Center
   - Medical examiner data (left side of page)
3) Causation and survival determination
   - Primary cause of death (may choose multiple but must be associated with severe injury)
   - Assuming immediate access to trauma care
   - Actual conditions
   - Opportunities for improvement (free text)

Survivability Definitions

- **Non Survivable-** Death as a result of catastrophic anatomic injuries
- **Possibly Survivable -** Anatomic injuries that were severe but medically survivable
- **Definitely Survivable-** Minimal anatomic injuries with a high likelihood of survival
- **Cannot Judge-** information insufficient to make a determination

Anatomic Survivability

Medically Non-Survivable (MNS)

- Dismemberment / decapitation
- Brain evisceration
- Transection spinal cord C3 and above
- Injury deep nuclei CNS, brainstem, or massive brain tissue injury
- Major tracheal injury within thorax
- Cardiac injury > 2cm
- Uncontained hemorrhage thoracic aorta
- Uncontained hemorrhage pulmonary vasculature
- Hepatic avulsion
- Junctional lower extremity injury with open pelvis with communication/hemi-pelvectomy

Medically Potentially Survivable / Medically Survivable

- All other

ENTER CASES! (REDCap)

Questions

- If you have any project related questions, please do not hesitate to reach out

Lizette Villarreal

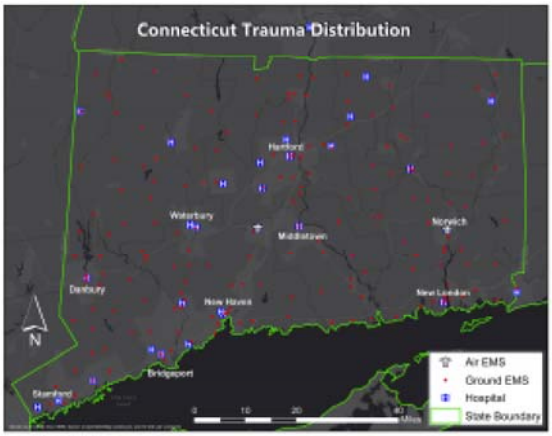
Lizette@NatTrauma.org

Nick Medrano

Nick@NatTrauma.org

MIMIC Study Breaks New Ground: Geospatial Mapping of Trauma System Response Resources

May 30, 2018



Connecticut GIS map with complete trauma resource data set.

The Multi-Institutional Multidisciplinary Injury Mortality Investigation in the Civilian Pre-Hospital Environment (MIMIC) project aims to determine whether injured people who died before reaching a hospital had potentially survivable injury. But before this Department of Defense-sponsored review of some 3,000 pre-hospital deaths in six different states can begin, the investigators need to develop a comprehensive dataset and map showing access to trauma centers by level designation, ground and air EMS, travel times, and other factors necessary to determine potential survivability.

“Unlike the military study of battlefield mortality, which conceptualized injury survivability based upon optimal medical circumstances, the civilian study will bear the additional information about the situational

context of the death," explained Brian Eastridge, MD, MIMIC project Principal Investigator and Trauma Medical Director at University Hospital in San Antonio. "This second tier of data analysis may provide specific actionable information upon which to develop essential criteria for trauma systems across the US."

To build the essential reference database, NTI hired a Geographic Information System (GIS) specialist with a master's degree in Environmental Science and a thorough knowledge of the ArcGIS mapping and analytics platform. He has nearly completed the meticulous work of mapping all the hospitals, air transport, and emergency medical systems within the six states involved in the study, as well as the 13 adjoining states from where an injured patient might be transported.

It was quickly discovered that while the locations of Level 1 and 2 trauma hospitals are easily accessible through the American College of Surgeons, every other data point needed intensive investigation of multiple disparate sources to assemble the requisite time and distance maps.

With no single resource to draw from, NTI has developed an expansive search, contacting State Departments of Health, EMS Systems, Fire Departments, and national organizations, such as the National Emergency Medical Services Information System (NEMSIS). "We know this information exists, but the key is figuring out who to talk to in each state. Sometimes I can find a document to download, but more often than not, it's a trail of contact emails, website referrals, and incomplete data sets," said Nick Medrano, the GIS specialist working on the map. In the cases where there is incomplete data, he does the research and creates a spreadsheet from scratch that he then uploads into the ArcMap software.

Medrano is also layering in information, drawn from past studies, related to dispatch response time, time with the patient, travel to and

from the scene, and other EMS inputs. As a last step, he will integrate a rich set of road network data and topographic data salient to aeromedical transport and run the software protocols on each set of state data being provided by Medical Examiners offices. It will then be up to MIMIC's panel of reviewers to use this tool to make accurate assessments of potential survivability and identify potential high yield areas for research and development in pre-hospital medical care, injury prevention, and trauma systems.

"Mapping is tedious and repetitive, but once you get the data in there, you can do all kinds of analyses, and that's when it gets very intriguing," Medrano said. He can already envision other interesting questions that could be answered once his comprehensive GIS map is completed.

"Medical examiners investigate deaths to serve the living," added Kurt Nolte, MD. Nolte is the Chief Medical Investigator, New Mexico Office of the Medical Investigator and University of New Mexico School of Medicine, and an investigator in the MIMIC study. "This study will use medical examiner data to learn how to reduce out of hospital trauma mortality and will also more closely link medical examiner data with emergency responder data sets so that we can learn to more effectively investigate cases of trauma mortality."

"The addition of GIS capability to the MIMIC analysis will substantively enhance the potential of the research to generate real evidence-based momentum toward the continued evolution of the trauma system concept," said Dr. Eastridge.

-by Pam Bixby, Pam@NatTrauma.org

This work is supported by the Office of the Assistant Secretary of Defense for Health Affairs through the Defense Medical Research and Development Program under Award No. W81XWH-17-2-0010. The U.S. Army Medical Research Acquisition Activity, 820 Chandler Street, Fort Detrick MD 21702-5014 is the awarding and administering acquisition office. Opinions, interpretations, conclusions and recommendations are those of the author and are not necessarily endorsed by the Department of Defense or the National Trauma Institute.

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News in Trauma

Alternative payment models: can (should) trauma care be bundled?

Source: TSACO | Published on 2018-06-07

Combat-tested abdominal/junctional tourniquet proven equivalent to REBOA

Source: Trauma Systems News | Published on 2018-06-04

NTI Facebook Posts

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NTI 7 Jun

Trauma Investigators lay out rationale for National Trauma Research Action Plan in JOT https://t.co/jTyaCNMHHf @traumadoctors @EAST_TRAUMA @CoalitionNTR #FundTraumaResearch

NTI 4 Jun

Help NTI build its Trauma Knowledge Translation Pathway https://t.co/raSAaFeKUb

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Reviewers Train for MIMIC Pre-Hospital Death Study

nattrauma.org/reviewers-train-for-mimic-pre-hospital-death-study/

October 11, 2018

In September at the 2018 AAST meeting in San Diego, the MIMIC project team trained more than 30 trauma surgeons on how to use the Profiler tool to review and determine survivability of prehospital trauma deaths. With the first training completed, the "Multi-institutional Multi-disciplinary Injury Mortality Investigation in the Civilian Pre-Hospital Environment" (MIMIC) study is well underway.

Col. Brian Eastridge greets MIMIC reviewers.

The MIMIC investigation is designed to develop a comprehensive perspective of prehospital injury death, which will highlight opportunities for improvement in EMS, medical examiner, and trauma care systems.

As a first step, NTI has assembled review teams including more than 90 subject matter experts in the fields of trauma surgery, emergency medicine, neurosurgery, orthopedic surgery, trauma systems, and forensic pathology. Using the Profiler tool, the reviewers will perform more than 3,000 electronic reviews of pre-hospital injury deaths from data provided by six medical examiner sites across the country.

Profiler is the customized computer-based tool that allows online reviews to achieve the goals and timelines. Another training session is being held in October during the National Association of Medical Examiners (NAME) meeting for the Medical Examiner reviewers and abstracters.

Dr. Ellen MacKenzie, Dean of the Johns Hopkins Bloomberg School of Public Health, and Dr. Kurt Nolte, with the National Association of Medical Examiners, serve as Co-Investigators along with Principal Investigator Dr. Brian Eastridge at UT Health Science Center in San Antonio.

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MIMIC Reviewer Training

January 7, 2019

Overview

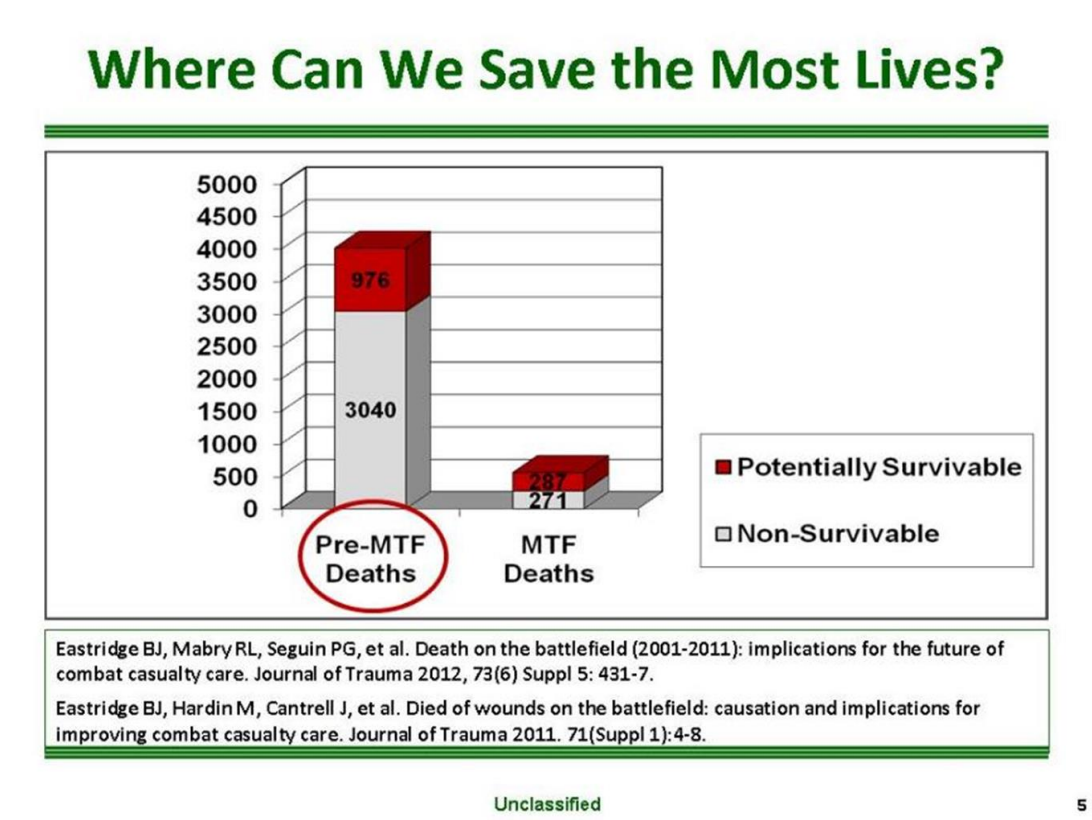
- MIMIC Project Overview
- Survivability Definitions
- Profiler Training

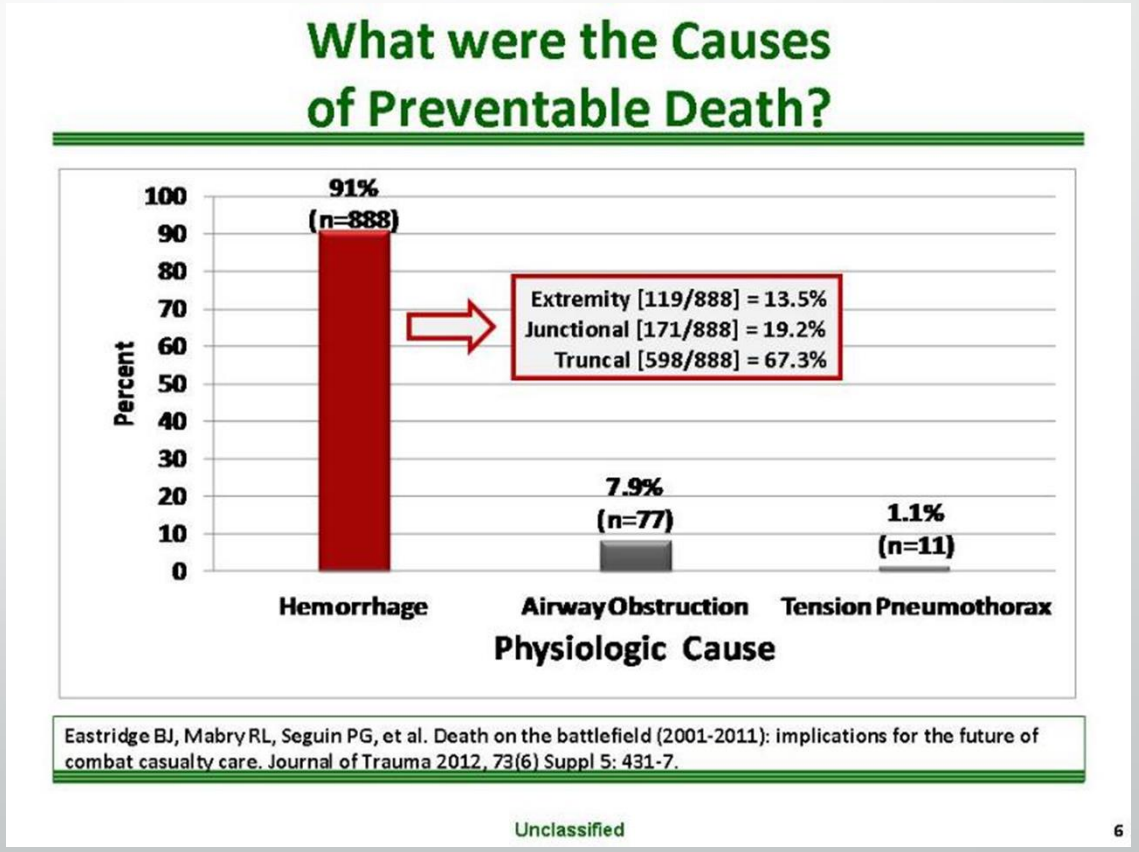
MIMIC Project Overview

DoD Broad Agency Announcement (BAA) Grant

- Department of Defense (BAA $3,979,380)
- PI: Brian Eastridge, MD
  Professor, Department of Surgery
  Division Chief, Trauma and Emergency General Surgery
  Jocelyn and Joe Straus Endowed Chair in Trauma Research
  University of Texas Health Science Center at San Antonio
- Co-PI: Kurt Nolte, MD
  Professor of Pathology
  University of New Mexico
  Director of Radiology-Pathology Center for Forensic Imaging
  Chief Medical Investigator, Office of the Medical Investigator
  Ellen MacKenzie, PhD
  Dean, Johns Hopkins Bloomberg School of Public Health
  Bloomberg Distinguished Professor

Background/Scientific Rationale
Pre-Hospital Mortality Combat

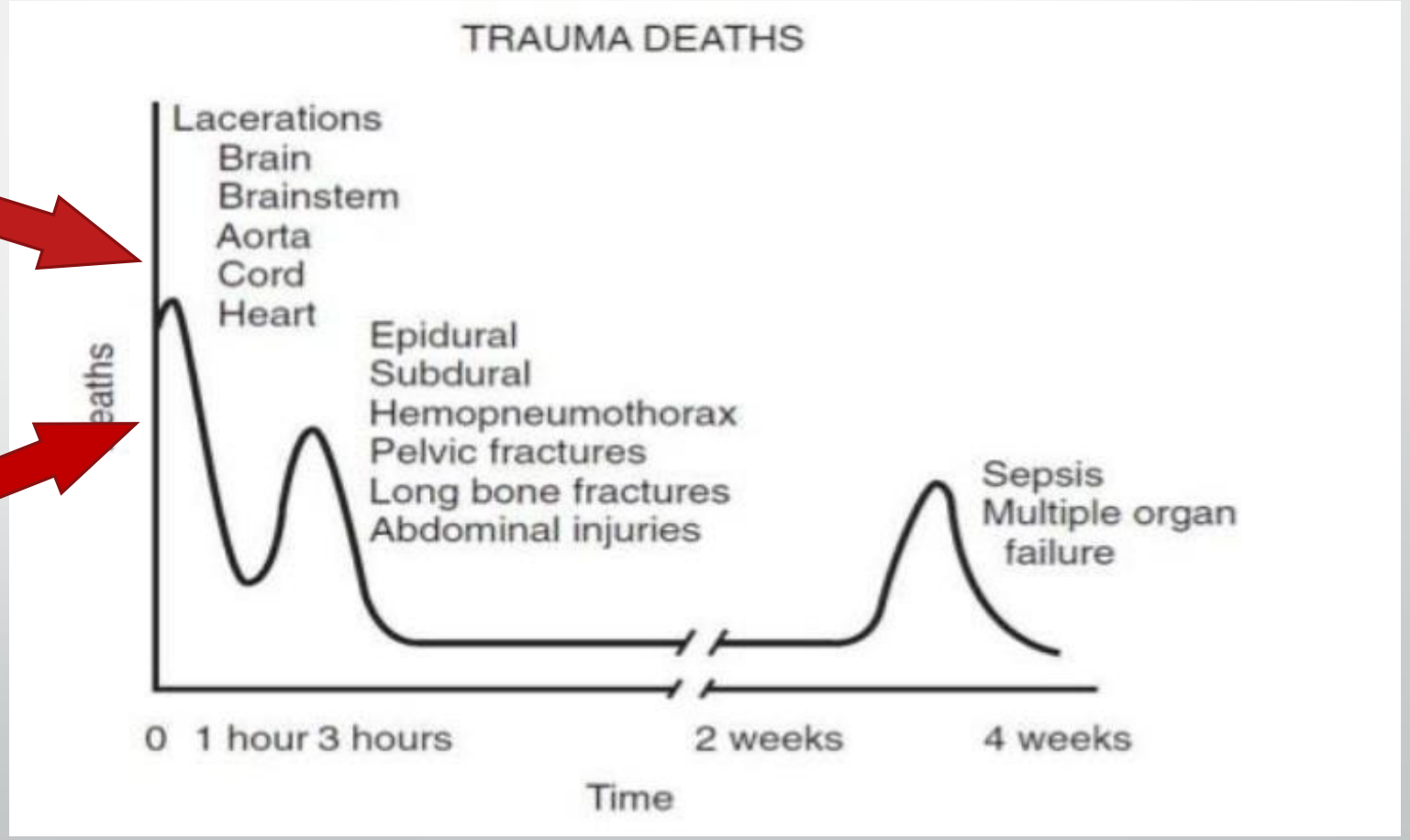




Background/Scientific Rationale PreHospital Mortality Civilian

Poorly defined

NASEM Report Emphasis



Study Hypotheses

- Substantial opportunity to further reduce deaths in pre-hospital setting.
  - Potential liabilities in civilian and military pre-hospital care must be identified and remediated in order to reduce the number of potentially preventable deaths on the battlefield and in the civilian environment.

MIMIC Objectives

- **Objective #1:** ***Develop a framework and methodology*** for evaluating pre-hospital deaths
- **Objective #2:** Organize and standardize a ***multidisciplinary, multi-institutional network of experts*** to identify the causes of pre-hospital deaths due to trauma and estimate the potential for survivability.
- **Objective #3:** ***Define the causes and pathophysiologic mechanisms of 3,000 pre-hospital deaths***, and estimate the potential for survivability
- **Objective #4:** ***Describe the epidemiology of pre-hospital mortality*** in the context of trauma system development and estimate its impact on society.
- **Objective #5:** ***Develop a blueprint for a sustained effort*** identifying high priority areas for injury prevention, trauma systems performance improvement and research and development.

System Benefits

Trauma

- Performance improvement
  - Engineering
  - Medical devices / procedures
  - EMS value validation
  - Injury Prevention
  - Collaboration between trauma and ME communities

Medical Examiner

- Funding for advanced radiological imaging
- Improve mechanistic information
- Interaction between trauma and ME communities
- Bridge the gap between ME and TS data sets

Study Population

- **Inclusion Criteria:**
  1. Pre-hospital deaths (at scene, en route to hospital or DOA – defined as no vitals upon arrival at hospital)
  2. Blunt, Penetrating, Thermal, and Suicides are included

- **Exclusion Criteria:**
  1. Non-mechanical causes of death – poisoning, drug overdoses, hangings, drowning (unless associated with trauma)
  2. Decomposed remains only (not fully fleshed with distinguishable organs)

Forensic Record

Medical Examiner cases may involve any of the following:

- External examination
- Internal examination
- Investigator reports
- Toxicology Report
- Radiographs- CT Reports will be uploaded. Actual images will be uploaded if available and when a case requires adjudication.

Study Setting
Six Regions in the Country

(Centralized ME systems and utilizing electronic case management system to collect uniform data on all deaths)

1. **State of Connecticut**. Serves a population of 3.6 million. They perform approximately 2,200 autopsy examinations at a single, centralized facility annually.
2. **Johnson County, Iowa.** Serves a population of 142,000. In 2014 JCME accepted jurisdiction of 380 deaths and performed 118 autopsies.
3. **State of Maryland.** Serves a population of approximately 6.0 million residents . They perform 4,220 autopsies at the single, centralized facility annually.
4. **State of New Mexico.** Serves a population of 2.0 million. They perform approximately 2,100 full autopsy examinations annually
5. **State of Oklahoma.** Serves a population of 3.8 million and conducts investigation of roughly 4,000 deaths annually.
6. **The District of Columbia.** Serves a population of 659,000. They perform approximately 1,110 examinations annually.

Estimates of Number of Injury Deaths

(Blunt, Firearm and Other Sharp Forces)

OCME	2012	2013	2014	Total
Connecticut	684	621	692	1997
Johnson Co, Iowa	133	128	110	371
Maryland	1509	1200*	1200*	3909
Oklahoma	1044	1153	1007	3204
New Mexico	823	778	906	2507
Washington, DC	232	267	254	753
Total	**4,425**	**4,147**	**4,169**	**12,741**

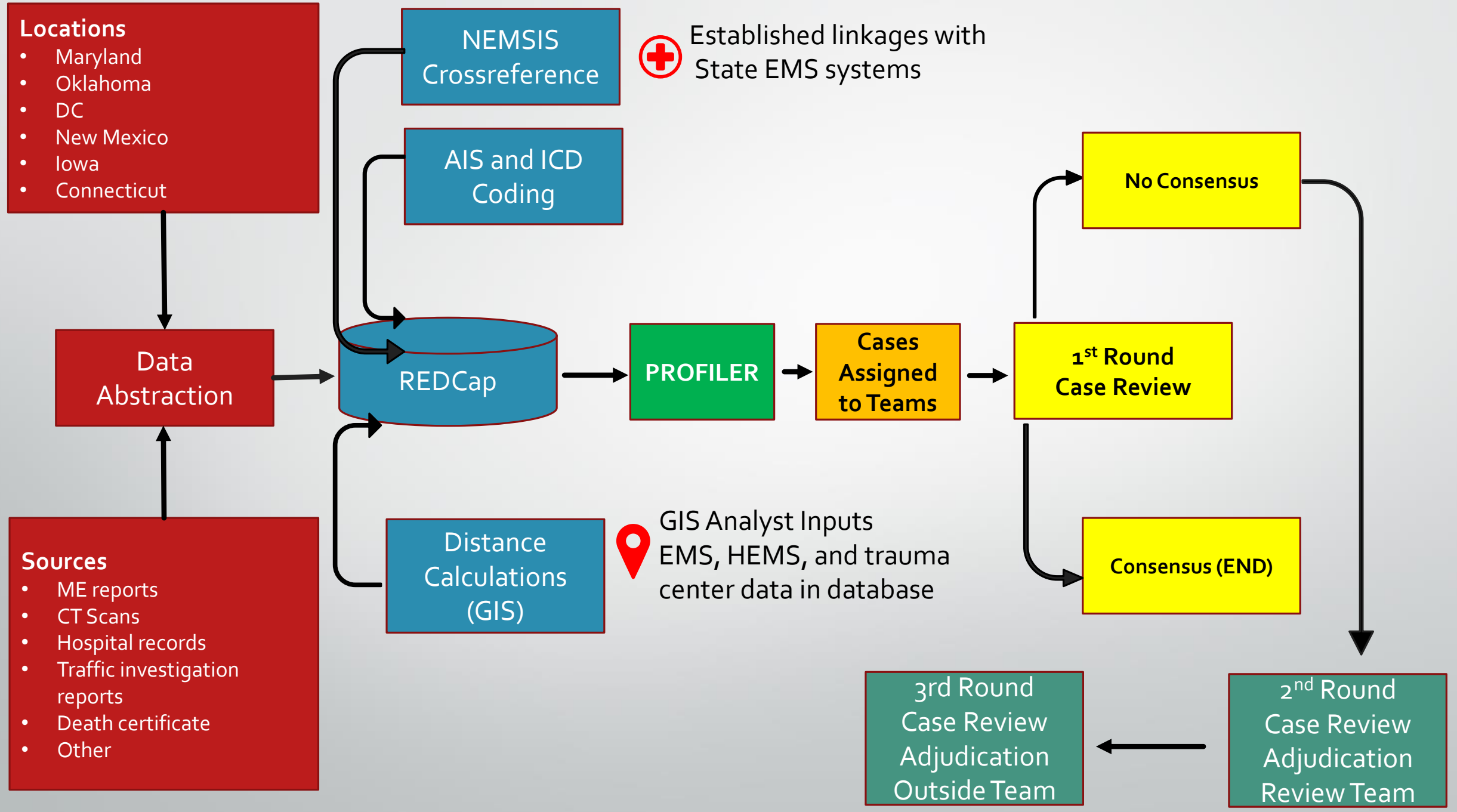
* Estimates

MIMIC Final Subject Selection

ME Site	Number of Cases
Connecticut	427
Johnson Co, Iowa	47
Maryland	848
Oklahoma	341
New Mexico	1,243
Washington, DC	152
Total	**3,058**

Case Review Methods

- Steering Committee (Military and Civilian) defined definitions and process
- Expert review panels (~ 80 Military and Civilian reviewers) (6 individuals each) will be identified and trained
  - 4 Trauma Surgeons
  - 1 EM/EMS
  - 1 Forensic
- Orthopedic Surgeons and Neurosurgeons will also be utilized on cases requiring expert review in these areas
- Panels will each review a certain number of cases using the **PROFILER** and assign a determination of survivability to each case – members of the panels will review cases independently. Throughout the course of the study approximately **250 cases** will be reviewed by each team.
- Discrepancies in determination of survivability will be identified and non-consensus will be reviewed by an adjudication team


Locations
Maryland
Oklahoma
DC
New Mexico
Iowa
Connecticut
NEMSIS Crossreference
Established linkages with State EMS systems
AIS and ICD Coding
Data Abstraction
REDCap
PROFILER
Cases Assigned to Teams
1st Round Case Review
No Consensus
Consensus (END)
Sources
ME reports
CT Scans
Hospital records
Traffic investigation reports
Death certificate
Other
Distance Calculations (GIS)
GIS Analyst Inputs
EMS, HEMS, and trauma center data in database
2nd Round Case Review Adjudication Review Team
3rd Round Case Review Adjudication Outside Team

MIMIC Timeline

- January 2019
  - Complete Team Assignments
  - Launch Study Cases
- Cases will be released monthly
  - (approximately 20 cases)
- Online adjudication will be conducted as needed

Survivability Definitions

Survivability Definitions

- **Non Survivable-** Death as a result of catastrophic anatomic injuries
- **Possibly Survivable -** Anatomic injuries that were severe but medically survivable
- **Definitely Survivable-** Minimal anatomic injuries with a high likelihood of survival
- **Cannot Judge-** information insufficient to make a determination

Anatomic Survivability

Medically Non-Survivable (MNS)

- Dismemberment / decapitation
- Traumatic Brain evisceration
- Cervical cord transection (above C_3)
- Airway transection within thorax
- Cardiac injury > 2cm
- Uncontained hemorrhage, thoracic aorta
- Uncontained hemorrhage, pulmonary artery
- Hepatic avulsion
- Junctional lower extremity amputations with open pelvis
- Injuries to the deep CNS nuclei, brainstem, or massive brain tissue injury
- Massive Pulmonary Tissue Disruption

Medically Potentially Survivable / Definitely Survivable

- All other

Profiler Training

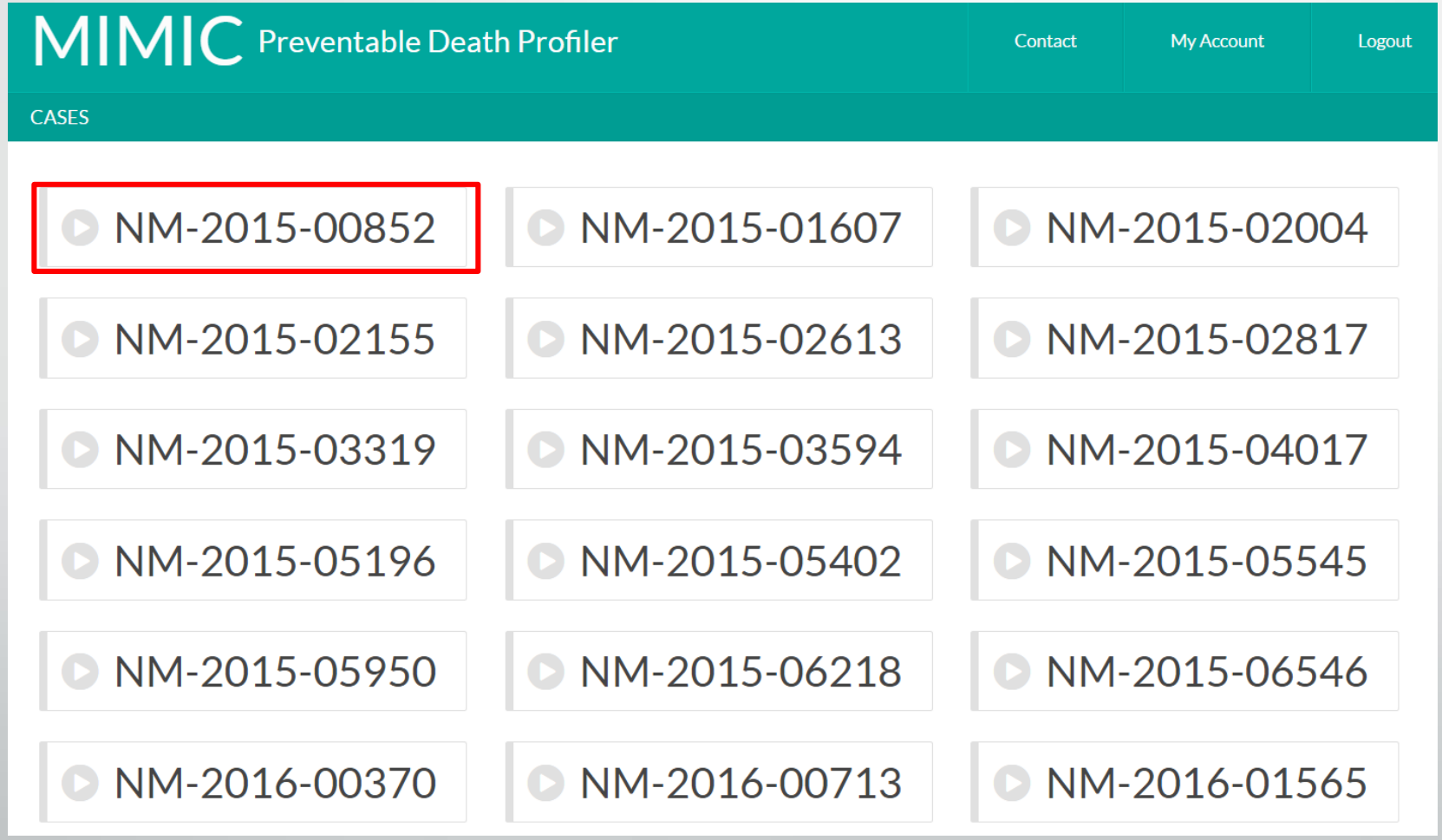
Profiler

- Log in to Profiler
- If you forget your password, click on forgot password to reset

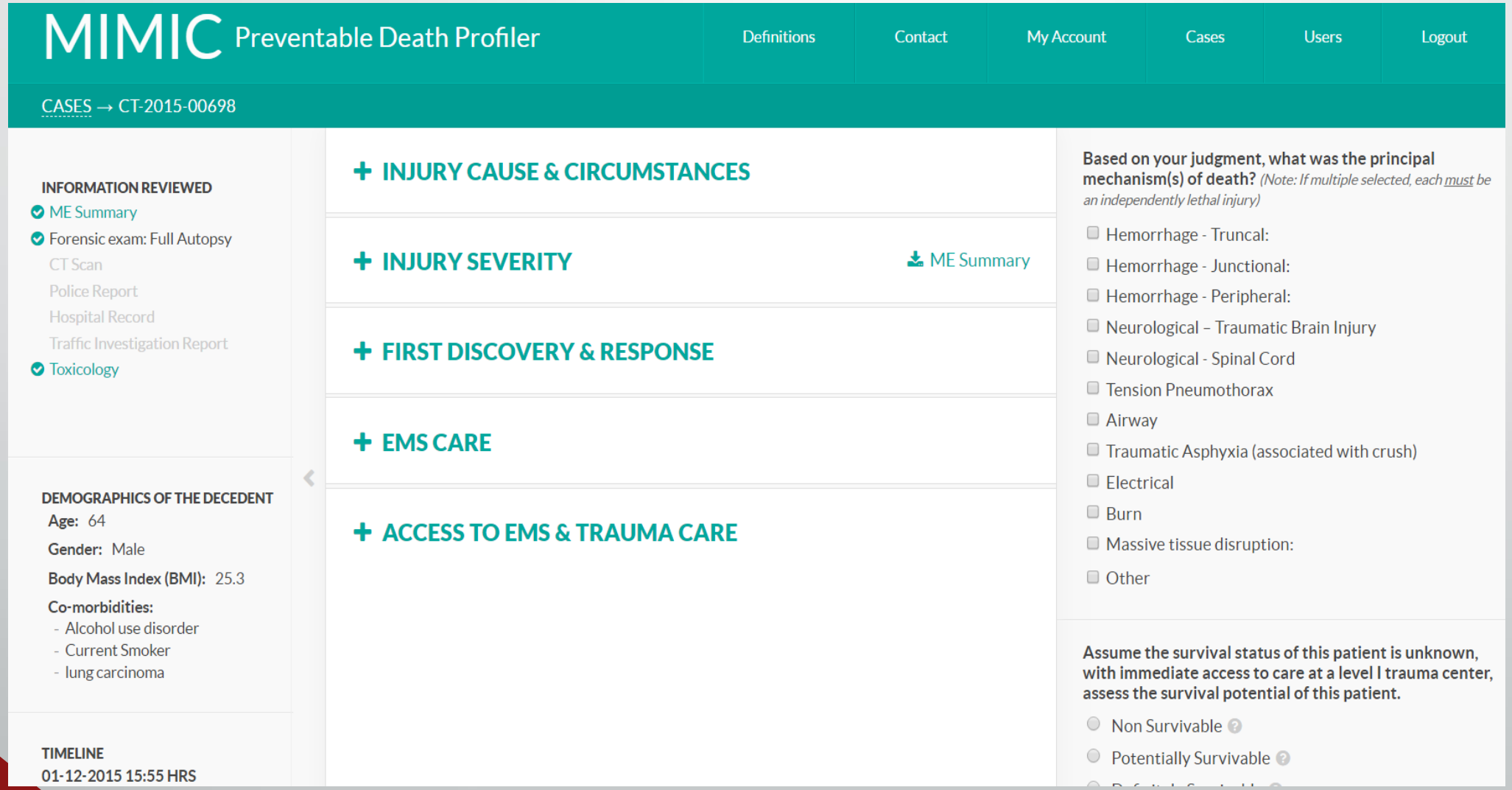
Profiler

1) **Open medical examiner case in Profiler**
2) **Review case**
   - Medical examiner data (left side of page)
   - Injury cause / circumstance
   - Injury severity
   - First Discovery & Response
   - EMS Care
   - Access to EMS and Trauma Center
3) **Causation and survival determination**
   - Primary cause of death (may choose multiple but must be associated with severe injury)
   - Assuming immediate access to trauma care
   - Actual conditions
   - Opportunities for improvement (free text)

Open Medical Examiner Case in Profiler

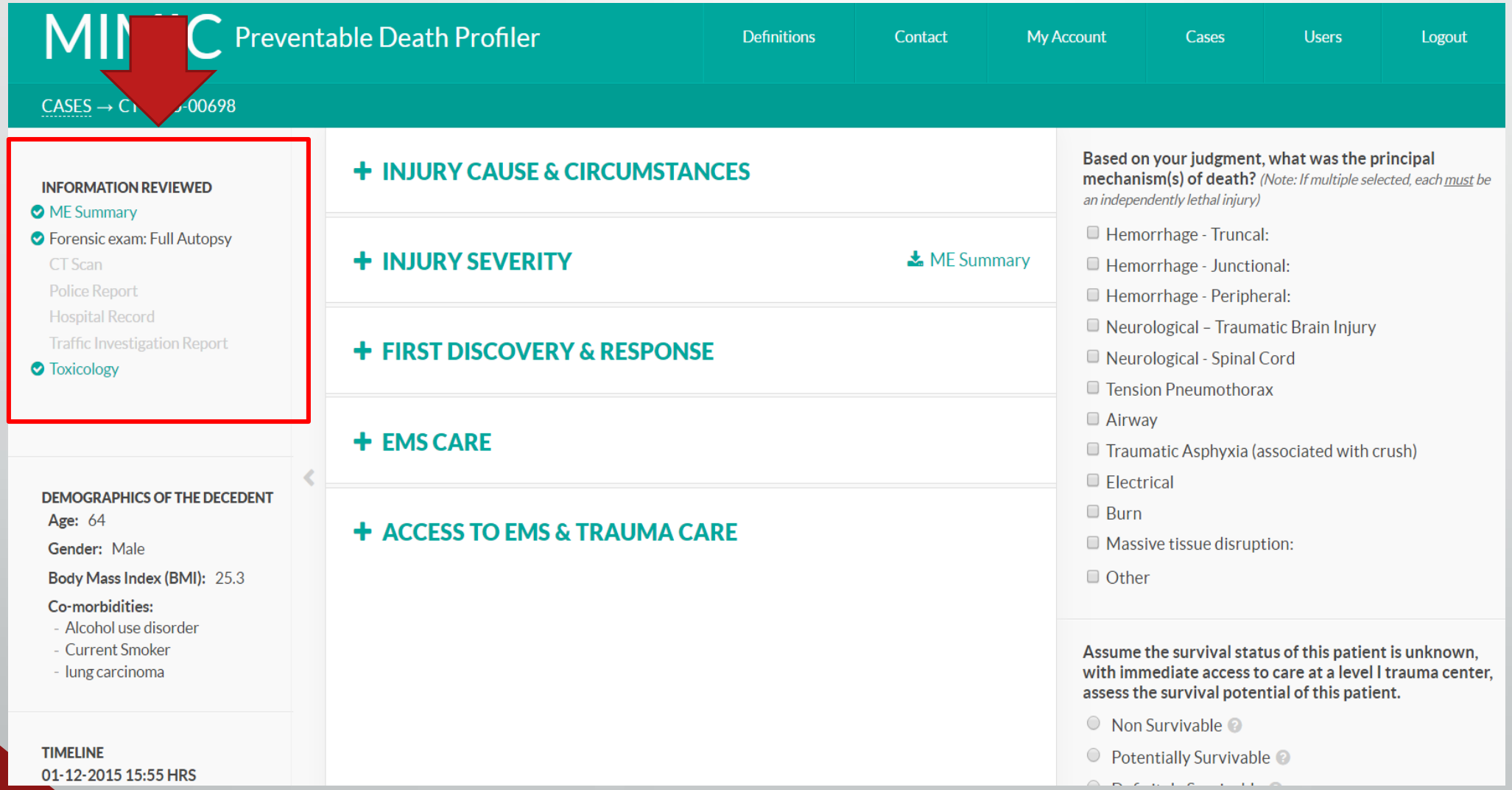


Open Medical Examiner Case in Profiler

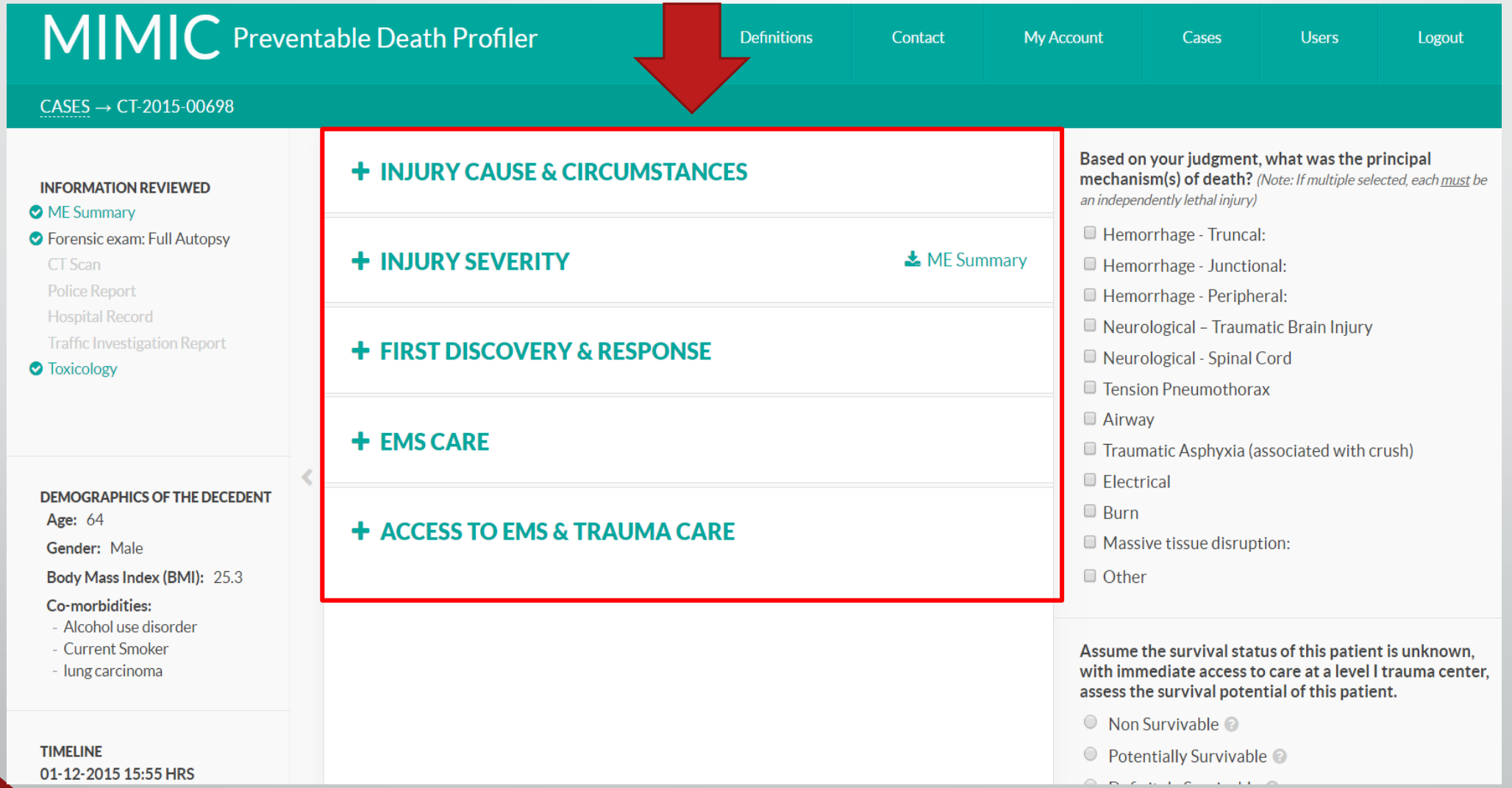


Review Case

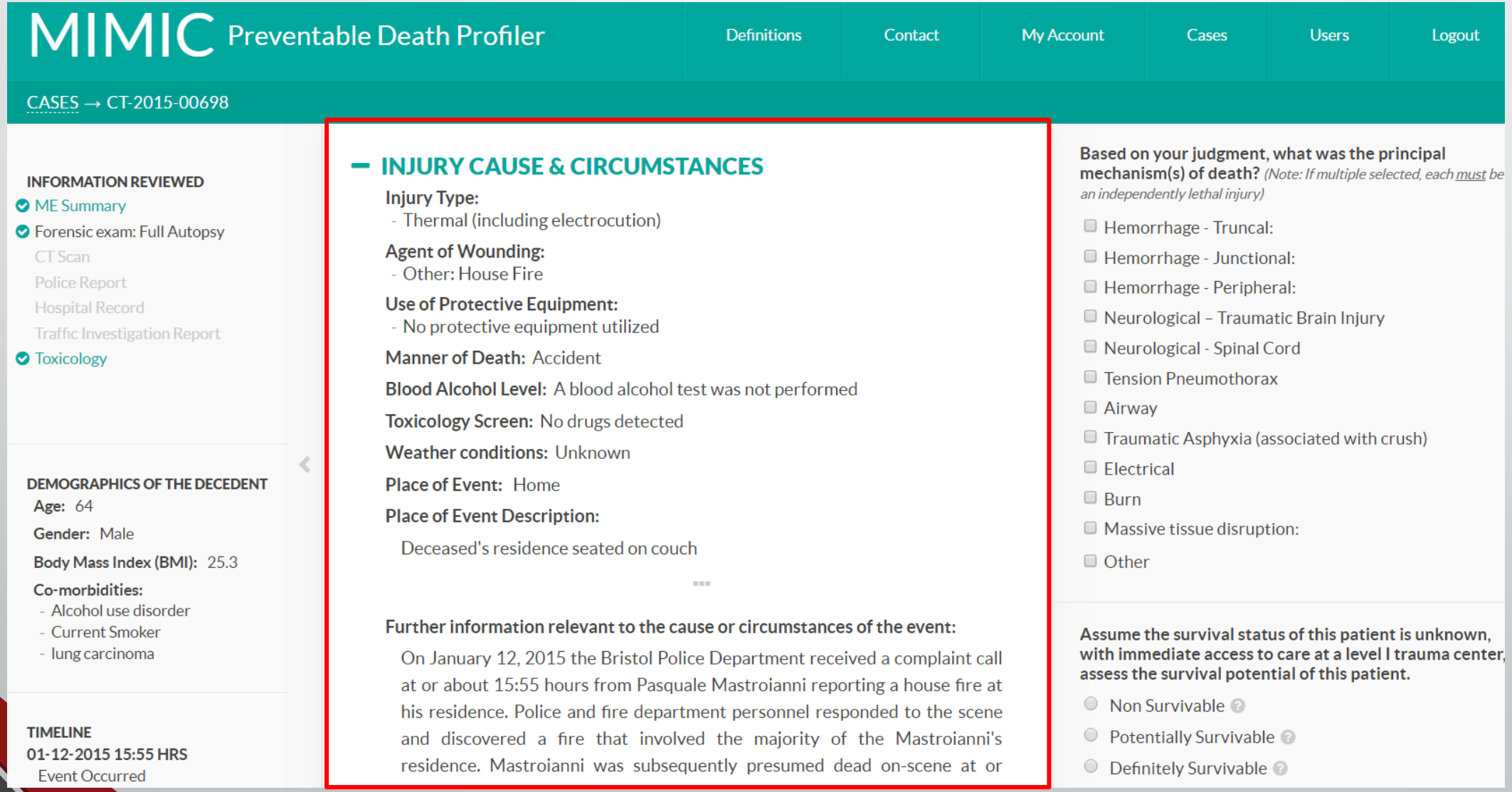
Medical Examiner Data



Review Case


MIMIC Preventable Death Profiler
Definitions
Contact
My Account
Cases
Users
Logout
CASES → CT-2015-00698
INFORMATION REVIEWED
ME Summary
Forensic exam: Full Autopsy
CT Scan
Police Report
Hospital Record
Traffic Investigation Report
Toxicology
DEMOGRAPHICS OF THE DECEDENT
Age: 64
Gender: Male
Body Mass Index (BMI): 25.3
Co-morbidities:
- Alcohol use disorder
- Current Smoker
- lung carcinoma
TIMELINE
01-12-2015 15:55 HRS
+ INJURY CAUSE & CIRCUMSTANCES
+ INJURY SEVERITY
ME Summary
+ FIRST DISCOVERY & RESPONSE
+ EMS CARE
+ ACCESS TO EMS & TRAUMA CARE
Based on your judgment, what was the principal mechanism(s) of death? (Note: If multiple selected, each must be an independently lethal injury)
Hemorrhage - Truncal:
Hemorrhage - Junctional:
Hemorrhage - Peripheral:
Neurological – Traumatic Brain Injury
Neurological - Spinal Cord
Tension Pneumothorax
Airway
Traumatic Asphyxia (associated with crush)
Electrical
Burn
Massive tissue disruption:
Other
Assume the survival status of this patient is unknown, with immediate access to care at a level I trauma center, assess the survival potential of this patient.
Non Survivable
Potentially Survivable

Review Case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Age: 64
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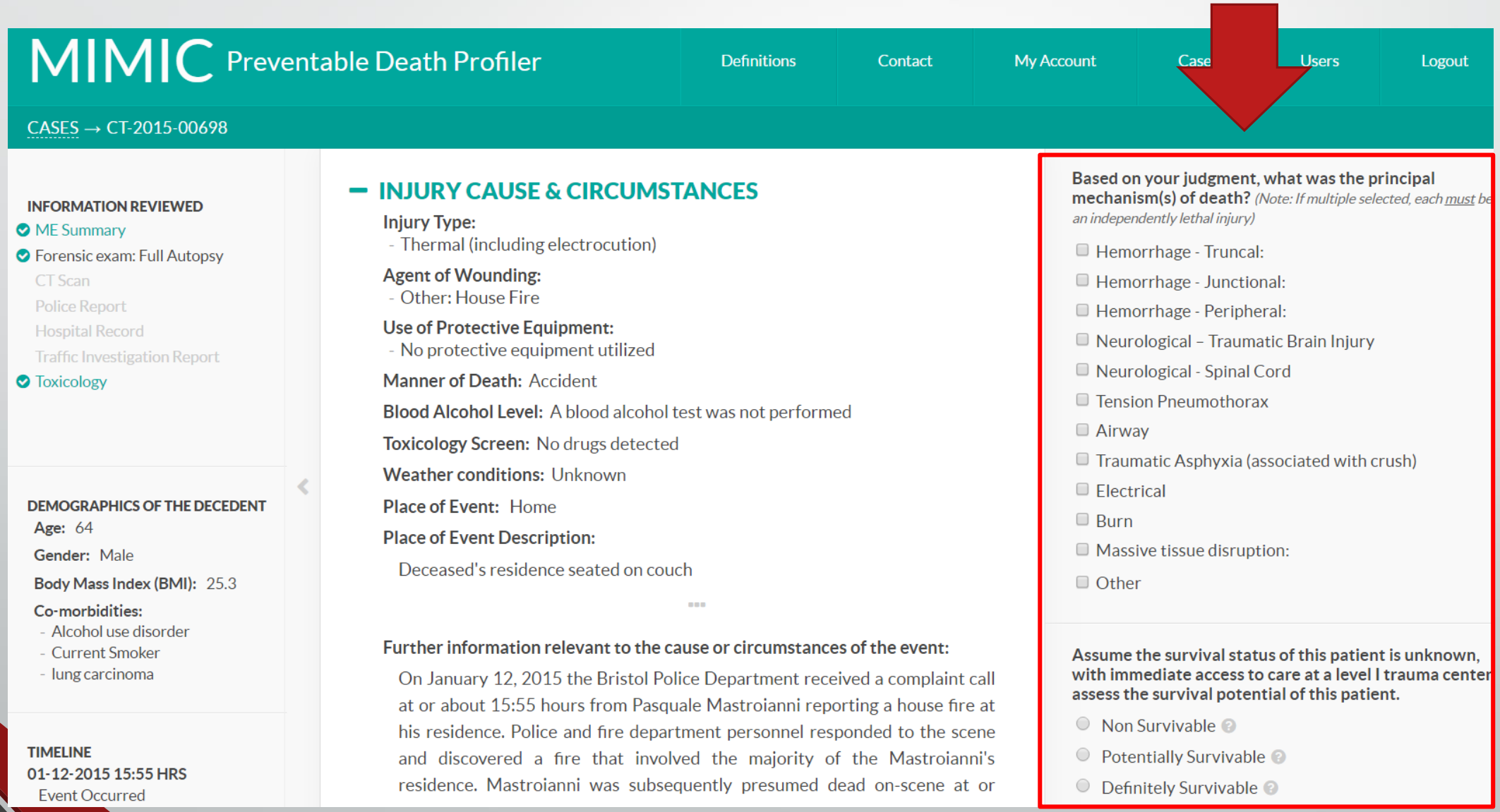
Co-morbidities:
- Alcohol use disorder
- Current Smoker
- lung carcinoma
TIMELINE
01-12-2015 15:55 HRS
Event Occurred
INJURY CAUSE & CIRCUMSTANCES
Injury Type:
- Thermal (including electrocution)
Agent of Wounding:
- Other: House Fire
Use of Protective Equipment:
- No protective equipment utilized
Manner of Death: Accident
Blood Alcohol Level: A blood alcohol test was not performed
Toxicology Screen: No drugs detected
Weather conditions: Unknown
Place of Event: Home
Place of Event Description:
Deceased's residence seated on couch
Further information relevant to the cause or circumstances of the event:
On January 12, 2015 the Bristol Police Department received a complaint call at or about 15:55 hours from Pasquale Mastroianni reporting a house fire at his residence. Police and fire department personnel responded to the scene and discovered a fire that involved the majority of the Mastroianni's residence. Mastroianni was subsequently presumed dead on-scene at or
Based on your judgment, what was the principal mechanism(s) of death? (Note: If multiple selected, each must be an independently lethal injury)
Hemorrhage - Truncal:
Hemorrhage - Junctional:
Hemorrhage - Peripheral:
Neurological – Traumatic Brain Injury
Neurological - Spinal Cord
Tension Pneumothorax
Airway
Traumatic Asphyxia (associated with crush)
Electrical
Burn
Massive tissue disruption:
Other
Assume the survival status of this patient is unknown, with immediate access to care at a level I trauma center, assess the survival potential of this patient.
Non Survivable
Potentially Survivable
Definitely Survivable

Causation and Survival Determination



Causation and Survival Determination

Principal mechanism of death

MIMIC Preventable Death Profiler

Definitions | Contact | My Account | Cases | Users | Logout

CASES → CT-2015-00698

INFORMATION REVIEWED

- ME Summary
- Forensic exam: Full Autopsy
- CT Scan
- Police Report
- Hospital Record
- Traffic Investigation Report
- Toxicology

DEMOGRAPHICS OF THE DECEDENT

Age: 64

Gender: Male

Body Mass Index (BMI): 25.3

Co-morbidities:

- Alcohol use disorder
- Current Smoker
- lung carcinoma

TIMELINE

01-12-2015 15:55 HRS

Event Occurred

INJURY CAUSE & CIRCUMSTANCES

Injury Type:
- Thermal (including electrocution)

Agent of Wounding:
- Other: House Fire

Use of Protective Equipment:
- No protective equipment utilized

Manner of Death: Accident

Blood Alcohol Level: A blood alcohol test was not performed

Toxicology Screen: No drugs detected

Weather conditions: Unknown

Place of Event: Home

Place of Event Description:

Deceased's residence seated on couch

Further information relevant to the cause or circumstances of the event:

On January 12, 2015 the Bristol Police Department received a complaint call at or about 15:55 hours from Pasquale Mastroianni reporting a house fire at his residence. Police and fire department personnel responded to the scene and discovered a fire that involved the majority of the Mastroianni's residence. Mastroianni was subsequently presumed dead on-scene at or

Based on your judgment, what was the principal mechanism(s) of death? *(Note: If multiple selected, each must be an independently lethal injury)*

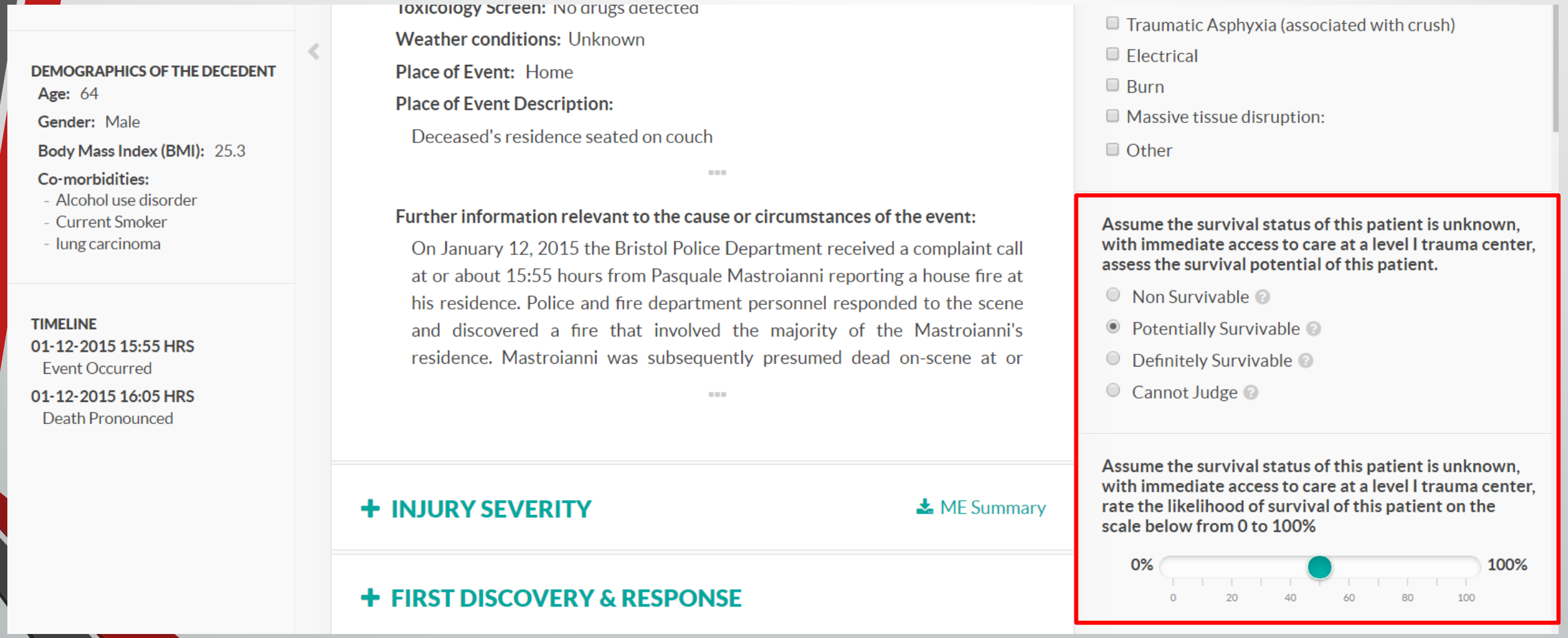
- ☐ Hemorrhage - Truncal:
- ☐ Hemorrhage - Junctional:
- ☐ Hemorrhage - Peripheral:
- ☐ Neurological – Traumatic Brain Injury
- ☐ Neurological - Spinal Cord
- ☐ Tension Pneumothorax
- ☐ Airway
- ☐ Traumatic Asphyxia (associated with crush)
- ☐ Electrical
- ☐ Burn
- ☐ Massive tissue disruption:
- ☐ Other

Assume the survival status of this patient is unknown, with immediate access to care at a level I trauma center, assess the survival potential of this patient.

- ○ Non Survivable
- ○ Potentially Survivable
- ○ Definitely Survivable

Causation and Survival Determination

Assuming immediate access to care…rate the likelihood of survival



Causation and Survival Determination

If Non Survivable…what led to your assessment?

- Current Smoker
- lung carcinoma

TIMELINE

01-12-2015 15:55 HRS
Event Occurred

01-12-2015 16:05 HRS
Death Pronounced

Further information relevant to the cause or circumstances of the event:

On January 12, 2015 the Bristol Police Department received a complaint call at or about 15:55 hours from Pasquale Mastroianni reporting a house fire at his residence. Police and fire department personnel responded to the scene and discovered a fire that involved the majority of the Mastroianni's residence. Mastroianni was subsequently presumed dead on-scene at or

INJURY SEVERITY

ME Summary

BODY REGION	AIS INJURY DESCRIPTION	AIS	MISS
THORAX	Smoke inhalation with large amounts of soot in upper and lower airways	5	5
EXTERNAL AND OTHER	1st - 3rd degree burns over 70 % BSA	5	5

OVERALL INJURY SEVERITY:

ISS:	50
NISS:	50
MISS:	50

FIRST DISCOVERY & RESPONSE

Event Witnessed? No

Assume the survival status of this patient is unknown, with immediate access to care at a level I trauma center, assess the survival potential of this patient.

- (•) Non Survivable
- ( ) Potentially Survivable
- ( ) Definitely Survivable
- ( ) Cannot Judge

IF NOT survivable assuming immediate access to definitive trauma care, what was the nature of the injury that led to your assessment?

IMMEDIATE / ACUTE

- [ ] Dismemberment
- [ ] Decapitation
- [ ] Traumatic brain evisceration
- [ ] Injuries to deep CNS nuclei, brainstem, or massive brain tissue injury
- [ ] Avulsive injury thorax (loss of portion chest wall in combination with avulsive destructive injury to thoracic organs
- [ ] Airway transection within thorax
- [ ] Massive pulmonary parenchymal destruction
- [ ] Cardiac Perforation (> 2 cm)
- [ ] Cardiac rupture / destruction
- [ ] Uncontained hemorrhage, thoracic aorta
- [ ] Uncontained hemorrhage, pulmonary artery
- [ ] Cardiac Injury (> 2 cm)

Causation and Survival Determination

Given the condition of the actual scenario…rate the likelihood of survival

− FIRST DISCOVERY & RESPONSE

Event Witnessed? No

RESPONSE	ARRIVAL	INTERVENTIONS	EXTRICATION
POLICE	Unknown	Unknown	No
FIRE	Unknown	Unknown	No

Transport from Scene:

- Mode of Transport: Trade Service
- Destination from Scene: OCME (Office of the Chief Medical Examiner)

− EMS CARE

EMS was not involved in this case.

+ ACCESS TO EMS & TRAUMA CARE

0 20 40 60 80 100

Assume the survival status of this patient is unknown, given the conditions of the actual scenario in which the injury occurred (i.e. discovery, EMS response, access to trauma center, weather etc.), assess the survival potential of this patient

- ○ Non Survivable
- ◉ Potentially Survivable
- ○ Definitely Survivable
- ○ Cannot Judge

Assume the survival status of this patient is unknown, given the conditions of the actual scenario in which the injury occurred (i.e. discovery, EMS response, access to trauma center, weather etc.), rate the likelihood of survival of this patient on the scale below from 0 to 100%

0% 100%

0 20 40 60 80 100

Causation and Survival Determination

What contributed to the death?

- Destination from Scene: OCME (Office of the Chief Medical Examiner)

EMS CARE

EMS was not involved in this case.

ACCESS TO EMS & TRAUMA CARE

Despite what actually occurred in this case, this table shows the estimated time and distance from the closest EMS facility to the location of the patient.

EMS GROUND DISTANCE (miles)	EMS GROUND TIME (minutes)	EMS AIR DISTANCE (miles)	EMS AIR TIME (minutes)
4	12	9	7

Despite what actually occurred in this case, this table shows estimated time and distance to the closest trauma center from the time EMS dispatch receives the call to the patient's arrival at the trauma center. These distances and times were calculated based on the location of this patient.

CLOSEST TRAUMA CENTER	EMS GROUND DISTANCE (miles)	EMS GROUND TIME (minutes)	EMS AIR DISTANCE (miles)	EMS AIR TIME (minutes)
LEVEL I	22	56	22	34
LEVEL II	19	51	19	33
LEVEL III	62	86	52	47
LEVEL IV OR NON-DESIGNATED	0	0	0	0

Given the conditions of the actual scenario in which the injury occurred, what contributed to the death (and how much did each contribute: very little, some, a lot)?

TRAUMA SYSTEM

- ☐ Lack of field intervention by law enforcement
- ☐ Lack of field intervention by bystander
- ☐ Access to regional trauma center > 30 minute transport
- ☐ Timeliness of discovery
- ☐ Delay secondary to tactical response
- ☐ Lack of specialized responders (high angle, swift water, etc)
- ☐ Lack of resources
- ☐ Failure of preparedness
- ☐ Other

AGENT / ENVIRONMENT

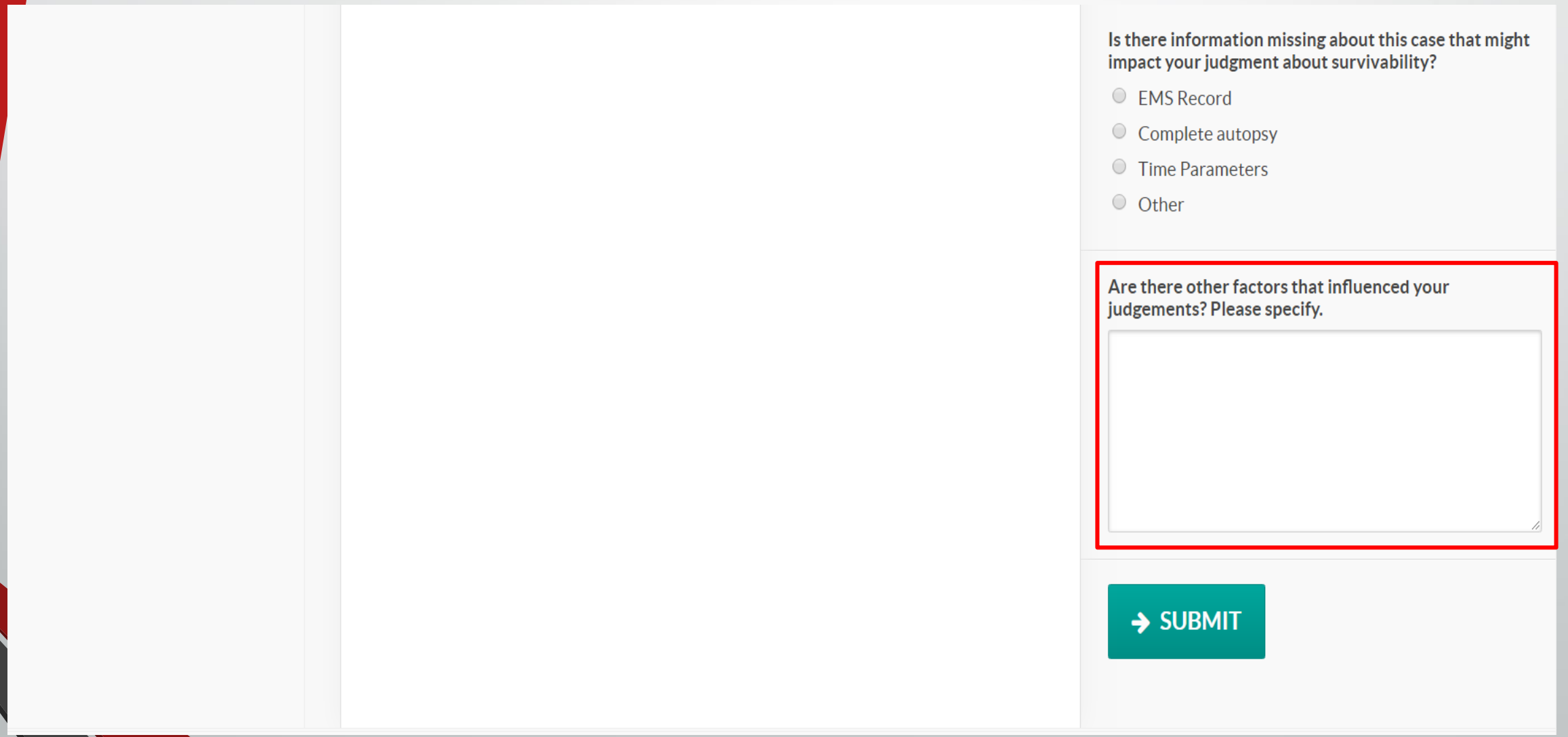
- ☐ Mechanical failure
- ☐ Safety device failure
- ☐ Safety device not used
- ☐ Automatic crash identification systems
- ☐ Other

PATIENT

- ☐ Comorbid physical conditions
- ☐ Comorbid behavioral health conditions
- ☐ Intoxication - Alcohol
- ☐ Intoxication - Drugs

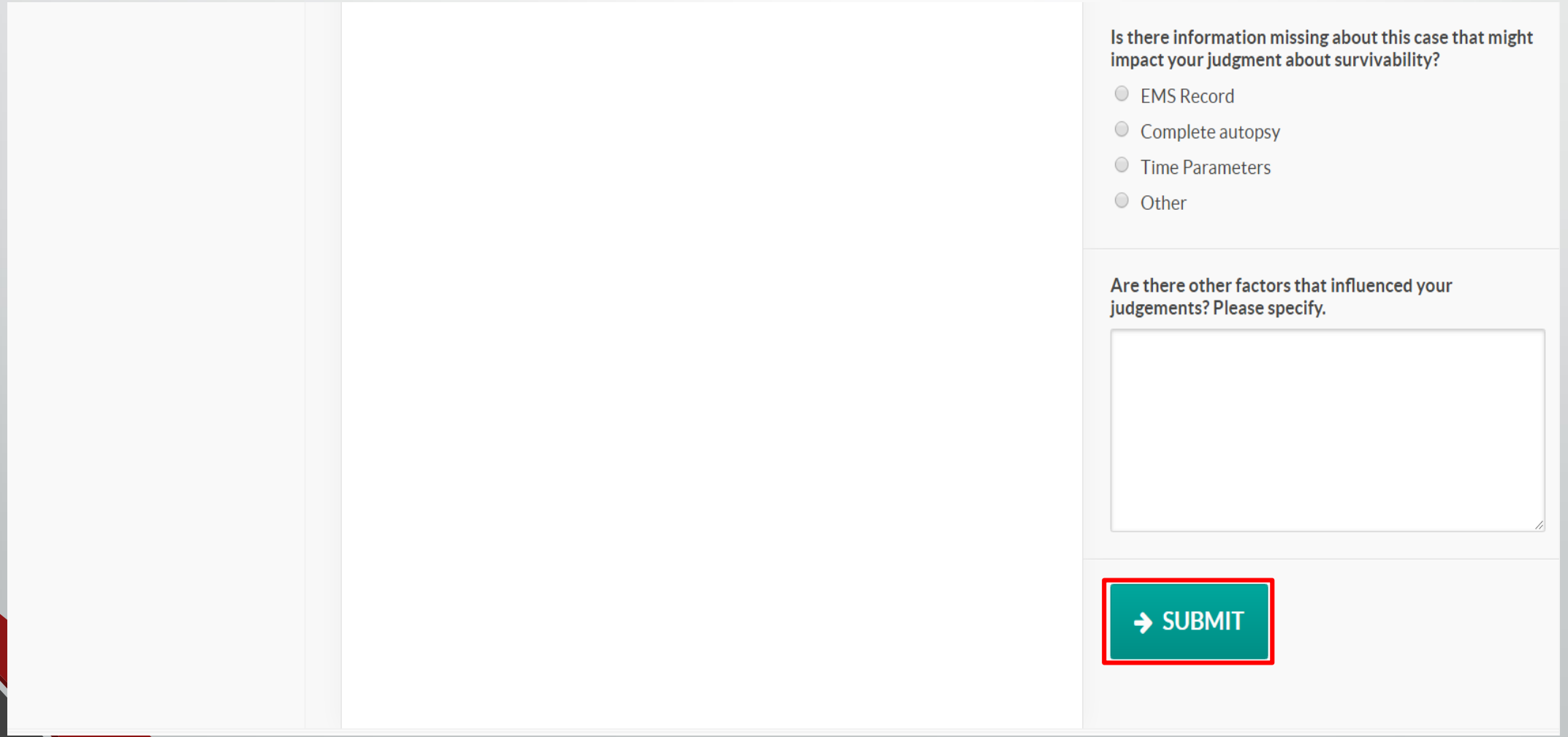
Causation and Survival Determination

- Rational for how you made your determination; may help if adjudication is needed



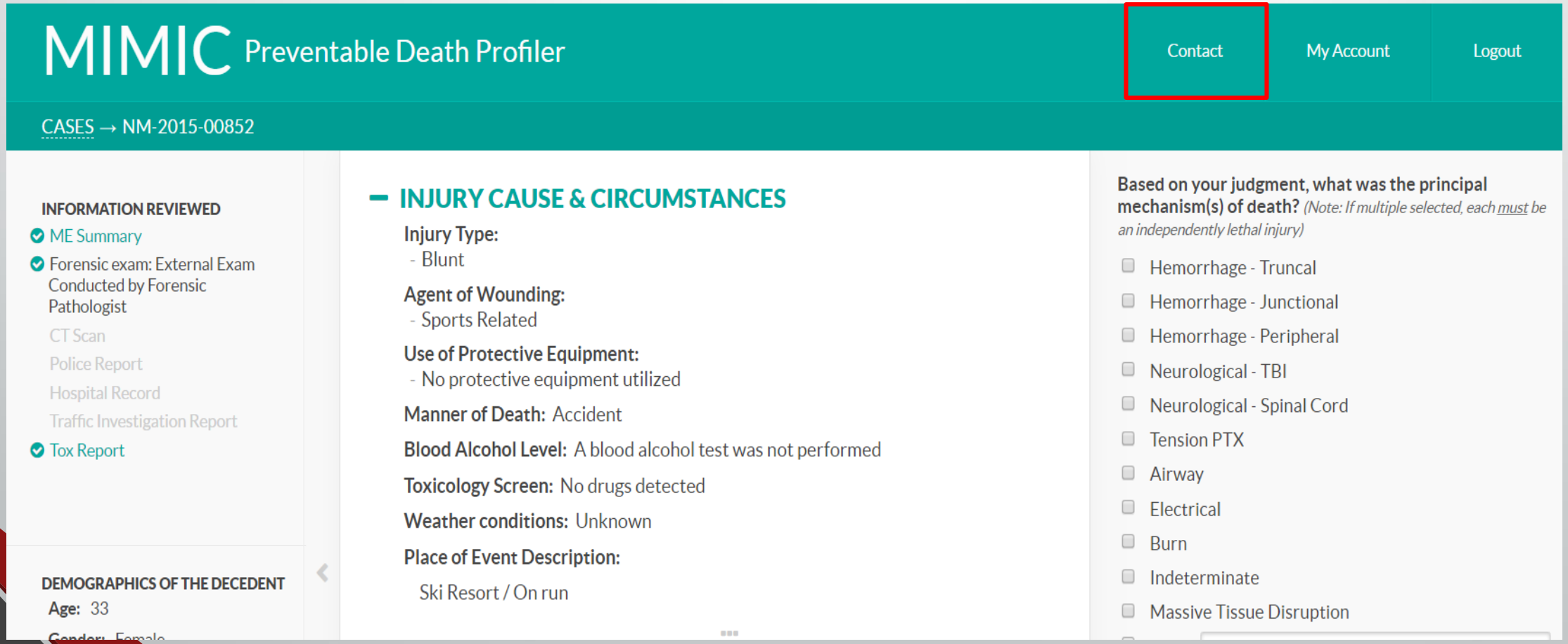
Causation and Survival Determination

- Submission is final, unless adjudication is needed



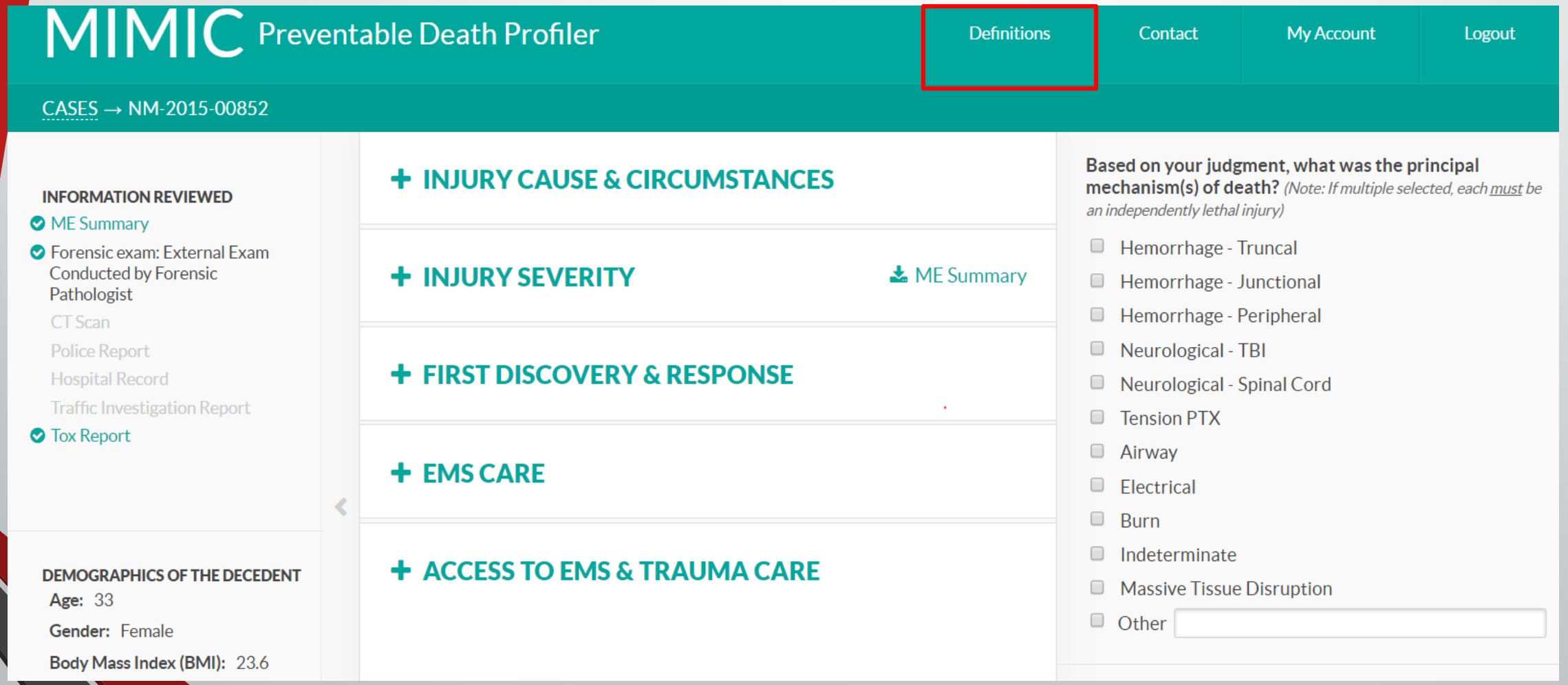
Profiler Questions

- If you have questions on a particular case or see an error in the information, please submit an email to the **Contact** located on the Profiler site.



Profiler: Definitions Tab

- If you need to refer to the survivability definitions, please click on the Definitions Tab located on the Profiler site.



Adjudication Process

- Online adjudication will be conducted with each team panel to discuss via an online platform in Profiler if consensus is not reached.
  - During adjudication, each reviewer will have access to the case they originally scored, and the ability to see the scores of other team members and be able to make edits.
- If consensus is still unable to be reached, the case will be reviewed by a separate adjudication team.

Questions

IF YOU HAVE ANY PROJECT RELATED QUESTIONS, PLEASE DO NOT HESITATE TO REACH OUT

BRIAN EASTRIDGE, MD

LIZETTE VILLARREAL, MA

EASTRIDGE@UTHSCSA.EDU

LIZETTE@NATTRAUMA.ORG

Final Changes Made After the Training

- **Principal mechanism(s) of death**
  - *More main categories were added and additional subcategories were added*
- **Survivability questions (revised):**
  - *Assume the survival status of this patient is unknown*, with immediate access to care at a level I trauma center, assess the survival potential of this patient?
  - *Assume the survival status of this patient is unknown*, given the conditions of the actual scenario in which the injury occurred (i.e. discovery, EMS response, access to trauma center, weather etc.), assess the survival potential of this patient?
    - *If* non-survivable given the conditions of the actual scenario a new section pops up with immediate/acute, and delayed injuries that lead to your assessment

MIMIC Data Abstraction Training

Oklahoma

March 5, 2019

Project Staff

- **Lizette Villareal**

  Project Manager – National Trauma Institute

- **Nick Medrano**

  GIS Analyst – National Trauma Institute

- **Craig Remenapp**

  METRC Senior Study Manager – Johns Hopkins

PROJECT OVERVIEW

Investigators

- **PI:** **Brian Eastridge, MD**

  Division Chief, Trauma and Emergency General Surgery

  University of Texas Health Science Center at San Antonio
- **Co-PI:** **Kurte Nolte, MD**

  Chief Medical Investigator

  New Mexico Office of the Medical Investigator
- **Co-PI:** **Ellen MacKenzie, PhD**

  Dean, Johns Hopkins Bloomberg School of Public Health

Study Hypotheses

- **Substantial opportunity to further reduce deaths in pre-hospital setting.**
  - Potential liabilities in civilian and military pre-hospital care must be identified and remediated in order to reduce the number of potentially preventable deaths on the battlefield and in the civilian environment.

MIMIC Objectives

- **Objective #1:** ***Develop a framework and methodology*** for evaluating pre-hospital deaths
- **Objective #2:** Organize and standardize a ***multidisciplinary, multi-institutional network of experts*** to identify the causes of pre-hospital deaths due to trauma and estimate the potential for survivability.
- **Objective #3:** ***Define the causes and pathophysiologic mechanisms of 3,000 pre-hospital deaths***, and estimate the potential for survivability
- **Objective #4:** ***Describe the epidemiology of pre-hospital mortality*** in the context of trauma system development and estimate its impact on society.
- **Objective #5:** ***Develop a blueprint for a sustained effort*** identifying high priority areas for injury prevention, trauma systems performance improvement and research and development.

System Benefits

Trauma

- Performance improvement
  - Engineering
  - Medical devices / procedures
  - EMS value validation
  - Injury Prevention
  - Collaboration between trauma and ME communities

Medical Examiner

- Funding for advanced radiological imaging
- Improve mechanistic information
- Interaction between trauma and ME communities
- Bridge the gap between ME and TS data sets

Study Setting
Six Regions in the Country

(Centralized ME systems and utilizing electronic case management system to collect uniform data on all deaths)

1. **State of Connecticut**. Serves a population of 3.6 million. They perform approximately 2,200 autopsy examinations at a single, centralized facility annually.
2. **Johnson County, Iowa.** Serves a population of 142,000. In 2014 JCME accepted jurisdiction of 380 deaths and performed 118 autopsies.
3. **State of Maryland.** Serves a population of approximately 6.0 million residents . They perform 4,220 autopsies at the single, centralized facility annually.
4. **State of New Mexico.** Serves a population of 2.0 million. They perform approximately 2,100 full autopsy examinations annually
5. **State of Oklahoma. Serves a population of 3.8 million and conducts investigation of roughly 4,000 deaths annually.**
6. **The District of Columbia.** Serves a population of 659,000. They perform approximately 1,110 examinations annually.

Study Population

- **Inclusion Criteria:**
  1. Pre-hospital deaths (at scene, en route to hospital or DOA – defined as no vitals upon arrival at hospital)
  2. Blunt, Penetrating, Thermal, and Suicides are included

- **Exclusion Criteria:**
  1. Non-mechanical causes of death – poisoning, drug overdoses, hangings, drowning (unless associated with trauma)
  2. Decomposed remains only (not fully fleshed with distinguishable organs)

Estimates of Number of Injury Deaths

(Blunt, Firearm and Other Sharp Forces)

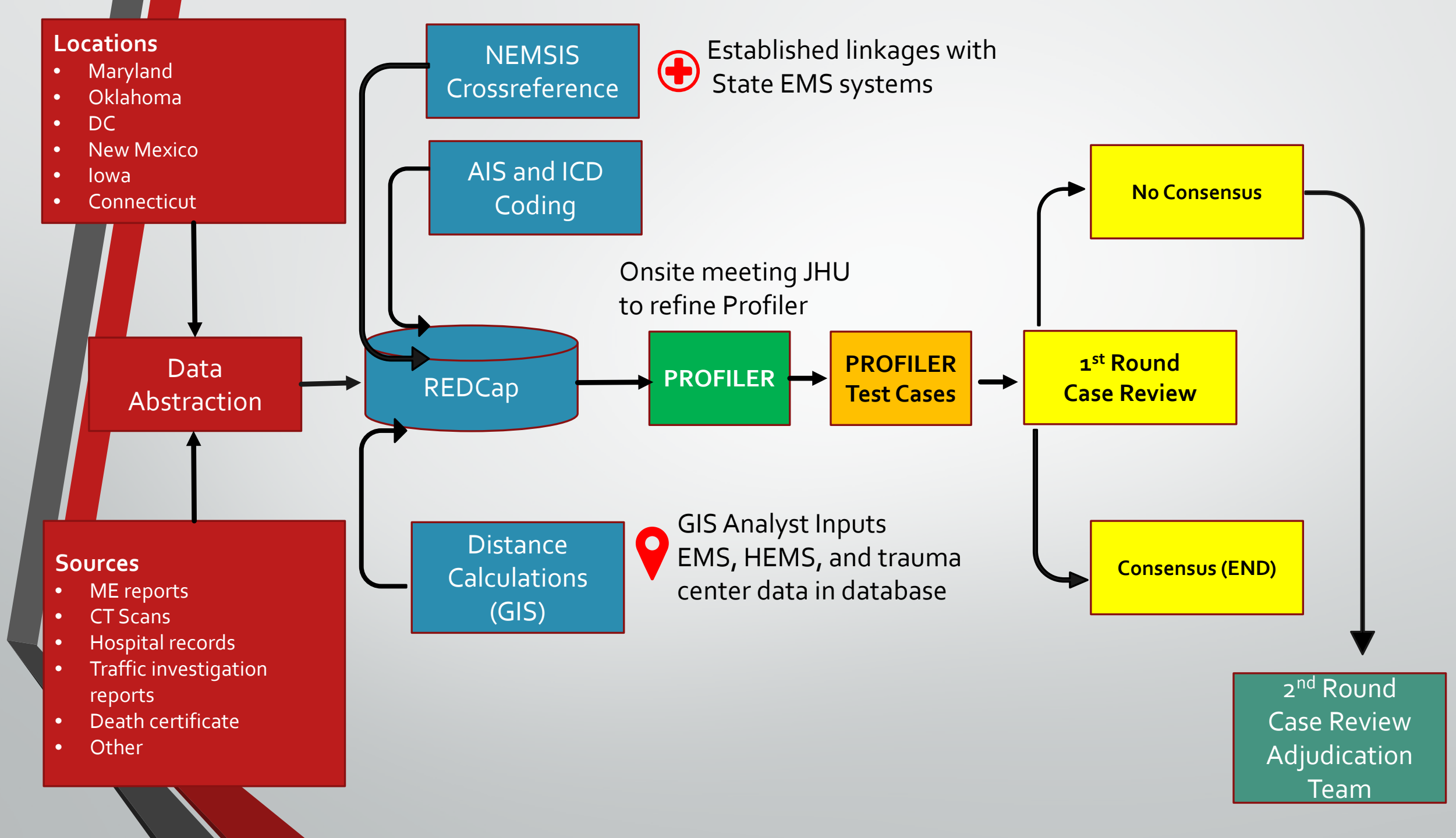
OCME	2012	2013	2014	Total
Connecticut	684	621	692	1997
Johnson Co, Iowa	133	128	110	371
Maryland	1509	1200*	1200*	3909
Oklahoma	1044	1153	1007	3204
New Mexico	823	778	906	2507
Washington, DC	232	267	254	753
Total	**4,425**	**4,147**	**4,169**	**12,741**

* Estimates

Forensic Record

ME cases may involve any of the following:

- Medical Examiner Report
  - Full Autopsy
  - Partial Autopsy
  - External Exam
- Radiographs
- Toxicology
- Photographs
- Investigator Reports


Locations
Maryland
Oklahoma
DC
New Mexico
Iowa
Connecticut
NEMSIS Crossreference
Established linkages with State EMS systems
AIS and ICD Coding
Onsite meeting JHU to refine Profiler
Data Abstraction
REDCap
PROFILER
PROFILER Test Cases
1st Round Case Review
No Consensus
Consensus (END)
Sources
ME reports
CT Scans
Hospital records
Traffic investigation reports
Death certificate
Other
Distance Calculations (GIS)
GIS Analyst Inputs EMS, HEMS, and trauma center data in database
2nd Round Case Review Adjudication Team

TIMELINE

MIMIC Timeline

- **October 2018**
  - Reviewed Test Cases
- **December 2018**
  - ME Offices Began Data Abstraction
  - Finalized Profiler Review System
  - Team Assignments Completed
- **January 2019**
  - Launch Study Cases

Data Abstraction Timeline

	Project Year 2				Project Year 3				Total
Target Enrollment (per quarter)	Q1 (Jun-Aug)	Q2 (Sept-Nov)	Q3 (Dec-Feb)	Q4 (Mar-May)	Q1 (Jun-Aug)	Q2 (Sept-Nov)	Q3 (Dec-Feb)	Q4 (Mar-May)	
Connecticut			100	100	100	123			423
Iowa			41						41
Maryland			150	150	150	150	150	99	849
Oklahoma				**100**	**100**	**100**	**41**		**341**
New Mexico			300	250	250	250	174		1,224
D.C.				100	52				152
Target Enrollment (cumulative)									3,030

NAVIGATING THE REDCap SYSTEM

Navigating the REDCap System

- Login to REDCap

REDCap User Interface

- Records Status Dashboard
- Forms
  1. CRF00
  2. Patient Demographics
  3. Injury Location
  4. Injury Cause and Circumstances
  5. First Discovery and Response
- Form Completion

REVIEW CASE EXAMPLE

Form: CRF00

Upload Document(s)

- Report of Investigation by Medical Examiner
- All variables should be taken from the source documents

Form: Patient Demographics

- Sex
- DOB
- Race
- Height (cm)
- Weight(kg)
- Comorbidities

Form: Injury Location

- Date and Time (military)
  - Injury
  - Decedent Found
  - Death Pronounced
- Location of Injury
  - Street Address
  - Intersection
  - Highway Mile Marker
  - GPS Coordinates

Injury Location – GPS Coordinates

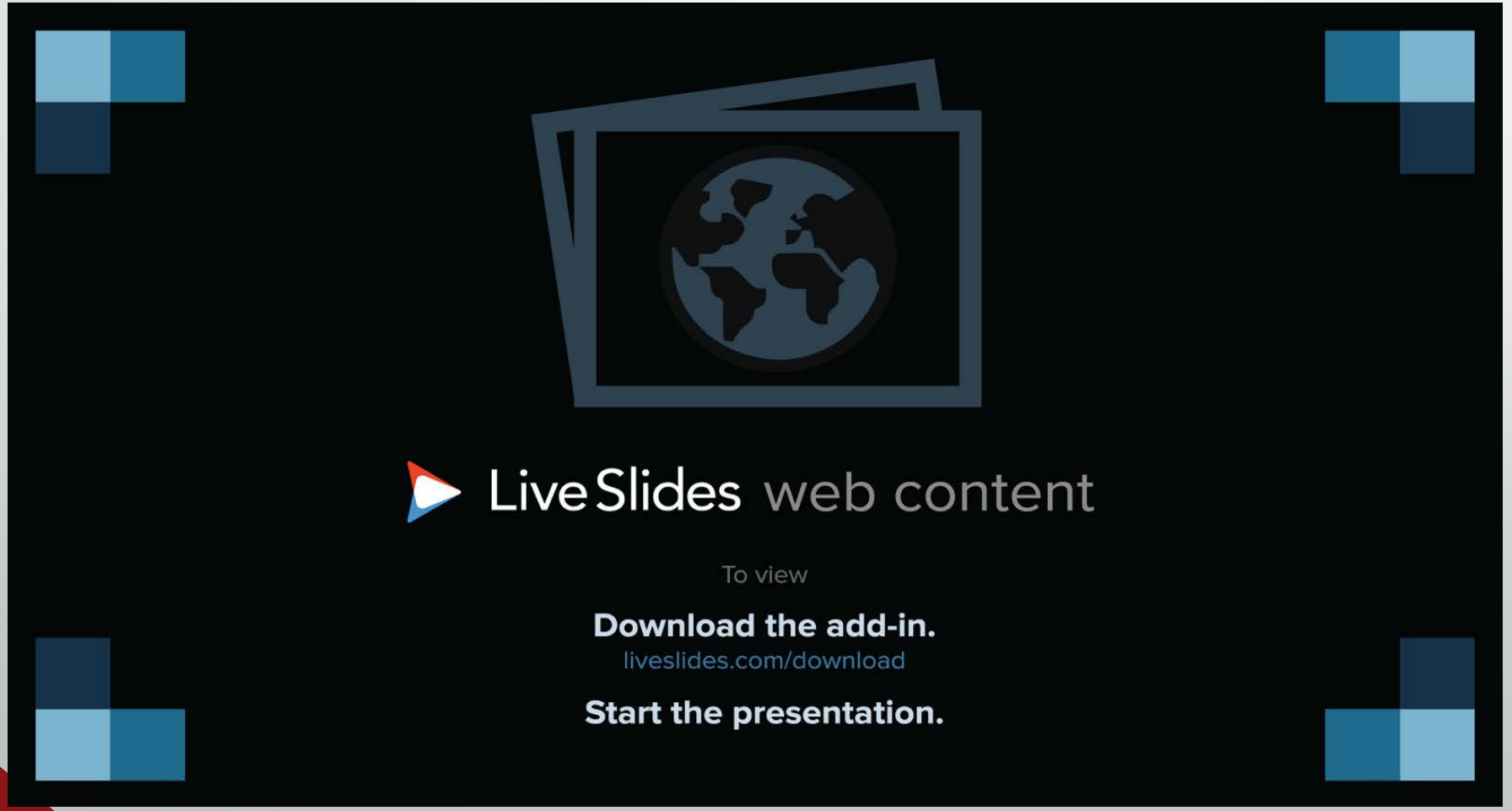
MUST Use Decimal Degrees (DD):
Positive Latitude & Negative Longitude

FORMAT	LATITUDE	LONGITUDE
***Decimal Degrees (DD)**	**34.19257**	**-106.06417**
Degrees Minutes Seconds (DMS)	34˚ 11’ 33.3	106 3’ 51.0
Degrees Decimal Minutes (DMM)	34˚ 11.554	106˚ 3.850

Injury Location – GPS Coordinates

Converter

www.geoplaner.com



Form: Injury Cause and Circumstances

- Type of Injury
- Manner of Death
- Weather
- Toxicology
- Verbatim Circumstances

Form: First Discovery and Response

- Responder Involved
  - Include even if no interventions applied
- Interventions Applied

REVIEW CASE EXAMPLE

TIPS AND TRICKS SHEET

Understanding Case Reviews in Profiler

Case Review Methods

- Steering Committee (Military and Civilian) defined definitions and process
- Expert review panels (~ 90 Military and Civilian reviewers) (5 individuals each) will be identified and trained (Trauma Surgery, Emergency Medicine, Neurosurgery, Orthopedic Surgery, Forensic Pathology, EMS, Trauma Systems)
- Panels will each review a certain number of cases using the PROFILER and assign a determination of survivability to each case – members of the panels will review cases independently
- Discrepancies in determination of survivability will be identified and non-consensus will be reviewed by an adjudication team

Profiler

1) Open medical examiner case in Profiler
2) Review case
   - Injury severity
   - Injury cause / circumstance
   - Discovery / first response
   - EMS
   - Access to EMS / Trauma Center
   - Medical examiner data (left side of page)
3) Causation and survival determination
   - Primary cause of death (may choose multiple but must be associated with severe injury)
   - Assuming immediate access to trauma care
   - Actual conditions
   - Opportunities for improvement (free text)

Survivability Definitions

- **Non Survivable-** Death as a result of catastrophic anatomic injuries
- **Possibly Survivable -** Anatomic injuries that were severe but medically survivable
- **Definitely Survivable-** Minimal anatomic injuries with a high likelihood of survival
- **Cannot Judge-** information insufficient to make a determination

Anatomic Survivability

Medically Non-Survivable (MNS)

- Dismemberment / decapitation
- Brain evisceration
- Transection spinal cord C3 and above
- Injury deep nuclei CNS, brainstem, or massive brain tissue injury
- Major tracheal injury within thorax
- Cardiac injury > 2cm
- Uncontained hemorrhage thoracic aorta
- Uncontained hemorrhage pulmonary vasculature
- Hepatic avulsion
- Junctional lower extremity injury with open pelvis with communication/hemi-pelvectomy

Medically Potentially Survivable / Medically Survivable

- All other

ENTER CASES! (REDCap)

Questions

- If you have any project related questions, please do not hesitate to reach out

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Trauma Surgery & Acute Care Open

Multi-Institutional Multidisciplinary Injury Mortality Investigation in the Civilian Pre-Hospital Environment (MIMIC): a methodology for reliably measuring prehospital time and distance to definitive care

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SUMMARY

The detailed study of prehospital injury death is critical to advancing trauma and emergency care, as circumstance and causality have significant implications for the development of mitigation strategies. Though there is no true 'Golden Hour,' the time from injury to care is a critical element in the analysis matrix, particularly in patients with severe injury. Currently, there is no standard method for the assessment of time to definitive care after injury among prehospital deaths. This article describes a methodology to estimate total prehospital time and distance for trauma patients transported via ground emergency medical services and helicopter emergency medical services using a geographic information system. Data generated using this method, along with medical examiner and field investigation reports, will be used to estimate the potential survivability of prehospital trauma deaths occurring in five US states and the District of Columbia as part of the Multi-Institutional Multidisciplinary Injury Mortality Investigation in the Civilian Pre-Hospital Environment study. One goal of this work is to develop standard metrics for the assessment of total prehospital time and distance, which can be used in the future for more complex spatial analyses to gain a deeper understanding of trauma center access. Results will be used to identify high priority areas for research and development in injury prevention, trauma system performance improvement, and public health.

INTRODUCTION

From a public health perspective, injury remains the leading cause of death in individuals up to the age of 44 and the leading cause of morbidity and mortality among children in the USA.[1] A 2016 report from the National Academies of Science, Engineering and Medicine, entitled 'A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury,' estimated that approximately 30 000 of the 147 790 trauma deaths that occurred in 2014 had potentially survivable injury.[2] Based on recommendations for leadership and action to develop and implement a national trauma system, the report set the goal of zero preventable death and disability from injury. Concomitantly, the National Trauma Institute has been developing the infrastructure to support the Multi-Institutional Multidisciplinary Injury Mortality Investigation in the Civilian Pre-Hospital Environment (MIMIC) study to elucidate the epidemiology of prehospital injury mortality. The pragmatic goals of this investigation are to estimate the impact of potentially preventable trauma death on society in terms of years of potential life lost and lost productivity and to develop a blueprint to improve the US civilian and military trauma system.

During the last several decades, advances in care in trauma centers and across trauma systems have substantially reduced death and disability associated with injury.[3] However, there remains a substantial opportunity to further reduce the number of deaths in the prehospital setting. From an analysis done by the US military during operations in southwest Asia spanning 2001–2011, it was determined that the majority of battlefield deaths occurred prior to casualties receiving care at a military medical treatment facility. Furthermore, it was determined that approximately 25% of the prehospital casualty mortalities died to potentially survivable injury, largely from hemorrhage. Importantly, this work highlighted clear priorities for research and development of mitigation strategies to improve battlefield casualty outcomes.[4] Unlike within the battlefield environment, the magnitude and impact of potentially preventable prehospital death from injury in the civilian environment has not been fully explored. These potential liabilities in civilian prehospital care must be identified and remediated to reduce the number of potentially preventable trauma deaths.

Understanding this deficiency, the purpose of the MIMIC study is to develop a coordinated, multidisciplinary, multi-institutional effort within the civilian clinical sector to identify and characterize the causes of mortality from trauma in the prehospital setting and to identify potential high-yield areas for research and development in prehospital medical care, injury prevention, and trauma systems. Using these data and a network of experts, the analysis aims to define the causes and pathophysiologic mechanisms of a nationally representative sample of 3000 prehospital deaths occurring in six regions of the country and estimate the potential for survivability. Key determinants of this investigation include mechanism of injury, physiologic

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cause of death, estimated time from injury to definitive care, geographic location of the injury, and access to components of the local trauma system.

A multi-institutional and multidisciplinary group of trauma surgeons, neurosurgeons, orthopedic surgeons, forensic pathologist/medical examiners, and emergency medical service (EMS) personnel was created to review these prehospital deaths. These experts will evaluate the potential for survivability of medical examiner injury cases based on the assumption of immediate access to level I trauma center care and under the actual circumstances of the injury. Injury survivability assessments will be established using a specially developed electronic tool with data abstracted from medical examiner reports, field investigation reports, medical examiner radiographic imaging, injury severity coding, and EMS and trauma center accessibility. One major emphasis of this study is to determine the degree to which access to care in the field and the nearest trauma center impact the potential for survivability among deaths occurring prior to definitive care. Numerous studies have supported the argument that longer prehospital times contribute to higher mortality rates,[5–8] and that timely delivery of trauma care to severely injured patients is an effective strategy for reducing mortality.[9–11] Current research also indicates designated trauma centers significantly lower the risk of mortality and morbidity, with a 25% reduction in 1 year mortality when compared with non-trauma centers.[12] Therefore, the potential to integrate data regarding access to designated trauma centers is critical in the panel's assessment of potential for survivability, given the circumstances of the injury.

Geographic information system (GIS) analysis has been used in previous trauma studies to measure travel time and distance of medical transportation when EMS was not involved, or when an EMS record with time elements could not be obtained. Widener *et al*[13] and Lerner *et al*[14] used network analysis tools to compare ground emergency medical service (GEMS) and helicopter emergency medical service (HEMS) and determine in which areas each transportation method was faster. The purpose of this article is to describe the GIS methodology developed to estimate the total prehospital time and distance by GEMS and HEMS for 3000 prehospital deaths after injury.

METHODS

Setting

The MIMIC study includes decedents after injury assessed at six medical examiner study sites. Four states (Connecticut, Maryland, New Mexico, Oklahoma), the District of Columbia, and one county (Johnson County, Iowa) were selected based on their centralized medical examiner system, utilization of an electronic case management system, demographic representation of the USA population, and varying levels of population density. In total, these areas serve a population of approximately 16 million with 14 000 medical examiner cases per year in composite.

The Institutional Review Board at UT Health San Antonio and the Human Research Protection Office at the Department of Defense both deemed this research as non-human subject research.

Data

While having real-time EMS run sheets is ideal for assessing time from injury to definitive care, approximately 80% of this cohort of prehospital decedents after injury is expected to have no EMS activation or engagement. A GIS will, therefore, be used to estimate total prehospital time and distance using current local trauma system resources. For the remaining 20% of the cohort expected to have had EMS interaction, the National Emergency Medical Services Information System (NEMSIS) data set will be used to match real-time EMS data with each subject through cross-referencing individual state-level data sets.

To calculate total prehospital time and distance, geographic data for GEMS depots, HEMS helipads, injury locations, and designated trauma centers were needed in the form of Global Positioning System (GPS) coordinates, physical address, road intersection, or highway mile marker. GEMS depot locations were obtained from respective state Departments of Health and local municipalities. For those rural depots in Maryland and New Mexico that provided PO boxes and no physical addresses, Google Map's Street View and the depot name were used to visually identify the GEMS depot and retrieve a physical address. HEMS base locations were obtained from the Atlas and Database of Air Medical Services (ADAMS),[15] which is a compilation of information on air medical services in the USA that respond to the scene of trauma or medical emergency. HEMS base locations present in the study area as well as in adjoining states were included in the analysis. Level I and II trauma centers were verified by the American College of Surgeons. The study team reached out to state agencies at each of the six study sites to develop a database of all trauma centers for each state, with their physical address, and trauma center designation level. Furthermore, trauma centers in bordering states were included as an assumption that the patient would be transported to the nearest trauma center without regard to state boundaries. Designated trauma center locations obtained using this method were verified using the 2017 American Trauma Society Trauma Information Exchange Program. This comprehensive inventory includes a physical address for all designated level I–IV trauma centers across the USA. After collecting location data for trauma centers, GEMS, and HEMS, a template map for each study area was created. Figure 1 illustrates the geographic locations used for the Connecticut study area.

Location of injury will be abstracted from field investigation and police reports by medical examiner offices at each location. If a physical address or GPS coordinates cannot be obtained from these records, the narrative will be reviewed for any supplemental geographic information, including mile markers, landmarks, and in-depth descriptions of the location of injury.

Design

Once an injury location physical address or GPS coordinate is obtained, location data will be geocoded using an address locator tool in ArcGIS V.10.6 (Environmental Research Systems Institute, Redlands, CA). Addresses unable to be geocoded will be manually added to the mapping software using the location narrative in field investigation reports. Results not lying directly on a road network will be snapped to the nearest point on the road network. Rurality of the injury location will be determined based on US Census guidelines. Areas with a population less than 2500 are classified as rural; areas with a population of at least 2500 and less than 50 000 people are classified as urban clusters; and areas with a population of 50 000 or more people are categorized as urbanized areas.

Planned analysis

Multiple time intervals are considered when calculating total prehospital time. Numerous studies[13 16 17] have adapted a four-component definition for total prehospital time, which includes activation, response, on-scene, and transport intervals. The activation interval is the time from receipt of 9-1-1 call to

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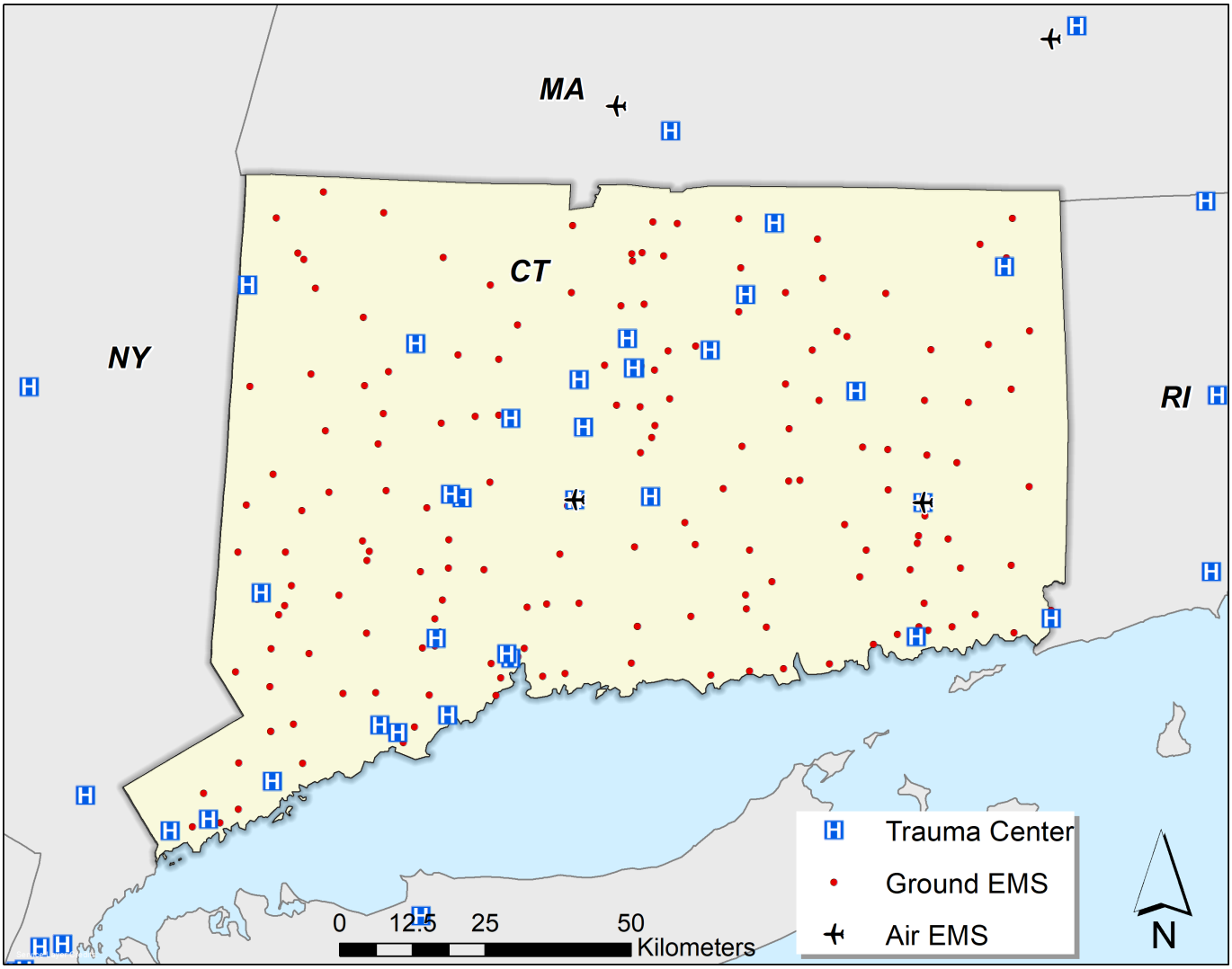

Figure 1 Trauma centers, ground emergency medical service (GEMS) and helicopter emergency medical service (HEMS) depots for Connecticut analysis. CT, Connecticut; EMS, emergency medical service; MA, Massachusetts; NY, New York; RI, Rhode Island.

EMS departure from depot. The response interval is the time from EMS departure to arrival at scene. The on-scene interval is the time from EMS arrival at the scene to the time when EMS departs the scene for the trauma center. The transport interval is the time from EMS departure from the scene to arrival at the trauma center. This study uses this four-component definition to calculate total prehospital time to level I–IV trauma centers.

The response and transport estimates for GEMS will be computed using a GIS-based network analysis. The StreetMap Premium for ArcGIS (North America V.2018.1) road network will be used in conjunction with the Closest Facility tool within the Network Analyst (ArcGIS V.10.6) to model vehicle transport routes and determine travel times and distances. The road network uses TomTom GPS units in use to provide historic traffic data and accurate time estimates. This model assumes that GEMS are immediately notified about the incident, an ambulance from the nearest GEMS base is sent to the incident location, time is spent at the scene to render emergency medical care and transfer the patient to the vehicle, and the ambulance drives to the nearest trauma center. This is represented by the formula below:

$$T_{totalG} = T_{dispG} + T_{responseG} + T_{sceneG} + T_{transportG}$$

T_{totalG} is the total time in minutes from the placement of the call to trauma patient arrival at the trauma center. T_{dispG} is defined as the time from when the 9-1-1 call was received until the time the GEMS unit was dispatched. Using Carr *et al*'s[16] meta-analysis of prehospital times, 2.9 and 1.4 minutes were applied for rural and non-rural locations, respectively. $T_{responseG}$ is the travel time in minutes from the nearest GEMS depot to the site of the incident, using the road network. Based on prior literature, T_{sceneG} is the assumed time spent at the incident location by the EMS team to render aid, move the patient into the ambulance, and prepare the patient for transport. Intervals of 13.5, 13.5, and 15.1 minutes were used for urban, suburban, and rural locations, respectively.[16] $T_{transportG}$ is defined as the travel time from scene to the closest trauma center by the available ground network.

The HEMS estimates will use the same assumptions as the GEMS estimates (eg, immediate notification), however our estimates use travel times that characterize helicopter transport, which uses straight-line routes instead of a road network. The Near tool (ArcGIS V.10.6) will be used to select the nearest HEMS depot and calculate the straight-line distance. The total HEMS time is represented by the formula below:

$$T_{totalH} = T_{dispH} + T_{responseH} + T_{sceneH} + T_{transportH}$$

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T_{totalH} is the total time in minutes from the placement of the 9-1-1 call to patient arrival at a trauma center via helicopter. T_{dispH} is defined as the time from when the 9-1-1 call was received until the HEMS unit was dispatched. A constant of 3.5 minutes was used, drawing from a meta-analysis of literature on HEMS prehospital times for trauma care.[16] $T_{responseH}$ is the estimated travel time from the nearest HEMS to the injury location using a straight-line flight path and an average helicopter cruising speed of 142.6 mph.[16] T_{sceneH} is equal to a constant 21.6 minutes, and is the average time spent on-scene to stabilize a patient and move to the helicopter.[16] $T_{transportH}$ is the estimated travel time from the injury location to the nearest trauma center using straight-line flight path and cruising speed of 142.6 mph.

DISCUSSION

Since trauma is such a significant public health issue and one of the leading causes of death in the USA, the MIMIC study intends to evaluate prehospital deaths after injury and highlight opportunities for performance improvement and trauma system development and maturation. As the majority of injury death occurs prior to hospital care, the capacity to evaluate casualty access across the continuum of care is a key element in making potential survivability determinations. GIS technology based on a four-component prehospital domain definition provides a standard reproducible method to obtain a quantitative assessment of prehospital time.

During the initial data collection process, several opportunities for improving data linkage within the EMS system were discovered. First, while the HEMS locations consolidated by ADAMS[15] provided detailed location information, state-wide GEMS location data proved more challenging. Due to the regional nature of EMS systems, a comprehensive list containing all GEMS depots for an entire state was difficult to obtain. For two study sites, lists provided by the Departments of Health contained PO Box information. This is not the physical location of EMS services and could not be used for travel time calculations using GIS. Moreover, the verification process for obtaining physical addresses was quite cumbersome and time consuming.

Linking prehospital EMS records was difficult. The nature of the medical examiner process limits the value and necessity of detailed information with respect to EMS interactions. Likewise, arrival times for responders other than EMS were frequently absent from reports, as were GPS coordinates and physical addresses. Therefore, to add more granular detail and precision to this study, we cross-referenced death cases with an EMS intervention to matching records in state-level EMS databases after effecting data use agreements with each entity.

Current methodologies quantifying overall access to trauma centers in the USA have limitations in their design, and use average driving speeds based on rurality instead of historic traffic data[3 18]; or they estimate time from GEMS depot to injury location using empirically determined constants instead of network analysis.[3 18 19] Viewing trauma care accessibility in this way does not provide a realistic view based on how trauma systems are designed, as they are predicated on convenience due to the inherent limitations posed by regulated or incomplete data linkages and the non-standardized geopolitical oversight of agencies and organizations across the spectrum of care. Results from this study will include GIS-calculated response intervals from GEMS/HEMS depot to injury location, and therefore, may provide more accurate total prehospital time.

FUTURE DIRECTIONS

There is currently a gap between the availability of spatial methodologies and the extent to which they are employed in understanding medical evacuation.[20] While prehospital time and distance calculated with this planned methodology may prove useful as a surrogate when EMS was not involved or a record with time elements could not be obtained, these values may also be useful for more advanced and robust spatial techniques such as hot spot analysis, cluster analysis, and spatial interpolation. An ordinary least squares or kernel density analysis can be used to determine statistically significant hot and cold spots of severe trauma incidents and help guide trauma system resources, as was done for Mobile, AL.[21] Local Moran's I may be used to identify spatial clusters of incidents with high or low transport times[22] or injury severity.[23] Spatial interpolation methods, such as kriging, use existing points to estimate values of other points.[13] Kriging could be used to more accurately estimate trauma center accessibility. Both spatial analysis techniques can be combined with publicly available US Census demographic data to provide insight and perspectives on the current state of the USA trauma system on a local, state, or national level.

There are also more advanced methods that can be applied to calculate total prehospital time. The study team is working on analyzing NEMSIS data to determine if a more accurate estimate for total prehospital time—specifically, mean on-scene time—can be determined. The study methods for calculating total prehospital time may be adjusted if the analysis yields results that provide a more precise estimation of time for the data used in this study.

GIS integration into MIMIC study design will be one of the most important components to identify potential high-yield areas for research and development in prehospital medical care, injury prevention, and trauma systems.

Contributors BJE devised the project and the main conceptual ideas of the MIMIC project. NWM designed the model and took the lead in drafting the article. All authors provided critical feedback and helped shape the research and article.

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Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

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Improving the Military- Civilian Taxonomy and Process to Determine Prehospital Injury Survivability

Background

In 2016, the National Academies of Science, Engineering, and Medicine convened a committee to codify the lessons learned from the nation's wartime military medical experiences. In that report entitled "A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths after Injury," several specific gaps requiring remediation were identified. One of the foundational deficiencies noted was that data linkages are incomplete or entirely missing among prehospital care; hospital-based acute care; rehabilitation; and the medical examiner. The committee also highlighted that "a critical but often neglected source of data—particularly in civilian systems—is autopsy reports on trauma deaths, which could be used to determine the preventability of fatalities based on a common, accepted lexicon."

Advances in care in both trauma centers and trauma systems have substantially reduced death and disability associated with injury. However, there remains a substantial opportunity to further reduce deaths in the pre-hospital setting. Potential liabilities in civilian and military pre-hospital care must be identified and remediated in order to reduce the number of potentially preventable deaths on the battlefield and in the civilian environment. Therefore, the Department of Defense (DoD) and Combat Casualty Care Research Program of the Medical Research and Material Command (MRMC) have made a significant investment to establish a dedicated research effort focused on understanding the survivability of injury in the prehospital environment. The Multi-Institutional Multi-Disciplinary Injury Mortality Investigation in the Civilian Pre-Hospital Environment (MIMIC) study was funded to develop a more comprehensive understanding of the epidemiology of civilian pre-hospital injury deaths and their potential for survivability. The ultimate goal of the research is to identify liabilities in trauma systems and develop mitigation strategies with translation potential for realistic and relevant improvements in battlefield trauma systems and improvements in Warfighter survivability.

Methods

The research proposes to review and analyze 3,000 injury-associated pre-hospital deaths and will be conducted at six (6) centralized medical examiner offices across the United States selected to be representative of the national population. The sites chosen for the review include New Mexico, Oklahoma, Connecticut, Maryland, District of Columbia, and a region of Iowa. These sites were chosen because centralized medical examiner systems provide mortality data that is uniform and centrally located and is based upon high quality death investigations and forensic pathology services. A multi-disciplinary, multi-institutional network of subject matter experts in the disciplines of trauma surgery, neurosurgery, orthopedic surgery, emergency medicine, radiology, forensic pathology, forensic nursing, trauma systems, and emergency medical services collaborated upon the development of a consensus taxonomy relative to determination of injury survivability. This framework and methodology was developed for evaluating the causes and pathophysiologic mechanisms of pre-hospital deaths; the appropriateness of EMS response and care delivered; and the potential for survivability under both optimal clinical circumstances and within the context of each individual injury event. In order to increase the military relevance and

facilitate comparisons with the combat environment, this framework and methodology was developed to be congruent with methodology used by the DoD in its landmark study of pre-hospital mortality resulting from battlefield injury along with newly released DoD lexicon on injury survivability. An electronic data tool (Profiler) with all relevant information was specifically developed for reviewers in order to make informed survivability judgements and record their determinations. This data was subsequently collected in the Research Electronic Data Capture (REDCap) system.

The MIMIC Study Group assembled consists of thirteen panels. The review team panels are composed of relevant disciplines including trauma surgery, neurosurgery, orthopedic surgery, forensic sciences, radiology and emergency medicine with a specialization in emergency medical services (EMS). Each panel consists of six members: four surgeons, one emergency medicine physician or EMS provider, and one forensic reviewer. All panels contain a minimum of two reviewers with military background and experience. All review panels of experts were trained to ensure standardization of assessments within and across panels. Data available for survivability review determinations included medical examiner autopsy data, injury codes (Abbreviated Injury Scale / AIS), geospatial data (injury location, EMS location/time, trauma center level/location /time), and National EMS Information System data when EMS was involved. Survivability determinations were developed based upon principal mechanism of death which was broken down into 13 categories: Hemorrhage-Truncal, Hemorrhage- Junctional, Hemorrhage-Peripheral, Neurological- Traumatic Brain Injury, Neurological- Spinal Cord, Tension Pneumothorax, Airway, Traumatic Asphyxia, Electrical, Burn, Massive Tissue Disruption, Unknown and, Other. Survivability determination was considered by selecting from four options: Non-Survivable, Potentially Survivable, Definitely Survivable, and Cannot Judge. For cases that are determined to be Non-Survivable, reviewers are then able to provide additional details on the nature of the injury that led to that assessment. These options are broken down into Immediate/Acute variables, and Delayed variables. All death determinations within the context of the actual scenario are followed by a reviewer analysis of characteristics/features of the EMS care, trauma system, or patient factors potentially contributing to the death that may identify strategies to mitigate prehospital injury mortality in the future.

Conclusion

The MIMIC study has developed a coordinated, multi-disciplinary, multi-institutional process within the civilian clinical sector to identify and characterize the causes of mortality from trauma in the pre-hospital setting and to identify potential high yield areas for research and development in pre-hospital medical care, injury prevention, trauma systems and public health. The comprehensive nature of the MIMIC study has allowed the pre-hospital care research community to unify the prehospital injury survivability lexicon that will enable future studies to advance the science for the future. These efforts are critical to advancing trauma and emergency care, as injury pattern as well as circumstance and causality have significant implications for the development of mitigation strategies. Utilizing the expertise of national experts serving as MIMIC team panel reviewers, this study will serve to advance pre-hospital care and trauma systems development, which in turn which will be translatable into military medicine and the protection and care of the Wounded Warrior.

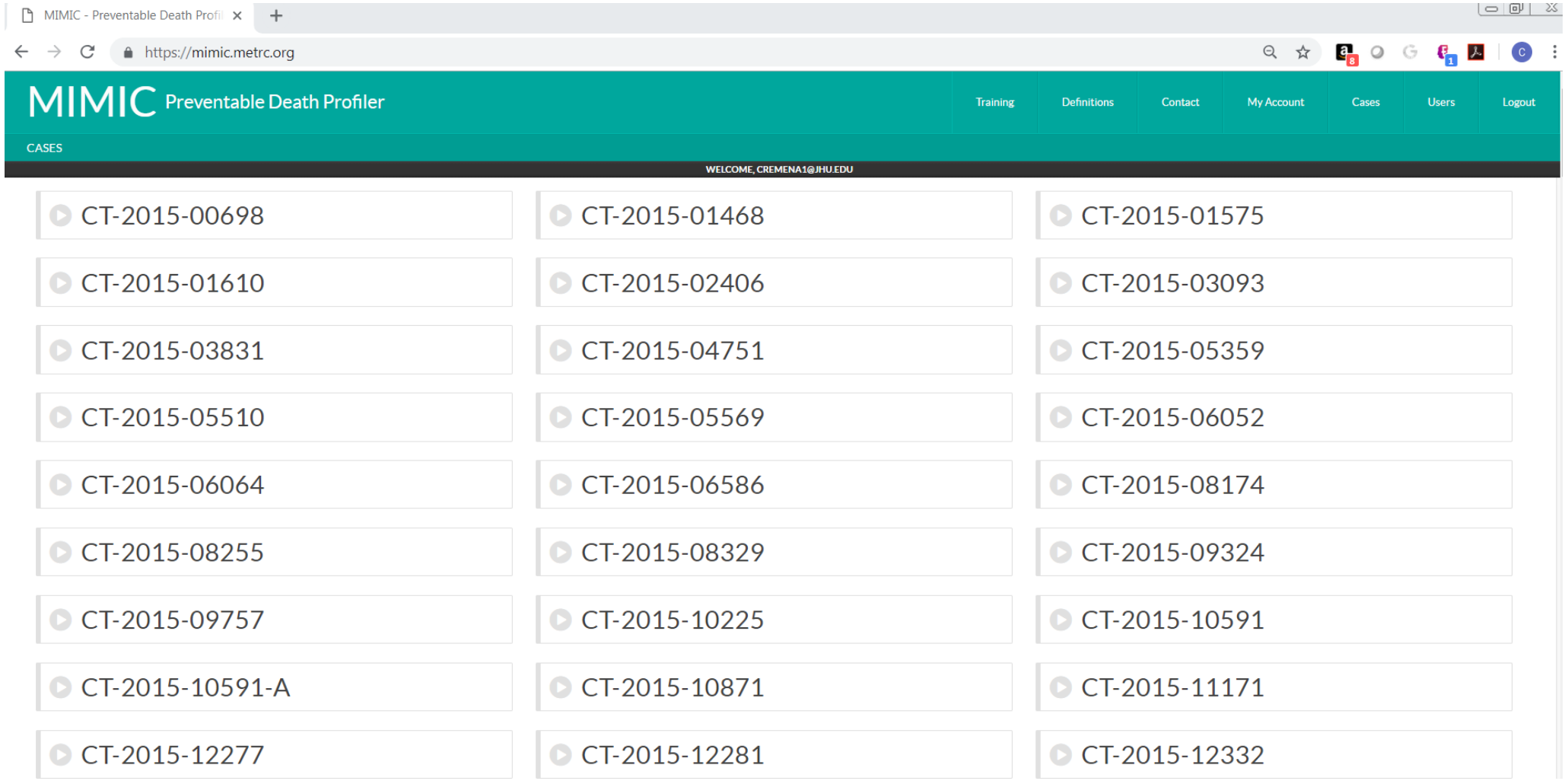
Learning Objectives:

- Discuss the military-civilian taxonomy relative to determination of injury survivability.
- Describe survivability determinations that were developed based upon principal mechanisms of death such as hemorrhage, neurological, airway, burns, etc.
- Review survivability determinations that will be used to identify strategies to mitigate prehospital injury mortality in the future.

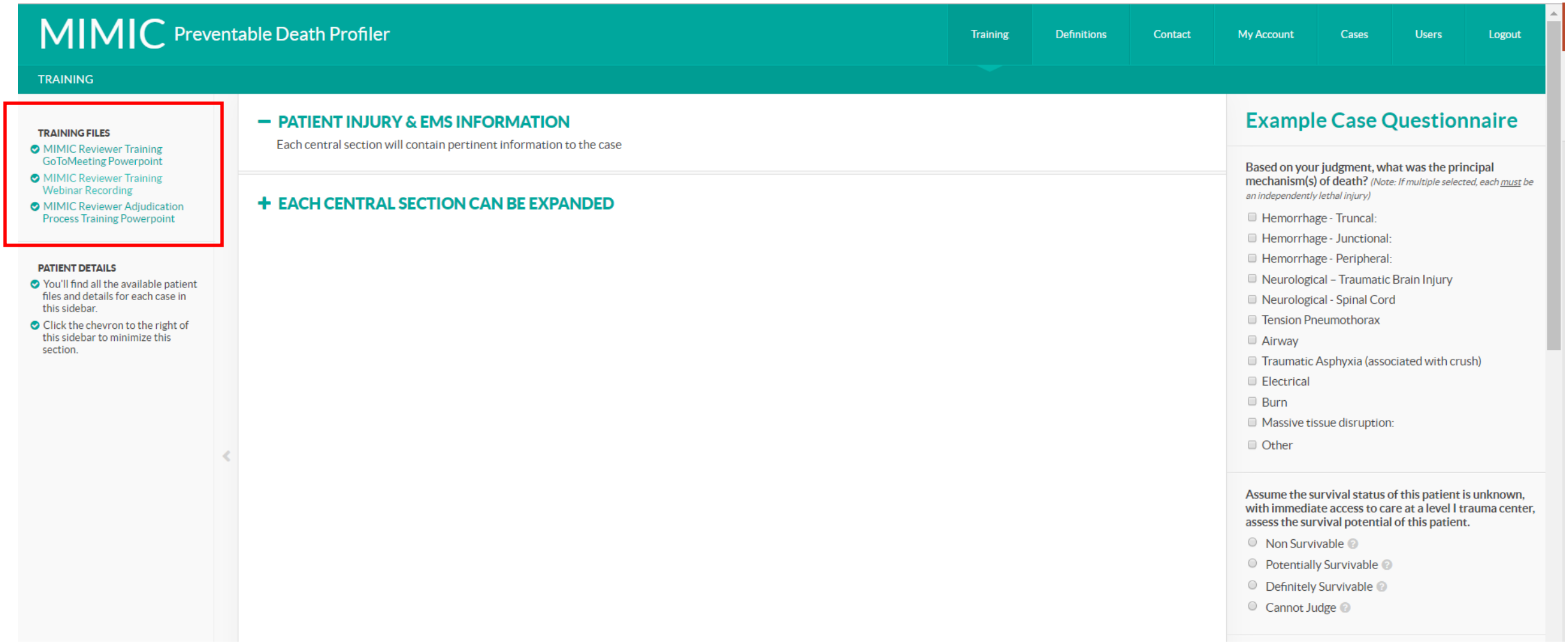
The U. S. Army Medical Research Acquisition Activity, 820 Chandler Street, Fort Detrick MD 21702-5014 is the awarding and administering acquisition office. This work was supported by the Office of the Assistant Secretary of Defense for Health Affairs, through the Defense Medical Research and Development Program under Award No. W81XWH-17-2-0010. Opinions, interpretations, conclusions and recommendations are those of the author and are not necessarily endorsed by the Department of Defense.

MIMIC
Profiler Case Review System

Main case list view



Training tab where any supplemental materials can be posted



Definitions tab where survivability definitions are laid out for reviewers

MIMIC Preventable Death Profiler

Training | Definitions

DEFINITIONS

Survivability Definitions

- **Non Survivable**- Death as a result of catastrophic anatomic injuries
- **Possibly Survivable**- Anatomic injuries that were severe but medically survivable
- **Definitely Survivable**- Minimal anatomic injuries with a high likelihood of survival
- **Cannot Judge**- information insufficient to make a determination

Anatomic Survivability

MEDICALLY NON-SURVIVABLE (MNS)

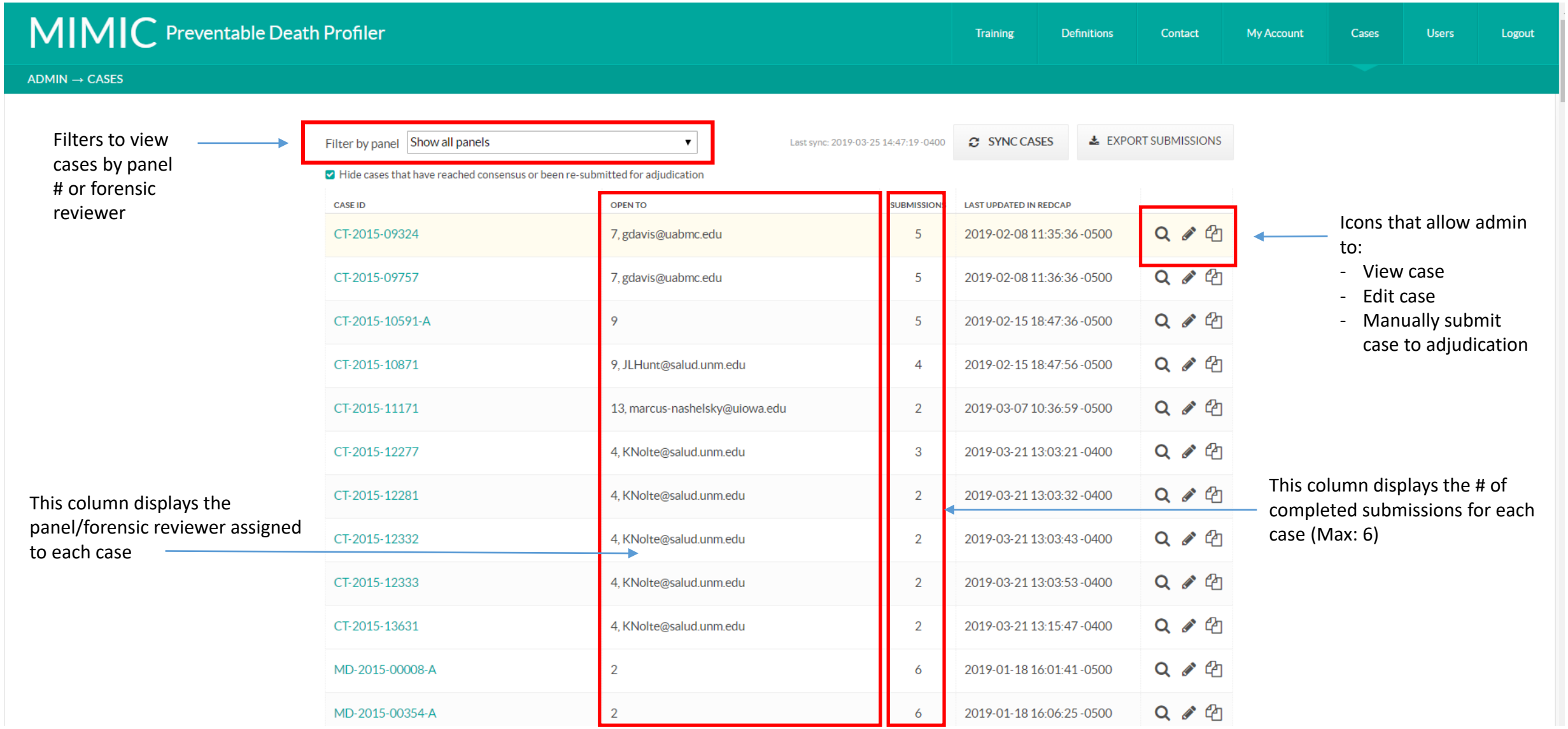
- Dismemberment / decapitation
- Traumatic Brain evisceration
- Cervical cord transection (above C3)
- Airway transection within thorax
- Cardiac injury > 2cm
- Uncontained hemorrhage, thoracic aorta
- Uncontained hemorrhage, pulmonary artery
- Hepatic avulsion
- Junctional lower extremity amputations with open pelvis
- Injuries to the deep CNS nuclei, brainstem, or massive brain tissue injury
- Massive Pulmonary Tissue Disruption

MEDICALLY POTENTIALLY SURVIVABLE / DEFINITELY SURVIVABLE

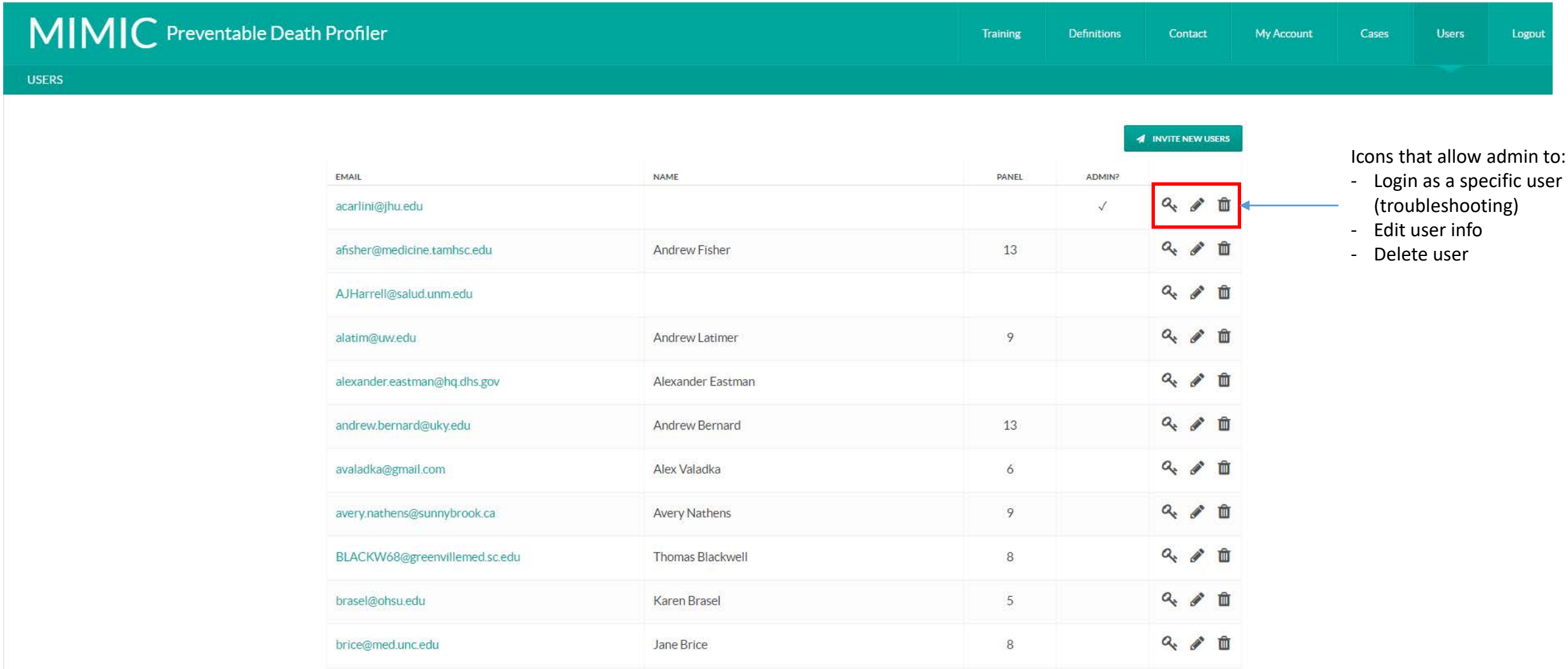
- All others

← Back to previous page

Administrative case list view that includes various features

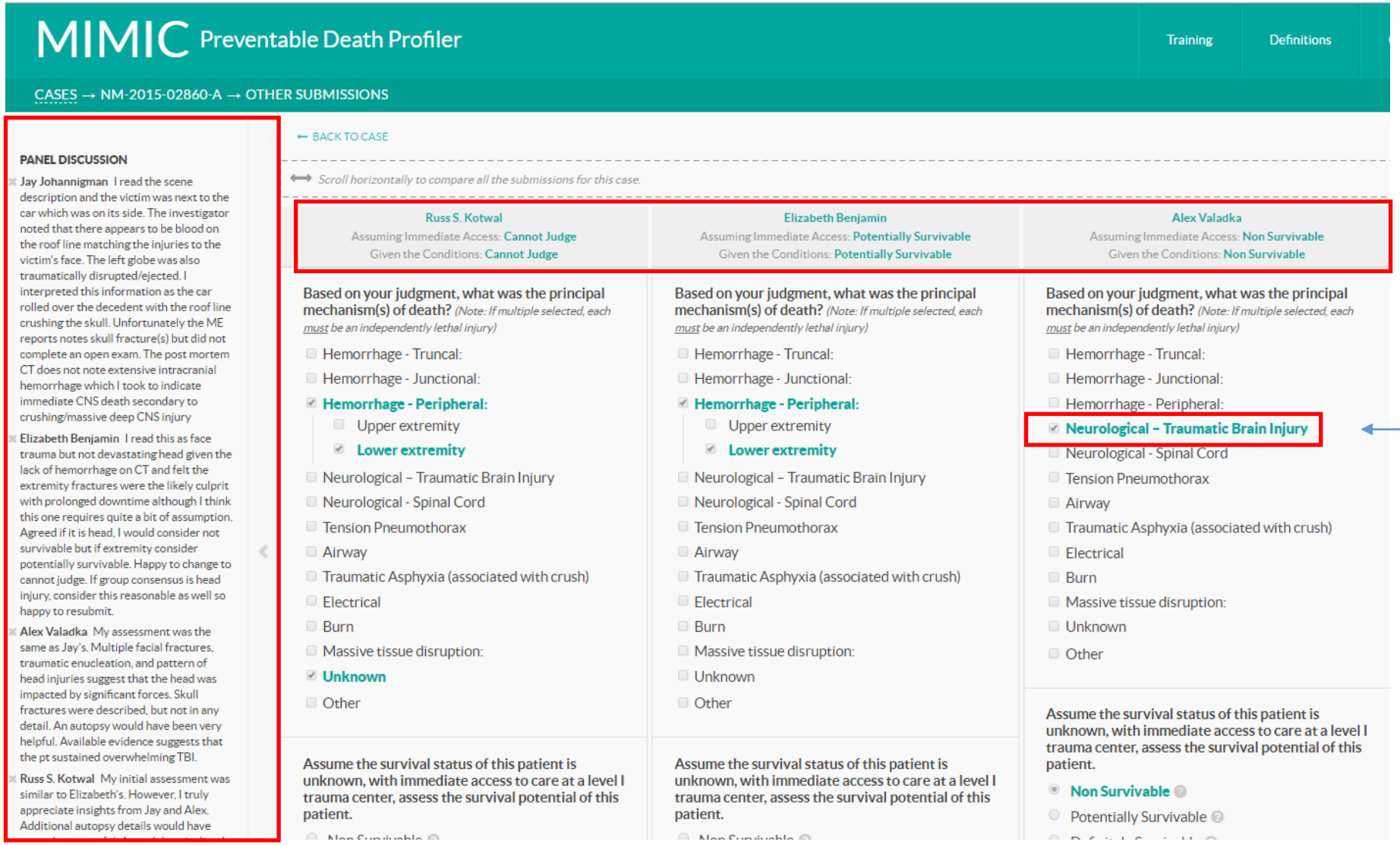


User list



Icons that allow admin to:
- Login as a specific user (troubleshooting)
- Edit user info
- Delete user

Adjudication panel review

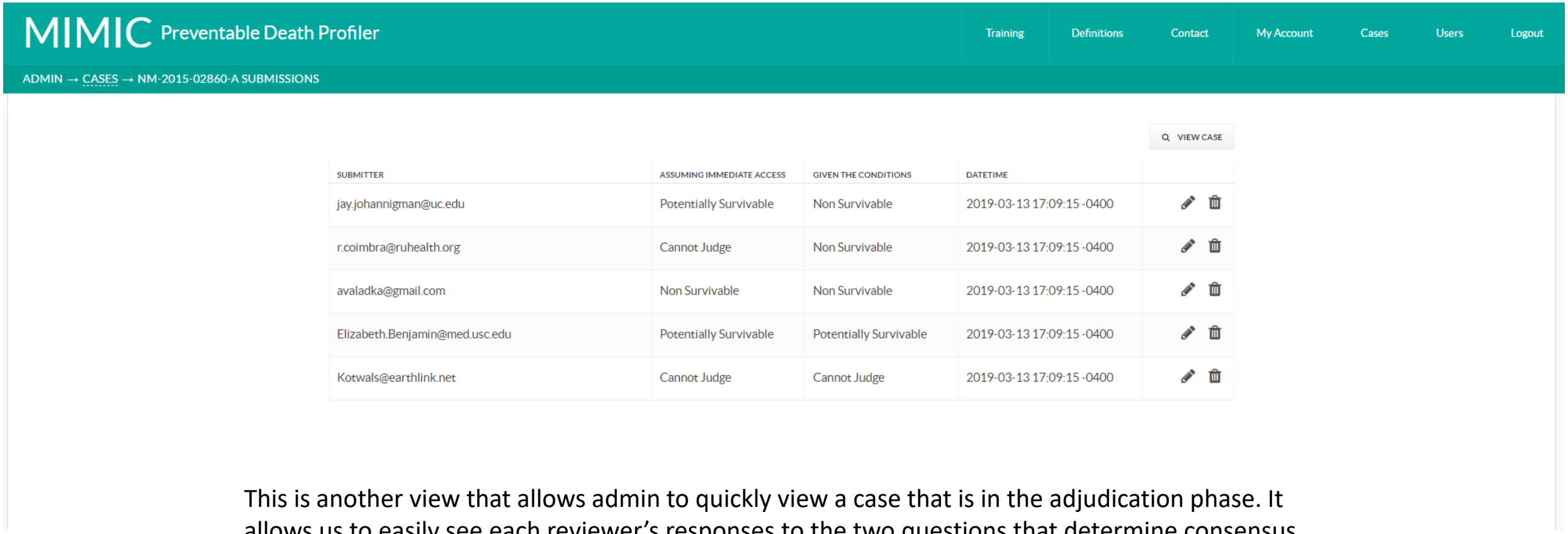


Quick view that displays:
- User name
- Response to survey question assuming immediate access
- Response to survey question assuming actual scenario

Each reviewers responses are highlighted in green text for easier viewing

Panel discussion board where members of the review panel can share their thoughts about the case with the rest of the panel, in real time

Adjudication panel summary view



This is another view that allows admin to quickly view a case that is in the adjudication phase. It allows us to easily see each reviewer's responses to the two questions that determine consensus

MIMIC Reviewer Adjudication Process Training

Adjudication Notification

- Once all Team Panel reviewers have completed the review on a case, if consensus is not reached, the case will duplicate with a Case Number-A.
  - For example NM-2015-01234-A
- Once all cases for your Team Panel are complete, you will receive an email notification with the number of cases that need adjudication.

Questions Used to Determine Consensus

- **Consensus must be reached on both Survivability Questions:**
  - Assume the survival status of this patient is unknown, ***with immediate access to care at a level I trauma center***, assess the survival potential of this patient.
  - Assume the survival status of this patient is unknown, ***given the conditions of the actual scenario*** in which the injury occurred (i.e. discovery, EMS response, access to trauma center, weather etc.), assess the survival potential of this patient.

Consensus Definition

- 5 reviewers are used to determine consensus. The ME/Forensic reviewer is not calculated in consensus as this analysis is kept separate.

- Each variable is independent. So it must be 3 or more reviewers answering the same on one specific category. (For example: 3 agree the case is Potentially Survivable)
  - If one reviewer selects non-survivable and the other 4 select either potentially, definitely survivable, or cannot judge, that case goes to adjudication
  - If two reviewers select cannot judge, but the other three are able to make a determination, the case goes to adjudication

Live Adjudication Process

- Once you receive the email that your Team Panel has cases under Adjudication, your Team Panel can go in and begin re-scoring the case.
- Each Reviewer will have the ability to see how they scored their case, along with the case review of each of their fellow Team Panel members. ***(click Review Other Submissions)***
- This process will require reviewers to utilize the discussion comments section, so that an online dialogue can assist the Team Panel in reaching consensus.
- Once consensus is reached, the case will be removed. (***This may occur prior to every reviewer logging back in to engage in the discussion***)

Step by Step Guide

- Log in to Profiler and select a case that has (***Case Number-A*** next to it)
- When the case opens, above the right Panel, you will see a button (***Review Other Submissions***), click to view all submissions
- You can now see all 5 reviews from your fellow Panel Members. (Use the ***horizontal scrollbar*** to view all case review submissions)
- Above each review you can quickly see the reviewer name, and their most recent survivability determination for both survivability questions.
- Begin reviewing the other submissions and provide your rationale by entering comments in the left column (***Panel Discussion***).
- While on this screen, you can adjust your responses at any time, and re-submit the case.
- The ability to re-adjust your score will be open until Team Panel consensus is reached for both survivability questions. As soon as consensus is reached, the case will no longer be visible.
- If after further review and discussion amongst the Team Panel, consensus cannot be reached, the case will be pushed out of the Team Panel, and submitted for additional review by a sperate Adjudication Team.

Select "-A" Case and Review Other Submissions

MIMIC Preventable Death Profiler | Training | Definitions | Contact | My Account | Cases | Users | Logout

CASES — CT-2015-00698-A

REVIEW OTHER SUBMISSIONS

INFORMATION REVIEWED

- ME Summary
- Forensic exam: Full Autopsy
- CT Scan
- Police Report
- Hospital Record
- Traffic Investigation Report
- Toxicology

DEMOGRAPHICS OF THE DECEDENT

Age: 64

Gender: Male

Body Mass Index (BMI): 25.3

Co-morbidities:

- Alcohol use disorder
- Current Smoker
- lung carcinoma

+ INJURY CAUSE & CIRCUMSTANCES

+ INJURY SEVERITY — ME Summary

+ FIRST DISCOVERY & RESPONSE

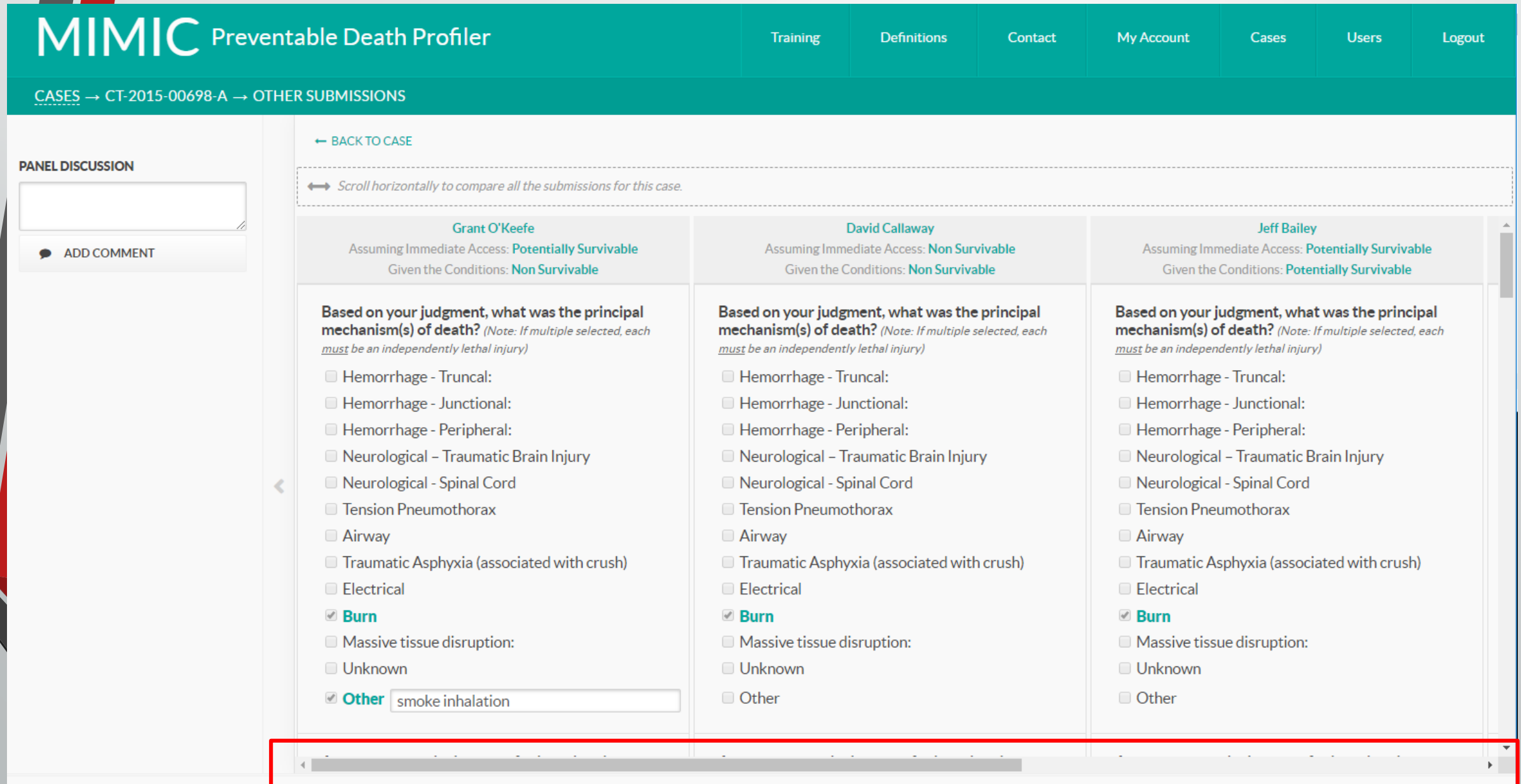
+ EMS CARE

+ ACCESS TO EMS & TRAUMA CARE

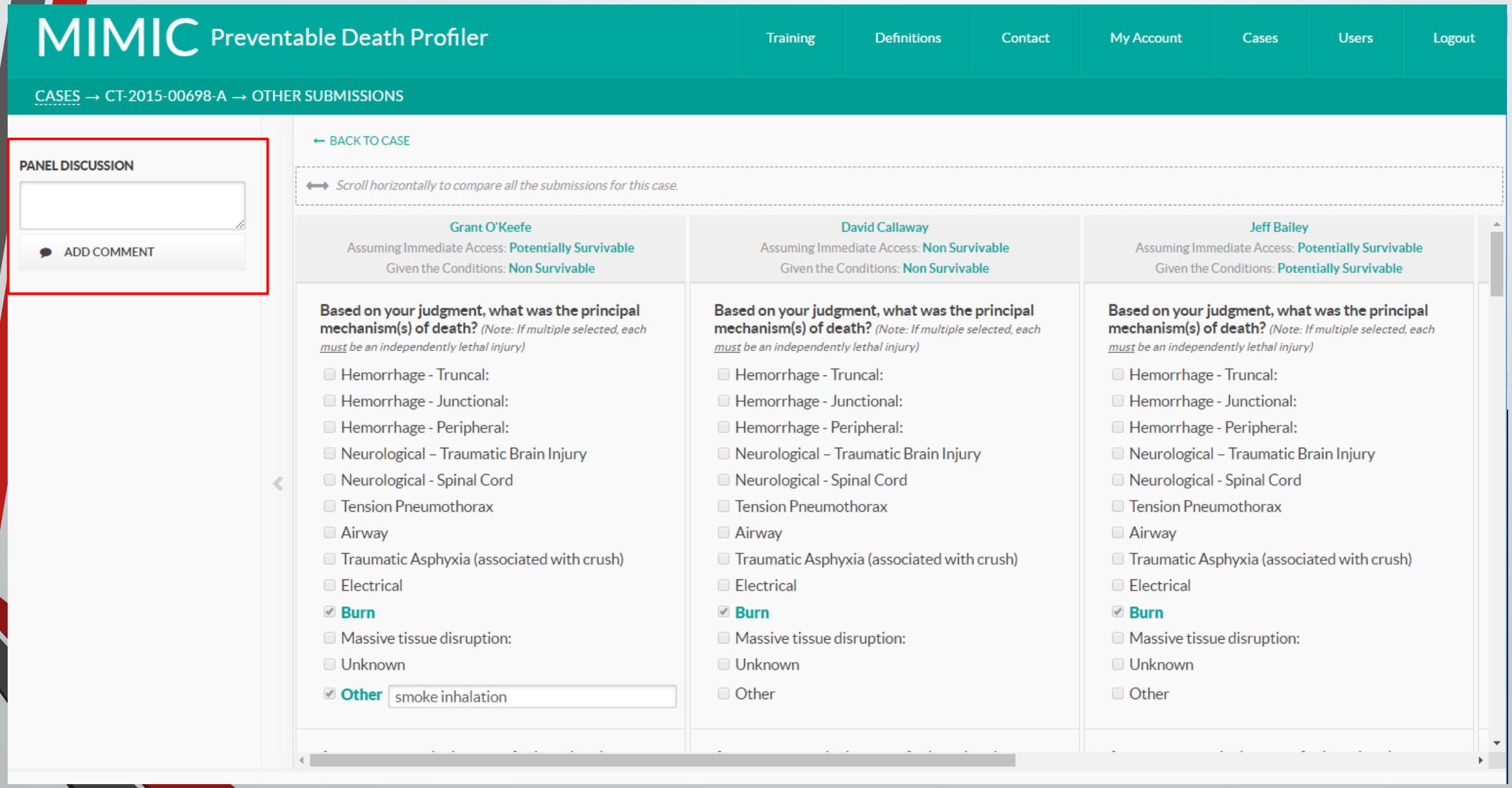
Based on your judgment, what was the principal mechanism(s) of death? *(Note: If multiple selected, each must be an independently lethal injury)*

- [ ] Hemorrhage - Truncal:
- [ ] Hemorrhage - Junctional:
- [ ] Hemorrhage - Peripheral:
- [ ] Neurological – Traumatic Brain Injury
- [ ] Neurological - Spinal Cord
- [ ] Tension Pneumothorax
- [ ] Airway
- [ ] Traumatic Asphyxia (associated with crush)
- [ ] Electrical
- [ ] Burn
- [ ] Massive tissue disruption:
- [ ] Unknown
- [ ] Other

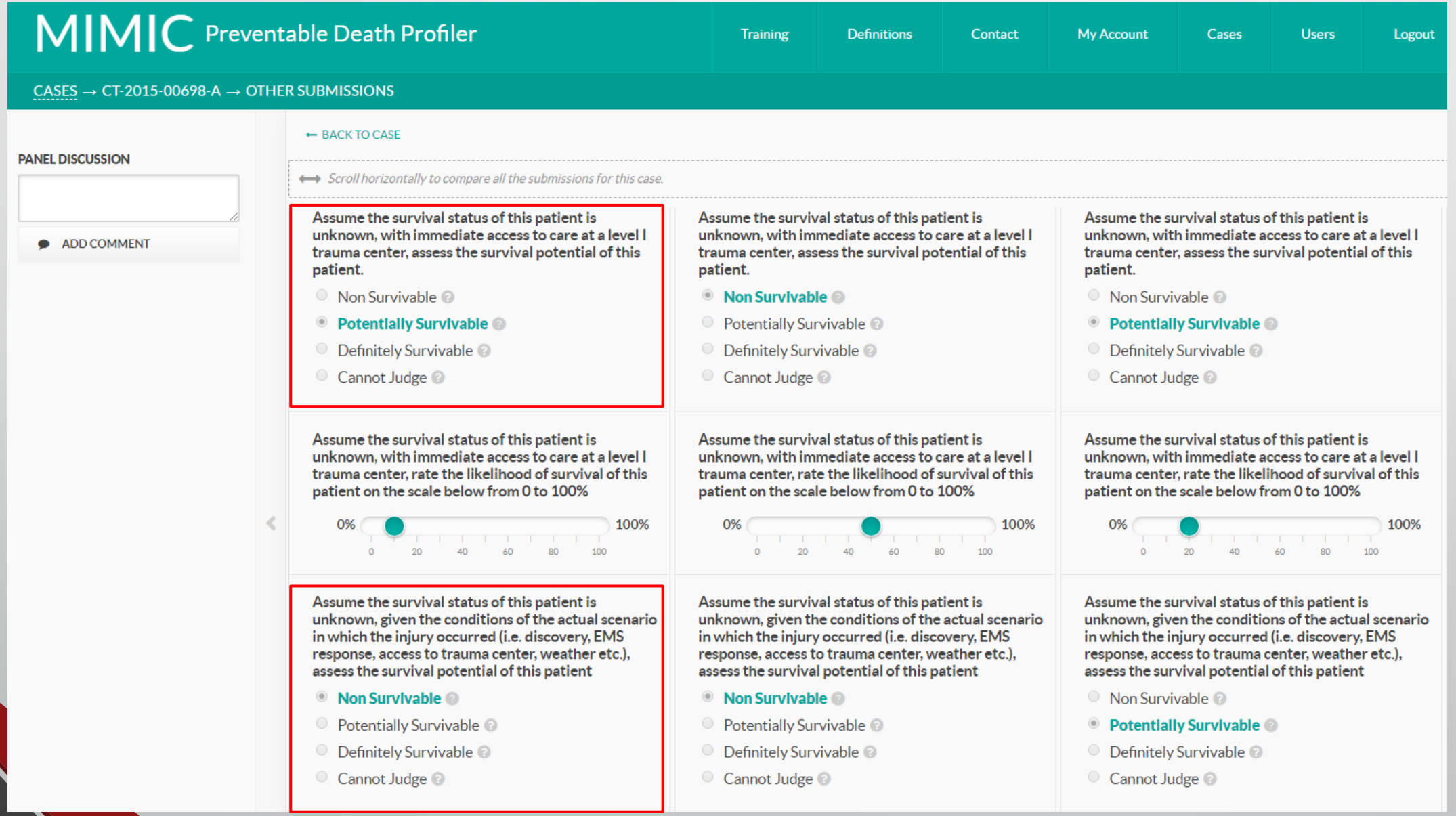
Use horizontal scroll bar to view all submissions



Review other submissions and start live discussion



Adjust Responses if Necessary and Re-Submit



Questions

IF YOU HAVE ANY PROJECT RELATED QUESTIONS, PLEASE DO NOT HESITATE TO REACH OUT

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