

# The Dangers of Working Alone in Agriculture

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# The Dangers of Working Alone in Agriculture

Motivation

Documented Cases

Related Research

Available Tech

Best Practices

Planned Work

## Overview

- Underreporting of lone injuries/ fatalities of agricultural workers
- Subjectiveness of current incident reporting methods

Aug 23, 2021

## Man Dies in Illinois Grain Bin Accident

Brian Satorius, 47, was president of Menard County Farm Bureau

Safety

source: [The State Journal-Register](https://www.thesjournal-register.com/story/news/local/2021/08/23/man-dies-in-illinois-grain-bin-accident/7711111002/)

The president of the Menard County, Illinois, Farm Bureau died from his injuries after he became submerged in a grain bin Friday, reports *The State Journal-Register*.

Brian Satorius, 47, of Petersburg, was pronounced dead in Springfield on Friday after first responders removed him from a grain bin after he became trapped on a farm in rural Petersburg, IL.

According to the Menard County Sheriff's Office, Satorius went inside to fix something. He was found submerged in grain after the silo was drained with the help of local farmers.

Satorius leaves behind a wife and two children.

\*<https://www.feedandgrain.com/news/man-dies-in-illinois-grain-bin-accident>



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## Overview Cont.

- The duality of technology as a safety mechanism



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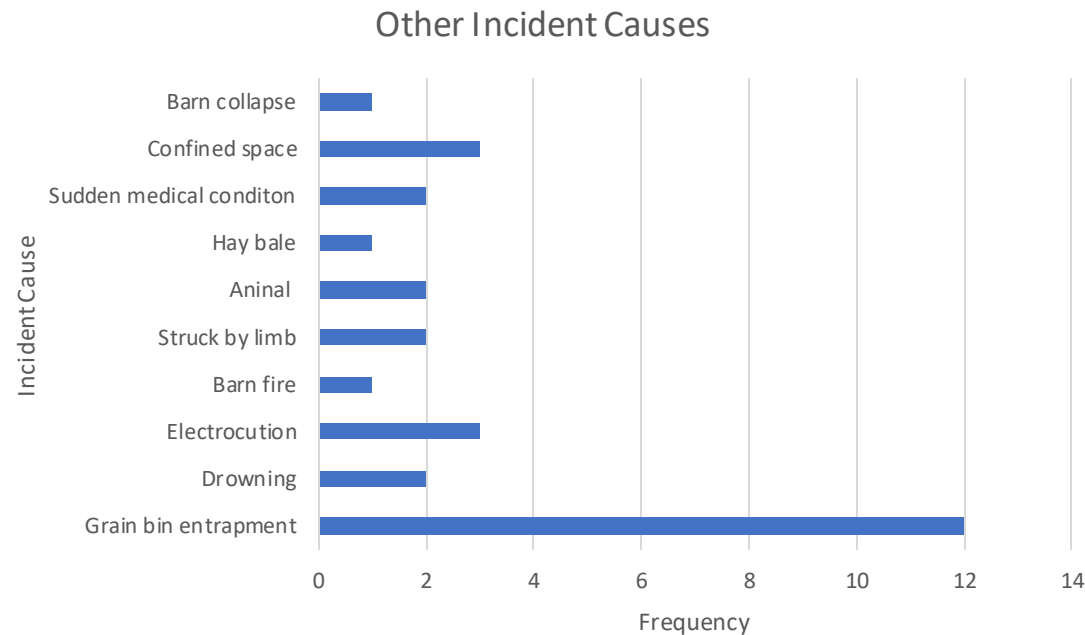
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## Problem Scope

- Identification of incident cases across the United States
- Analysis from 2016-2022





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## Problem Scope Cont.

- What can be done to improve emergency response time, decrease fatality rate, and improve communication strategies?



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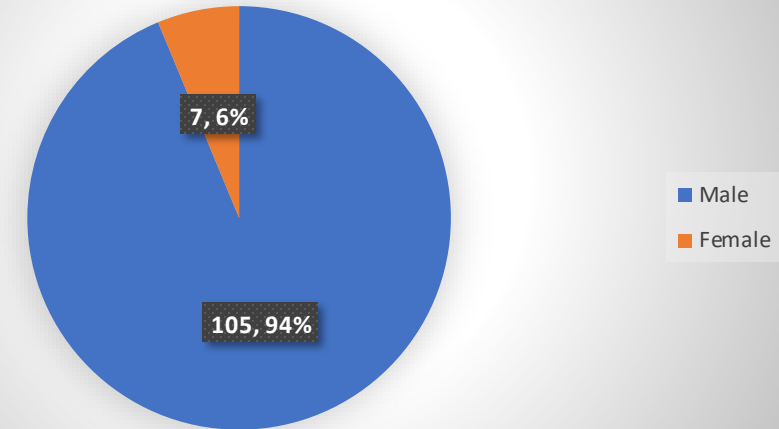
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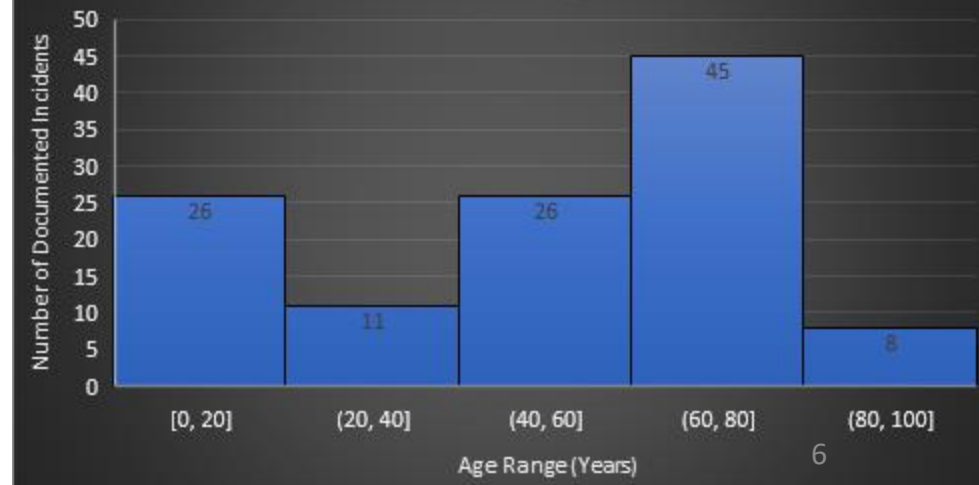
## Initial Documentation

- Incident reports were documented from [aginjurynews.org](http://aginjurynews.org), NIOSH FACE reports, and the PUASH annual agricultural fatality reports for Indiana
- A total of 112 lone incident cases were identified, with more than 800 cases looked through
- Average victim age was 57.58

Sex of Incident Victims



Victim Age



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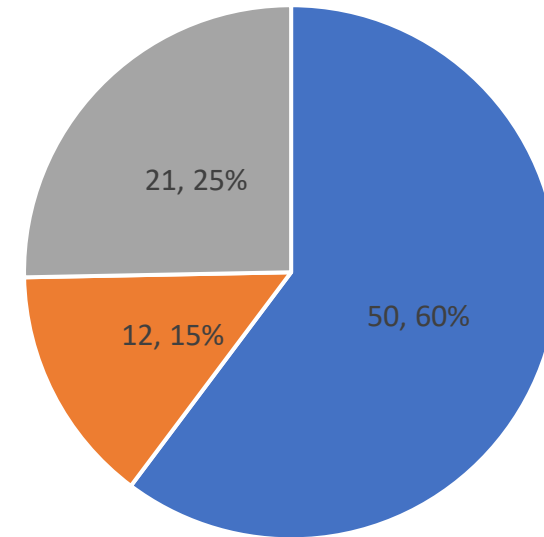
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## Most Common Incident Types

- Vehicle or equipment related incidents were most prevalent
- Tractor rollovers accounted for the majority of these
  - 50 identified incidents
  - Nearly half of all incidents found

Vehicle or equipment related incidents



■ Tractor ■ ATV/UTV ■ Other

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## Case Study 1

- A 73-year-old woman succumbed to injuries sustained from a sheep attack while cleaning out its pen.





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## Case Study 2

- A 93-year-old man survived a fall from his grain bin thanks in part to the Apple Watch he was wearing.



<https://www.ketv.com/article/92-year-old-farmer-survives-21-foot-fall-from-ladder-credits-apple-watch-for-saving-his-life/32911334>

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## Case Study 3

- A 57-year-old man survived an ATV overturn on remote Wyoming cattle pasture by drinking beer and water from his cooler.



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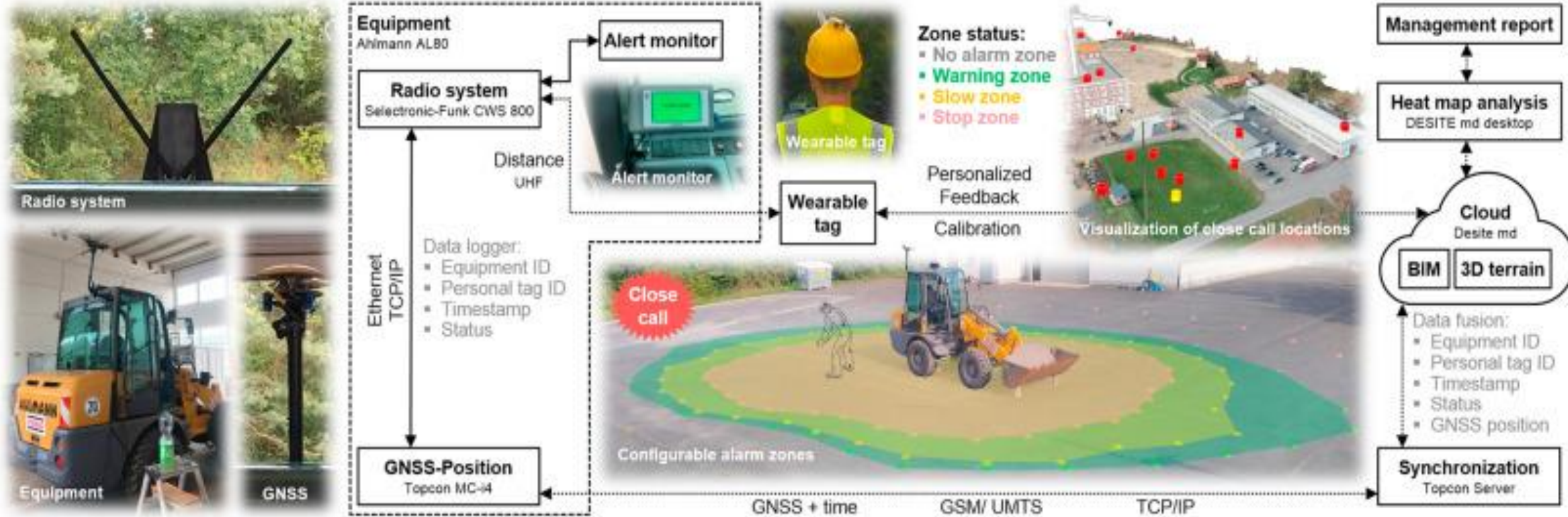
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## Construction Industry



\*Marks, E. D., & Teizer, J. (2013). Method for testing proximity detection and alert technology for safe construction equipment operation. *Construction Management and Economics*, 31(6), 636-646. doi:10.1080/01446193.2013.783705



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## Oil and Natural Gas Workers

- Safety, mental health, and fatigue biggest factors impacting these remote workers, compared to workers performing similar roles in a non-isolated environment. (Alroomi & Mohamed, 2021)
- Elevated stress and fatigue levels experienced by isolated oil and gas workers directly linked to occupational hazards and accident potential (Chan, 2011).





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## Forestry and Logging

- Ability of emergency services to respond to an accident greatly hampered by remote nature of these operations and difficult terrain
- Cellular network connection can be spotty to non-existent.
- Occasional woodcutters especially vulnerable to injury due to a lack of experience and improper technique (Tormoehlen, Field, Ehlers, & Ferraro, 2020).
  - Three times more likely to get injured when compared to workers in the logging industry (Fischer, Young, Mueller, & Stueland, 2005).



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## Commercial Fishing

- Commercial fisherman, such as deep sea and lobster fishermen, often work alone and in a remote or secluded area
- Even with a small crew working on a vessel, each member of the crew is responsible for a specific task, often left alone to perform a dangerous task in perilous conditions
- 725 fatalities occurred in commercial fishing, in the United States, from 2000 to 2015
- Unintentional falls overboard was the leading cause of fatality over this period
- In half of these cases, the fishermen were alone, having no one to witness there fall and attempt rescue operations or call for help (Ruehr, 2019)



\*<https://www.ktoo.org/2020/12/09/worry-for-commercial-fishermen-and-peninsula-communities-after-cook-inlet-fishery-closure/>



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## Hunting and Trapping

- Solo hunters and trappers face elevated risks, compared to going with a partner or group.
- Dangers include challenging, changing terrain, lack of cellular coverage, dangerous predator territories, extreme weather, and increased distances from emergency facilities
- Carry a physical map of the area as devices could stop working or malfunction in extreme weather or changing temperatures (Livesay, 2017).
- Limit travel and navigation at night



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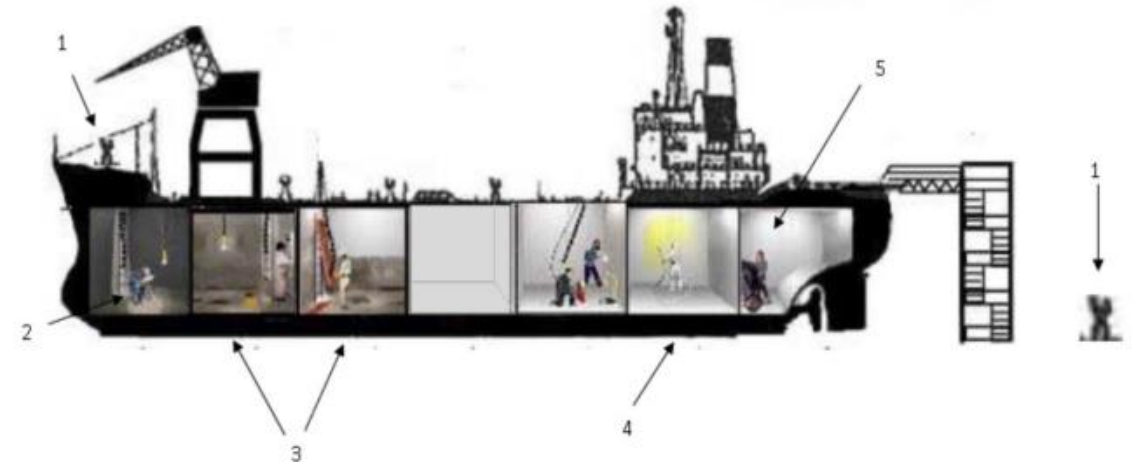
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## Shipyards

- An example OSHA standard for working alone is 29 CFR 1915.84, for shipyard employment.

Shipyard employers are required to account for each worker either by sight or verbal communication

- Shipyard employers are required to account for each worker either by sight or verbal communication. OSHA specifies that this “must be done throughout each work shift at regular intervals, appropriate for the job assignment” (OSHA , 2013)



### Examples of Working Alone

1. An employee working alone on a job task at the far end of a vessel, vessel section, or shipyard;
2. An employee working alone in a hold, sonar space, or tank;
3. Two employees working on either side of a metal partition;
4. One employee performing hot work with a fire watch located on the other side of a bulkhead; or
5. An employee working alone in a confined space.



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## Relations to Agriculture

- Like construction, agricultural environments commonly have extreme temperatures, loud noises, and poor air quality
- In some parts of the country, farmers and ranchers must deal with the remoteness faced by backcountry hunters daily
- Similar to oil and natural gas workers, safety, mental health, and fatigue are major concerns for the lone agricultural worker
- Related to commercial fisherman, agricultural injuries often occur without witnesses





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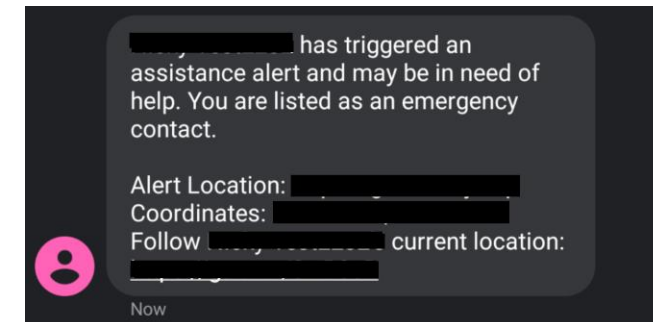
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## Wearable Devices

- Smartwatches
- Rings
- Bands (headband, waistband, arm strap, etc.)
- Smart PPE



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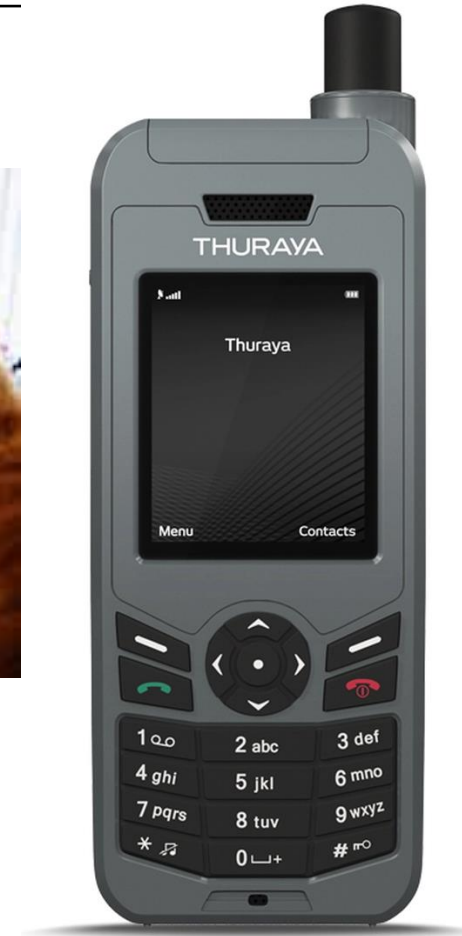
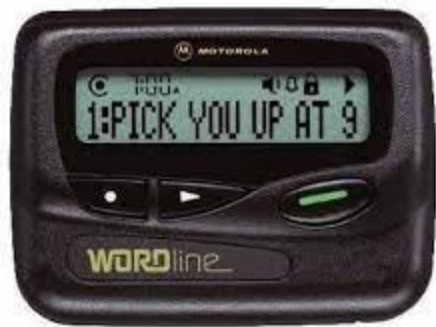
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## Communication Technologies

- Cellular phones
- C/B radio, walkie talkies
- Pager (outdated)
- Online/ web- computer/ smartphone/ other device



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## Surveillance Technologies

- GPS tracking software/ applications
- Security cameras
- Game cameras





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## Communication Strategies

- Make a habit of letting others know where you plan to be throughout the day
- If planning to do a hazardous task alone, make sure others are aware of your location, the task you are doing, how long you expect it to take, and when you should arrive back
  - If possible, include others when performing this task, even if they are only able to observe
- Make communication a key part of your safety training for your farm or business
  - Ensure that employees/ family members know what to do in the event of an injury



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## Smart Device Utilization

- Wearing a smart watch with built-in fall detection can help to alert emergency first responders in the event you are unable to reach your cellphone
- Technology is being developed to enhance incident detection and automatically alert emergency services
- Keeping the GPS feature in your phone, watch, or other device while working alone can allow for faster emergency response
- Tracking features such as 'find my iPhone' and others can be used by family/ coworkers to monitor your location
  - Pings can be sent to the person at a set time interval if needed





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## Safety and Health Regulations

- Existing federal and state workplace safety and health regulations that address the need for co-workers, outside observers, emergency first responders, and on-site and backup personnel need to be complied with and enforced





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## Planned Research & Experimentation

- Further analysis of published lone injury/ fatality cases
- Create a subset of the PAUSH injury surveillance database to document lone agricultural incidents
- Develop interventions and recommendations based on analysis
  - Specific steps towards injury/ fatality reduction

Purdue University Agricultural Safety & Health



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## Planned Research & Experimentation Cont.

- A variety of health, communication, and monitoring technologies will be tested through scenario-based situations
  - Determined from interviews with farmers, educators, first responders, and other stakeholders with vested interest in improving lone agricultural worker safety



\*<https://www.onfocus.news/national-farm-medicine-center-to-host-farm-rescue-training-for-first-responders/>

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## Planned Research & Experimentation Cont.

- Demonstrational material will be developed for scenario-based situations in which communication technologies can be used for lone agricultural workers
- First responders and agricultural workers will be interviewed on most challenging aspects of lone worker safety, from the view of each respective profession



\*<https://vet.purdue.edu/news/purdue-vth-ecc-team-provides-pet-cpr-training-to-volunteer-firemen.php>



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## Planned Research & Experimentation Cont.

- Open-source software will be developed for automatic incident detection and notification
- Identification of specific use cases and best practices will occur during the design and beta testing phases of the software design process
- Data collected from commercially available health, communication, and surveillance devices will be processed, analyzed, and made available



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## Future Strides

- Inclusion of whether victim was alone at time of incident in news reporting
- Expansion of automated incident detection and alert software
- Work in remote areas where signal is poor
- Utilization of upcoming technologies such as Starlink™ to gain service in dead-zone areas



\*<http://www.bearmonitoring.com/gallery/>

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Thank You!

Questions?