

EMS & Injury Prevention: Gathering & Compiling Data

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MVC Site Identification Projects

- -Crow Reservation (1996-2009)
- -Fort Belknap Reservation (1996-2009)
- -Fort Peck Reservation (1996-2009)
- -Wind River Reservation, Wyoming (1994-2009)

Goal & Purpose of Projects

- Spatial Injury Epidemiology Analysis
 - To identify Motor Vehicle Crash (MVC) cluster sites
 - To determine patterns and potential cofactors of MVCs through descriptive data analysis.
 - To Identify Morbidity and Mortality resulting from MVCs

Importance of MVC Spatial Analysis

- Scarcity of geographical information system (GIS) spatial analysis of MVCs for tribes in Montana & Wyoming.
- Limited time and training for tribes to conduct epidemiologic analysis and interpretation of MVC morbidity & mortality burden.

Importance of MVC Spatial Analysis

- Static Paper Maps
 - Pin map v. GIS Digital Map
- Interactive Maps
 - Network
 - Organization(s)
 - Website (Data Specific Queries)
 - DVD data disc compatibility
 - (GIS Software: ArcReader)

Project Authorizations

- Crow Tribal Legislature
 - Joint Action Resolution (JAR#08-06)
 - Passed July 16th, 2008.
 - Received permission to conduct MVC project.
 - Legislative Resolution (LR #10-04)
 - Passed January 28th, 2010
 - Received permission to publish project paper.

Project Authorizations

- Fort Peck Tribe
 - Tribal Resolution (#342-2010-02)
 - Passed February 22nd, 2010
- Fort Belknap Tribe
 - Tribal Resolution (#101-2010)
 - Passed September 14th, 2010

Data Collection & Research

– Montana Highway Patrol MVC data list.

- 1996-2009
- Crow Reservation
- Fort Belknap Reservation
- Fort Peck Reservation

– Crow Law Enforcement MVC reports.

- 2006-2008
- Crow Reservation
- Unreliable dataset
 - MVC reports inconsistent
 - Did produce 20% more crashes than MHP Dataset.

Data Collection & Research

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GIS Spatial Software Applications

- Environmental Systems Research Institute's (ESRI)
 - ArcMap
 - ArcPad
 - ArcPublisher

GIS Spatial Software Applications

Developed GIS maps for each reservation.

Map layers

- Raster images (aerial photos).
- Boundaries (political)
- Road Systems
- MVC points

Data Procedure (Raw Data from MHP Dataset):

1. Transfer raw dataset to Microsoft Excel.
2. Extract Morbidity & Mortality MVCs within reservation boundary.
3. Conduct GPS plotting of MVCs and import into ArcMap.
4. Export X,Y (GPS) coordinates and join with Excel file MVC dataset.
5. Import complete Excel file to ArcMap.
6. Conduct spatial analysis of crash cluster sites.
7. Conduct epi analysis of crashes using SPSS statistical software.
8. Calculate Crash Rate, Severity Index, and Severity Rate of road systems using MDOT formulas.
9. Develop paper and maps of findings, submit to Tribal DOT.
10. Initiate Road Safety Audit (RSA) with Tribal DOT & Stakeholders.

Recommendations

- Conduct further MVC site analysis for top cluster locations
 - Environmental factors
 - Traffic characteristics
 - Driver behavior
- Results could lead to:
 - Environmental Modification
 - Public Education
 - Enforcement

Recommendations

- Upkeep on traffic signs
 - Mile marker posts (ex. mile markers run in opposite directions on Route 418).
 - Traffic signs
 - Guardrails
 - Etc.
- Incorporate GPS units in police vehicles to accurately plot MVCs in the field.

- Collaboration & Agreement between State of MT and Tribes
 - **Tribes must set up agreement with MDOT to receive MHP raw crash data annually.**
 - Several roadway systems not recognized by the state of MT and Counties
 - MHP uses Montana Public Land Survey System to list crashes (highly erroneous MVC locations), GPS would remedy this issue.
 - Collaborative engineering analysis by state and tribe (none exist in MHP data list).

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