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Emergency Medical Services in American Indian Reservations and Communities: Results of a National Survey

Kathryn S. Quick
Sara Dufour
Humphrey School of Public Affairs
University of Minnesota

Guillermo Narváez
Proxemic Insights, LLC

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16. Abstract (Limit: 250 words)

The focus of this exploratory study is emergency medical response (EMS) for motor vehicle crashes (MVCs) in American Indian reservations and communities. Tribal transportation professionals have raised questions about the role of EMS in the high MVC fatality rate – 656 annually – in these areas. We conducted a national survey (n=189) of tribal governments, first responders, and state-tribe transportation liaisons. They assessed factors in the quality of EMS response in their areas (e.g., 911 access, dispatch, accessibility of MVC locations, responders' training and equipment, distance to hospital; and inter-jurisdictional coordination). We recommend continuing research on MVCs specifically in American Indian reservations and communities. Specifically, more research is needed on dispatch issues (e.g., cell phone coverage and dispatchers' ability to pinpoint MVC sites) because this is study respondents' single highest area of concern, and the whole EMS response hinges on successfully placing a call for help. And, examples of productive inter-jurisdictional coordination need to be identified since tribes report vastly different experiences with this aspect of EMS system functioning. Two statistically significant findings merit further study, namely: a) heightened concern about response times and hospital access among responders from the Pacific Northwest and Alaska (compared with other regions); and b) higher optimism on all aspects of EMS response from study participants who work for tribal governments versus participants without that affiliation. Finally, it is important for researchers to communicate clearly about the geographic areas covered under "American Indian reservations and communities" in order to improve characterization of road safety and EMS issues.

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Prepared by:

Kathryn S. Quick, PhD
Sara Dufour, MPH
Humphrey School of Public Affairs
University of Minnesota

Guillermo E. Narváez, PhD
Proxemic Insights, LLC

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The authors confirm their respective contributions to this report as follows. Study conception and design: Kathryn Quick, Guillermo Narváez. Literature review: Sara Dufour, Guillermo Narváez, Kathryn Quick. Survey design and other methodology: Guillermo Narváez, Kathryn Quick. Data collection: Sara Dufour. Analysis and interpretation of survey results: Kathryn Quick, Sara Dufour, Guillermo Narváez. Manuscript writing: Kathryn Quick, Guillermo Narváez. All authors reviewed the results and approved this version of the manuscript.

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EXECUTIVE SUMMARY

The focus of this exploratory study is emergency medical service (EMS) response for motor vehicle crashes (MVCs) in American Indian reservations and communities. Tribal transportation professionals have raised questions about the role of EMS in the high MVC fatality rate – 656 annually – in these areas. We conducted a national survey of transportation safety specialists from tribal governments, first responders, and state-tribe transportation liaisons to better understand the perceived quality of EMS response by those who have high degrees of knowledge and experience with these issues.

DATA SOURCES

This report presents the analysis of responses from 189 study participants. The survey assessed factors related to the quality of EMS response (e.g. 911 service, dispatch, accessibility of MVC locations, responders' training and equipment, distance to hospital, and inter-jurisdictional coordination), as well as comparisons between perceived EMS quality for American Indian reservations and communities compared to surrounding areas.

KEY FINDINGS

While the study is exploratory, three findings suggest that additional research is important:

1. There is a bottleneck at the first stage in activating EMS response: of all stages of EMS response, study participants are *least* confident that cell phone coverage is adequate to place a 911 call for help.
2. Challenges in EMS response are elevated in the Pacific Northwest and Alaska. Study participants from this area (compared with all other areas of the U.S.) were statistically significantly more concerned about several aspects of EMS response in American Indian reservations and communities; and
3. Transportation specialists who work for tribal governments are more optimistic about EMS quality in American Indian reservations and communities than study participants who do not work for tribal governments.

BOTTLENECK AT THE FIRST STAGE OF ACTIVATING EMS RESPONSE

Study participants demonstrated a notably low level of confidence in the necessary first step to activate an effective EMS response (Figure ES-1). Asked if cell phone signal was adequate for 911 calls, only 42% of respondents agree (11% strongly agree and 31% somewhat agree). Because a 911 call is usually the first step in activating EMS response to a MVC, with all subsequent steps hinging on this step, this is all the more troubling.

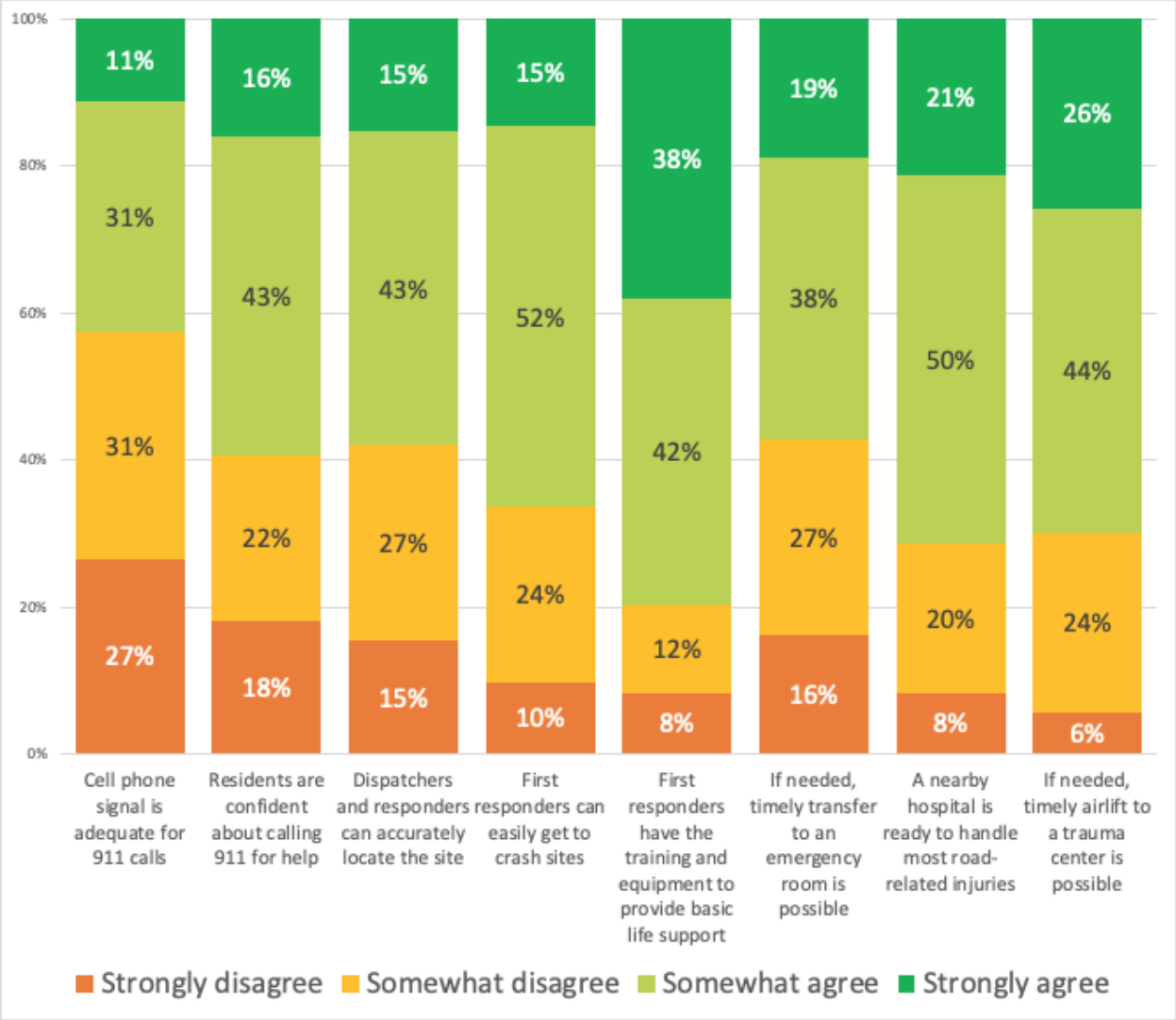

Figure ES 1: Levels of confidence in the quality of 8 steps of EMS response, from having sufficient cell phone coverage to place a 911 call through timely airlift to a trauma center (if needed).

ELEVATED CONCERN FROM ALASKA AND THE PACIFIC NORTHWEST

The second notable finding is an elevated level of concern from study participants in Alaska and the Pacific Northwest (US Department of Transportation Region 10) compared with the rest of the country (Figure ES-2). In two aspects of EMS response quality, statistically significant (p <0.05) differences are found, though effect sizes are small:

- *EMS service equity for American Indian reservations or communities and surrounding areas.* Asked whether service was "better, worse, or about the same" for American Indian or Alaska Native reservations and communities compared with surrounding regions, 46% of Pacific Northwest respondents, compared with 39% of respondents from other regions, considered EMS service worse on the reservations than for surrounding communities (p = 0.041) Notably,

not even one of the 60 respondents from the Pacific Northwest considered EMS response in American Indian communities to be better, whereas 11% of respondents from other regions considered service better on reservations.

- *Emergency room access.* Asked if injured persons could be transferred to an emergency room in a timely manner if needed, only 40% of Pacific Northwest respondents agreed, compared with 67% of respondents in other regions of the country (p = 0.018)

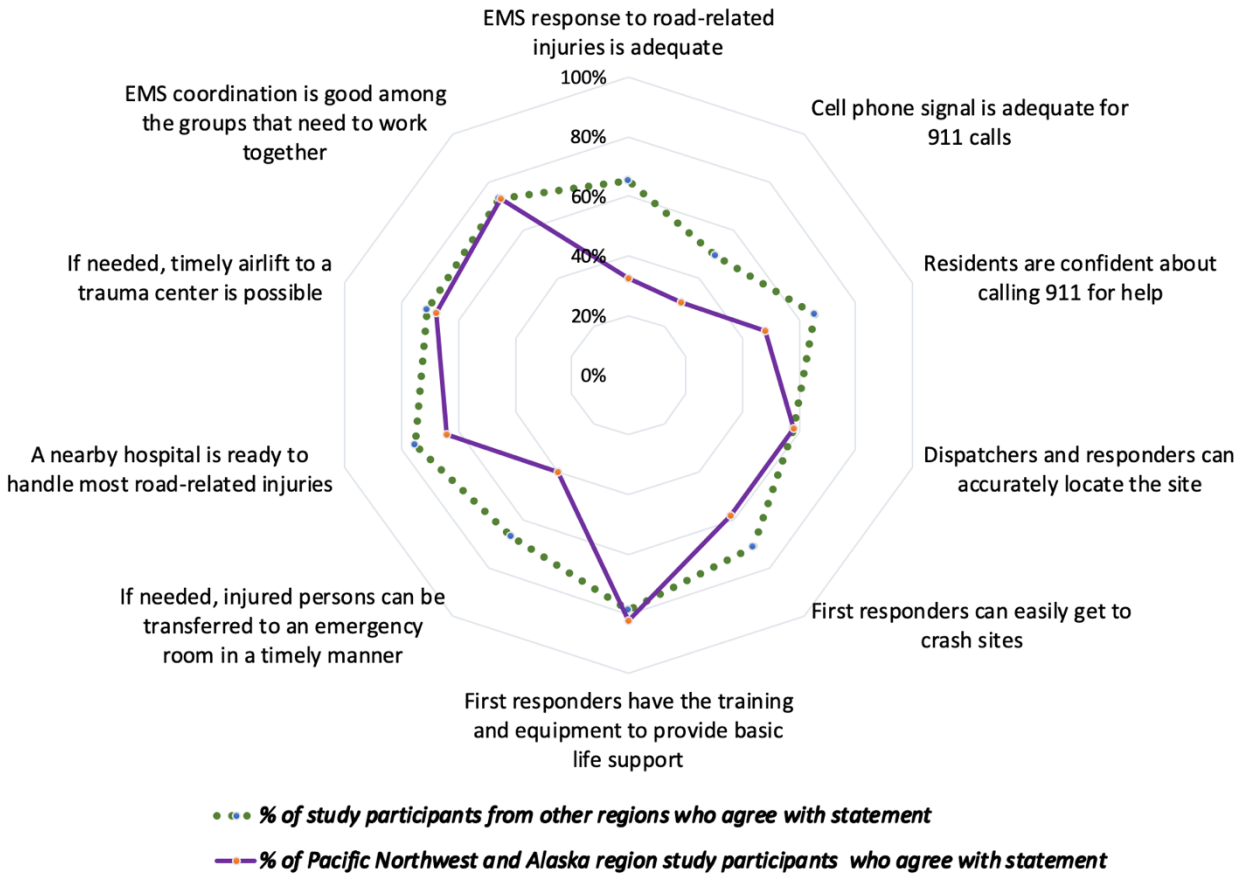

Figure ES 2: Differences in optimism (total percentage who agree or strongly agree) about EMS assets and implementation by region (Pacific Northwest and Alaska vs other).

GREATER OPTIMISM FROM TRIBAL GOVERNMENTS THAN STUDY PARTICIPANTS FROM OTHER ORGANIZATIONS

The third notable finding is that study participants from tribal governments consistently had more optimistic views about roadway safety and the ability of EMS to adequately respond to emergencies in reservations than did study participants without tribal government affiliation (Figure ES-3).

In five aspects of EMS response quality, statistically significant (p <0.05) or very statistically significant (p <0.01) differences are found, though effect sizes are small:

- *Seriousness of MVC issues in reservations.* Asked if there are many issues with road-related injuries in reservations, only 72% of tribal government affiliates agreed or strongly agreed, compared with 87% of respondents *without* tribal affiliation ($p = 0.0072$).
- *Quality of EMS response.* Asked if EMS response to road-related injuries is adequate, 68% of tribal government affiliates agreed or strongly agreed, compared with 40% of respondents *without* tribal affiliation ($p = 0.016$).
- *Dispatch quality.* Asked if dispatchers and responders could accurately locate the site, 63% of tribal responders agreed that they could, compared to 39% of non-tribal respondents ($p = 0.012$).
- *Ability to access MVC sites.* Asked if first responders can easily get to crash sites, 73% of tribal government affiliates agreed that they could, compared to 43% of non-tribal respondents ($p = 0.0067$).

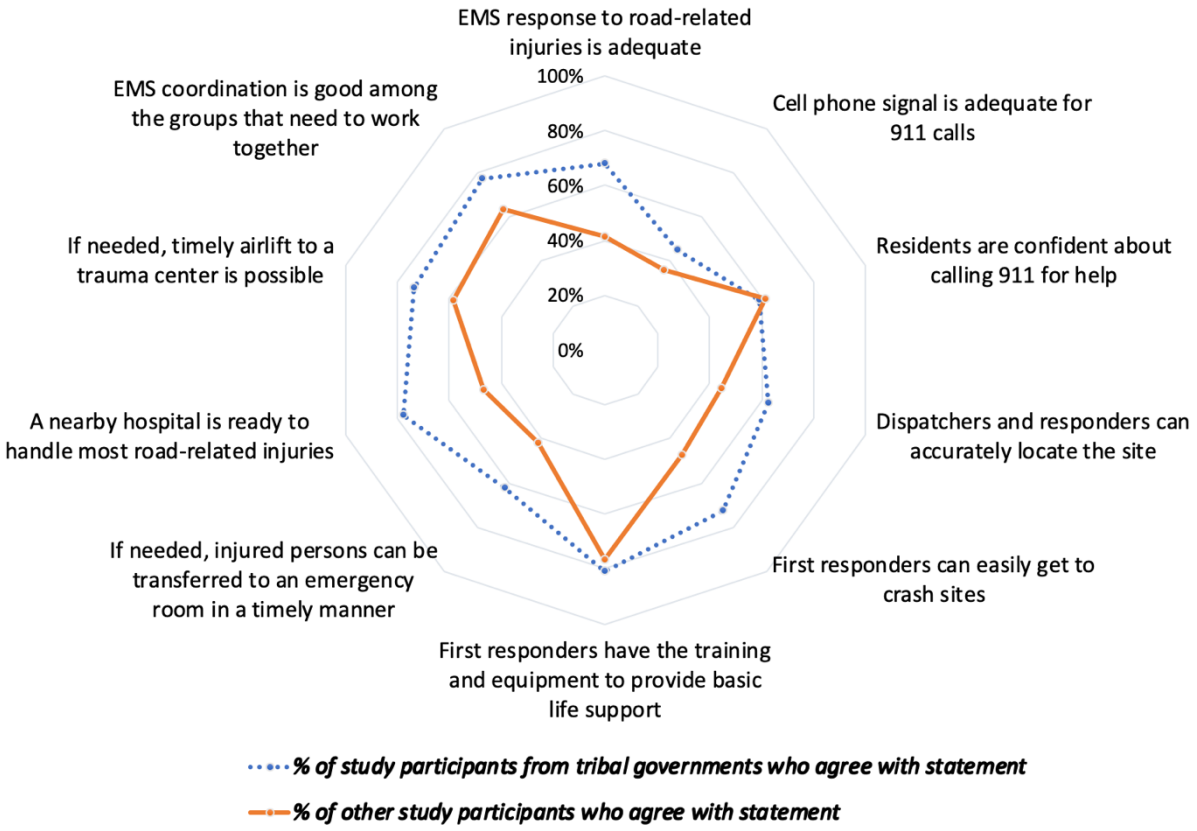

Figure ES 3: Differences in optimism (total percentage who agree or strongly agree) about EMS assets and implementation between study participants with and without tribal government affiliation.

- *Airlift options.* Asked if timely airlift to a trauma center is possible when needed, 74% of tribal government affiliates agreed this would be possible, compared with 61% of non-tribal respondents (p = 0.019).

RECOMMENDATIONS

EMS response to MVCs is a high stakes issue for American Indian and Alaska Native people, reservations, and communities. This exploratory study finds several areas of concern that merit additional analysis. We recommend additional research specifically in these six areas:

1. ***Continue research on MVCs specifically in American Indian reservations and communities.*** With over 650 MVC fatalities annually in reservations and communities where tribal governments have interest and responsibility, this issue is inherently important to reduce the fatalities and injury severity resulting from MVCs. Indeed, 91% of all study respondents agree that road safety is a serious issue in these areas.

2. ***Focus on dispatch issues in reservations, particularly relating to cell phone coverage and dispatcher's ability to pinpoint MVC sites.*** Dispatch is study participants' area of highest concern, and all other components of an effective EMS response depend on the ability to place the first call for help.
3. ***Focus additional sub-regional analysis on the Pacific Northwest and Alaska.*** Half of study participants from this region estimated that the usual time between an MVC and transfer to an emergency room was at or beyond the 60-minute window that is critical to survival and recovery. At statistically significant levels, participants from this region are more likely to be concerned about the ability to transfer people to emergency rooms and about the equity of EMS response for Native and non-Native communities. This region is home to a disproportionately high share of all AIAN communities in the U.S. and is too geographically and culturally diverse to generalize.
4. ***Investigate differences in perspective between roadway safety stakeholders who are and are not affiliated with tribal governments.*** It is noteworthy that there is such a strong difference in the responses given by these two groups of study participants in our survey. Almost always, the group of respondents who work for tribal governments are *more optimistic* about roadway safety and EMS response than respondents who do not have a tribal government affiliation.
5. ***Identify examples of productive inter-jurisdictional coordination.*** Effective EMS response depends on good coordination through the chain of response, from first responders to trauma centers. In rural areas generally, and especially in the complex checkerboard of tribal/nontribal land ownership and overlapping jurisdiction in reservations, often this involves multiple agencies. Therefore, to improve safety in reservations, both tribal organizational capacity and intergovernmental relationships may need to be strengthened.
6. ***Improve definitional clarity on these geographic regions.*** Some important definitional work remains to be done to get better purchase on characterizing and addressing these issues. The lack of a consistent definition of "American Indian reservation and community areas," continues to make it difficult for any given research team to decide how to scope their work and makes it even harder to make sense of how studies of these topics — using their respective definitions — relate to one another.

CHAPTER 1: INTRODUCTION

Motor vehicle crashes (MVCs) are one of the highest causes of injuries to American Indian and Alaskan Native (AIAN) populations (Campos-Outcalt et al., 2003; Berger et al., 2009). Indeed, MVCs are the leading cause of unintentional injury for AIAN people ages one to 44 (Raynault et al., 2010). Their MVC fatality rate is the highest of any U.S. ethnic or racial group (Pollack et al., 2012), and their rate of hospitalization due to MVC-related injuries is twice the rate of the general U.S. population (Sullivan and Grossman, 1999). Simultaneously, there is a well-recognized need to reduce MVC injuries in American Indian reservations and other tribal lands (Shinstine & Ksaibati, 2013). A total of 656 fatalities per year have been reported in the 5-year period from 2010-2014 in reservations and other tribal areas where tribal governments have the greatest influence on engineering, enforcement, emergency medical services, and education (Tribal Transportation Safety Management System Steering Committee, 2017).

To understand and address this problem, this exploratory study provides some initial scoping of one potential factor in the high fatality rate: *the quality of emergency medical services (EMS) response to MVCs in American Indian reservations and communities.* We focus on this topic because of emerging concern regarding the role of EMS quality in MVC fatality rates in American Indian reservations and communities. Several years ago, the California Tribal Road Safety Data Project gathered data that implies EMS response is a concern (Ragland, 2016). Subsequently, improving EMS response to crashes was identified as one of seven priority areas in the Tribal Transportation Strategic Safety Plan (Tribal Transportation Safety Management System Steering Committee, 2017) and one of five emphasis areas in the subsequent report to Congress, *Options for Improving Transportation Safety in Tribal Areas* (FHWA, 2018). In 2017, FHWA's Tribal Transportation Program designed a national survey of tribes to assess their priority concerns about transportation safety issues in reservations. Asked the top three sources of roadway safety risk on their reservations, 18% of 150 tribal government respondents selected "slow emergency response time" (Quick, Larsen, and Narváez, 2019).

Thus, among people with the greatest knowledge and interest in roadway safety on reservations, there are many questions about the quality of EMS response in their communities. However, no systematic research has been done to identify what — if any — EMS problems exist in American Indian[1] reservations and communities. The topic thus merits additional research. The purpose of this study — a national survey of people with immediate knowledge and interest in roadway safety on reservations — is to gather and analyze their insights about EMS as a factor in MVC fatalities. In this report of our results, we do not characterize the extent of EMS issues in reservations and we do not assert the strength of EMS quality as an explanatory factor in MVC fatality rates in reservations. Rather, this is an initial, exploratory study intended to scope some key features, improve the problem definition, and

[1] Following the guidance of respected scholar David Treuer (2019), we honor the naming preferences of our colleagues. American Indian is the descriptor preferred by our collaborators and the majority of members of the communities in our region; others prefer to describe themselves as Native American or by their specific community name.

propose some tentative hypotheses to inform the design of additional, more in-depth studies and policy interventions (Shields and Rangarjan, 2013; Babbie, 2015).

1.1 THE CONTEXT: AIAN PEOPLE, RESERVATIONS, AND COMMUNITIES

This study concerns MVCs in American Indian reservations and communities. This is a high-stakes issue for American Indian and Alaskan Native (AIAN) populations and all people living, working, and traveling through reservations. Statistics describing this issue are sometimes difficult to interpret and triangulate because of data quality issues and different ways of understanding the problem that do *not* entirely coincide. Some statistics refer to AIAN people (regardless of geographic location) while others refer to MVCs of all people (AIAN and other) in reservations or other areas of Indian country.

- *From a population perspective*, The Fatality Analysis Reporting System (FARS) data indicate that 2,840 AIAN people lost their lives in MVCs in the U.S. over the 2011-15 period. This figure refers to reported fatalities anywhere in the country. Of the approximately 90% of MVC fatalities recorded on reservation lands for which race and ethnicity data are reported (Poindexter, 2004), non-AIAN persons comprise somewhere between one-third (Poindexter, 2004; Oh et al., 2017) and 46% (NHTSA, 2016) of all fatalities. This is a wide range, in part, because FARS did not include data on race or ethnicity prior to 1999 and because race and ethnicity data continue to be incomplete (Briggs et al., 2005). Unfortunately, the Indian Health Services (IHS) discharge database is also incomplete; AIAN individuals with severe MVC injuries are typically transferred to non-IHS facilities with trauma care centers (Sullivan and Grossman, 1999), and the severity of injuries may be understated even in reported discharges (Korenbrot et al., 2003). In other words, between missing IHS data and incomplete FARS ethnicity reporting, it is difficult to estimate the true numbers of AIAN persons involved in MVCs.

- *From a geographic perspective*, FARS data indicate 1,799 reported fatalities on reservations over the same period (2011-15). Of all AIAN fatalities over this period, 1,019 (or 36% of the total) occurred on reservations. This points to the disproportionate importance of reservation contexts in understanding elevated AIAN MVC risks, since only 22% of AIAN people reside in reservations (Norris, Vines, & Hoeffel, 2012).

- *From a broader geographic perspective*, the Tribal Transportation Safety Management System Steering Committee (2017) found 3,278 MVC fatalities during the 2010-14 period in "American Indian reservations and other tribal areas where tribal governments have the greatest influence on engineering, enforcement, emergency medical services, and driver education."

Again, our focus is on geographic areas, and is thus most closely aligned with the approach taken in the last statistic, which employs a comprehensive definition of *geographically* based phenomenon with particular impacts on AIAN people and tribal governments. It was developed by the Transportation Safety Management System Committee (TSMSC), using a methodology laid out in Appendix A of its *National Tribal Transportation Strategic Safety Plan*. We followed TSMSC's lead by asking our survey

respondents to characterize EMS issues in "American Indian reservations and communities," broadly defined.[2]

Existing statistics, alarming as they are, may understate the problem of roadway safety issues in American Indian areas in three important ways. First, while MVCs are obviously of the greatest importance in a study of roadway safety, they do not reflect all the impacts of roadway safety in terms of less serious injuries or self-imposed limitations on residents' activities to manage their understandings of the risks. For example, in-depth case studies of four reservations in Minnesota documented a commonplace pattern of parents' preventing their children from walking or biking to school because of their adverse experiences with pedestrian safety (Quick & Narváez, 2018).

Second, there is a documented problem of under-reporting of MVC fatalities on reservations (Li & Bhagavathula, 2016; Ragland, 2016; FHWA, 2017). This is, in part, because MVC reports often do not properly record the incidents location as being inside a reservation (Poindexter, 2004; Stewart & Longthorne, 2018). Other explanations for poor data quality regarding MVCs in reservations include limited human resources for law enforcement (and thus limited crash reporting) and crash data analysis in tribal governments, lack of standardization in crash reporting, and a variety of boundary issues in relationships between tribal governments and state governments (Li & Bhagavathula, 2016).

1.2 PRIOR RESEARCH ON MVCS IN RESERVATIONS

Driver behavior in reservations. Compared with the nation as a whole, MVCs in American Indian areas involve lower rates of seatbelt and car seat usage, higher rates of reported alcohol impairment, and higher rates of older (pre-1994) vehicles and pickup trucks (Oh et al., 2017; Gross et al., 2007). Seatbelt laws seem to be less effective on reservations than for non-reservation areas (Garcia et al., 2007), although interventions that are tailored to the communities to include education and other components as well as law enforcement have been found effective on the Pine Ridge reservation (Amiotte et al., 2016).

Road quality in reservations. We do not have enough research to evaluate the contribution of road quality (engineering and maintenance) to MVC rates in American Indian reservations. There are 42,000 miles of roads under direct ownership of tribal governments or the Bureau of Indian Affairs (BIA); the

[2] Their interpretations likely include the areas variously described as "tribal lands," "Indian Country" (as per 18 U.S. Code §1151: definition of Indian country), reservations, American Indian communities, and the physical locations of other non-urban Indian communities. Although in everyday language these terms are sometimes used interchangeably, they are not legally equivalent, and their substitution is inappropriate and causes confusion among people who do know the proper meaning of the terms. Per federal law, the term "tribal lands" includes the reservations, lands held by the federal government in trust for a tribe or tribal member, and lands in the ownership of the 573 tribes that are currently federally recognized. However, "tribal lands" excludes substantial geographic regions where many American Indians live, such as Oklahoma tribal statistical areas, the lands of Alaskan Natives or native Hawaiians, other "dependent Indian communities," and the lands of tribes that are not federally recognized.

National Congress of American Indians (2018:126) recently asserted they are "among the most underdeveloped, unsafe, and poorly maintained road networks in the nation." Several studies have recommended additional research into the possible contribution of road conditions to MVC injuries and fatalities in reservations (Campos-Outcalt et al., 2003; Brussoni et al., 2018). Data quality may be too poor to support such inquiries, however (Noyce et al., 2014). For example, when Oh et al. (2017) tried to look into the possible contributions of traffic control devices to MVCs, the studies researchers were stymied by the lack of data in MVC records about whether such devices were present and functioning; by the study's estimate, that data was missing from about 70% of MVC reports.

EMS in reservations. We have not found studies identifying the degree to which the quality of EMS response is a factor in MVC crash rates in American Indian reservations and communities. In general, barriers to effective EMS response include the condition of the roadway, access and connectivity to remote areas, long travel times to trauma centers, poor address and mapping data for emergency dispatch (Grossman, et al., 1995; Miller & Killlian, 2017), and issues with the sequencing and coordination of different providers and venues in the chain of care. Therefore, we included survey questions about the quality of EMS response in reservations, as well as about specific factors that might contribute (positively or negatively) to the effectiveness of the EMS system: dispatch (cell signal, resident confidence in calling 911, and ability to locate MVC site), first response (ability to access MVC site, quality of training and resources to provide ambulatory care), and access to a hospital or trauma center (if needed).

Ambulatory, hospital, and trauma center access. Given the high percentage of remote and rural areas found in Indian country, and the difficulty in collaboration and effective transportation planning, the accessibility of hospitals and emergency services to MVC sites on the reservation presumably is important. Even when IHS facilities are present on reservations, they are not necessarily sufficient or physically accessible to serve the entire reservation population, as found in a recent study of the Pine Ridge Hospital on the Pine Ridge Reservation (Amiotte et al., 2016). An analysis of hospitalization rates in California found that for injuries that in theory can be cared for solely through ambulatory care without hospital admission, AIAN people are hospitalized at twice the rate of the California population as a whole; the authors concluded that the disparity was partly due to the absence of adequate ambulatory care, including care from EMS first responders, at an MVC site for AIAN people (Korenbrot et al., 2003). Therefore, we included survey questions about the training and resources of first responders providing ambulatory care and the time needed for transfer to hospitals and trauma centers.

Inter-governmental relations in reservations. Roadway safety demands strong collaboration across multiple sectors, disciplines, and levels of government (Fleisher, Wier, & Hunter, 2016). Indeed, EMS response chains involve complex hand-offs among organizations, from 911 dispatch centers to police or ambulance first responders, to public and private medical clinics (Wolf et al., 2017). Effective coordination among all of these actors becomes all the more important in the landscape of reservations (Letourneau & Crump, 2016), yet it seems to be even more challenging. While it is rarely discussed in the literature on roadway safety in reservations, we feel that the quality of EMS response cannot be understood without an appreciation of tribal sovereignty. In theory, tribal sovereignty could simplify roles and authority for EMS and other features of roadway safety. In practice, however, there is

frequently confusion or outright conflict over whether tribal, federal, state, or local government has authority, responsibility, and rights over territory, populations, road ownership, and policing (DeLoria 1979; Wilkins, 2008; Anderson et al., 2015; Treuer, 2019). There are some efforts to involve tribal communities in transportation planning, including relating to road engineering improvements for safety (Migliaccio et al., 2010), and identification of key features of successful engagement (ATR Institute et al., 2011). Therefore, we included survey questions about who provides what aspects of EMS response in American Indian reservations and communities, the presence and/or absence of inter-jurisdictional agreements, and whether inter-jurisdictional coordination supports effective EMS response.

Confidence in police response. Law enforcement officers are often among the first responders to MVCs. The confusion or hostility in inter-governmental relationships toward tribal sovereignty just described sometimes also manifests in confusion or hostility — or the anticipation of hostility — by law enforcement toward American Indian people. Fletcher, Fort, and Singel (2010; p. 43), leaders of the Indigenous Law and Policy Center, summarize the practical complexities of law enforcement in reservations as follows: "Officers...must consider the location of the crime, their current location, the political identity of the alleged perpetrator, the political identity of the alleged victim, and the nature of the alleged crime before deciding what action, if any, they are authorized to take...." Members of our research team who conducted extensive field research about perceptions of roadway safety in four American Indian reservations in Minnesota heard from multiple reservation residents that regional 911 dispatchers would question them regarding whether they lived on the reservation, might deny them service if they were tribal enrollees, and instruct them to call their tribal government for help, or would be very confused about their location (Quick & Narváez, 2018). There is also increasing public discourse about indigenous and people of color feeling underserved or unsafe in their interactions with law enforcement, manifest, for example, in movements such as Native Lives Matter. Therefore, we included a survey question about whether reservation residents feel confident calling 911 for help.

CHAPTER 2: METHODS

As the preceding review of the literature demonstrates, very little research has been done on the quality of EMS response to MVCs in reservations. Consequently, we designed this research project as an exploratory study to improve the initial scoping of the nature of an emerging, poorly defined public policy problem (Shields and Rangarjan, 2013; Babbie, 2015).

We utilized an online survey (Appendix 1) to conduct this research. This approach facilitated reaching a broad, nationwide group of study participants, which is appropriate for this exploratory stage of research. This was conducive to gathering responses to a short set of closed-ended questions, our intention being to maximize participation through a short, straightforward instrument. In addition, we gathered qualitative data through one optional, open-ended question in which respondents could present their concerns and observations in their own terms. While qualitative methods are not the most commonplace approach in roadway safety research, they are particularly apt for this research question because they are well-suited to analyzing organizational processes as well as stakeholder's perceptions and attitudes (Hennink, Hutter, & Bailey, 2010).

This survey utilized similar methods to the 2016 national Tribal Transportation Safety Data Survey, which asked about the overall concerns and priorities regarding transportation safety and data. The current study is more focused on EMS issues and distributed to a slightly different audience (described below). We developed the survey based upon the preceding literature review, EMS-related comments on the 2016 national survey, and consultations with key stakeholders working on reservation roadway safety. Through the survey, we gathered data on:

- characteristics of the respondents: their professional role (e.g. emergency responder, road engineer, law enforcement), organizational affiliation (e.g., tribal government, state government), and geographic location (e.g., one of the 10 DOT regions or national scope);
- response time: estimated minutes for first responders to arrive and for transfer of injured to hospital and trauma center (if needed);
- comparison of reservation and other areas: evaluation of whether response was about the same, worse, or better than surrounding areas;
- extent of concerns: strength of agreement / disagreement with statements about road safety and injuries;
- evaluation of factors contributing to safety: strength of agreement / disagreement with statements regarding the quality of the 911 and dispatch system, the accessibility of MVC locations, the training and equipment of responders, and distance to hospital or trauma center;
- response providers profile: basic information about who provides EMS response; and
- inter-jurisdictional coordination: evaluation of presence / absence of agreements and quality of coordination among agencies in the EMS response chain.

The final part of the survey was an open-ended question asking respondents to summarize, in their own words, their two to four highest priorities for improving EMS response in the American Indian reservations and communities where they work. Respondents were also asked about being contacted for follow-up interviews. As of the time of this draft, the researchers are currently arranging interviews with nine individuals who asked to be contacted because they stated they had more to say. We are also creating a sampling strategy to identify an additional eight to twelve individuals to interview in order to address gaps in our data. The qualitative data from the open-ended question on the survey and the follow up interviews will be the subject of a separate paper.

The survey was administered through Qualtrics® and distributed through four email lists to 1,165 individuals or organizations. To gain as much information as possible on this emerging policy issue, we also used a snowball strategy of asking all recipients to forward the request to others whom they felt would have a particularly informed perspective or interest in the study. Our four lists consisted of:

1. *Tribal leadership:* The tribal chairperson or administrator for all federally recognized tribal governments (583);[3]

2. *Law enforcement:* Police chiefs or other key contacts for BIA and tribal law enforcement agencies, as of 2016 (204);

3. *State liaisons:* Lead staff from state departments of transportation working with tribes (71);[4] and

4. *Other strategic stakeholders:* These are individuals identified by the research team to have expertise or interest relevant to this project. This list included all members of the Tribal Working Group of the First Responder Network Authority, staff for all current and prior FHWA Tribal Transportation Assistance Program offices, all members of the Transportation Research Board's standing committee on Native American Transportation Issues, and other scholars and professionals active in roadway safety in reservations (307).

A total of 189 participants responded to the survey, which was open for a 38-day period from January 28 through March 6, 2019. Participants were permitted to respond only to those questions they felt sufficiently well informed to answer; 137 of the 189 study participants completed the survey in full. The sample includes a diverse array of professional involvement with EMS, affiliations with different kinds of entities, and geographic regions:

- *Professional connection with EMS*: The most common professional occupations were roadway engineering, planning, or maintenance (37%), community leadership (22%), law enforcement

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[3] This list was comprised of the most current contact information available from the Bureau of Indian Affairs database, located at https://www.bia.gov/tribal-leaders-directory, as of January 18, 2019.

[4] This list was built through the state survey component of the 2016 Tribal Transportation Safety Data Survey, and consisted of individuals who had responded or had been identified as other good contacts by the 2016 survey respondents.

(19%), medical first responders (16%), and injury prevention specialist (13%). Smaller numbers of respondents identified themselves as researcher (5%), primary health care or hospital/trauma center provider (3%), or miscellaneous other (22%). Participants were permitted to select all categories that apply.

- *Organizational affiliation:* Most respondents work for tribal governments (67%); the other major categories were those who work for state governments (16%) or the BIA (8%). Other categories include business (4%), federal government (3%), local government (4%), and nonprofit organizations (2%). Seven individuals chose "other," six of whom identified themselves as researchers and one as an EMS volunteer. Participants were permitted to select all categories that apply.

- *Geographic distribution:* To protect confidentiality while gathering geographic data, we asked respondents to identify their location by USDOT region. Proportions of responses generally, though not exactly, reflected the uneven distribution of American Indian reservations and communities in the US. The largest number of respondents were from the Pacific Northwest and Alaska (60, 34% of respondents); followed by Southwest and Hawaii (32, 18%); South Central (25, 14%); the Upper Midwest (22, 12%); and the Mountains/Rockies (21, 12%). Smaller numbers were from the Southeast, New York, New England, or Central Midwest regions or worked at a national scale.

The paucity of American Indian scholars' and community voices in research about reservation roadway safety issues is an ethical, empirical, and methodological problem. Gaps in the existing body of knowledge on roadway safety in American Indian reservations are probably made more acute by the historically limited engagement of American Indians as leaders or partners in research on American Indian transportation safety issues (Andrew & Krouse, 1995). Previous studies have found a need to build partnerships and institutional capacity to enhance knowledge, tools (e.g., road safety audits), and collaborations to address tribal transportation safety needs (Raynault et al., 2010; Bailey & Huft, 2008; Zaloshnja et al., 2003; Sequist et al., 2011). As non-Native researchers who recognize our limited knowledge of American Indian contexts and desire to de-center our authority in these spaces, we have endeavored to respond to the research agendas set by committees with strong representation of native communities, namely the Tribal Transportation Safety Management System Steering Committee of Lifesavers and the Native American Transportation Issues Committee of the Transportation Research Board. In addition, in our data collection and in the following analysis, we have privileged the perspectives of tribal governments with the most immediate, direct knowledge of risks and options to improve roadway safety in reservations.

CHAPTER 3: RESULTS

3.1 OVERALL ROAD SAFETY AND EMS RESPONSE QUALITY

Since the purpose of this study is to provide some additional shape to the topic of the quality of emergency medical services (EMS) response to MVC in American Indian reservations and communities, one of our most important questions was to ask respondents how they feel about the adequacy of EMS response to road-related injuries in reservations. A majority of study participants - 61% - feel that the EMS response *is* adequate, but 39% somewhat or strongly disagree (Figure 1).

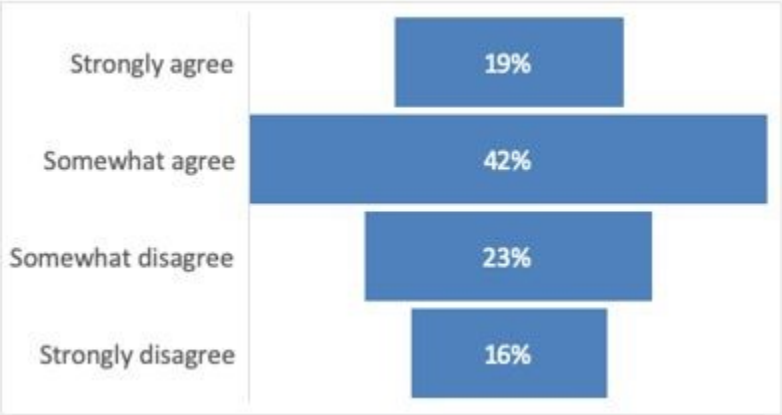

Figure 1 Level of agreement that "EMS response to road-related injuries is adequate" in American Indian reservations and communities.

Study participants strongly affirmed that they consider roadway safety to be a serious issue (91% agree or strongly agree) and that there are many road-related injuries (76% agree or strongly agree) in the American Indian reservations and communities where they work (Figures 2 and 3). This is not surprising, given our sampling strategy of contacting and using a snowball strategy to reach out to individuals and agencies with known interest or expertise in some aspect of roadway safety. Respondents who do see a problem are probably more likely to take an interest in the topic and participate in the survey.

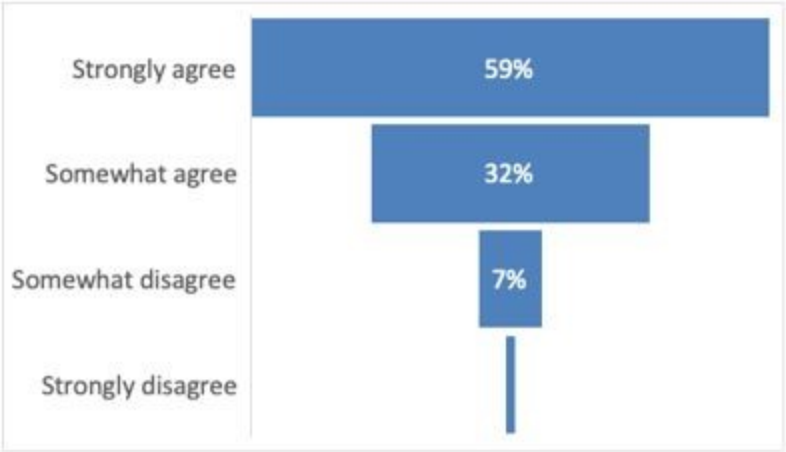

Figure 2 Level of agreement that "road safety is a serious issue" in American Indian reservations and communities.

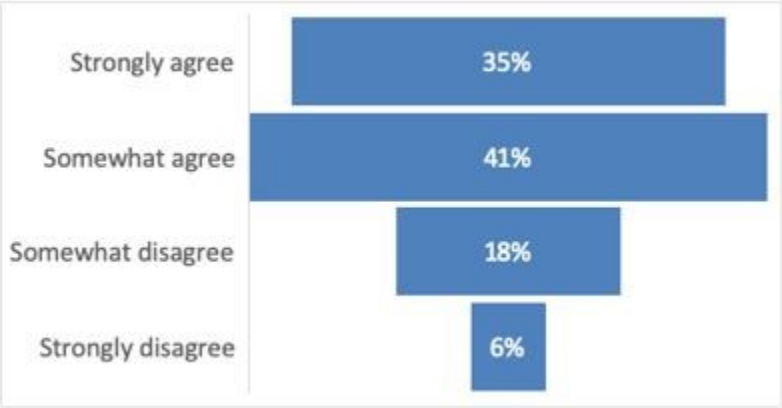

Figure 3 Level of agreement that "there are many road-related injuries" in American Indian reservations and communities.

3.2 RESERVATION AND NON-RESERVATION EMS QUALITY COMPARISON

Not wanting to presume that there is something distinctive about reservations, as opposed to rural conditions generally, we asked respondents how the EMS qualit in reservations or American Indian communities compares with EMS quality in surrounding areas (Figure 4). Just over half (51%) responded that service levels are equitable, but study respondents were far more likely to indicate that service is worse (41%) than better (7%) in American Indian reservations and communities than in surrounding areas. Study participants *without* some affiliation with a tribal government entity had a more negative impression of EMS service on reservations; 55% of these respondents stated EMS response was worse on reservations, compared with only 37% of respondents with tribal affiliation.

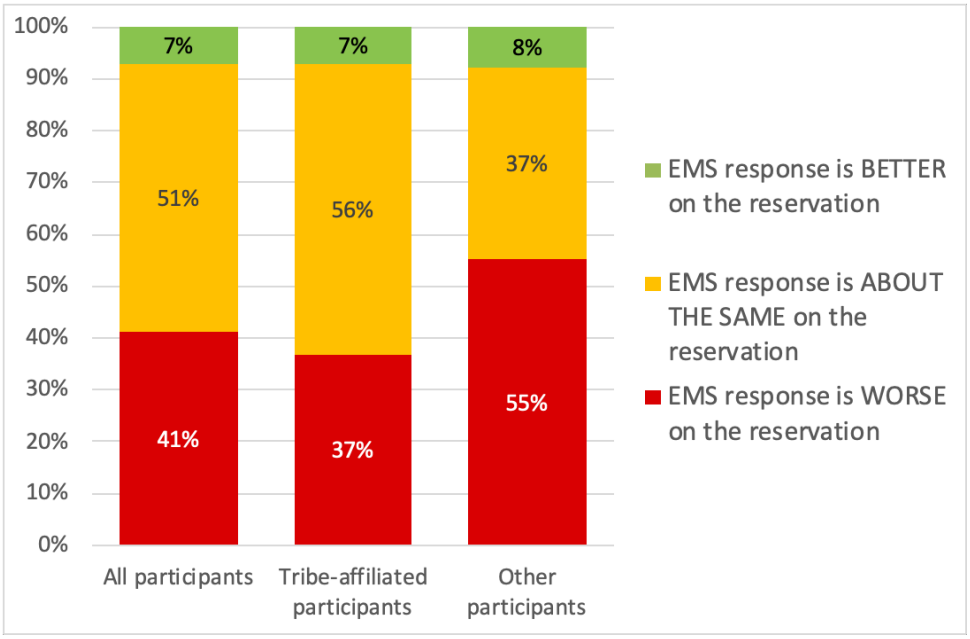

Figure 4: EMS quality in American Indian reservations and communities compared with EMS quality in surrounding areas.

3.3 EMS RESPONSE TIME

Another measure of EMS response quality is response time. The "golden hour" is so named because people experiencing traumatic injuries from MVCs are much more likely to survive and avoid irreversible damage if they can receive emergency care in a hospital or trauma center within 60 minutes (Lerner and Mascoti, 2001). Study participants were asked, using a sliding scale, "how many minutes does it usually take" for a first responder to arrive at an MVC in their reservation, for transfer to a hospital emergency room, or for transfer to a trauma center.

Unfortunately, half of study respondents believe that the "usual" time to transfer individuals who need trauma care to a trauma center exceeds the golden hour (median = 70 minutes) (Table 1). The situation seems most serious in the Pacific Northwest and Alaska region, where half of study participants believe the usual time for transfer to a hospital emergency room exceeds the golden hour (median = 60 minutes).

Table 1. Time elapsed for EMS response, broken down by region.

Region	First responder to arrive to crash site (minutes)	Transfer of injured to hospital, if needed (minutes)	Transfer of injured to trauma center, if needed (minutes)
All	20	45	70
Upper Midwest (n=17)	13	30	60
South Central (n=23)	15	32	70
Mountains/Rockies (n=13)	30	50	60
Southwest & Hawaii (n=26)	20	45	62
Pacific Northwest & Alaska (n=44)	25	60	90

3.4 ROLES AND QUALITY OF COORDINATION AMONG DIFFERENT EMS PLAYERS

We asked several questions to understand the roles played by different players in the EMS response chain and about the quality of the coordination among them. Because of the complex checkerboard of tribal/nontribal land ownership and multiple overlapping jurisdictions in American Indian reservations and communities, we gathered some data on who does what. Not surprisingly, more specialized levels of care tend to be provided by professionals such as staff of health clinics, ambulance providers, and hospitals. However, friends, neighbors, and community members also play roles in EMS response, particularly in immediate, basic life-saving care, but sometimes also in more skilled care (Figure 5).

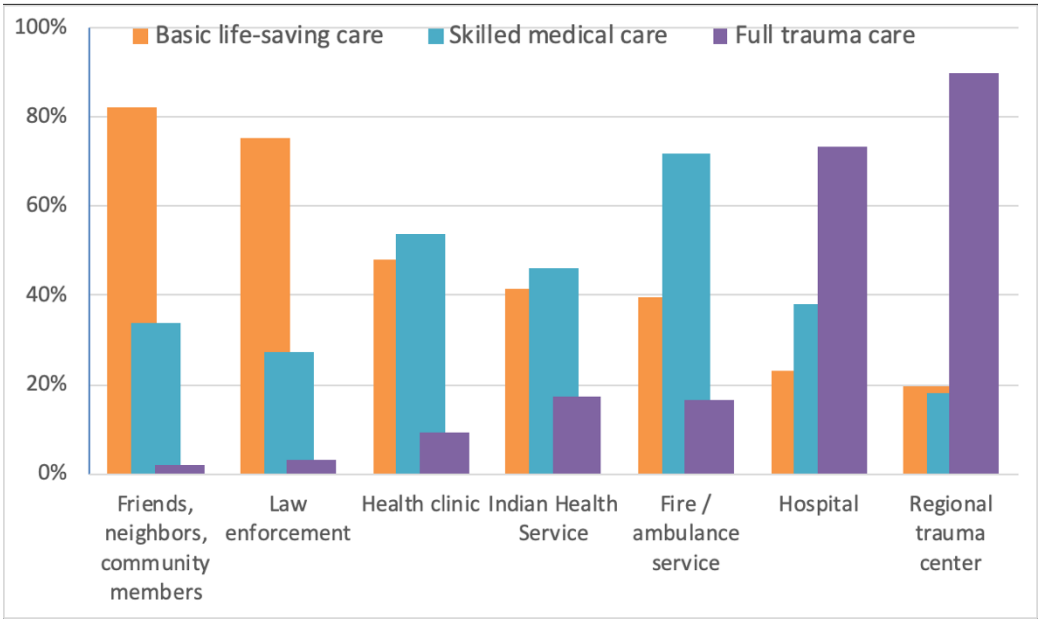

Figure 5. Roles played by bystanders, first responders, and medical center staff.

We then asked about the quality of EMS coordination between the many groups that do (or should) work together. A majority (73%) of all respondents somewhat or strongly agree that coordination is good (Figure 6). Study participants with a tribal affiliation are more confident in the quality of inter-jurisdictional coordination (77% strongly or somewhat agree) than study participants without a tribal affiliation (63% strongly or somewhat agree).

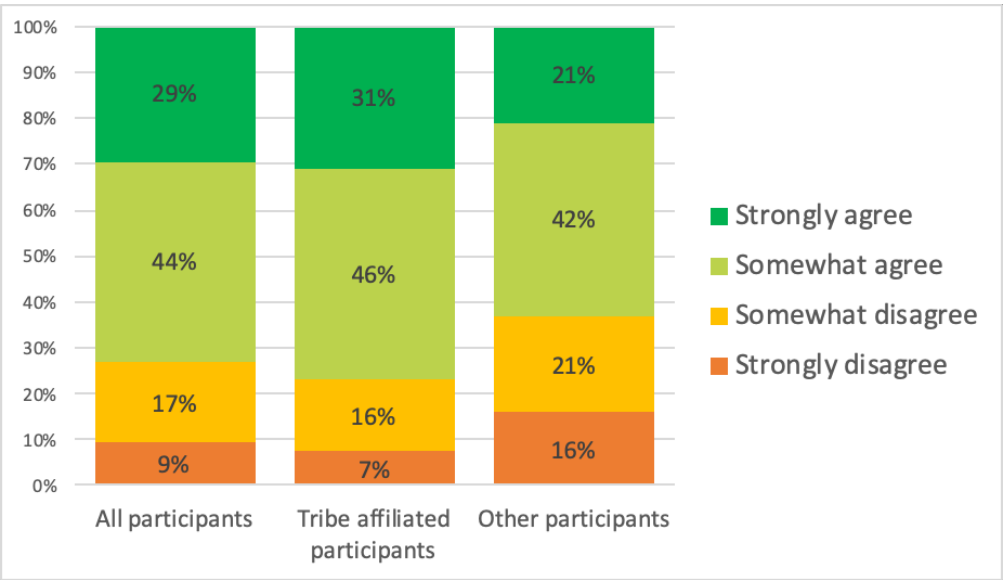

Figure 6. Level of agreement that EMS coordination is good among the groups that need to work together.

Finally, we asked if there are some sort of EMS coordination agreements. A minority (36%) indicated that there are, but many respondents were not sure (30%), asserted there are no such agreements (21%) or concluded "It's complicated" (13%). The large number of "It's complicated" replies implies that even where there are agreements, there might be other factors that influence the understanding and implementation of EMS response coordination (Figure 7).

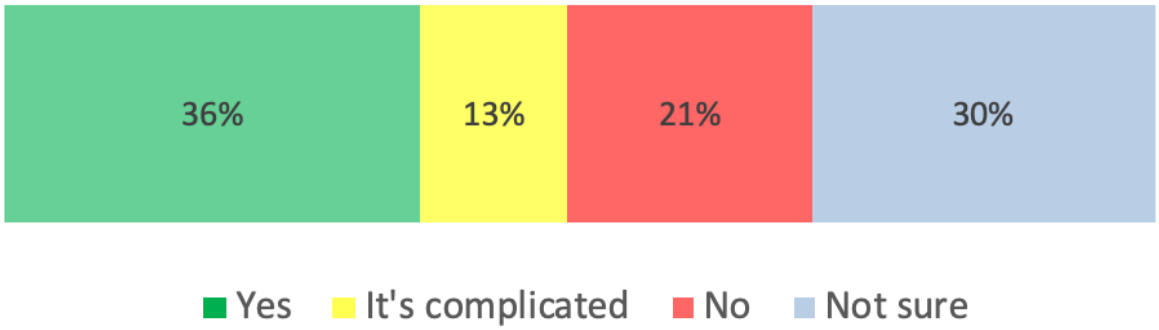

Figure 7: Presence / absence of agreements for coordinating EMS response among tribes and other jurisdictions.

3.5 ASSETS AND BARRIERS CONTRIBUTING TO EMS RESPONSE

Other survey questions provide insight into key stakeholders' perceptions of factors that are potentially important assets or barriers to effective EMS response. To understand where barriers occur in the

effective functioning of EMS system, we present these results in the same order as the typical sequence of EMS response:

- Dispatch: Cell signal, resident confidence in calling 911, and ability to locate MVC site
- First responders: Ability to access and resources to care at the MVC site
- Access to a hospital or trauma center (if needed)

Figure 8 summarizes response to all eight of these questions. Questions are shown from left to right in approximate chronological order of the beginning of a MVC-related need for EMS through transfer to a trauma center. In the following pages, we consider the results for each of the components (dispatch, first responder access and resources on-site, and transfer to ER or trauma center).

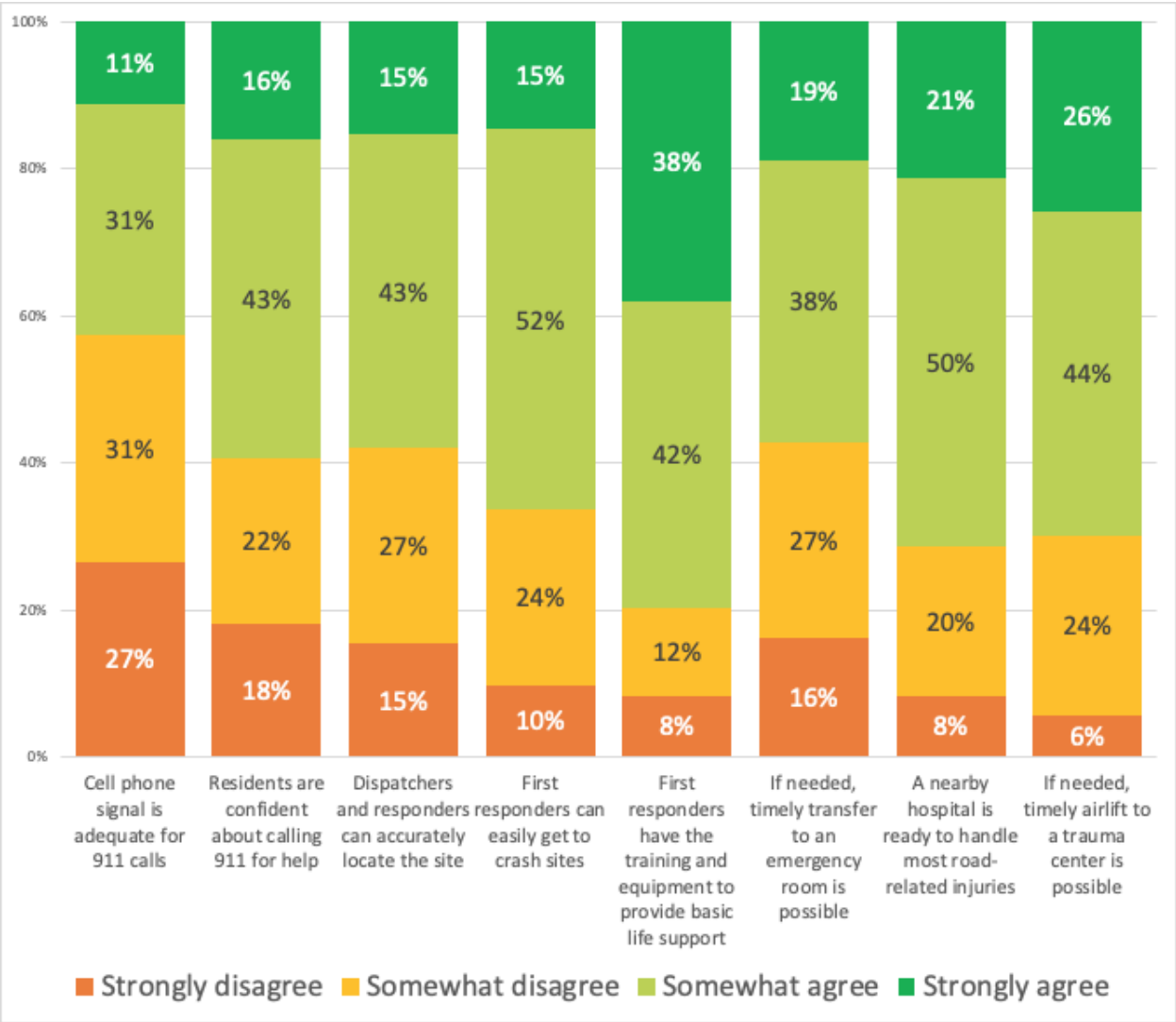

Figure 8: Levels of confidence in the quality of 8 steps of EMS response, from having sufficient cell phone coverage to place a 911 call through timely airlift to a trauma center (if needed).

3.5.1 Dispatch: Cell signal, resident confidence in calling 911, and ability to locate MVC site

It is alarming that calling 911 for help is study respondents' single lowest area of confidence. Typically, this is the very first step in activating EMS response to a MVC, so if this part of the EMS response chain is missing or inadequate, everything else suffers as a cascading effect from that. Only a minority of respondents (42%) somewhat or strongly agree that cell phone signal is adequate to allow people to reliably place 911 calls in response to MVCs and other emergencies. Over one quarter of all respondents — 27% — strongly disagree that cell phone signal is adequate for 911 calls (Figure 8).

We asked respondents whether or not they agree that reservation residents are confident about calling 911 for help. This is a slightly different question than asking about whether it is technically possible; "confidence" has plural meanings that may imply that it is technically possible to get help, that residents' believe in the competence of the response they will receive, and/or that they trust EMS, fire, or law enforcement sufficiently to ask for help. We asked the question because of emerging concerns in national public discourse about whether indigenous people and people of color feel sufficiently well served and safe in their interactions with police that they do in fact call 911 for EMS or public safety officers' help. A majority (59%) of all respondents agree that residents do feel confident (Figure 8).

Finally, we also asked respondents if dispatchers and responders can accurately locate MVC incident sites, given prior research indicating that reservation and other rural addresses are sometimes difficult to describe and locate (Figure 8).

3.5.2 First responders: Ability to access and resources to care at the MVC site

We asked respondents whether first responders can easily reach MVC incident sites, given that reservations are often located in rural environments that may be remote from police, ambulance, and fire response centers. A majority (67%) agree that they can, although there are significant differences in how study participants from different regions felt about this question, as discussed further below.

The most positive finding of our study is a high level of confidence that first responders serving reservations and other native communities do have the resources — the training and equipment — to do their job. We also asked whether first responders have sufficient training and equipment to provide basic life support at MVC incident sites. A strong majority (80%) expressed confidence in their ability (including 81% of respondents with tribal affiliation and 71% *without* a tribal affiliation).

3.5.3 Access to hospital or trauma center (if needed)

We asked about having access to hospitals and trauma centers to handle road-related injuries. A majority (71%) agree that a "nearby" hospital is ready to handle most road-related injuries. Of course, the quality of the hospital is relevant only if MVC victims who need a hospital can get there, **and only 57% of respondents agreed that the injured could be transferred to an emergency room in a timely manner**. (In future studies, we recommend instead asking this question in terms of "within 60 minutes, or inside the golden hour.")

In contrast to lower confidence about timely transfer to a local emergency room, confidence was high about timely transfer to a trauma center; 70% of all respondents agree this occurs. This seems to contradict the data on both our question about timely transfer to an ER and our question about estimating how often it usually takes to get to a trauma center (described above).

3.6 DIFFERENCES IN PERSPECTIVES ACROSS REGIONS

Respondents from the Pacific Northwest and Alaska (US Department of Transportation Region 10) seemed to have more negative views about roadway safety and the ability of EMS to adequately respond to emergencies than study participants from other areas (Figure 9).

We utilized Pearson's chi-squared tests to evaluate the probability that differences between study participants from the Pacific Northwest and Alaska (60 respondents) and other areas (129 respondents) arose by chance. In two aspects of EMS response quality, statistically significant ($p < 0.05$) differences were found.

- *Reservation and non-reservation EMS service equity.* Asked whether service was better, worse, or about the same across regions (reservations or AIAN communities versus surrounding, non-Native regions), 46% of Pacific Northwest respondents, compared with 39% of respondents from other regions, considered EMS service worse on the reservations than for surrounding communities. Though statistically significant ($p = 0.041$) the effect size of this relationship is small. Notably, not even one of the 60 respondents from the Pacific Northwest considered EMS response in American Indian communities to be better, whereas 11% of respondents from other regions considered service better on reservations.
- *Emergency room access.* Pacific Northwest respondents also reported more obstacles with emergency room access. Asked how much they agreed with the statement, "If needed, injured persons can be transferred to an emergency room in a timely manner," only 40% of Pacific Northwest respondents agreed, compared with 67% of respondents in other regions of the country. Though statistically significant ($p = 0.018$), the effect size of this relationship is small.

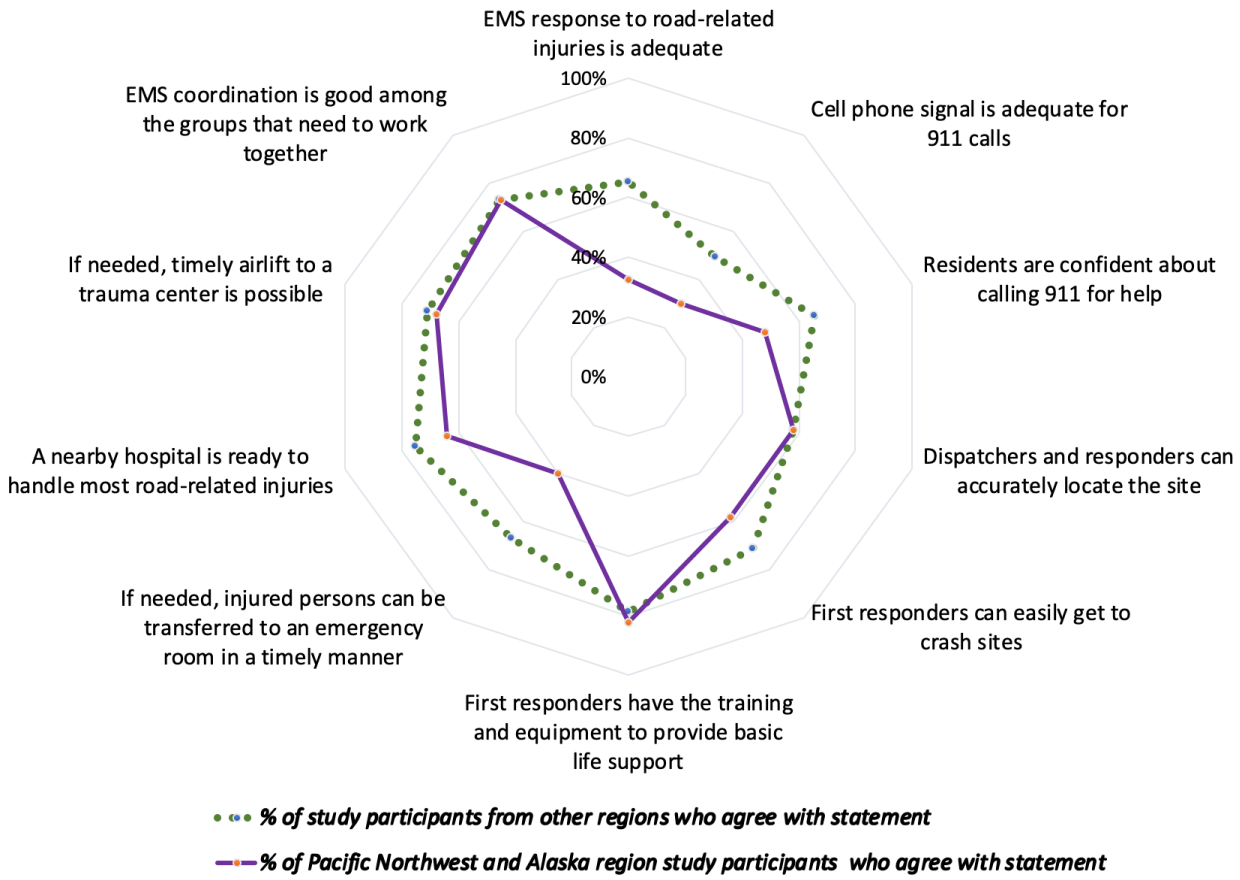

Figure 9. Differences in optimism (total percentage who agree or strongly agree) about EMS assets and implementation by region (Pacific Northwest and Alaska vs other).

3.7 DIFFERENCES BETWEEN TRIBAL GOVERNMENTS' AND OTHERS' PERSPECTIVES

Study participants from tribal governments consistently had more optimistic views about roadway safety and the ability of EMS to adequately respond to emergencies in reservations than did study participants without tribal government affiliation (Figure 10).

These descriptive statistics imply there are differences in perspectives between study participants who are affiliated with tribal governments (119 respondents) and those who are not (55 respondents). Therefore, we utilized Pearson's chi-squared tests to evaluate the probability that differences between the two subpopulations arose by chance. In five aspects of EMS response quality, statistically significant (p <0.05) or very statistically significant (p <0.01) differences were found. In all cases, those with tribal government affiliation were more optimistic than study participants without tribal government affiliation:

- *Seriousness of MVC issues in reservations.* Asked if there are many issues with road-related injuries in reservations, only 72% of tribal government affiliates agreed or strongly agreed, compared with 87% of respondents *without* tribal affiliation (p = 0.0072).

- *Quality of EMS response.* Asked if EMS response to road-related injuries is adequate, 68% of tribal government affiliates agreed or strongly agreed, compared with 40% of respondents *without* tribal affiliation ($p = 0.0158$).
- *Dispatch quality.* Asked if dispatchers and responders could accurately locate the site, 63% of tribal responders agreed that they could, compared to 39% of respondents *without* tribal affiliation ($p = 0.012$).
- *Ability to access MVC sites.* Asked if first responders can easily get to crash sites, 73% of tribal government affiliates agreed that they could, compared to 43% of respondents *without* tribal affiliation ($p = 0.0067$).
- *Airlift options.* Asked if timely airlift to a trauma center is possible when needed, 74% of tribal government affiliates agreed this would be possible, compared with 61% of respondents *without* tribal affiliation ($p = 0.019$)

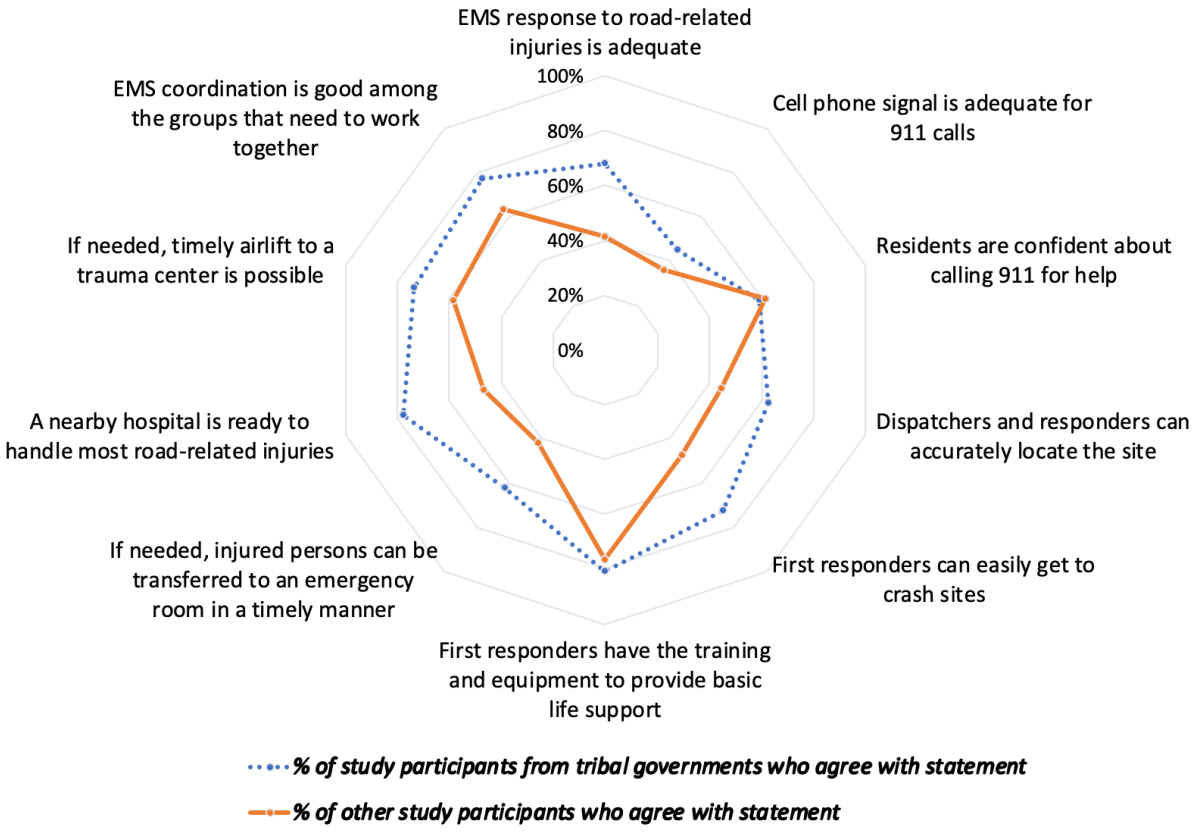

Figure 10. Differences in optimism (total percentage who agree or strongly agree) about EMS assets and implementation between study participants with and without tribal government affiliation.

CHAPTER 4: SUMMARY AND DISCUSSION

As noted, this is an initial, exploratory study intended to improve our understanding of the nature of EMS issues in MVC response and fatalities in American Indian reservations and communities. Analysis of this survey leads us to several suggestions for future research in terms of framing the issues, research questions, and methodologies.

1. ***Continue research on MVCs specifically in American Indian reservations and communities.*** Continuing research on EMS issues specifically in American Indian reservations and communities is vital given that delays in EMS response times have a detrimental impact on the overall outcomes on trauma patients. With over 650 MVC fatalities annually in reservations and communities where tribal governments have interest and responsibility, this issue is inherently important to reduce the fatalities and injury severity resulting from MVCs. Our study demonstrates a high level of concern: 91% of all respondents agree — indeed, 59% strongly agree — that road safety is a serious issue in these areas, while 76% strongly agree or agree that there are many road-related injuries in reservations.

2. ***Focus on dispatch issues in reservations, particularly relating to cell phone coverage and dispatcher's ability to pinpoint MVC sites.*** This is a priority for two reasons. Notably, we requested feedback on multiple potential assets and barriers to an effective EMS response, and this is the single area of greatest concern among all study respondents. Only 43% agree or strongly agree with the statement, "Cell phone signal is adequate for 911 calls," only 58% that dispatchers and responders can accurately locate MVC sites, and only 59% that residents are confident calling 911 for help. Because dispatch is respondents' area of highest concern, it inherently deserves priority attention, but besides that, dispatch is typically the necessary first step on which all of the other components of an effective EMS response hinge. While there has been a great deal of progress in developing and deploying updated 911 services (e.g. E911, NG911, etc.) throughout the country, in remote areas, which would include many American Indian reservations, these efforts are ongoing and often incomplete as their implementation depends on state funding and regulation (Miller & Killian, 2017; King et al., 2018; Minnesota Department of Public Safety, 2019). Thus, the combination of uneven cell phone service, limited caller location information system, and a lack of location information in remote areas probably has an impact on the EMS response times in American Indian reservations and community areas.

3. ***Investigate EMS issues at a regional level, including through focused sub-regional analysis of the Pacific Northwest and Alaska area.*** Respondents' estimates of the "usual amount of time" for EMS response are difficult to interpret. It is problematic to try to infer central tendency in a set that is itself comprised of respondents' subjective estimates of median or mean ("usual") response times. That said, there are some marked regional differences among the responses. The Pacific Northwest and Alaska area deserve more attention for several reasons. First, some of the statistics are alarming, including, for example, the fact that half of the respondents

estimated that the usual time between an MVC and transfer to an emergency room was pushing the limit of or beyond the "golden hour" timeframe that is so critical to survival and recovery. Second, this region is large, home to a disproportionately high share of all of the American Indian and Alaska Native communities in the U.S., and too geographically and culturally diverse to generalize.

4. ***Investigate differences in perspective between roadway safety stakeholders who are and are not affiliated with tribal governments.*** It is noteworthy that there is such a strong difference in the responses given by these two groups of study participants in our survey. Almost always, the group of respondents who work for tribal governments are ***more optimistic*** about roadway safety and EMS response than respondents who do not have a tribal government affiliation. This surprises us somewhat, as it directly contradicts the findings of in-depth field research that two of the members of this research team conducted in conjunction with four tribal governments in Minnesota (Quick & Narváez, 2018). That study found that roadway safety stakeholders who did not have direct, experiential knowledge of reservations consistently and strongly underestimated roadway safety risks for pedestrians in particular. On the other hand, there is a well-documented trend of associating life on reservations with tragedy, despite their beauty and meaning and the love that many native people have for reservations (Treuer, 2012, 2019). Possibly roadway safety stakeholders from outside reservations pathologize reservation communities and exaggerate the severity of conditions through misplaced assumptions. Or, possibly the distinctions we observe between the two groups — which we defined to examine whether there might be differences — are artifacts of our categorization scheme or idiosyncratic features of our relatively small survey population. We recommend additional research because roadway safety in reservations is a highly complex problem that requires sophisticated coordination among organizations and groups of people with different knowledge bases, organizational functions, and jurisdictions. And good problem-solving depends on a well-developed understanding of the nature of the problem, so it is important to illuminate where there are differences in perspective. By intentionally engaging diverse or conflicting viewpoints, it is possible to generate more nuanced problem definitions (Innes & Booher, 2018) and thus more innovative, impactful, and durable solutions (Klijn & Edelenbos, 2013).

5. ***Identify examples of productive inter-jurisdictional coordination.*** Additional work needs to be done on the dynamics of inter-jurisdictional coordination between tribal and non-tribal governments for EMS response. Effective EMS response depends on good coordination through the chain of response, from first responders to trauma centers. In rural areas generally, and especially in the complex checkerboard of tribal/nontrival land ownership and overlapping jurisdictions in reservations, often this involves multiple agencies. Therefore, to improve safety in reservations, probably both tribal organizational capacity and intergovernmental relationships need to be strengthened. Given the targeted outreach we did to people known to have a stake in reservation roadway safety and our snowball sampling strategy to engage additional study participants, we expect that the survey respondents would have some knowledge of the EMS system and its facets. Yet, only 36% of respondents were able to confirm that there is some sort

of EMS coordination agreement in place. It is telling that 30% did not have enough information to answer this question and another 13% reported "it's complicated." It is not clear whether the ambiguity they express reflects a lack of inter-jurisdictional agreements or a lack of awareness of agreements that are in fact in place. We feel this topic merits further research, which we intend to contribute to. A majority of our study participants agreed to be interviewed if we want further information, and we are currently formulating a sampling strategy to reflect the full range of responses to this question. Some of the research questions that will guide our design for the next phase of research are: Why are there so many places without agreements? What is the quality of EMS response in areas with and without agreements? Is there anything distinctive about EMS coordination involving reservations and tribal governments, relative to rural areas in general? What are good practices and other lessons to be learned about coordination between tribes and others on EMS response?

6. ***Improve definitional clarity on these geographic regions.*** Some important definitional work remains to be done to get better purchase on characterizing and addressing these issues. The lack of a consistent definition of "American Indian reservation and community areas," discussed in the opening paragraphs of this paper, continues to make it difficult for any given research team to decide how to scope their work and makes it even harder to make sense of how studies of these topics — using their respective definitions — relate to one another. We echo previous studies calling for a discussion among tribal governments, other transportation safety professionals, and scholars to create consistent guidelines for identifying the areas of interest to American Indian or Alaska Native communities (Quick, Larsen, & Narváez, 2019).

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APPENDIX A: EMERGENCY MEDICAL SERVICE IN AMERICAN INDIAN RESERVATIONS AND COMMUNITIES SURVEY

Emergency Medical Service in American Indian Reservations and Communities

Thank you for participating! The **purpose of this study** is to understand and improve **emergency medical response** to **road crashes** (car crashes, pedestrian safety, etc.) in **American Indian reservations and communities**.

Our request: You are being asked to complete this **confidential** survey because we believe you have relevant knowledge of these issues. This online survey should take about seven (7) minutes to complete. At anytime you can pause this survey and resume it later, or go back and modify your answers before submitting the survey.

Impacts on you: We believe you have an interest in improving EMS services in reservations, which is the purpose of this study. Otherwise, there is no particular benefit and no compensation for participating. There are no known risks. Participation is confidential and voluntary. Your decision to participate, or not, will not affect your relationship with the University of Minnesota or other affiliated researchers to this study.

For more information: This national study, titled "Improving Emergency Medical Service Response to Motor Vehicle Crashes in American Indian Reservations," is being conducted by researchers at the Roadway Safety Institute. If you have any questions, please contact Dr. Kathy Quick at tts@umn.edu or (612) 625-2025.

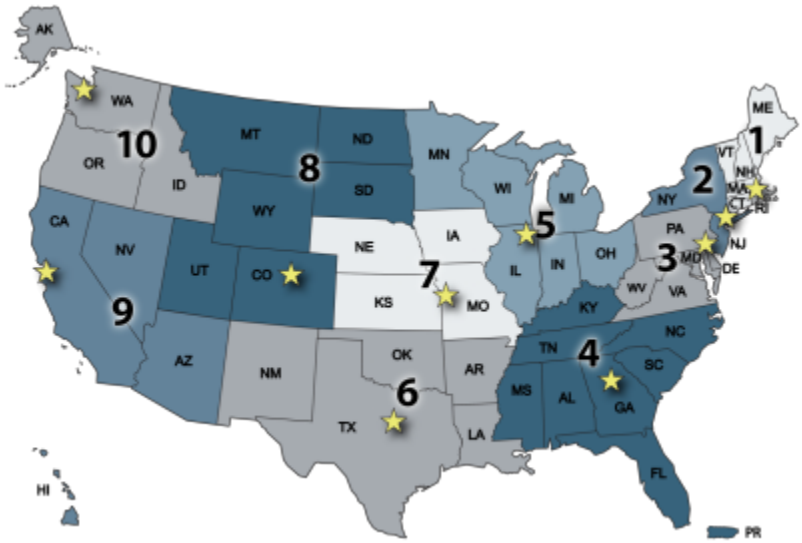
Q1 How are you involved in emergency medical response for road safety issues? (Please check all that apply.)

- ☐ Law enforcement
- ☐ Medical first responder (EMS/fire/ambulance)
- ☐ Roadway engineering, planning, or maintenance
- ☐ Injury prevention (seatbelt / carseat, driver education)
- ☐ Community leadership
- ☐ Hospital / trauma center
- ☐ Primary health care
- ☐ Researcher
- ☐ Other (please specify) _____

Q2 What kind of organization do you work for? (Check all that apply)

- ☐ Tribal government
- ☐ Bureau of Indian Affairs
- ☐ Federal government (other than BIA)
- ☐ State government
- ☐ Local government (county, city, or township)
- ☐ City or Township
- ☐ Business
- ☐ Private individual
- ☐ Nonprofit organization
- ☐ Other (please specify) _____

Q3a

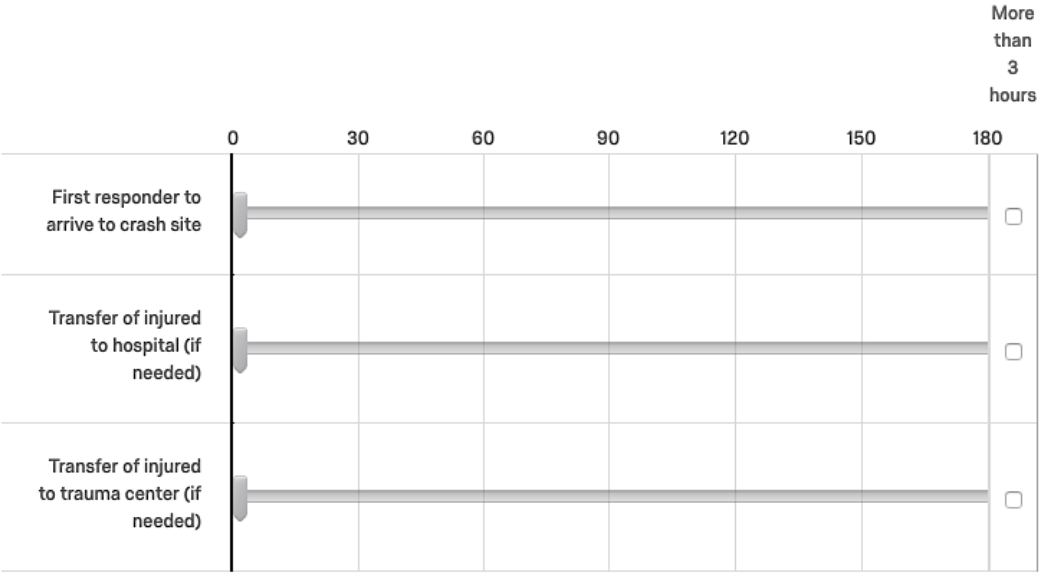


Q3b In which region of the country do you work?

1. New England
2. New York
3. Mid-Atlantic
4. Southeast
5. Upper Midwest
6. South Central
7. Central Midwest
8. Mountains/Rockies
9. Southwest and Hawaii
10. Pacific Northwest and Alaska
11. Multiple/National

For the following questions please focus your answers on road safety issues in the American Indian ***communities / reservation(s)*** where you work.

Q4 After a ***road-related injury*** occurs in the American Indian community / reservation where you work, ***how many minutes*** does it usually take for:



Q5 Please ***compare*** EMS service for: American Indian communities / reservations vs. surrounding communities.

- ☐ EMS response is ABOUT THE SAME on the reservation
- ☐ EMS response is WORSE on the reservation
- ☐ EMS response is BETTER on the reservation

Q6 **EMS need**

Thinking of the American Indian communities / reservations where you work, what is your opinion about each statement?

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
Road safety is a serious issue	○	○	○	○
There are many road-related injuries	○	○	○	○
EMS response to road-related injuries is adequate	○	○	○	○
EMS coordination is good among the groups that need to work together	○	○	○	○

Q7 **EMS dispatch & coordination**

Thinking of the American Indian communities / reservations where you work, what is your opinion about each statement?

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
Cell phone signal is adequate for 911 calls	○	○	○	○
Residents are confident about calling 911 for help	○	○	○	○
Dispatchers and responders can accurately locate the site	○	○	○	○
First responders can easily get to crash sites	○	○	○	○
First responders have the training and equipment to provide basic life support	○	○	○	○
If needed, injured persons can be transferred to an emergency room in a timely manner	○	○	○	○
A nearby hospital is ready to handle most road-related injuries	○	○	○	○
If needed, timely airlift to a trauma center is possible	○	○	○	○

Q8 Who contributes to EMS response in the communities where you work? (Click all that apply.)

	Basic life-saving care	Skilled medical care (EMT to paramedic level)	Full emergency / trauma medical care
Friends, neighbors, community members	☐	☐	☐
Indian Health Service	☐	☐	☐
Law enforcement	☐	☐	☐
Fire / ambulance service	☐	☐	☐
Health clinic	☐	☐	☐
Hospital	☐	☐	☐
Regional trauma center	☐	☐	☐

Q9 Are there agreements in place for coordinating EMS response (for example, tribal-local government agreements)?

- ☐ Yes
- ☐ No
- ☐ It's complicated
- ☐ Not sure

Q10 We know we have asked a lot of questions. To conclude, please summarize, in your own words, the 2-4 **highest priorities for improving** EMS response in the American Indian communities / reservations where you work.

Q11a Thank you very much for participating. We would like to gather comprehensive data on this important issue. May we follow up with you? (All participation is strictly confidential.)

- ☐ Yes, if you have questions.
- ☐ Yes, please. I have more to say.
- ☐ No.

Q11b Please provide your contact information (name, phone, email)