Resources and Tools to Improve Pedestrian Safety

by

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A proposal prepared for the

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PROBLEM STATEMENT

Pedestrian fatalities have increased at an alarming rate. "According to the Fatality Analysis Reporting System (FARS), pedestrian fatalities increased by 53 percent from 2009 to 2018, while other traffic deaths increased by only 2 percent" (U.S.DOT, 2020, p. 6). Pedestrian fatalities account for a growing percentage of all roadway fatalities (Sandt et al., 2020). Transportation stakeholders are uniquely positioned to lead efforts to improve pedestrian safety. However, whether stakeholders engage in appropriate strategies to improve pedestrian safety is influenced by their traffic safety culture – their shared values and beliefs.

While pedestrian safety is found in many strategic highway safety plans across the country, there may be potentially competing values and beliefs that influence the deployment of effective pedestrian safety strategies. Values such as innovation or efficiency may influence planning, prioritization of transportation projects, and design efforts (Sandt et al., 2016). Further, beliefs about support (or lack of support) for pedestrian strategies and implementation of such strategies may be influencing the deployment of effective strategies to improve pedestrian safety.

Therefore, understanding shared values and beliefs among transportation stakeholders about pedestrian safety is critical to growing a positive traffic safety culture, deploying effective strategies to improve pedestrian safety, and ultimately achieving our nation's goal of zero deaths on our roadways. We propose a project that seeks to improve pedestrian safety by developing resources to assess and grow beliefs among transportation stakeholders to support deployment of effective pedestrian safety strategies.

BACKGROUND SUMMARY

Fatal and serious injury crashes involving pedestrians have increased in recent years. On average, "a pedestrian was killed every 85 minutes and injured every 7 minutes in traffic crashes in 2019" in the United States (NHTSA, 2021, p. 1). Most of these incidents occurred in urban settings (82%), not at intersections (73%), and when it was dark (76%) (NHTSA, 2021). While the ages of pedestrians killed varied, more than two-thirds were male. Alcohol was involved (for the driver and/or pedestrian) in almost half of the incidents. About one third of pedestrians killed had a BAC of 0.08% or higher (NHTSA, 2021). Minorities, immigrants, and low-income populations are over-represented in pedestrian crashes. This may result from less infrastructure in poorer neighborhoods, more walking for transport, and differing beliefs among recent immigrants about traffic safety (Chakravarthy et al., 2010, 2012; Chen et al., 2012). Ultimately, everyone is a pedestrian at some point. Whether traveling short distances like from a parked car to a store entrance, strolling to check the mail or take out the trash, or being among the more than 60% of people who walk longer distances regularly for exercise, transportation, or relaxation, we all rely on pedestrian travel in some fashion (NHTSA, n.d.).

As cities continue to expand and plan ways to accommodate population growth and access to resources, multimodal forms of transportation that are equitable and sustainable must be prioritized. Walking is the most basic, common, and universal mode of transportation (WHO, 2013) -- one that offers extensive health benefits for those who can access safe and "walkable" places in their communities (Sandt et al., 2020). Walking should be an accessible and safe option of transportation in every community in the United States. Unfortunately, in the U.S., "pedestrian fatalities increased by 53 percent from 2009 to 2018, while other traffic deaths increased by only 2 percent" (Sandt et al., 2020, p. 6). "The Governors Highway Safety Association is projecting that 6,721 pedestrians died on U.S. roads in 2020 – a 4.8 percent increase from 2019 despite a drastic drop in vehicle miles traveled" (AASHTO Journal, 2021, p. 1).

Obviously, we must take measures to protect our most vulnerable road users -- pedestrians -- in pursuit of our goal of zero deaths and serious injuries in our transportation system. Increasing pedestrian fatalities are largely occurring at night, among people of color, on local roads, and at areas away from intersections (Governor's Highway Safety Association, 2021). These factors suggest the need for more (or better) crossing options for pedestrians and ways to make pedestrians more visible – through pedestrian tactics and better lighting (AASHTO Journal, 2021). Strategies and countermeasures for pedestrian safety are plentiful covering a range of different approaches from roadway design and engineering to vehicle design and technology, driver and pedestrian education campaigns and capacity building to enforcement and speed management, planning and land use to public engagement and attention to equity concerns (United States Department of Transportation, 2020).

Unfortunately, efforts focusing on just pedestrians, just drivers, only environmental design, or solely vehicle technology are not enough. There is an increasing need for integration and communication of stakeholders in pedestrian safety, and a necessity to stop treating different pedestrian strategies as if they are targeting isolated issues (McCann, 2013). Vision Zero and Safe Systems approaches acknowledge the need for comprehensive efforts that combine strategies whereby environmental (engineering) tactics and policy requirements must be integrated with behavior-change efforts (Brookshire et al., 2016), and more recently, vehicle technology and

commitments to equity are also essential considerations to be integrated into pedestrian safety efforts (Equity in Transportation Infrastructure, 2021; Kim, 2014;). One public health initiative, Safe Routes to School (SRTS), is an example of a comprehensive effort to make students' travels to school safer and more health-focused (CDC, 2021). Safe Routes to School efforts are implemented around six Es of an integrated approach: *engagement* from students, families, school staff, and community members; *equity* considerations ensuring different demographics of community members and road users all benefit; *engineering* that is "creating physical improvements to streets and neighborhoods that make walking and bicycling safer, more comfortable, and more convenient"; *encouragement* of road users with events, programs, and activities promoting walking and cycling; *education* for all road users and stakeholders about transportation options and benefits; and *evaluation "*assessing which approaches are more or less successful, ensuring that programs and initiatives are supporting equitable outcomes, and identifying unintended consequences or opportunities to improve the effectiveness of each approach" (Safe Routes Partnership, 2020, p. 1).

In 2017, the Federal Highway Administration (FHWA) began the Safe Transportation for Every Pedestrian (STEP) initiative, which has seven countermeasures to help states improve pedestrian safety (Redmon et al., 2021). In 2020, the United States Department of Transportation (U.S. DOT) published a pedestrian safety action plan as part of their "comprehensive approach that encompasses improvements to the roadway and surrounding environment, increased education on the shared responsibility of both pedestrians and motorists along with enforcement and adjudication of pedestrian safety laws" (USDOT, 2020, p. 2). In this action plan, it is noted that a National Pedestrian Safety Partnership Plan (NPSPP) is being developed between NHTSA, FHWA, and the leadership of U.S. DOT to collectively envision better pedestrian safety and how the pedestrian safety status currently could be improved by 2035 (USDOT, 2020).

With the recent passing of the Infrastructure Investment and Jobs Act, state transportation agencies will receive funding for multimodal transportation system projects and upgrades. State-by-state fact sheets plot out priorities and associated funding each state will receive, and pedestrian safety and equitable considerations are written into them all (USDOT, 2021). Local and tribal governments in each state can compete for funding ($6 billion) from a new program called Safe Streets for All, which will provide funds directly to "'vision zero' plans and other improvements to reduce crashes and fatalities, especially for cyclists and pedestrians" (USDOT, 2021, p. 1). Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grants will also be available ($15 billion), and Racial and Ethnic Approaches to Community Health (REACH) grants have already been in use in some states to improve pedestrian safety and increase access to safer modalities of travel for communities of color (USDOT, 2021; *REACH_2.0_about.Pdf*, n.d.).

Ten of the 17 participating Pooled Fund states have "pedestrians," "non-motorized," or "vulnerable road users" listed as emphasis safety areas or areas of concern in their Strategic Highway Safety Plans (SHSP). Since 2010, pedestrian safety has been a growing public health concern (Hafeez & Mehta, 2021), and now in response, it is a growing priority of traffic safety efforts. Yet some suggest that for such a common mode of travel and one that is yielding such a high percentage of traffic fatalities and injuries, pedestrian safety receives an inappropriate proportion of research and effort. For example, the Transportation Research Board (TRB) has 179 committees and only one of those is focused on "walking" (Sandt et al., 2020).

Currently, five states mention pedestrian safety in the "Goal" component of their Strategic Highway Safety Plans (SHSP); specifically, "reducing non-motorized fatalities and serious injuries," "users of all modes of transportation," and "all travelers whether they drive, ride, walk, or ride a bike should safely arrive at their destinations" are noted (USDOT, n.d.). The majority of SHSPs (39 out of 52) have "pedestrian safety" in some form as an "Emphasis Area," although six of these are secondary emphasis areas (USDOT, n.d.). Six states have a "Special Topic" category included that is titled: "Older driver/pedestrian special rule" (USDOT, n.d.). We recognize that SHSPs are prioritized and organized based on the data, so not all states have exclusively focused pedestrian emphasis areas.

Countermeasures, strategies, and guidance to increase pedestrian safety exist, yet "This problem continues to get worse. 49 states and 84 of the 100 largest metro areas have become more dangerous compared to the decade of data covered in Dangerous by Design 2019" (Smart Growth America, 2021, p. 5). States have the ability to affect change at different levels of government. Lower speeds, intentional design, and attention to communities whose walkability safety has been largely ignored are actions that states can prioritize in the interest of pedestrian safety (Smart Growth America, 2021). Despite the available countermeasures and guidance to support traffic stakeholders in selecting and implementing pedestrian strategies, fundamental and meaningful change is not happening in favor of pedestrian safety (Smart Growth America, 2021).

Pedestrian safety prioritization and stakeholder engagement are influenced by the traffic safety culture – the shared values and beliefs. Thus, understanding the culture of pedestrian safety is an important focus if we are to grow beliefs that support pedestrian safety prioritization and deployment of effective pedestrian safety strategies. The proposed research project seeks to understand the culture of pedestrian safety among different stakeholder groups and to develop resources to assess and grow beliefs among stakeholders that support deployment of effective pedestrian safety strategies.

A semantic note:

Different data and research sources imply different groups of road users when they use terms such as "pedestrians," "vulnerable road users," etc. The World Health Organization defines a "pedestrian" as

> any person who is travelling by walking for at least part of his or her journey. In addition to the ordinary form of walking, a pedestrian may be using various modifications and aids to walking such as wheelchairs, motorized scooters, walkers, canes, skateboards, and roller blades. A person is also considered a pedestrian when running, jogging, hiking, or when sitting or lying down in the roadway. (WHO, 2013)

Some research refers to pedestrians by use of the term "vulnerable road users" (Sandt et al., 2020). Vulnerable road users (VRO) also include bicyclists, motorcyclists, and any road user without "the protection of vehicle safety features in the event of a crash" (Sandt et al., 2020, p. 5).

For purposes of this project, "pedestrians" as defined by the WHO will be the prime focus and term used.

BENEFITS

Pedestrian safety is influenced by pedestrian behavior, driver behavior, vehicle speed, infrastructure, vehicle design, and roadway design. Whether stakeholders engage in strategies to improve pedestrian safety is influenced by their traffic safety culture – their shared values and beliefs. Understanding shared beliefs among stakeholders about pedestrian safety strategies is critical to growing a positive traffic safety culture, deploying effective strategies to improve pedestrian safety, and ultimately achieving our nation's goal of zero deaths.

We propose a project that seeks to improve pedestrian safety by developing resources to assess and grow beliefs among stakeholders to support deployment of effective pedestrian safety strategies.

OBJECTIVES

This project proposes to develop resources to assess and grow beliefs among stakeholders to support deployment of effective strategies to improve pedestrian safety. Project objectives include:

1. Understand self-reported values, attitudes, beliefs, and behaviors associated with pedestrian safety among transportation stakeholders, which is critical to growing a positive traffic safety culture.
2. Create tools to increase beliefs supportive of pedestrian safety strategies.

RESEARCH PLAN

The methods proposed for this project are divided into five tasks:

Task 0. Project Management

Task 1. Literature Review and Formative Interviews

Task 1a. Literature Review

Task 1b. Interview Current Stakeholders

Task 2. Understand the Culture of Pedestrian Safety

Task 2a. Design Stakeholder Surveys. Stakeholders may include traffic safety professionals, engineers and planners, law enforcement, safety advocates, and/or elected officials.

Task 2b. Pilot Test, Implement, and Analyze Surveys

Task 3. Create Tools to Grow Beliefs Supportive of Pedestrian Safety Strategies

Task 3a. Toolkit

Task 4. Complete Final Report

Task 0. Project Management

Dr. Kari Finley will be the principal investigator for this project. As a Research Scholar at the Center for Health and Safety Culture (CHSC) and from her experience leading other projects, Finley is well qualified to lead the project. She will be joined by Jamie Arpin as a Co-Principal Investigator. Together, they will participate in the kick-off meeting to review the details of the project and to make sure all policies and procedures are followed to align with MDT's expectations. Finley and Arpin will assure quality for all aspects of the project and will be supported by Kelly Green who will provide financial data. As part of project management, communications will leverage existing communication plans from the support contract including quarterly meetings with the pooled fund panel. To ensure quality of deliverables, the pooled fund panel will review draft deliverables. Necessary revisions will then be made for the final products submitted to MDT.

Task 1. Literature Review and Formative Interviews

A literature review will be conducted to identify published research on the beliefs and attitudes among traffic safety stakeholders about pedestrian safety prioritization and deployment of strategies to improve pedestrian safety and to understand the barriers and challenges that might inhibit the implementation of pedestrian safety strategies.

To obtain research articles for this review, a keyword search will be conducted using databases that cover published academic research (e.g., Google Scholar, TRID database and Montana State University Library search engines Academic Search Complete and EBSCO). The search will be limited to peer-reviewed and publicly available literature published in English after 2000. Word search and phrase combinations will include: "pedestrian safety beliefs," "pedestrian safety attitudes," "pedestrian safety challenges," "pedestrian safety barriers," "pedestrian safety implementation," and "factors affecting pedestrian safety." Once articles are reviewed for

relevance, additional key words will be used in combination to narrow the search. Additionally, the reference lists of relevant articles will be reviewed for other potentially relevant articles that may have been missed with the key word searches. A summary of the findings of the review of literature will be done by Arpin, Finley, and Andrea Hamre and will be included in the Task 1 Report.

A series of interviews will be conducted with ten to twelve current traffic safety stakeholders involved in decision making about the implementation of pedestrian safety strategies (e.g., traffic safety professionals, engineers, planners, law enforcement, elected officials, safety advocates). An interview protocol (guidance and questions) will be created to support this interview process. The interviews will provide a critical understanding of the current pedestrian safety culture and opportunities for improvement. This information will be used to inform the assessments in Task 2. Green, Finley, and Bridget Hanson will be responsible for conducting interviews, synthesizing results, and creating the summary report that will be included in the **Task 1 Report**.

Task 2. Understand the Culture of Pedestrian Safety

Based on the review of literature and formative interviews in Task 1, stakeholder surveys to reveal beliefs about pedestrian safety and their understanding, support for, and engagement in strategies will be developed. These assessments will provide necessary data to develop tools to increase beliefs supportive of deploying effective pedestrian safety strategies. Stakeholder groups may include traffic safety professionals, engineers and planners, law enforcement, elected officials, and/or safety advocates. We have included incentives to recruit participants. A behavioral model will inform the development of surveys. Institution Review Board (IRB) approval will be obtained.

Surveys will be pilot tested, and data will be collected and analyzed. We will use Qualtrics for pilot testing questions. Arpin and Otto will lead the development, pilot testing, implementation, and analysis of the assessments and will be primarily responsible for completing the **Task 2 Report.** Finley and Hanson will support and contribute to the design, implementation, and analysis efforts. Finley, Hanson, and Green will also contribute to the Task 2 Report.

Task 3. Create Tools to Grow Beliefs Supportive of Pedestrian Safety Strategies

We propose to create tools to grow supportive beliefs to foster engagement in best practices to improve pedestrian safety. Tools will be created based on what is learned in Task 1 and Task 2. Sample tools may include speaking points to foster community conversations, guidance to support planning decisions regarding pedestrian safety, summary sheets, presentations, guidance on next steps, or other resources to increase supportive beliefs and influence behavior. Finley, Arpin, Otto, Hanson, and Hamre will be responsible for creating tools. The tools will be packaged in a stand-alone **Toolkit.** Finley and Arpin will be responsible for developing the toolkit. Karen Gee will be responsible for formatting tools and designing the toolkit layout.

The **Task 3 Report** will include a summary of tools that have been created for the project. Finley and Arpin will be primarily responsible for the Task 3 Report. Contributions to the report will be made by Otto, Hanson, and Green.

Task 4. Complete Final Report

- **Poster** A poster will be created for traffic safety professionals to use to disseminate information in a traffic safety poster session.

- **PowerPoint Presentation** A PowerPoint presentation will be created for traffic safety professionals to use to disseminate information.

- **A Recorded Webinar** A webinar will be completed to disseminate findings from this project.

- **Final Report** A final report will be completed summarizing each task in the project.

Finley and Arpin will be responsible for completing these products and will be supported by Otto, Green, Hanson, and Gee. The Pooled Fund Board will review and approve the final products.

TSC POOLED FUND INVOLVEMENT

We anticipate the assistance of the TSC Pooled Fund board in contributing to the review and approval of the surveys and the project deliverables. We would also request that the TSC Pooled Fund support the recruitment effort of traffic stakeholders for the formative interviews and assessments in this project.

PRODUCTS

1. **Task 0.** Quarterly Progress Reports
    a. Progress reports based on MDT template for each quarter of project
2. **Task 1 Report**. Summary of literature review and formative interviews
3. **Task 2 Report.** Stakeholder surveys developed to reveal beliefs about pedestrian safety and their understanding, support for, and engagement in appropriate strategies.
4. **Toolkit.** Tools that have been created to grow supportive beliefs to foster engagement in best practices to improve pedestrian safety. Sample tools may include speaking points to foster community conversations, guidance to support planning decisions regarding pedestrian safety, summary sheets, presentations, guidance on next steps, or other resources to grow beliefs and influence behavior. The tools will be "packaged" in a stand-alone toolkit for easy access.
5. **Task 3 Report.** Summary of tools that have been created to grow supportive beliefs.
6. **Poster.** A poster will be created for traffic safety professionals to use to disseminate information in a traffic safety poster session.
7. **PowerPoint Presentation.** A PowerPoint presentation will be created for traffic safety professionals to use to disseminate information.
8. **Recorded Webinar.** A webinar will be completed to disseminate findings from this project.
9. **Final Report.** A final report will be completed summarizing each task in the project.

PROJECT IMPLEMENTATION

This project will seek to improve pedestrian safety by developing resources to assess and grow beliefs among stakeholders to support deployment of effective pedestrian safety strategies.

SCHEDULE

The timeline for the main tasks and deliverables is summarized below for this 30-month project. Task deliverables will be submitted to MDT by the end of the month denoted by an "**X**."

	2022											2023												2024						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July
Task 0. Project Management Quarterly Progress Report	X	X	**X**	X	X	**X**	X	X	**X**	X	X	**X**	X	X	**X**	X	X	**X**	X	X	**X**	X	X	**X**	X	X	**X**	X	X	**X**
Task 1. Literature Review and Formative Interviews	X	X	X	X	X	X	X	X	**X**																					
Task 2. Understand the Culture of Pedestrian Safety (i.e., stakeholders surveys)								X	X	X	X	X	X	X	X	X	**X**													
Task 3. Create Tools																	X	X	X	X	X	X	X	X	**X**					
Task 4. Complete Final Report																								X	X	X	X	X	X	**X**

BUDGET

The project costs are summarized below. Table 1 summarizes the costs by budget item; Table 2 summarizes the pay rate and benefit rate for project staff; Table 3 summarizes the costs by task; and

Table 4 summarizes the project costs by fiscal year. Note that a variety of staff are included in the budget because of (1) the need for skills and knowledge across a range of disciplines, and (2) the need to control the budget by using staff from lower salary ranges.

Table 1. Project Budget by Item

Item	**Total**
Salaries	$139,261
Benefits	$48,994
Contracted Services	$0
Supplies	$4,000
Communications	$0
Other: Qualtrics	$3,360
Total Direct Costs	$195,615
Indirect Costs (25%)	$48,904
Total Project Cost	**$244,519**

Table 3. Project Budget by Task

Item	Total
0 – Project Management	$8,425
1 – Literature and Data Review	$46,168
2 – Develop Assessments	$89,846
3 – Develop Tools	$77,566
4 – Final Report	$22,514
Total Project Cost	**$244,519**

Table 4. Project Budget by Federal and State Fiscal Years

	Federal Fiscal Year			State Fiscal Year			
Item	**2022**	**2023**	**2024**	**2022**	**2023**	**2024**	**2025**
Salaries	$31,669	$66,985	$40,606	$17,849	$65,272	$54,040	$2,100
Benefits	$11,206	$23,282	$14,506	$6,389	$22,480	$19,405	$720
Supplies	$0	$4,000	$0	$0	$4,000	$0	$0
Other	$0	$3,360	$0	$0	$3,360	$0	$0
Total Direct Costs	**$42,876**	**$97,627**	**$55,112**	**$24,238**	**$95,112**	**$73,445**	**$2,280**
Indirect Costs (25%)	$10,719	$24,407	$13,778	$6,059	$23,778	$18,361	$705
Total Project Cost	**$53,594**	**$122,034**	**$68,890**	**$30,297**	**$118,890**	**$91,806**	**$3,525**

STAFFING

Staffing for this project involves members of the Center for Health and Safety Culture. Each staff member contributes to the project in a unique way based on their specific expertise and background. Table 5 summarizes staff time by task for the 30-month duration of this project. Overall, this effort can be interpreted as the equivalent of one person working on this 33.72% of the time for 30 months (see FTE in Table 5). We believe this FTE equivalent effort is reasonable to satisfy the goals of this project in a cost-effective manner.

Kari Finley, Ph.D., will serve as the PI for the project and oversee all efforts. Finley is a Research Scholar at the Center for Health and Safety Culture. Finley will oversee all aspects of this project and will contribute as a lead writer for the literature review, will support the develop of the culture surveys and support the data analysis, and will be responsible for creating tools and developing a toolkit to grow supportive beliefs to foster engagement in best practices to improve pedestrian safety. She will provide oversite of all other Task deliverables. Finley is a Behavioral Specialist with extensive experience in behavior change.

Jamie Arpin will serve as the co-PI for the project and contribute to all efforts. Arpin is a Research Scientist at the Center for Health and Safety Culture. Arpin will be a lead writer for the literature review and will lead survey work, recruitment, and task report writing. She will also contribute to the creation of the tools to grow supportive beliefs to foster engagement in best practices to improve pedestrian safety and other deliverables for this project.

Jay Otto, M.S., is the Principal Research Scholar of the Center for Health and Safety Culture. He oversees all the Center's projects and fosters integration and dissemination of research findings across projects. Otto will lead the key findings and data analysis for the project. Otto will also support the development of the literature review and contribute to the design of the tools and other project deliverables for the project.

Bridget Hanson, Ph.D., is a Senior Research Scholar at the Center for Health and Safety Culture. Hanson will be involved in the development and completion of the formative interviews in Task 1, will be involved in drafting, analyzing and reporting data for all assessments created in Task 2, and will be involved in the development of tools in Task 3. Hanson will also contribute to writing each Task Report for this Project.

Kelly Green, M.P.A., is a Research Scientist at the Center for Health and Safety Culture. Green will be involved in the financial and contract management of this project. She will also support the development and completion of the formative interviews in Task 1, and all Task Reports for the project.

Karen Gee is a Research Associate at the Center for Health and Safety Culture. Gee will be responsible for the graphic design and packaging of tools created in Task 3.

Andrea Hamre, Ph.D., is a Research Associate with the Western Transportation Institute in the Mobility and Transportation Program. She will serve as a collaborator on Task 1 and Task 3 of this project.

Table 5. Schedule of Staffing

*Based on a total of 30 months

Name	Role	FTE*	Hours by Task					
			0	**1**	**2**	**3**	**4**	**Total**
Finley, Kari	Principal Investigator	.1236	55	130	165	225	70	**645**
Arpin, Jamie	Research Staff	.1312	0	130	260	225	70	**685**
Gee, Karen	Research Staff	.0441	0	0	0	210	20	**230**
Green, Kelly	Research Staff	.0383	55	110	10	10	15	**200**
Hamre, Andrea	Research Staff	.0345	0	80	0	100	0	**180**
Hanson, Bridget	Research Staff	.0948	0	110	220	120	45	**495**
Otto, Jay	Research Staff	.1169	0	55	315	175	65	**610**
	Total	**.3372**	**110**	**615**	**970**	**1065**	**285**	**3045**

FACILITIES

Center for Health and Safety Culture

The Center for Health & Safety Culture (CHSC) is an interdisciplinary center serving communities and organizations through research, training, and support services to cultivate healthy and safe cultures. The Center is dedicated to applying research to develop sustainable solutions to complex social problems. Our research focuses on understanding how culture impacts behavior – especially behavior associated with health and safety. We have expanded beyond Positive Community Norms (PCN) to consider a broader set of cultural influences in addition to norms including values, beliefs, and attitudes. This broadly operating model to measure, analyze, and transform culture is called "Positive Culture Framework" (PCF). This framework is grounded in validated psychological models of human social behaviors related to health and safety. We address a variety of issues working with tribal, federal, state, and community agencies as well as private non-profit and for-profit organizations and companies. Current research projects include addressing substance abuse, traffic safety, child maltreatment and violence. The Center works with a variety of clients and sponsors including local, state, federal governmental agencies (e.g., state departments of transportation), private businesses, corporations, community coalitions, and private foundations.

Information Services

The MSU Library system has licenses with the largest databases of published literature as well as open access to published articles in numerous peer reviewed journals. These resources will be critical in researching past studies and identifying evidence-based strategies. Literature and information gathering are performed through the Carnegie Research Level 1 Library (Renne Library). In addition to an extensive collection of printed material, the library subscribes to dozens of databases and hundreds of refereed journals in print and electronic format. Specific items not accessible through these sources can be located and retrieved by the Interlibrary Loan service, which is affiliated with other research libraries across the United States. Typical sources used to aid literature searches include TRIS Online (Transportation Research Information Services), E-Science Server, Transportation Research Board Research Records and Annual Meeting CD-ROMs, Google Scholar, Google, and Montana Local Technical Assistance Program library.

Graphic and Communication Services

Communications staff provides technical editing, layout, graphic design, and web page support. Information Technology staff maintain network servers and individual computers, software, and hardware. Relevant university communication facilities include video and conference room facilities.

Administrative Services

The researchers at CHSC are assisted by a highly qualified group of experienced support staff. Administrative staff members assist with budgeting, procurement, contracts, and accounting. The university provides Extended University services for online educational course development and publications and an Institutional Review Board (IRB) to oversee all research engaging humans.

REFERENCES

AASHTO Journal. (2021, October 15). *Federal, state agencies ramping up pedestrian safety efforts*. AASHTO Journal. https://aashtojournal.org/2021/10/14/federal-state-agencies-ramping-up-pedestrian-safety-efforts/

Brookshire, K., Sandt, L., Sundstrom, C., Thomas, L., & Blomberg, R. (2016, April). Advancing pedestrian and bicyclist safety: A primer for highway safety professionals (Report No. DOT HS 812 258). Washington, DC: National Highway Traffic Safety Administration.

CDC. (2021, June 30). *Safe Routes to School (SRTS) | Health Impact in 5 Years | Health System Transformation | AD for Policy | CDC*. Safe Routes to School (SRTS). https://www.cdc.gov/policy/hst/hi5/saferoutes/index.html

Chakravarthy, B., Anderson, C. L., Ludlow, J., Lotfipour, S., & Vaca, F. E. (2010). The relationship of pedestrian injuries to socioeconomic characteristics in a large southern California county. *Traffic Injury Prevention, 11*(5), 508–513.

Chakravarthy, B., Anderson, C. L., Ludlow, J., Lotfipour, S., & Vaca, F. E. (2012). A geographic analysis of collisions involving child pedestrians in a large southern California county. *Traffic Injury Prevention, 13*(2), 193–198.

Chen, C., Lin, H., & Loo, B. P. Y. (2012). Exploring the impacts of safety culture on immigrants' vulnerability in non-motorized crashes: A cross-sectional study. *Journal of Urban Health: Bulletin of the New York Academy of Medicine, 89*(1), 138–152.

Dasa, S., Tamakloe, R., Zubaidi, H., Obaid, I., & Alnedawie, A. (2021). Fatal pedestrian crashes at intersections: Trend mining using association rules. *Accident Analysis & Prevention, 160,* 106306. https://doi.org/10.1016/j.aap.2021.106306

Equity in transportation infrastructure: Connecting communities, removing barriers, and repairing networks across America, no. S. Hrg. 117-31; Senate Hearing 117-31 (2021). https://www.hsdl.org/?abstract&did=856720#:~:text=https%3A//www.hsdl.org/%3Fview%26did%3D856720

Governor's Highway Safety Association. (2021). Spotlight on highway safety: Pedestrian traffic fatalities by state 2021 FINAL [2020 preliminary data]. https://www.ghsa.org/sites/default/files/2021-03/Ped%20Spotlight%202021%20FINAL%203.23.21.pdf

Hafeez, Z., & Mehta, M. (2021). What factors impact pedestrian and cyclist fatalities? A state level analysis. *Injury Epidemiology, 8.* https://doi.org/http://dx.doi.org/10.1186/s40621-021-00315-z

Kim, J. (2014). A review of the traffic safety culture in Europe to improve pedestrian safety in the U.S.: Lessons from France and Sweden [Master's Thesis, University of Washington]. https://www.proquest.com/docview/1566482159/abstract/106421EC66374DE3PQ/1

McCann, B. (2013). Completing our streets: The transition to safe and inclusive transportation networks. Island Press.

https://ebookcentral.proquest.com/lib/montana/detail.action?docID=3317652&pq-origsite=primo

National Center for Statistics and Analysis. (2019, March). Pedestrians: 2017 data. (Traffic safety facts. Report No. DOT HS 812 681). Washington, DC: National Highway Traffic Safety Administration.

National Center for Statistics and Analysis. (2021, August). Traffic safety facts 2019: A compilation of motor vehicle crash data (Report No. DOT HS 813 141). National Highway Traffic Safety Administration.

NHTSA. (2021). Traffic safety facts: Pedestrians. NHTSA's National Center for Statistics and Analysis. https://www.nhtsa.gov/road-safety/pedestrian-safety

NHTSA. (n.d.). Pedestrian safety. NHTSA.Gov. https://www.nhtsa.gov/road-safety/pedestrian-safety

REACH_2.0_about.pdf. (n.d.). Retrieved December 15, 2021, from https://multco-web7-psh-files-usw2.s3-us-west-2.amazonaws.com/s3fs-public/REACH_2.0_about.pdf

Sandt, L., Brookshire, K., Heiny, S., Blank, K., Harmon, K. (2020, June). Toward a shared understanding of pedestrian safety: An exploration of context, patterns, and impacts. Pedestrian and Bicycle Information Center, Chapel Hill, NC. Retrieved from https://www.pedbikeinfo.org/cms/downloads/PBIC_Pedestrian%20Safety%20Background%20Piece_7-2.pdf

Safe Routes Partnership. (2020, June). *The 6 Es of Safe Routes to School | Safe Routes Partnership*. Safe Routes to School. https://www.saferoutespartnership.org/safe-routes-school/101/6-Es

Sandt, L., Combs, T., & Cohn, J. (2016, March). Pursuing equity in pedestrian and bicycle planning. White Paper Series. Pedestrian and Bicycle Information Center. Chapel Hill, NC: Retrieved from https://www.pedbikeinfo.org/cms/downloads/PBIC_WhitePaper_Equity.pdf

Smart Growth America. (2021). Dangerous by design 2021. National Complete Streets Coalition. https://smartgrowthamerica.org/wp-content/uploads/2021/03/Dangerous-By-Design-2021-update.pdf

United States Department of Transportation. (2020). The USDOT pedestrian safety action plan. USDOT. https://highways.dot.gov/sites/fhwa.dot.gov/files/2020-11/FHWA_PedSafety_ActionPlan_Nov2020.pdf

USDOT. (2021, November 18). USDOT releases state by state fact sheets highlighting benefits of the bipartisan infrastructure law | US Department of Transportation. https://www.transportation.gov/briefing-room/usdot-releases-state-state-fact-sheets-highlighting-benefits-bipartisan

USDOT. Roadway safety professional capacity building program. https://rspcb.safety.fhwa.dot.gov/shspsearch/statesearch.aspx. Accessed 3 Dec. 2021.

World Health Organization. (2013). *Pedestrian safety: a road safety manual for decision-makers and practitioners*. https://www.who.int/publications-detail-redirect/pedestrian-safety-a-road-safety-manual-for-decision-makers-and-practitioners

World Health Organization. (2018). Global status report on road safety 2018 (ISBN 978-92-4-156568-4). file:///Users/jamiearpin/Downloads/9789241565684-eng%20(1).pdf