Transportation inequities and disparities are focus of conference session

The COVID-19 pandemic and the death of George Floyd have brought new attention to racial inequities and disparities in many parts of our society, including transportation. At the annual CTS Transportation Research Conference, held virtually on November 5, an expert panel came together to discuss how transportation inequities and disparities can (and should) continue on page 6

Director’s farewell: Fond memories and exciting opportunities

Laurie McGinnis stepped down as director of CTS on January 15. Inside, she shares highlights from her decade as director and looks ahead to new opportunities for transportation. McGinnis continued on page 5
Adding stop lines at two-way stop-controlled intersections doesn’t directly correlate to improved safety, according to U of M researchers. Stop lines are frequently used along with regulatory stop signs to indicate where drivers must stop before they enter the conflicting traffic lane, but very little research had been conducted on this pavement marking’s effect.

“The benefits of stop lines had been assumed, not proven,” says John Hourdos, director of the U’s Minnesota Traffic Observatory. “And while one stop line is not an expensive addition, maintaining them at hundreds of intersections can become a sizable expense for local agencies.”

Researchers took a two-pronged approach in this study to determine what effects stop lines have on crashes, whether stop lines have an effect on overall driver behavior, and if stop lines affect where drivers stop.

“In an era where local public agencies aim to maximize the value of their limited budgets, we wanted to give local agency traffic engineers definitive data that would allow them to make informed and cost-effective decisions regarding stop line installation and maintenance,” Hourdos says.

The researchers began with a safety study using a large data sample of historical crash records from five Twin Cities metro cities. They applied models relating expected crash frequency to relevant site characteristics, including the presence of stop lines at the cities’ non-all-way stop-controlled intersections. The team closely examined detailed features of each intersection by year, including stop signs and lines, speed limits, sight distances, and crash locations.

The second part of the research project was an observational before-and-after field study at 23 stop-controlled intersections without stop lines in several cities. Researchers installed video cameras at each intersection, recorded normal traffic for two weeks, and then installed stop lines. After a two-week period to allow driver familiarity, researchers resumed collecting video of drivers’ responses to the new stop lines for another two weeks.

The safety study’s key finding was that the presence of a stop line showed no association with crash occurrence when used as the sole predictor. “When controlled for the presence of a painted crosswalk, a weak positive influence from stop lines was reported,” Hourdos says. The field study showed that in all cases—both before and after stop line installations—drivers stopped 10 feet or more after the stop sign or stop line.

Additionally, researchers found that the more space there was between the line or sign and the edge of the conflicting driving lane, the more drivers ignored the stop line. After stop lines were added, some cases showed drivers stopping even closer to the conflicting lane than before.

“A positive observation was that although the presence of the line did not increase the number of drivers that come to a full stop, overall rolling stops became slower rolling stops,” Hourdos says. Researchers concluded that while the marking has some effect, most frequently it is not the predicted one—and in some cases not even the desired one.

The study provides welcome insight at local public agencies such as the City of Edina, which estimates that the annual maintenance of stop lines at each of its 700 intersections costs around $1,000, due in large part to Minnesota’s cold weather and plowing operations.

“The benefit of this study is knowing that the installation of stop lines doesn’t directly correlate to improving traffic safety,” says Nick Baler, Edina’s traffic safety coordinator. “By no longer installing and maintaining stop lines, agencies can allocate more funding elsewhere for proven safety improvements.”

The research was sponsored by the Minnesota Local Road Research Board.
U study helps identify and prioritize high-risk pedestrian crossings on reservations

A pedestrian crossing near Grand Casino Mille Lacs has a new signal system known as a HAWK—a high-intensity activated crosswalk. The Minnesota Department of Transportation (MnDOT) moved forward with support and funding for the HAWK installation based on crossing-volume data requested by the Mille Lacs Band of Ojibwe and collected in collaboration with U of M researchers.

The HAWK crosswalk, which began operation in December 2020, provides a safer way for pedestrians to cross from the schools, government buildings, and homes on the east side of the highway to the casino, Grand Market, and neighborhoods on the west side.

“We knew the site was a problem area for pedestrian crossings and had asked MnDOT to make it a priority,” says Mike Moilanen, director of planning and project management for the Mille Lacs Band of Ojibwe. Mille Lacs Band staff had suggested a HAWK, which costs less to build than traditional traffic signal systems, to MnDOT after seeing it in operation at other locations, he says.

Minnesota’s Native American population is among the priority populations identified in MnDOT’s statewide pedestrian system plan. To learn more about pedestrian behavior on reservations across the state and help identify potential safety countermeasures, the department turned to a research team led by Professor Greg Lindsey of the Humphrey School of Public Affairs. The Mille Lacs location is part of a larger multiyear study of pedestrian travel behavior and safety in rural settings funded by MnDOT; John Hourdos, director of the U’s Minnesota Traffic Observatory (MTO), is the co-investigator.

In the project, MTO researchers monitored 10 crossings on four reservations in Minnesota’s northeast quadrant between May and August 2017; site monitoring ranged from 11 to 20 days. “The Mille Lacs site had the most pedestrian crossings—a mean daily volume of 136,” Hourdos says. “More than half of these crossings—54 percent—involved some interaction with vehicles, meaning that either the pedestrians or drivers sped up, slowed, or stopped and waited.”

The research team documented activity at the crosswalk and at an opening in a nearby fence. “The data collected was hard to ignore, as over 98 percent of crossers used the opening in the fence and not the controlled intersection,” Moilanen says.

One of the lessons of the project is that “evidence is essential,” Lindsey says. “Rural and tribal transportation managers often lack data about pedestrian activity. Evidence such as simple user counts can inform decision making.”

The findings also show that although rural pedestrian crossing volumes are low relative to urban volumes, the risks pedestrians face are real. “Equity, as well as efficiency, is important,” Lindsey says. “If efficiency—in other words, the numbers of pedestrians—were the sole basis for investments, agencies would rarely fund countermeasures on reservations. But we believe investments on reservations are needed to redress historical marginalization of tribes and existing disparities in traffic safety.”

Another key takeaway, Lindsey says, is to engage collaborators early on. For this study, the Advocacy Council on Tribal Transportation served as the technical advisory panel, and tribal transportation managers from the four reservations identified priority sites. MnDOT and county engineers collaborated with tribal transportation managers and the U research team to review monitoring results and identify potential countermeasures for each area of concern.

Lindsey adds that existing plans and policies by MnDOT and the Mille Lacs Band contributed to the success of this effort. “MnDOT’s commitments to priority populations, pedestrian safety, and equity provided a rationale for our study and increased the likelihood of projects such as the Mille Lacs implementation,” he says.

The second phase of the larger study, already in progress, will complete field investigations and identify safety concerns at sites on additional reservations.
Among the attendees at the CTS Freight and Logistics Symposium in December, 44 percent expected to add staff to their organization in 2021, according to a live poll conducted by keynote speaker Joe Mahon. Another 39 percent of respondents expected staffing to remain steady.

Mahon, regional outreach director with the Federal Reserve Bank of Minneapolis, kicked off the 23rd annual symposium, which focused on freight demand and capacity during the COVID-19 pandemic. He connected with an audience of nearly 200 via Zoom through instant polling and by fielding questions about his macro-level overview of the regional and national economy.

To no one’s surprise, Mahon noted that the US economy experienced a sharp downward plunge in March when the pandemic first began. Gross domestic product declined by a record amount—a little more than 30 percent—and recovery has been slow with fits of volatility. But not every sector has been affected in the same way, and there are signs of hope ahead, particularly with news of a vaccine.

“What happens with the course of the virus over the next six months is really crucial,” Mahon stressed. “We’re just not going to see robust recovery in the economy until people feel safe going out in public and spending money.”

Following Mahon, a panel of representatives from different sectors of the freight industry and government also reported seeing volatility, but with distinct variations depending on the type of business.

In the rail sector, for instance, intermodal business began increasing after a year of decline as international e-trade boomed and restocking picked up. John Gray, senior vice president of policy and economics at the Association of American Railroads, said November 2020 ended up being the best November on record for intermodal shipping. Gray said he expects these trends to continue into 2021.

The housing market also has been one of the bright spots in the economy. Mike Sheef, logistics manager with the Minnesota-based window manufacturing company Marvin, said business began rebounding in May from a precipitous early pandemic fall and has stayed high ever since. Sheef expected the business to reach its goal of 10 percent growth by the end of 2020.

Deb Deluca, executive director of the Duluth Seaway Port Authority, reported seeing a mix of results. Iron ore and coal are closely linked to the production of auto parts, and by October, the year-to-date cargo rates relative to 2019 were down 27 and 45 percent, respectively. Wind turbine cargo, however, saw a banner year. “We really smashed last year’s record,” Deluca said.

The trucking industry has had some problems. Robert Costello, chief economist for the American Trucking Association, said that capacity has tightened and trucking rates are increasing as fleets go out of business and the number of new drivers entering the field slows down.

Patrick Hessini, vice president of transportation and logistics for CHS, said the largest agricultural cooperative in the US experienced dramatic shocks to its supply chains, followed by a demand shock. In response, the cooperative reshuffled drivers and adopted new safety procedures to ensure everyone stayed employed, busy, and healthy. “I just cannot state enough how impressed I’ve been with our team members and all front-line employees,” Hessini said. “Our supply chains have become much more resilient.”

To conclude, many of the panelists expressed cautious optimism for 2021. “Obviously 2020 was a chaotic year for everyone,” said panel moderator Dan Murray, senior vice president for the American Transportation Research Institute (ATRI). “The data we’re seeing at ATRI is that things are picking up. We hope that continues into 2021.”
What are some highlights from your decade as director?

This has been a dream job for me so it’s hard to choose only a few. I enjoy identifying and pursuing new opportunities, so I found great satisfaction in helping create three programs that have positioned our researchers as international experts—the Accessibility Observatory, the Initiative on the Sharing Economy, and the MnCAV Ecosystem. In each case, we have been able to advance the mission of the University and bring value to policymakers and practitioners.

Another highlight has been meeting and working with professionals nationally and internationally. Through various roles I held with the Transportation Research Board, I had the chance to participate in projects and activities with colleagues from around the world. It was exciting to compare challenges and collaborate on solutions.

What are you most proud of?

During the first year of my tenure as director, we evaluated our communications products and set a goal of maximizing the impacts of research results through those products. I am proud that we have maintained a commitment to that goal. We have been very effective at translating research results and connecting stakeholders to information and knowledge that informs their decision-making.

In addition, I’m very pleased about the level of stakeholder engagement that we’ve been able to sustain and grow during my time as director. I’m grateful for all our partners’ support in helping CTS be successful.

But without a doubt, I am most proud of building a world-class staff of professionals at CTS and helping establish a culture of curiosity, excellence, and courage in which they can thrive. The staff are the backbone of all of CTS’s success.

What challenges and opportunities do you see for transportation, and how can the U help address those challenges?

Transportation equity is becoming a critically important issue for CTS and our stakeholders. We’ve convened several meetings around this topic over the past six months, and significant work has begun toward defining roles for CTS and University researchers in addressing this challenge. Sustainability and technological innovation, including shared/automated/electric vehicles, are other areas of ongoing importance. I expect, too, that traditional issues such as safety, asset management, infrastructure design, and transportation finance, to name a few, will be with us for a long time.

The challenge, and the fun, is that transportation issues are complex and cross-cutting. The field keeps getting broader and drawing in more disciplines. That’s a key reason why the University of Minnesota is so well-positioned to address today’s complex transportation needs. The breadth and depth of research talent here means there are few limits to how the U can help address these challenges.

What will you miss the most?

I will dearly miss the professional and personal relationships I have built over the years. I needed a “relationship job” to truly thrive and I landed in an amazing one. I’ll miss drawing on those relationships to be the broker—connecting researchers with funders, practitioners, and policymakers to ensure effective, impactful research solutions. And I’ll miss being part of strategic discussions about the new opportunities that continuously present themselves in this dynamic field. The variety of opportunities that crossed my desk made this feel like a new job week after week.

What’s on tap for you?

I’m taking a few months to reset and refresh. Then I’ll think about what’s next. I would love the chance to continue supporting the University in its work to develop and grow the MnCAV Ecosystem. That’s one way I can continue to enjoy all the special relationships I find so rewarding!

New reports measure access to jobs

The Accessibility Observatory has published three new reports measuring access to jobs by auto, transit, and biking across the United States. The reports, part of the Observatory’s ongoing Access Across America series, use data from 2019 to rank accessibility by each mode in the 50 largest US metro areas.

Visit ao.umn.edu to learn more or download the reports.
Transportation inequities from page 1

be addressed.

“To make better decisions in the future we need to acknowledge the decisions we have made in the past, and unfortunately many of the decisions we’ve made in the past regarding transportation and transit investments have been decidedly racist and centered to elevate one population over another,” said Tawanna Black, founder and CEO, Center for Economic Inclusion. “The consequences of those decisions have resulted in some populations being left out of our economy—positioned farther away from jobs, opportunities, and affordable, quality housing.”

For Jason Hollinday—Advocacy Council for Tribal Transportation co-chair and director of planning, Fond du Lac Reservation—a central focus has been enhancing transportation service and safety on the Fond du Lac reservation by shaping the transportation system to support the needs of its members. “A lot of our members walk and bike on the reservation, so we are working to open up trails along the busiest corridors for their safety,” he said.

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Theresa Thompson Nix—Move Minnesota’s field manager—emphasized the need to rethink how fares are enforced on public transit. “We are currently unable to pay transit fares in an equitable way. Buses have armed police officers checking fares; not paying a fare is a misdemeanor offense with a $180 fine, and people of color are 7 to 10 times more likely to be charged and arrested compared with white riders,” she said. “We want to prioritize the decriminalization of fare evasion and connect folks with supportive programs and resources.”

Metropolitan Council Chair Charlie Zelle echoed Nix’s belief that transit should be safe and welcoming for everyone. “We need to acknowledge that transportation safety is a different experience depending on who you are and reconsider our policing practices to ensure our transit systems are a safe place for the most vulnerable populations.”

Additionally, Nix acknowledged the intersection of transportation issues with the homicide of George Floyd and the rise of the Black Lives Matter movement, particularly in the case of the Minneapolis D Line. “We have championed investment in the D Line, which travels through the intersection where George Floyd was tortured and murdered,” Nix says. “We need to work out how to move forward in a way that honors this sacred space, realigning and holding space for the voice of the community.”

In the area of transportation research, U of M Humphrey School of Public Affairs professor Yingling Fan said nontraditional data is needed to support equity. “We have lots of data, but that is typically based on observed behavior, which can reinforce the status quo,” she said. “Collecting nontraditional data will allow us to better understand hidden needs in transportation. For example, if we only focus on observed data, we may say that we should only focus on getting people to work, but there is likely a hidden demand for leisure travel.”

Panelists stressed the need for Black, Indigenous, and people of color to be centered in the transportation decisions we make every day in order to grow our economies. According to Black, if we want drastically different results, we need to structure dramatically different partnerships.

“The decision-making process needs to not just bring those communities to the table but to center those communities in designing the solutions our transportation and transit systems need in order for all of us to benefit and our economies to grow,” she says. “When this happens, we will benefit by having communities where the fabric of all of us is truly woven together.”

Disruptions of 2020 offer opportunity to reexamine the transportation status quo

The year 2020 will likely go down in history as one of the most disruptive ever. In a plenary session of the annual CTS Transportation Research Conference, founder and CEO of Emerging Transport Advisors Timothy Papandreou discussed how these disruptions compel us to reexamine the status quo and offer a once-in-a-lifetime opportunity to reimagine our transportation systems.

One of the major transportation changes to arise from the pandemic—the increase in telecommuting—was the focus of a concurrent session presentation by Adeel Lari, director of innovative financing at the Humphrey School of Public Affairs.

Read articles about these presentations at cts.umn.edu/news.
Factoring short trips into the spread of COVID-19

Modeling the spread of the COVID-19 pandemic is a critical part of controlling it. Previous models based on movement patterns have mainly used long-distance travel to predict the spread of the virus, but new research is looking to include short-distance commutes as well.

Raphael Stern and Michael Levin, assistant professors with the Department of Civil, Environmental, and Geo- Engineering, are part of a research initiative aiming to incorporate short-distance transportation data into viral spread models. They worked in tandem with contacts from Purdue University and the KTH Royal Institute of Technology on the effort.

“Most of the virus-spread models with transportation consider people moving from one place to another,” says Stern, “which may be true if you’re in Minneapolis and get on a plane and go to Chicago. But our question was, ‘What about short-term travel?’”

The model that Stern and Levin came up with started with a basic SIR or SEIR model (Susceptible, Exposed, Infected, Recovered), which uses factors such as “incubation time” and “duration of disease” to predict the rate at which people transition from one of the SEIR categories to the next. Then, using the data aggregator StreetLight, they were able to gather cellphone data on the number of trips people made from county to county in Minnesota.

By adding this travel data to the basic model, Stern and Levin were able to create a new set of predictions for the spread of the virus. To check their work, they used travel data from known points in the pandemic: the Minnesota stay-at-home order, the limited reopening of offices, the stay-at-home expiration, and the restricted reopening of businesses and restaurants. They then compared the resulting pattern with actual case numbers.

“The predicted model is actually quite good at capturing the virus spread,” Stern says. “It’s particularly good, we think, because it’s incorporating these additional trips.”

Knowing this, Stern and Levin were able to make some projections based on different scenarios. When they ran the model at the end of the summer of 2020, it predicted a peak of around 70,000 active infections by September if travel habits reverted back to pre-COVID levels—the worst-case scenario. If travel were utterly cut off, by contrast—which is unlikely since it has severe economic ramifications—the model predicted a peak of 30,000 active cases in August.

There are, however, limitations to the predictive capabilities of the model, Stern says. It makes assumptions about the willingness of the population to stay in quarantine, and the recent case surge was not predicted.

“These estimates clearly don’t take into account the ‘COVID fatigue’ that set in, with people engaging in more risky behavior,” Stern says.

Short-term travel behavior does, however, remain a significant factor in the spread of the virus. “By incorporating travel into this equation,” Stern says, “we really do get a substantially better model.”

Stern presented the research at the CTS Research Conference on November 5.
Transportation inequities and disparities are focus of conference session
page 1

Director’s farewell: Fond memories and exciting opportunities
page 1

Study casts doubt on safety benefits of stop lines at intersections
page 2