Collaborative Sciences Center for ROAD SAFETY

Coffee and Conversation Speaker Series

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How does transportation impact public health? How will autonomous vehicles (AVs) impact health?

Michael Clamann, Senior Human Factors Engineer at the Highway Safety Research Center (HSRC) opened the second installment of Coffee and Conversations. The theme of the second installment of the talk series is autonomous vehicles. Clamann has much experience in the field as Senior Human Factors Engineer at the HSRC. Was at Duke, leading the efforts to do robotics on all autonomous vehicles. Fully Autonomous Vehicle Committee at NC. Report back to Administration. HSRC Human Machine interfaces for TPO systems,

When will AVs roll out? Conceding that no one really knows, Clamann cited most estimates at "somewhere between next year and never. And I agree. We have different stakeholders. Everyone has different levels of complexities and different objectives," said Clamann. Throughout the 7-speaker series, "we're going to hear from stakeholders who shape this discussion."

Clamann then introduced Dr. Laura Sandt, who is an expert in the field of injury prevention. Dr. Laura Sandt is Senior Research Associate at HSRC. She is the Director of the Collaborative Sciences Center for Road Safety. She earned her PhD in Epidemiology with a concentration in injury prevention. Sandt has been with the HSRC since 2004 and is active in a variety of research areas, including intervention evaluations and studies focusing on pedestrian and bicycle safety and other modes of travel. Her primary focus area lies in conducting research and developing guidance related to pedestrian and bicycle safety and mobility.

Sandt outlined the Safe Systems Approach, a hallmark of the CSCRS method of sharing knowledge on road safety:

- See interconnectedness of the issues
- Think through unintended consequences

- Unveil surface assumptions, values, and beliefs
- Develop common goals
- Cultivate deeper learning and insights

Coffee and Conversations talks "are meant to be interactive. There are going to be opportunities for feedback. We'll be talking about environmental, social equity, ethics, engineering and other topics related to autonomous vehicles," said Clamann.

Because autonomous vehicles are not yet being used widely by the public, it is difficult to know their impacts, but there is context within other evolutions of transportation modes. Sandt began by first examining transportation pathways to health. These include:

- ENVIRONMENT: The impact of modes on air quality and noise pollution.
- RESILIENCY: Our ability to prepare for disasters, how we collectively react after a disaster. This also includes emergency preparedness and route planning, or how to move people and materials out of harm's way.
- SAFETY: Often people think of health as the absence of disease or injury. We now discuss it with broader value. We look at complete social and physical well-being. If you have ever been in a crash, you know how quickly these things can disappear.
- PHYSICAL ACTIVITY: If we can get people walking 120 mins per day, we can see major physical changes in populations. How we can promote active travel?
- ACCESS: This is the way we can eliminate disparities by providing access to communities who are currently underserved.
- COMMUNITY WELL-BEING: Transportation plays a role. In. General quality of life goes up. How can we provide place-making that supports community cohesion and reduces stress? Look at any long-term studies on mental health? We saw people involved in a crash having higher chances for depression. Seniors, when they are no longer able to drive can also get depression if they don't have other mobility options.

Next, Sandt outlined some of these same health issues in the context of AVs. Economic models point to increasingly electric-powered vehicles: What are the air, water, and noise impacts? Will a new energy source translate into more miles driven?

Other issues that came up during the discussion:

- LAND USE: Parking might not be a required commodity anymore? Does that mean the AVs drive around? If so, what infrastructure needs to be in place?
- TRANSIT: Buses using electric vehicles (EVs) could have an effect on reduction in emissions compared with busses that use diesel.
- ECONOMIC: What happens to roadside towns, where people stop for gas and maybe a bite to eat?
- FREIGHT: Truck driver unions. Can gut millions of jobs. These groups are much against AVs.

- RESILIENCY: Often we think of cyber security. Limitations of AVs? Flooding might stall all vehicles such as in a hurricane.

Especially because the talk was held days before Hurricane Florence made landfall in the Carolinas, the discussion moved toward how AVs might affect hazards resiliency and disaster recovery.

On the plus side, said Sandt, we could keep humans out of danger and let the vehicles move people out of areas. In a disaster what are the utilization capacities of the vehicle and the infrastructure? may not need parking lots but do you need the car to be somewhere?

AV IMPACT ON SAFETY

Common types of vehicle crashes with pedestrian/bicyclists crash include backing out from a stop or dooring, said Sandt. We need to think about the most vulnerable outside the vehicles.

Some of the safety issues of AVs include trouble with rerouting and temporary cues. Sandt cited the fatal Uber AV crash in Tempe, Arizona.

"Where might tech help us and where the tech might be misused or breached or still vulnerable to the humans developing the technology in the first place?" said Sandt. "In the Uber case, it's not the software but it took a while to compute what the object was and what to do about it."

Technology in mapping is continuously evolving, however, navigational technology is still a challenge for all vehicles and technology, including phones. Currently it's not reliable.

"There is always going to be the case where a car is the first to find a new route," said Clamann. "Or there could be a mudslide or flood that changes geography."

Ethics is now an issue in terms of driver decisions. For AVs this becomes more complicated. One participant asked: How do you get the vehicle to prioritize people's lives and which one? The driver or that driver? Clamann offered that within the Safe Systems approach, we would examine what went wrong in the first place to get the vehicle at this point in the first place. "That situation means a number of other things have gone wrong," he said.

Participants also brought up the issue of driver training. When are AVs going to be absorbed by Driver's Education programs?

"The answer to these questions depends on us in the room," Sandt said. "What do we choose to value, measure, prioritize, build, monetize, evaluate, etc. and who we engage and empower in the process?"