

Research Stage 1 Problem Statement

PROPOSED TITLE: **Advancing Oregon’s Safety Data System through Crash–Health Data Integration**

1. Concisely describe the transportation issue (including problems, improvements, or untested solutions) that Oregon needs to research.

Hospital, trauma, and EMS data contain detailed clinical information on injury severity, treatment, and outcomes that is essential for understanding the true consequences of traffic crashes. However, Oregon currently lacks an integrated system that connects these health datasets with ODOT’s crash records, a gap identified in both the Oregon Transportation Safety Action Plan ([OTSAP, 2021](#)) and the Oregon Traffic Records Strategic Plan ([OTRSP, 2022](#)), which call for collaboration between ODOT and the Oregon Health Authority (OHA) to merge crash, EMS, and hospital data to improve injury analysis. Police crash reports provide valuable roadways and behavioral context but rely on subjective or incomplete injury classifications, while health system data capture clinical outcomes without crash details. For instance, consider a nighttime single-vehicle crash on a rural highway where the responding officer classifies the driver’s injury as “minor” because the individual was conscious and able to walk. Hours later, the driver develops internal bleeding and is airlifted to a trauma center for emergency surgery. In ODOT’s crash database, this event remains coded as a “possible injury” and is therefore excluded from serious-injury analyses that guide roadway safety investments. Without hospital or EMS data, ODOT cannot see that this was, in fact, a life-threatening injury nor that long EMS response and transport times may have worsened the outcome. This gap affects every part of Oregon’s safety ecosystem: it limits the accuracy of statewide injury severity metrics used for *Vision Zero* tracking; it prevents evaluation of EMS response performance, especially in rural or underserved areas; it underestimates the true medical and economic burden of crashes; and it weakens the feedback loop between health and transportation agencies. Linking these datasets would close that gap allowing ODOT to validate injury classifications, assess post-crash care outcomes, and build a comprehensive, data-driven system that improves safety decision-making and saves lives.

2. What final product or information needs to be produced to enable this research to be implemented?

The proposed research should deliver a scalable and operational framework for integrating ODOT’s crash data with Oregon Health Authority’s (OHA) EMS, trauma registry, and hospital discharge records, creating the foundation for a statewide crash-health linkage system. The primary product would be a pilot linked dataset developed using probabilistic and deterministic matching techniques that demonstrate how injury outcomes from hospital and EMS records can be accurately connected to crash circumstances recorded by ODOT. This pilot would quantify injury misclassification rates, validate police-reported injury severities against medical outcomes, and identify data fields necessary for routine linkage. Accompanying documentation would include a technical guide and implementation protocol specifying linkage variables, data quality standards, governance structure, and privacy-compliant workflows (consistent with HIPAA and state data security requirements).

Beyond the technical deliverables, the project will produce a practical roadmap for institutionalizing the crash–health data linkage process, outlining staffing, software, and sustainable funding models to maintain it over time. Recommendations will include updates to ODOT’s Traffic Records Strategic Plan, data collection and reporting procedures, and internal workflows to support automated or periodic linkages. The research will also generate policy-ready findings including validated serious injury performance metrics, identification of EMS response disparities, and refined estimates of crash-related medical costs that directly inform ODOT’s Highway Safety Improvement Program (HSIP) reporting, Transportation Safety Action Plan (TSAP), and Vision Zero tracking.

The project will also deliver a prototype ([click here to see the prototype dashboard*](#)) Crash–Health Data Integration and Injury Validation dashboard to demonstrate how linked crash, EMS, and hospital data can be explored and applied for safety analysis. The tool will provide interactive dashboards that allow users to query linked records, compare police-reported and medical injury severities, assess EMS response and transport times, and visualize medically validated serious injury hotspots across Oregon. It will include summary reporting functions for key indicators including injury misclassification rates, response disparities, and estimated medical costs, thus supporting more accurate *HSIP* and *Vision Zero* performance tracking. Development of the dashboard will depend on the structure and availability of linked datasets, and the final design will be refined in consultation with ODOT to ensure technical feasibility and alignment with data access constraints. The analytical framework can incorporate vehicle-type distinctions (e.g., passenger vehicles, trucks, motorcycles) if dataset variables allow, and the linkage to medical records will improve estimation of crash-related health care costs, directly addressing ODOT’s emphasis on cost impacts for safety investment decisions. If preferred, the final prototype can also be delivered as a spreadsheet-based tool or in another format that best integrates with existing analysis workflows.

In summary, this work will enable ODOT to transform existing datasets into an integrated injury surveillance and evaluation system, strengthening evidence-based decision-making and long-term coordination across transportation and public health agencies.

3. (Optional) Are there any individuals in Oregon who will be instrumental to the success of implementing any solution that is identified by this research? If so, please list them below.

Name	Title	Email	Phone

4. Other comments:

Oregon has long recognized the value of integrating crash and health data to improve the accuracy and utility of its transportation safety systems. Both the *Oregon Transportation Safety Action Plan (TSAP, 2021)* and the *Traffic Records Strategic Plan (2022)* call for formal collaboration between ODOT and the Oregon Health Authority (OHA) to link crash, EMS, and hospital data. These plans identify the lack of integration as a key deficiency, noting that the state’s crash system does not interface with EMS or trauma registries,

resulting in limited validation of injury outcomes and incomplete representation of crash-related injuries. The Oregon Traffic Records Coordinating Committee (TRCC) has also emphasized this need, with OHA's EMS and Trauma Systems program actively participating as a stakeholder.

ODOT and OHA have already conducted a short-term pilot linkage covering one month of crash, EMS, trauma, and hospital data, which demonstrated technical feasibility using probabilistic matching methods ([OTRSP, 2022](#)). However, this pilot was exploratory and limited in scope. The proposed research builds directly upon that effort by expanding, validating, and institutionalizing the linkage process to make it sustainable and analytically useful for ODOT's long-term safety management goals.

Previous ODOT–OHA Pilot (Completed)	Proposed Research (Next Step)
Linked one month of crash, EMS, trauma, and hospital data to test feasibility.	Link one to two full years of statewide data to validate linkage methods and quantify match accuracy.
Focused solely on technical feasibility of probabilistic matching.	Develop a repeatable and privacy-compliant framework using both probabilistic and deterministic methods.
Did not establish data governance or long-term coordination structure.	Create governance, data-sharing agreements (MOUs), and HIPAA-compliant procedures under the TRCC.
No validation of injury misclassification or use for safety analysis.	Validate police-reported vs. clinical injury severities (AIS/ISS) and assess implications for crash severity metrics.
One-time linkage; no plan for maintenance or automation.	Develop a replicable process and implementation roadmap for periodic or automated linkage.
No policy or program integration.	Deliver actionable recommendations for updates to ODOT's Traffic Records Strategic Plan and TSAP.

From a broader perspective, integrating crash and health data directly supports Oregon's *Safe System* and *Vision Zero* frameworks by improving how the state measures, understands, and responds to serious injuries. Linked data can validate police-reported injury severities, reveal where EMS response times or hospital access affect outcomes, and identify medical cost burdens associated with crashes. These insights can inform equitable resource allocation, rural trauma system improvements, and policy decisions related to roadway design, enforcement, and emergency preparedness. States such as New Jersey, California, and Texas have shown that linked datasets enhance both safety research and public health collaboration, leading to improved countermeasure targeting and more accurate federal performance reporting. Oregon can build upon these examples to create a sustainable, interagency data system that improves decision-making while maintaining privacy protections.

The research will include the following proposed tasks:

- Review ODOT's crash data and OHA's EMS, trauma, and hospital datasets to document available variables, coding structures, and data quality needed for integration.
- Establish a multi-agency working group under the Traffic Records Coordinating Committee (TRCC) to guide data-sharing, privacy compliance (HIPAA), and governance procedures.
- Clean and harmonize key linkage variables such as crash date/time, location, age, and sex to enable accurate record matching across systems.

- Conduct a pilot linkage for one to three years of data using probabilistic and deterministic matching methods, with validation and accuracy testing.
- Compare police-reported injury severities with medical injury scores (AIS/ISS) to quantify misclassification and assess crash–injury mechanisms.
- Develop a replicable technical guide and workflow for secure data integration, including resource needs, software tools, and procedures for ongoing linkage.
- Develop a tool/interactive dashboard to illustrate how linked crash, EMS, and hospital data can be queried, visualized, and analyzed for injury validation and performance reporting.
- Translate findings into actionable recommendations for updating ODOT’s *Traffic Records Strategic Plan*, *Transportation Safety Action Plan*, and data management policies to institutionalize a sustainable crash–health data linkage program.

5. State of Oregon Decision Making Lenses

Climate

5a. Will addressing the transportation issue identified as a need in Question 1 develop, or **validate methods for the estimation, measurement, or monitoring** of transportation generated greenhouse gases (GHG)?

☐ Yes

☒ No

☐ Unsure

5b. If climate or GHG is not the focus of this **transportation issue** identified in this problem statement, will the research apply a GHG analysis to transportation infrastructure, planning, operations, maintenance, or materials?

☐ Yes

☒ No

☐ Unsure

5c. Will addressing the **transportation issue** include development or testing of construction practices, methods, or materials to establish potential reductions in greenhouse gas emissions?

☐ Yes

☒ No

☐ Unsure

5d. Will solving the **transportation issue** in question 1 study or support the reduction of vehicle miles traveled and single occupancy vehicle travel or support transition to electric vehicles (or other types of zero emission vehicles) or low-carbon alternative fuels?

☐ Yes

☒ No

☐ Unsure

5e. Will the solving the **transportation issue** in question 1 lead to work that will support, measure, or monitor, transportation system resilience in response to expected climate events, effects, or natural disasters in general?

☐ Yes

☒ No

☐ Unsure

5f. Will solving the **transportation issue** in question 1 lead to work that may result in better environmental conditions for wildlife and native vegetation?

☐ Yes

☒ No

☐ Unsure

5g. If you answered yes to any of the climate questions above or can provide alternative details related to climate, please provide additional information:

Equity

Equity can have many dimensions and impacts relating to communities and transportation. It is important that problem statement proposals clearly explain the equity dimensions or impacts being examined. Oregon commits to social equity in the OTP, specifically to *improve access to safe and affordable transportation for all, recognizing the unmet mobility needs of people who have been systemically excluded and underserved. Create an equitable and transparent engagement and communications decision-making structure that builds public trust.* We seek research that studies elements of this goal or applies analysis to specific transportation topics to ensure the resulting research recommendation is consistent with agency equity goals. For definitions and details please review the equity vision, goals, and objectives of the [ODOT Strategic Action Plan](#) and [Oregon Transportation Plan](#).

5h. Is the **transportation issue** identified as a need in Question 1 specifically focused on transportation equity?

☐ Yes

☒ No

☐ Unsure

5i. If the **transportation issue** is not focused on transportation equity, will the primary topic be assessed for equity benefits or impacts within the research project?

☒ Yes

☐ No

☐ Unsure

5j. Is the implementation of potential findings from this research likely to directly involve participation from an identified group that would benefit from an equitable process or outcome?

☒ Yes

☐ No

☐ Unsure

5k. Is the intended final product or information expected to support ODOT's equity efforts (Including but not limited to supporting one of the equity related objectives of the [ODOT's Strategic Action Plan](#) or [Oregon Transportation Plan](#)) ?

☒ Yes

☐ No

☐ Unsure

5l. If you answered yes to any of the equity questions above or can provide alternative details related to equity, please provide additional information:

Although equity is not the primary focus, this research directly supports Oregon's equity goals by enabling data-driven identification of disparities in crash outcomes and emergency response. The linked crash-health dataset will allow ODOT and OHA to examine whether certain communities (such as low-income, rural, or minority populations) experience longer EMS response times, higher injury severities, or unequal access to trauma care. These insights can inform equitable allocation of safety resources and improvements in statewide trauma system planning. In this way, the project aligns with the ODOT Strategic Action Plan goal of ensuring all Oregonians have access to safe, timely, and effective transportation and emergency response systems.

Safety

Research outcomes may include interventions and countermeasures to prevent or reduce the frequency of crashes or other causes of transportation-related injury or death; or may include measures to reduce severity of injury (including prevention of death) after a crash or other injurious event. For definitions and details please review the equity vision, goals, and objectives of the [ODOT Strategic Action Plan](#), [Oregon Transportation Safety Action Plan](#) and [Oregon Transportation Plan](#).

5m. Will solving the **transportation issue** in question 1 support improving **safety culture** for either transportation workers or the traveling public?

☒ Yes

☐ No

☐ Unsure

5n. Will the solving the **transportation issue** support improving safety through **healthy and livable communities**?

☒ Yes

☐ No

☐ Unsure

5o. Will solving the **transportation issue** support improving safety through using **best available technologies**?

☒ Yes

☐ No

☐ Unsure

5p. Will solving the **transportation issue** support improving safety through **communication and collaboration**?

☒ Yes

☐ No

☐ Unsure

5q. Will solving the **transportation issue** support improving safety through **investing strategically**? 5r. If you answered yes to any of the safety questions above or can provide alternative details related to safety, please provide additional information:

This research directly advances ODOT's safety management and data improvement goals as outlined in the *Oregon Transportation Safety Action Plan (TSAP, 2021)* and *Traffic Records Strategic Plan (2022)*. The project will provide ODOT with a more accurate and medically validated measure of injury severity; addressing long-recognized deficiencies in current crash reporting systems. This integration will allow ODOT to more accurately identify serious injuries, understand injury mechanisms, and evaluate post-crash outcomes, enabling data-driven prioritization of countermeasures and investments under the *Highway Safety Improvement Program (HSIP)*. The linked dataset will also enhance performance tracking and policy evaluation by supporting ODOT's Vision Zero and Safe System objectives. Specifically, it will:

- Improve the accuracy of serious injury metrics used in safety performance reporting.
- Support validation of crash severity scales and correction of misclassified injuries.
- Provide evidence for evaluating the effectiveness of roadway, behavioral, and emergency response interventions.
- Strengthen collaboration between ODOT, the Oregon Health Authority (OHA), and the Traffic Records Coordinating Committee (TRCC) for long-term data-driven safety improvements.

Collectively, this research will enable Oregon to move toward a complete, outcome-based safety data system, improving how the state identifies, prioritizes, and mitigates transportation-related injuries and fatalities.

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This form is not a grant application or contract document. Please do not include proprietary information on this form. Once this form is received ODOT may revise and publish the problem statement. If selected, ODOT will assign investigator(s) of the department's choosing to conduct research.