

Episode Title: Safely Sharing the Road with Farm Vehicles: SaferTrek Project

Summary: Dr. Michelle Reyes, Sr. Research Associate at the University of Iowa's Driving Safety Research Institute, and Dr. Cara Hamann, Associate Professor at the University of Iowa, and core director of the Injury Prevention Research Center are on the podcast to talk about the SaferTrek project. This project observes the behavior of passing vehicles and how they interact with farm vehicles on the road.

Expert: Dr. Michelle Reyes, Sr. Research Associate at the University of Iowa's Driving Safety Research Institute, and Dr. Cara Hamann, Associate Professor at the University of Iowa, and core director of the Injury Prevention Research Center

Episode Quote:

*"They found that often when there's a crash with a passenger vehicle and farm equipment, they happen to be **severe**, they're often the fault of the **passenger** vehicle driver, not the farm equipment operator."*

– Dr. Cara Hamann, Associate Professor at the University of Iowa, core director of the Injury Prevention Research Center

Transcript

00:10 A Proctor

Welcome to the FarmSafe Podcast brought to you by the Great Plains Center for Agricultural Health. In the blink of an eye, an injury can change your life and your farm forever. During each episode, we share first-hand stories and real-life tips for making safer and healthier decisions while on the farm.

First, we have a story from Maggie at last year's Minnesota FarmFest.

Maggie

Hi, I'm Maggie, and I'm from a small rural town and my husband and I farm. And we were driving down the highway in opposite directions with farm implements and my husband – I happened to look in the rear-view mirror and he was basically on the shoulder but into the lane part way, and a semi came along going the same direction as him and decided he had to pass right then. He was only going a quarter of a mile so it's not like the semi would've had to wait very long. The semi driver decided he had to pass, and there was an oncoming car, and that car had to take the ditch in order to avoid a head-on collision with that semi. So, I'd really like to tell people, give farmers the lane. They really need that whole lane of their travel, in order to be safe.

A Proctor

Thanks for tuning in to the FarmSafe Podcast! We are continuing our series on technology on the farm by talking with two researchers involved with the SaferTrek project. This project looks at the driving behaviors of passenger vehicles when they encounter farm vehicles and their associated behaviors. Welcome, Cara and Michelle!

Would you both mind introducing yourselves to our listeners and describing your background, your research interests, and what led you to this position?

C Hamann

Hi, I'm Cara Hamann. I'm an assistant professor in epidemiology at the University of Iowa College of Public Health. And I'm also the core director for training and education for the University of Iowa Injury Prevention Research. My training is in injury epidemiology, and my research focuses on road Traffic Safety, primarily around topics like high-risk road users. Such as teen drivers and older drivers, and then also vulnerable road users, including like bicyclists and pedestrians, but also kind of special cases like farm vehicles on the road, which is what we're talking about today.

A Proctor

Awesome. Thank you. **C. Hamann** – mhm.

M Reyes

My name is Michelle Reyes. I am a senior research associate at the Driving Safety Research Institute at the University of Iowa. We had a recent name change so folks might know us as the national Advanced Driving Simulator, and I have been doing research in human factors and Transportation Safety for about 20 years. And I've been fortunate to cover a wide range of research areas, including teen driving, which is how Cara and I first started working together. And working on things like driver and attention occupant protection-- that means like seat belts, working with crash data, and we recently worked on a project where we looked at the impacts of three lane road conversions. -- A whole wide variety of things that I've had my hands in.

A Proctor

Great! Thank you for those introductions. I didn't realize that the simulation center changed names, that's good to know. Would you mind explaining what the Safer Trek project is?

C Hamann

It's what we call a naturalistic study of farm equipment on the roadway. That's the primary piece of it. Naturalistic meaning, we're observing something in the real world. We collected roadway data of farm equipment on the road and how other vehicles are interacting with that farm equipment on the road. And the other piece of the project is we created and evaluated a community-level campaign around rural roadway safe.

A Proctor

Did the project have any specific aims or any specific components that you wanted to incorporate during the creation of it?

C Hamann

Yeah, it had two main parts. The first was focused on collecting the naturalistic roadway data. We put cameras on and GPS systems on the back of farm equipment facing backwards so we could see cars approaching the farm equipment from behind. And really, we wanted to understand and get a better idea, a lot of which is unknown about farm equipment like how often are they on the road, what kind of roads do they travel on, what times of day, how often do they interact with cars. The second part of this study focused on a community-level campaign which we developed, and we implemented in a small rural town in Iowa and that was focused on specifically trying to get drivers to drive safer around farm equipment on the road. And Michelle, anything you would add to that overview?

M Reyes

I would add that we did the data collection in two different areas of the state, both roughly about the same distance from the university. But one of those was a control community that did not receive any of that community campaign that Cara mentioned and then that way the data collection happened both before, during and after. So, I guess there were kind of three phases of data collection relative to that campaign for both the intervention community and that control community.

A Proctor

What are the cameras on the back of the farm equipment trying to capture? Is it more for analysis of how the farm vehicle itself drives or how community drivers respond to the farm vehicle?

M Reyes

This study really did focus on the behavior of the other drivers, though the data collection device did record information about the farm equipment, mainly what speed they were traveling at. That's another piece of that exposure data that we're curious about, what are their typical road speeds. The crashes that happen in the unsafe, near crashes, I guess you could say that happen. A lot of times is that speed differential that comes into play. The passenger vehicles are traveling at or often above the speed limit and they come over the crest of a hill and encounter a piece of farm equipment that's typically moving at a much lower speed. We annotated a lot of these videos to try to quantify and classify the behavior of these drivers in terms of how long they've followed behind the farm equipment. How close did they follow? When did they decide to pass? When annotating the videos, we noted whether there was a no passing zone, we noted whether there were other potential conflict points like entries into a field. One of the common crash scenarios is

another driver approaching and beginning to overtake the farm equipment operator while the farm equipment operator is preparing to make a turn, and that's one of the common crash scenarios that has been seen in the data prior to our study. Those are the things that we coded. We're still working on crunching all of that data to marry up those observations we made by watching and annotating the video manually with the measurements that come out of our video image processing, those being mainly the distance estimate. So how close the following vehicle was to the farm equipment and then what their relative speed was? Was that distance between the approaching vehicle and the farm equipment closing? Were they beginning to pass, or were they just hanging back and following for a while?

A Proctor

Was there a specific event or a roadway crash that led to the creation of SaferTrek?

C Hamann

I wouldn't say there is a specific event, but prior to our project that we've been describing, there was another project that was also through the Great Plains Center that focused on crash data and examined crash data in nine states, basically the Midwestern states. They found that often when there's a crash with a passenger vehicle and farm equipment, they happen to be severe, they're often the fault of the passenger vehicle driver, not the farm equipment operator. The types of crashes that often occurs when the passenger vehicle rear ends the farm equipment or tries to overtake when the farm equipment is turning left, that's what Michelle was describing. When the crashes occur, the injuries often happen to the passenger vehicle occupants more so than the farm equipment operators. The collection of that information inspired us to do our current study. We can only learn so much from crash data, so we wanted to get more information on the context of the exposure piece, like how often is farm equipment on the road, what happens during these interactions and how often do passenger vehicles do risky things like passing in no passing zones that or following too closely that type of stuff.

A Proctor

OK, so not a specific event, but more of trying to meet a critical need for safer road sharing.

C Hamann

Yeah, exactly.

A Proctor

Is there anything important about the changing designs of tractors and implements that we want communities to know about when driving on the road with tractors? Hasn't equipment gotten larger?

M Reyes

Yeah, I'm glad you brought that up. One of the operators that I met had a combine and I can't tell you how old it was, but it fit into his shed by about 6 inches. He was telling me that he was kind of in the market for a new one, but he couldn't find one that would fit in his existing shed. In terms of the video data that we collected; we can see how wide some of these pieces of equipment are. They don't stay within a standard 12-foot lane, and they don't always have usable shoulder. Depending on where they're driving and where they're going and how long they're on the road, there may be parts of their drive where they're having to be over the center line. When we would go out to put the device on a piece of equipment, take measurements to see how wide is it as it's going down the roadway, how long is it? That's information we hope to integrate into our analysis to see, OK, the passenger vehicle decides to pass this piece of equipment on the road how long is this implement that they're trying to pass? Because you may have a very large tractor pulling a very long planter.

A Proctor

That makes sense. Can farm equipment safety features change the odds of a roadway crash?

C Hamann

Related to the 9-state study that I talked about before that our colleagues did, they evaluated lighting and marketing policies for farm equipment and found that states that had stricter lighting and marking policies had lower rates of crashes. They didn't directly measure the amount of lighting and marking and whether the lights were working on farm equipment, but they at least found states that had stricter policies showed a protective effect in terms of crashes.

M Reyes

Anecdotally I've heard of several rear end crashes, rear end collisions. Of the ones that were shared with me, that handful, it seemed like most of the time, or all of the time was like, yeah, they had their lights, that it seemed like the operator was doing everything right and the other driver for unknown reasons, just kind of drove into the back of the implement even with the slow moving sign and the lights and everything.

A Proctor

Yeah. Are there any factors that cause farm equipment crashes on the road?

M Reyes

I would say on the whole, the things that contribute to farm equipment crashes are the things that contribute to crashes for everybody else too. They're not necessarily anything really special about farm equipment crashes in that regard other than the speed differential that I mentioned earlier where you have a slow-moving vehicle and another vehicle that's moving probably at quite a bit higher speed and so they need more time to react.

C Hamann

But then definitely distraction, although that one is really hard for us to quantify as researchers because it often doesn't even end up in a crash report because it's hard to prove, essentially.

A Proctor

How can farmers receive community support for safer roadways?

C Hamann

Well, you know, specific to our project, one of our goals was that developing this community level campaign would raise awareness and knowledge around driving safely around farm equipment. So, I would say trying to move toward shifting the communities' thoughts around safety culture around driving around farm equipment is one way to get that to garner support, but it isn't like you can just flip a switch and make everyone act safer. But I do think it is a community wide effort. Everybody collectively needs to take it seriously when driving around farm equipment.

A Proctor

Are there any specific driving strategies that agricultural communities can use to stay safe while sharing the road with a farm vehicle.

C Hamann

Well, I can tell you the messages that were in our campaign, our main messages were leave more space, slow down and avoid passing. Especially the passing piece, usually farming equipment, you don't have to wait that long before they turn off into the next field or whatever, just being patient and avoiding passing is a good thing.

A Proctor

And then why is it important for farm vehicles to know roadway safety?

I mean it's important for all drivers to understand the types of interactions they may have and how to handle those, and how to respond, but especially there may be a gap related to passenger vehicles encountering farm equipment on the road and our colleagues that did the 9-state study also looked at with the more urban sprawl or kind of like the mixing between urban, suburban and rural.

There's a lot more interactions in sort of that mixing zone of suburban area and some of those drivers may not be as familiar with encountering farm equipment on the road, which can lead to issues as well.

A Proctor

Perfect. Michelle, do you have anything to add to that?

M Reyes

We conducted intercept surveys in each of the communities prior to the campaign phase of the study. And based on the analysis of that data, there is some evidence that having experience driving farm equipment changes people's perceptions. Combining that finding with what Cara just mentioned, I think that there is kind of some interaction of having experience operating this equipment and how you at least think about driving and maybe to some extent how you drive when you're on the road in a passenger vehicle.

A Proctor

Thank you so much, Cara and Michelle. We have included resources with this episode on how to share the road with farm vehicles as well as the Driving Safety Research Institute page.

A Proctor

Listen in on the FarmSafe podcast to join in on the conversation about keeping safe on the farm.

We want to hear from you. Share your stories about health and safety issues on the farm, about injuries that made you change the way you work, or about the ways you keep yourself and others safe on your farm. Also let us know if there's questions you have or topics that you want to hear about on the air. You can visit our website, gpcah.org, or email us.

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Episode Resources

- [Road Safety](#), Injury Prevention Research Center
- [Published Community-Level Campaign Findings](#)
- [Safe Driving Tips for Planting Season](#), Purdue University
- [Sharing Rural Roads with Farm Equipment](#), Iowa State University
- [Driving Safety Research Institute Homepage](#)

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