

# Motor Vehicle Collisions

## Breaking Down the Elements



Presented by James E. Kruse M.Sc. Of the Iowa  
Office of the State Medical Examiner

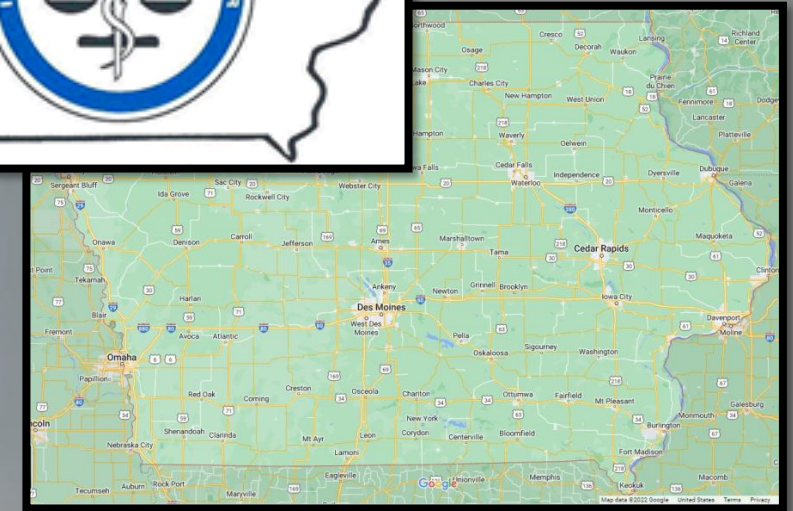
**CAUTION**

**This presentation will  
include sensitive images**  
(Decedents and scene photos)

Please **do not** take photos or record this presentation.

Outline...

- 1) Basics of Basics
- 2) M.V.C.s as an M.E.I.
- 3) Case Studies
- 4) How are we moving forward?



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# Basics of Basics

# What are we talking about?

- Motor Vehicle: *An automotive vehicle not operated on rails especially : one with rubber tires for use on highways* (2)
- Possible Vehicles for our proposes:
  - Cars
  - Vans
  - Trucks
  - Motorcycles
  - Tractors
  - Etc.....
- M.V.C. vs M.V.A.
  - An M.V.C. can be an M.V.A.



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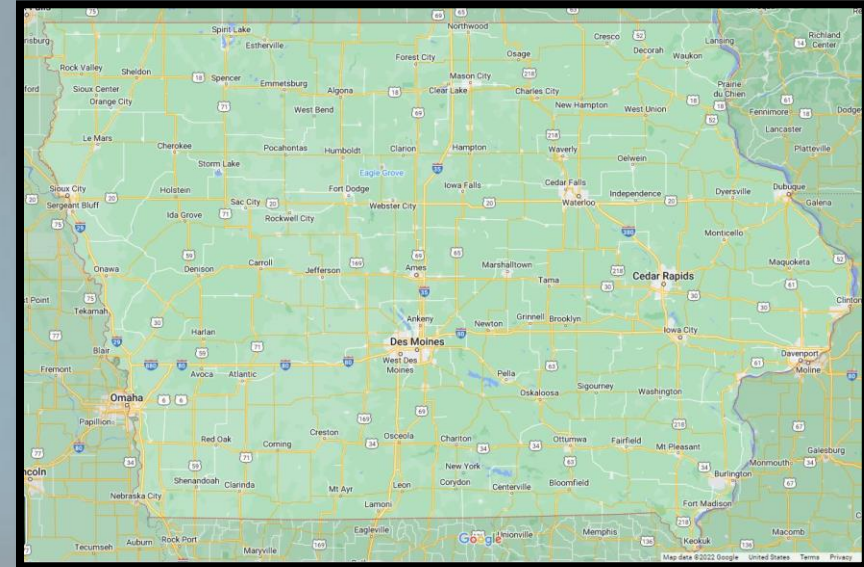
(2) Merriam-Webster. (n.d.). Motor vehicle. In *Merriam-Webster.com dictionary*. Retrieved September 18, 2022, from <https://www.merriam-webster.com/dictionary/motor%20vehicle>

(3) [Two Vehicle Crash]. Iowa DOT: Iowa.gov. Accessed 9/18/2022. <https://iowadot.gov/mvd/driverslicense/accidents>



# What we see in Iowa

- \_\_\_ Total as of \_\_\_\_, 2022 <sup>(4)</sup>
- \_\_\_ this time last year, 2021
  - \_\_\_ in 2021 - 355 total
  - \_\_\_ in 2020 - 343 total
  - \_\_\_ in 2019 - 336 total
  - \_\_\_ in 2018 - 319 total



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**M.V.Cs as an M.E.I.**





**Why do an autopsy?**

**We know the crash killed them.**

# Manner and Cause of Death

- We are not always looking at Accident as the *Manner of Death*.
  - Accident
  - Natural
  - Suicide
  - Homicide
  - Undetermined
- We are not always looking at blunt force injuries as the *Cause of Death*.
  - Blunt force injury
  - Positional asphyxia
  - Natural event (heart attack, stroke, etc.)
  - Etc.....

# On Scene

## First things First

- As always, gage your surroundings:
  - Is everyone accounted for?
    - Additional passengers, children, pedestrians...
  - Where is everything?
  - Identify what type of collision you are looking at
  - How many Decedents/vehicles are there?
- What do we know already?
  - Do we know what happened before the crash?
  - Is there video of the crash???
- **Take Photographs (or find out who is!)**
  - Scene as a whole
  - Decedent's position in the vehicle (or outside)
  - Other Structures and objects nearby

Photos Removed

# EMER

## MEANS OF DEATH

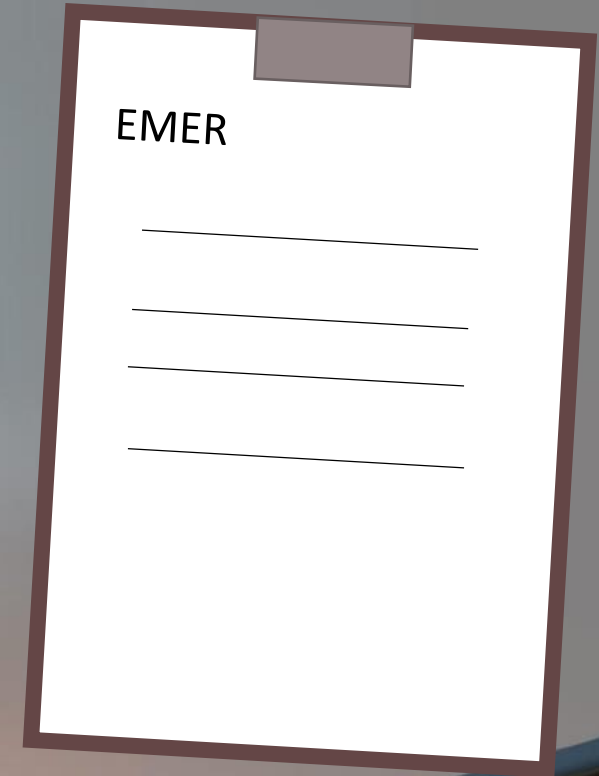
- |                                  |   |                                     |                                       |  |                                |                    |
|----------------------------------|---|-------------------------------------|---------------------------------------|--|--------------------------------|--------------------|
| <input type="checkbox"/> Natural | <input type="checkbox"/> Carbon Monoxide-Vehicle  | <input type="checkbox"/> Pedestrian | <input type="checkbox"/> Drowning     | <input type="checkbox"/> Asphyxiation            | <input type="checkbox"/> Other | Other Description: |
| <input type="checkbox"/> Suicide | <input type="checkbox"/> Carbon Monoxide-Dwelling | <input type="checkbox"/> Firearm    | <input type="checkbox"/> Fire/Thermal | <input type="checkbox"/> Drug/Alcohol/Poison     |                                |                    |
| <input type="checkbox"/> Hanging | <input type="checkbox"/> Vehicles                 | <input type="checkbox"/> Instrument | <input type="checkbox"/> Falling      | <input type="checkbox"/> Suspected Abuse/Neglect |                                |                    |

<div>VEHICLES</div>	<p><b>Type of Road:</b></p> <p><b>Estimated Speed:</b>          Construction Zone:          At Intersection:          Intersection Street(s):</p> <p>Intersection Control Present:          Intersection Control Type:</p> <p><b>Crash Type</b></p> <p><input type="checkbox"/> Head On  <input type="checkbox"/> Angle  <input type="checkbox"/> Driver Side Impact  <input type="checkbox"/> Left Roadway  <input type="checkbox"/> Passenger Side Impact  <input type="checkbox"/> Rollover  <input type="checkbox"/> Rear End  <input type="checkbox"/> Other</p> <p><b>Additional Crash Type Info:</b></p> <p><b>Weather Condition:</b></p> <p><b>Accident Description (Location Narrative):</b></p>	<p><b>Deceased Position in Vehicle:</b></p> <p><b>Vehicle Type:</b></p> <p><b>Vehicle:</b>          Year:          Make:          Model:</p> <p><b>Distractions Present during the Accident</b></p> <p><input type="checkbox"/> Cell Phone  <input type="checkbox"/> Changing Music  <input type="checkbox"/> Drag Racing:  <input type="checkbox"/> Alcohol Present in Vehicle  <input type="checkbox"/> Drugs Present in Vehicle  <input type="checkbox"/> Other:</p> <p><b>If Decedent was Driver:</b>  <input type="checkbox"/> Sleep Deprived</p> <p><b>If under 18</b>          # of Vehicle Occupants:          List Age of Each Occupant:</p> <p>Date License/Permit Issued:</p> <p>License Type:</p>	<p><b>Other Vehicles:</b>          Vehicle Type:</p> <p><b>Vehicle:</b>          Year:          Make:          Model:</p> <p><b>Additional Vehicles:</b></p>	<p><b>Restraint Used in Vehicle</b></p> <p><input type="checkbox"/> Restrained in Vehicle  <input type="checkbox"/> Unrestrained in Vehicle  <input type="checkbox"/> Unknown if Restraint Used  <input type="checkbox"/> Ejected from Vehicle  <input type="checkbox"/> Partially Ejected from Vehicle</p> <p><b>Restraint Type:</b></p> <p><b>Additional Restraint Info:</b>  <input type="checkbox"/> Air Bags in Vehicle  <input type="checkbox"/> Air Bags Deployed  <input type="checkbox"/> Child Restraint</p> <p><b>Point of Impact:</b></p> <p><b>Tire Marks Description:</b></p> <p><b>Helmet Worn:</b>  <b>Helmet Damage:</b></p>



**On Scene**

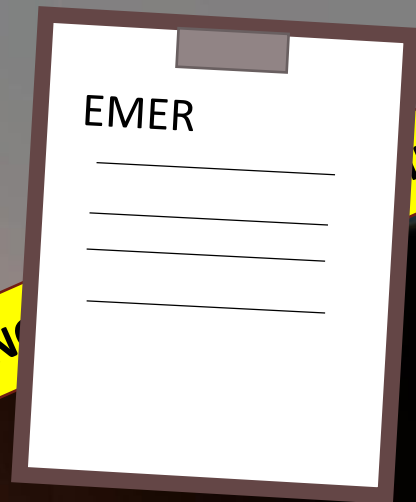
**Document any and all  
Roadway Evidence**



# On Scene – Document any and all Roadway Evidence

## Starting Wide

- Tread marks, skid marks, or scuffs
  - Could indicate:
    - Sudden turns
    - Attempts to break
    - Reckless behavior (doughnuts, drag racing, etc....)
- Is there any other damage in the area?
  - Buildings, poles, fences, plants, dead animals.....
  - Gouge marks or chunks missing from anything?
  - A debris field?
- How much debris and where is it located?
  - Is it all from the vehicle structure/interior?
- Fluid trails? Gas, Oil.....
- Where is everyone in proximity to the vehicle
- Are there any obstacles for paths of clear sight?
  - Signs, hills, billboards, corn.....
- Are their barriers, rumble strips, or other safety features on the road itself?
- Time of day and weather!!!!



# On Scene

## Focusing in on the Vehicle and Decedent

- *What is the condition of the vehicle?*
- *How far is the Decedent from the vehicle?*
- *Are their objects or debris spread out? Was it originally loose in the car?*
- *How is the decedent positioned? Is there anything obstructing their face or pushing into them?*

Photos Removed

# On Scene

## Focusing in on the Decedent

- *Were they removed from the vehicle?*
  - *DOA?*
  - *Medical intervention?*
- *If moved: Find someone who can detail how they were found*
- *If In original position: Take note and take photos*
- *Take note of:*
  - ***Defects** to the Decedent's body*
  - *Anything suppressing respiration*
  - *How are they positioned in reference to the vehicle (what side, in drivers seat, 30 ft. from car).*
  - *Is there any part of the Decedent missing?*

Photos Removed

# On Scene

## Focusing in on the car litter

- *What is the condition of the car*
  - *Did the airbags deploy?*
  - *Are the seatbelts buckled?*
  - *Where is the damage focused?*
  - *Were the doors open or windows broken?*

Photos Removed

### *Is there anything of interest near or in the vehicle*

- *Alcohol bottles/cans*
- *Drug paraphernalia*
- *Medical supplies*
- *Where is the Decedent's phone?*
  - *Is it on the ground by the gas peddle???*
  - *Is it in the back seat.....*



# On Scene

## Fill in the Banks...

- *Does law enforcement have an estimated speed?*
- *What is the area like? Construction zone, intersection (specify streets), etc....*
- *Stop lights or other signage?*
- *What was the road type? Paved, gravel, dirt, etc....*
- *Vehicle details (make, model, year)*

**CROSS - POLICE LINE DO NOT CROSS - POLICE LINE**

# On/Off Scene

## What happened before the crash???

- *Who last saw the Decedent?*
- *How were they feeling?? (Angry, depressed, in Pain)*
- *Where were they going?*
- *What has their health been like? Do they have any medical issues?*
- *What is their social history like? Drugs, alcohol, tobacco, vaping.....*
- *Is it their car?*
- *How familiar are they with the car?*
- *How familiar are they with the area?*

CROSS - POLICE LINE DO NOT CROSS - POLICE LINE

# When off Scene

## Working with Law Enforcement

- *Reconstructionists are trained in putting the pieces back together.*
  - *Measurements can help rule in or out possibilities*
    - *Calculate speeds*
    - *Approach/departure angles*
    - *Principle direction of force*
      - *Directly correlates to where the Decedent will end up post crash*
      - *Was the vehicle speeding at the time of the crash?*
      - *If at the speed limit, would they have had time to react if not distracted?*
        - *Cell phones*
        - *Conversations/arguments*
        - *Other distractions*
      - *Did they break?*
    - *Provide evidence for a search warrant (phones or other locations/devices)*

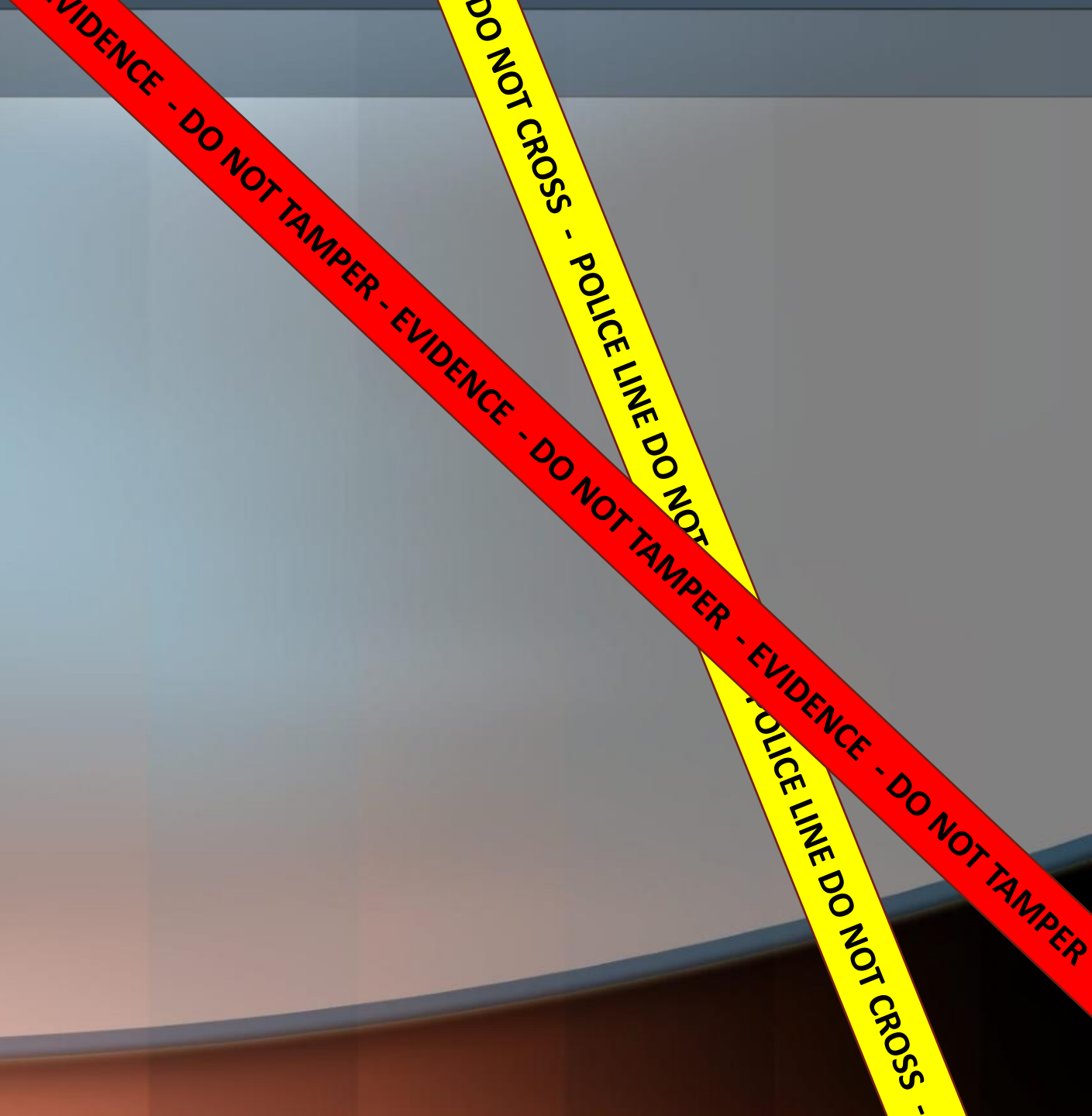


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# When off Scene

## Working with Law Enforcement

- *Black Box data*
  - *Airbag deployment*
  - *Speed*
  - *RPMs*
  - *Throttle position*
  - *Break usage*
  - *Delta V*
  - *Seatbelts*
  - *Etc.....*



**What Can We Do?**



# MVC Review Conference

- All MVCs are recorded and broken down
  - Components include all listed in the EMER amongst others
- Once per quarter an interagency meeting takes place to review select cases
  - IOSME
  - Iowa State Patrol
  - Johnston County Medical Examiner's Office
  - University of Iowa
  - Iowa Department of Transportation
  - And more.....
- Cases reviewed are not limited to those investigated by the IOSME

## Interagency MVC Review Conference



Made Available by the Iowa Office of the State Medical Examiner

Last Updated: 7/5/2022

# MVC Review Conference: Goals

## Purpose:

The purpose of this meeting is to allow us to take a deeper dive into select motor vehicle collisions and put the pieces together as a group. The following questions are the primary focus questions/goals.

- What can we do to prevent future deaths???
  - What information can we take from this crash?
  - Can anything be done regarding road design or public safety announcements?
  - Can the information taken from this meeting benefit State legislation?
  - Can the information taken from this meeting benefit automotive research or design?
- Make sure that everyone involved in the investigation of a MVA is versed in all aspects of the process.
- **Can this information be used to prevent this from happening again???**

**In Summary.....**

# Summary

## 1) Basics of Basics

- Crash numbers appear to be increasing in recent years, however small this increase may be

## 2) M.V.C.s as an M.E.I.

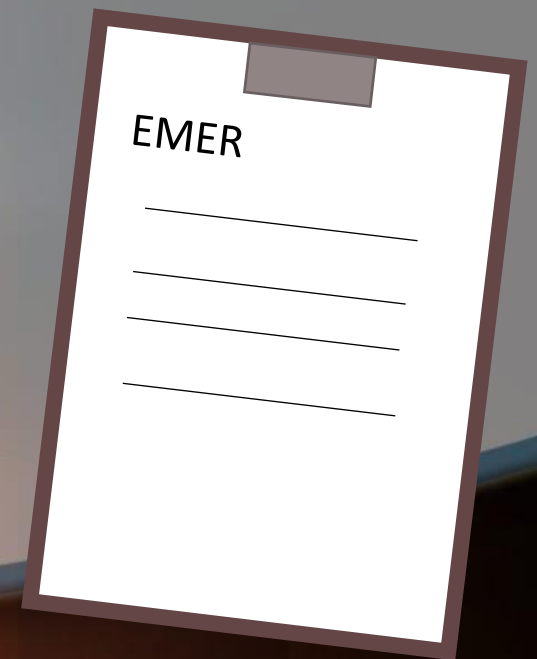
- Start wide and work your way in.
- Be aware of both the natural and man made landscape (hills, signs, weather....)
- Record what you see on the road, in the vehicle, on the Decedent, and in the Debris field
- Was the Decedent moved? How were they found? Are their photos???
- What law enforcement is on scene?
- **The EMER is your friend!!** 😊

## 3) Case Studies

- Manner and Cause are not always obvious!

## 4) How are we moving forward?

- What can we do to prevent future deaths?
  - Research?
  - Meetings?
  - Trainings?
  - Etc.....



Questions???



# Contact Information

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# Sources

- (1) [Google Maps: Iowa]. Google: Maps. Accessed 9/18/2022. <https://www.google.com/maps/place/Iowa/@42.1365884,-94.2426199,8z/data=!4m5!3m4!1s0x87ee5e6ff1f86019:0xc6ef634a57c759d9!8m2!3d41.8780025!4d-93.097702>
  - (2) Merriam-Webster. (n.d.). Motor vehicle. In *Merriam-Webster.com dictionary*. Retrieved September 18, 2022, from <https://www.merriam-webster.com/dictionary/motor%20vehicle>
  - (3) [Two Vehicle Crash]. Iowa DOT: Iowa.gov. Accessed 9/18/2022. <https://iowadot.gov/mvd/driverslicense/accidents>
  - (4) Iowa DOT (2022, March 9). *2022 Iowa Traffic Fatality Count as of Wednesday, 03/09/2022*. Iowa DOT. <https://www.iowadot.gov/mvd/stats/daily.pdf.3/9/2022>
  - (5) [Iowa State Patrol Logo]. Iowa State Patrol: Iowa.gov. Accessed on 9/18/2022. <https://dps.iowa.gov/divisions/iowa-state-patrol>
- Additional Information as to the Iowa State Patrol's Investigating Process was provided by Trooper Eric Payne.
  - Information included in this presentation as to scene investigation process is a collaborative effort between multiple Medical Examiner Investigators and Forensic Pathologists of the Iowa Office of the State Medical Examiner.
  - Case studies and their content are from Investigations conducted by the Iowa Office of the State Medical Examiner and other medical examiner office(s) and are not cited in order to provide anonymity to the Decedent, their family, and the County of Investigation.

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**Thank you**