The Impact of Misclassification of AIAN Race in Describing the Burden of Traffic-Related Injuries in Washington State

Analysis of Washington Syndromic Surveillance Data Linked to the Northwest Tribal Registry (Q1 2021)

Project Purpose

American Indian/Alaska Native (AIAN) people experience a disproportionate burden of motor vehicle injuries and deaths, among other health disparities. This burden is likely underestimated due to AIAN misclassification (the miscoding of AIAN people as White or other races) in public health and administrative data. Probabilistic linkages with tribal registries are an effective tool for addressing AIAN misclassification in surveillance datasets. The purpose of this project is to link Washington Rapid Health Information Network (RHINO) syndromic surveillance data to the Northwest Tribal Registry and assess the effect of misclassification on estimates of emergency care visits for motor vehicle injuries among AIAN people in Washington. The findings will inform efforts to improve the quality of race information in Washington's syndromic surveillance system and allow for the accurate assessment of outcomes for AIAN people in Washington state. This project was supported by grants from the Washington Traffic Safety Commission.

Data Sources and Linkage Methods

Washington's RHINO program collects near real-time data on patient visits to hospitals and other health care facilities across Washington state. For this project, RHINO provided a linkage file containing patient personal identifiers for health care visits that occurred during Quarter 1 of 2021. The original file provided for the linkage (RHINO _Q12021_NWPAIHB.csv) had a total of 1,520,978 records which included some non-production data. We linked this data to the Northwest Tribal Registry (N = 259,281) using the probabilistic linkage software Match*Pro v.2.2.1. The Northwest Tribal Registry contains personal identifiers for members of federally recognized Tribes and their descendants who are eligible for services provided by Indian Health Service (IHS), and have accessed care at IHS, Tribal, or urban Indian health facilities in the Northwest. We matched the two datasets using patient date of birth, last name, first name, middle name, sex, and zip code, and conducted a clerical review to identify true matches between the two datasets.

Following the linkage, RHINO provided a de-identified analytic file with patient demographic, chief complaint, diagnosis, facility information, and a flag for records that matched with the Northwest Tribal Registry. The analytic file (RHINO_Q12021_ESSENCEfields.csv) had 1,213,356 records where nonproduction data was removed and deduplicated. The analytic file had a total 1,188,630 records of

WA residents and 24,726 from other states. The analytic dataset included 17,724 RHINO records that matched with the Northwest Tribal Registry, of which 7,734 were identified as having misclassified race.

Analytic Methods

For this analysis, we used only records of WA residents identified using the "Region" variable. Using the original "race_flat" variable, we identified records with AIAN race code (1002-5) alone or AIAN in combination with other races; these records were recoded as "AIAN any mention" and this field was used for pre-link race estimates. Post-link AIAN counts included records with any mention of AIAN or all records matched with the Northwest Tribal Registry (match_status = 'Match'). The variable "ethnicity_flat" was recoded in to Hispanic and non-Hispanic categories. We used both CCDD category "Alltrafficrelatedv1" and "Alltrafficrelatedv2" query selections for our analysis. We selected all WA resident traffic injury related emergency care visits (ER) who has been to an emergency department (YES) to estimate total visits by race. For the denominator, we used all WA resident emergency care visits by race regardless of their reason for visits.

We calculated motor vehicle injury counts, rates, and rate ratios for AIAN to non-Hispanic White both before and after linkage with the Northwest Tribal Registry. We evaluated the impact of misclassification (i.e., records that matched with the Northwest Tribal Registry but did not have the AIAN race code pre-linkage) on AIAN motor vehicle injury counts, rates, and rate ratios and by sex, age, and county of patient residence.

Findings

Linkage to the Northwest Tribal Registry identified 116 misclassified AIAN all traffic injury related emergency department visits in the Washington RHINO 2021 Q1 dataset. Misclassification of AIAN race in RHINO underestimates the burden of traffic injury related emergency visits in the following ways:

- Counts are underestimated by 45%
- Rates are underestimated by 5%
- Disparity to NHW is underestimated by 6%

While correcting misclassified records had a large effect on counts of traffic injury related emergency department visits, there was a smaller effect on rates. This is because the linkage correction also increased the denominators (i.e., all WA resident emergency care visits) used to calculate the rates, which resulted in a smaller change, and occasionally a decrease, in rates.

AIAN traffic-related emergency department visits before and after linkage between RHINO and the Northwest Tribal Registry

Washington State, Quarter 1 2021

	Pre-link AIAN		Post-link AIAN				
	Count	Rate	Count	Rate	Misclassified count	Percent change in counts	Percent change in rates
Men	123	216.0	189	235.5	66	↑53.7%	↑9.0%
Women	135	180.5	185	183.1	50	↑37.0%	↑1.4%
Total	259	196.5	375	206.8	116	↑44.8%	↑5.2%

Note: Total includes unknown sex; Rate is calculated per 10,000 emergency room visits

Records include AllTrafficRelated v1 CCDD Category or AllTrafficRelated v2 CCDD Category; Region=WA_ ; HasBeenE=1; Facility Type - All records = Emergency Care

Rate ratios of AIAN to NHW all traffic emergency department visit rates especially increased for men after linkage to the NTR.

Rate ratios of AIAN emergency department visits to NHW, Washington State, Quarter 1 2021.
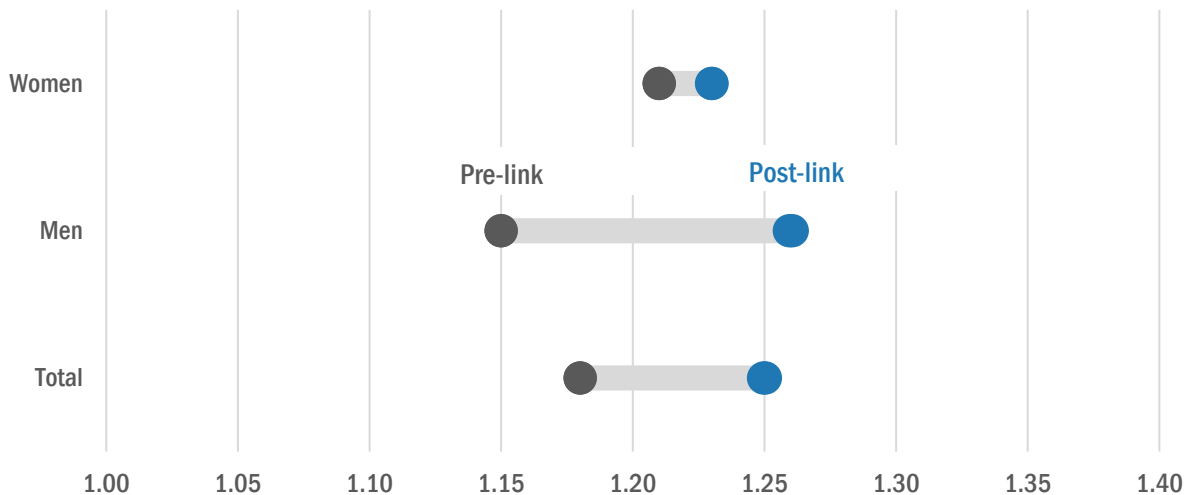
AIAN traffic-related emergency department visit counts were highest for those age 15-24.

Post-link counts increased the most for those ages 15-39.

Post-link count
Pre-link count
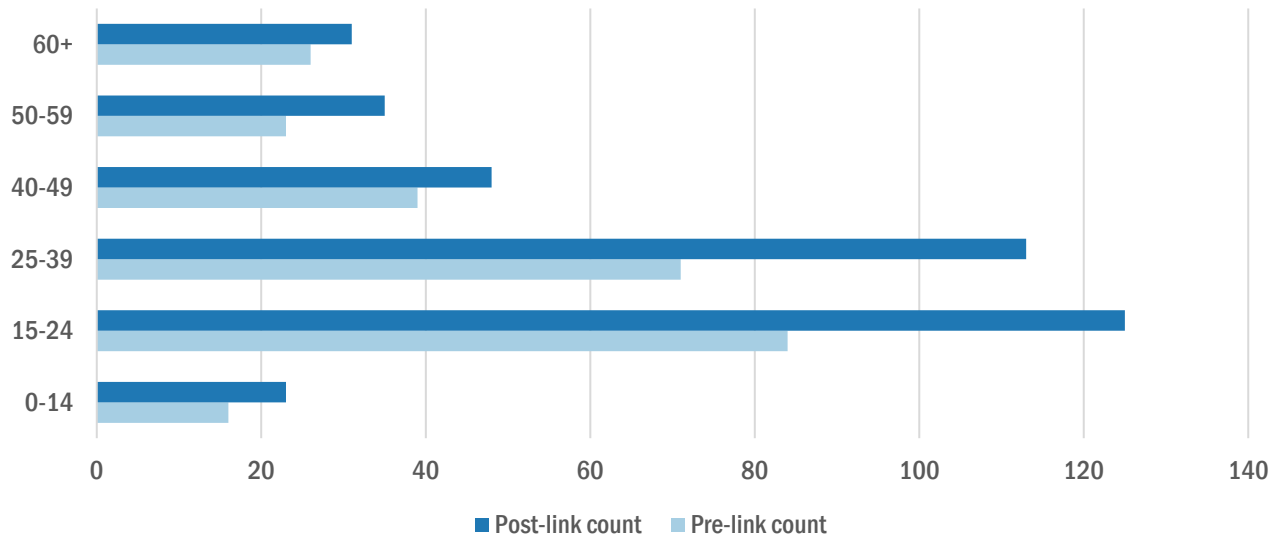
AIAN traffic-related emergency department visit rates were highest for those age 15-24.

Rates increased for most age groups post-link.
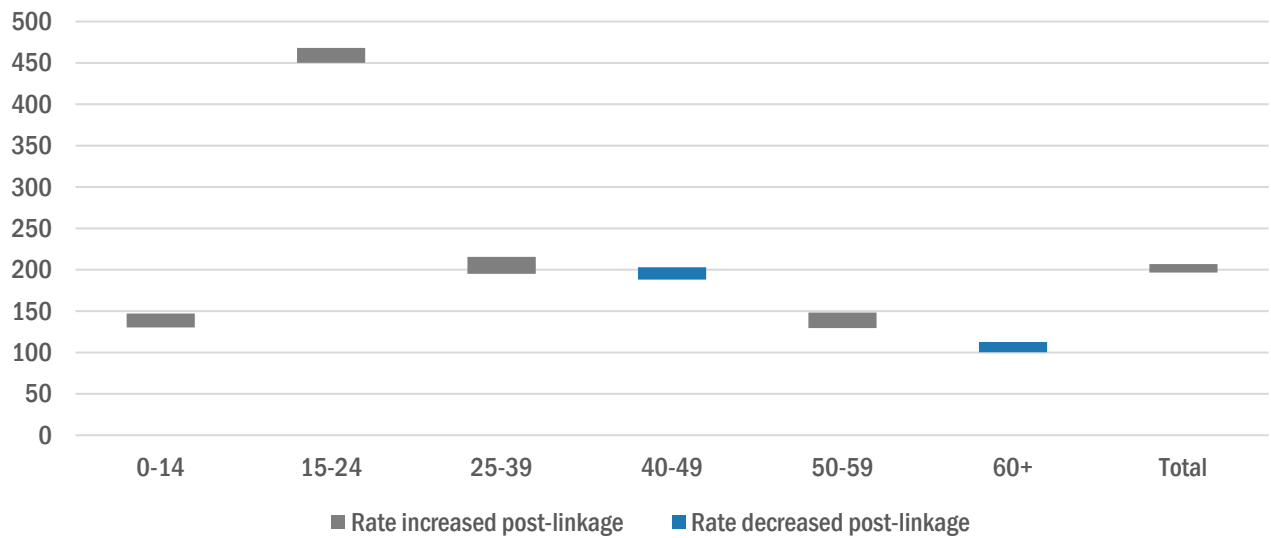
Rate increased post-linkage
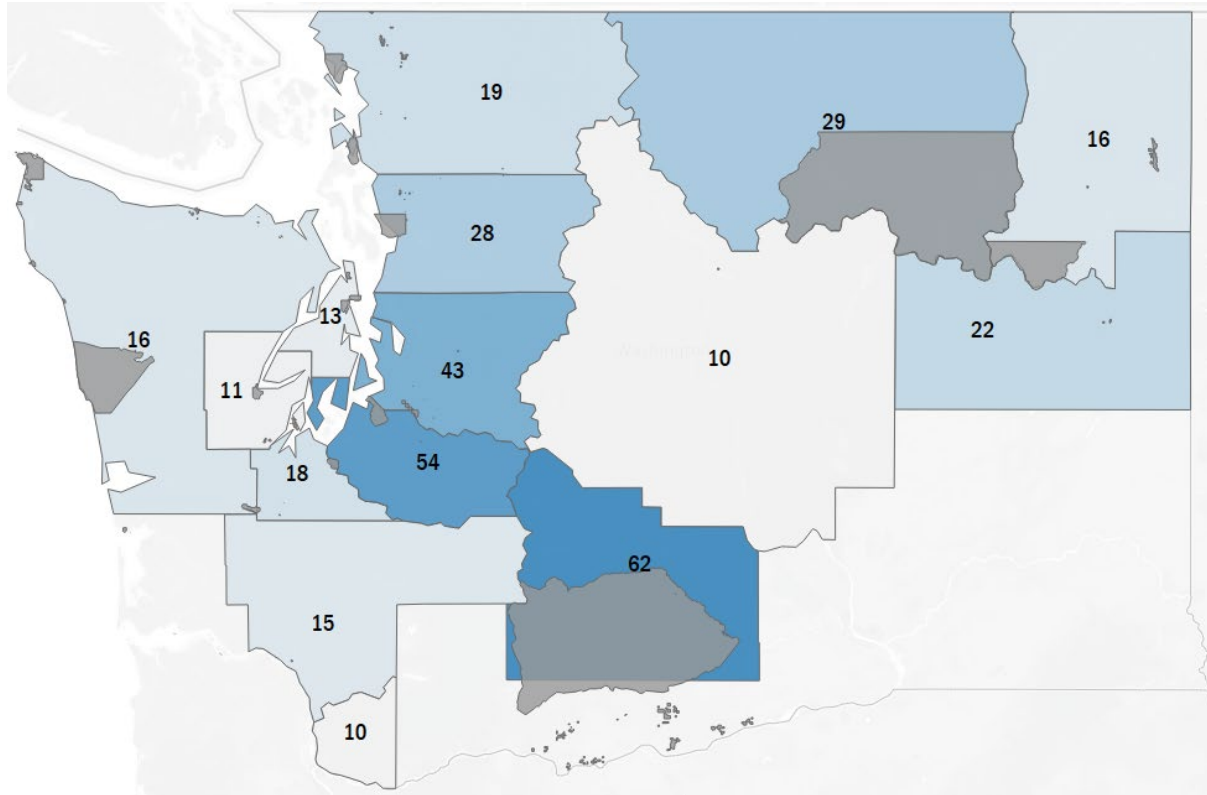Rate decreased post-linkage

AIAN traffic injury-related emergency department visit counts by county after linkage to the Northwest Tribal Registry.

Washington State quarter 1 2021 RHINO records.
Tribal land layers are in gray. Counts less than ten have been aggregated into multi-county counts.

Percent increase in AIAN traffic injury-related emergency department visit counts by county after linkage to the Northwest Tribal Registry.
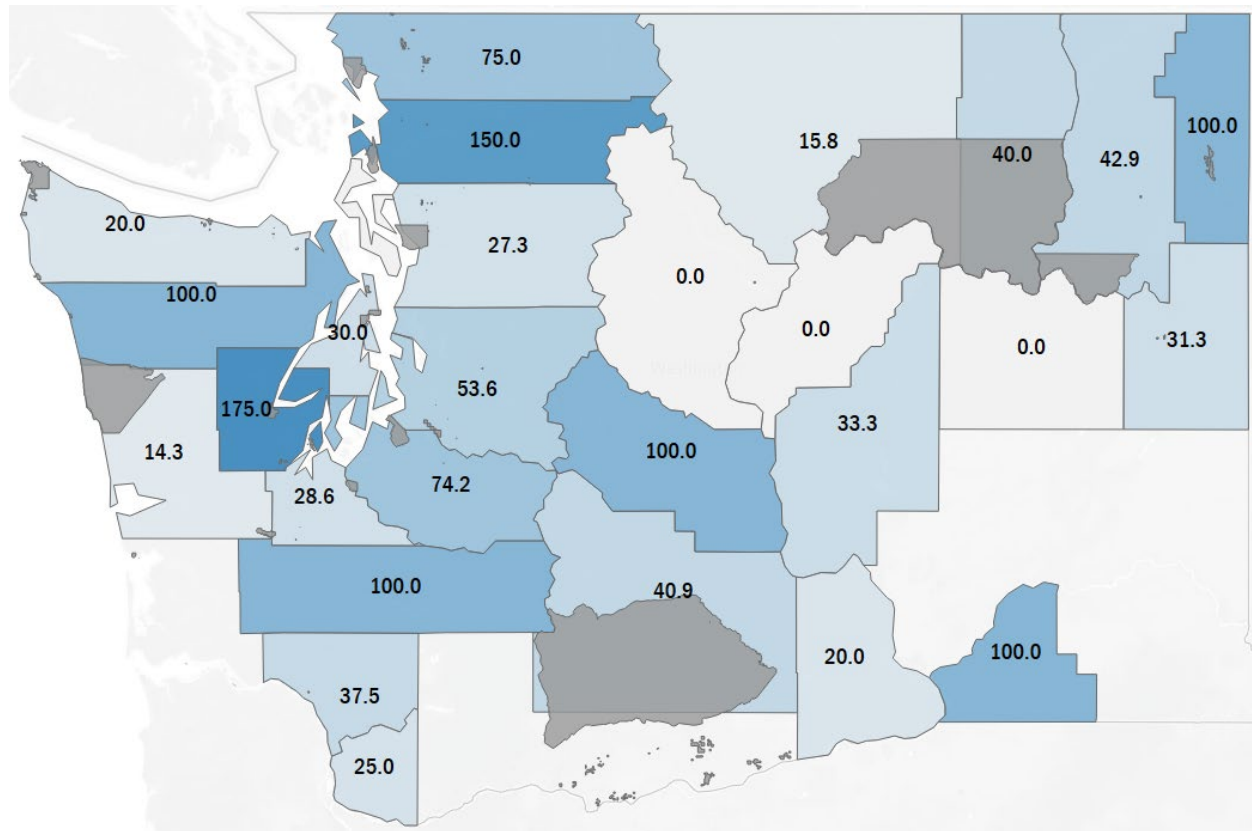
Washington State quarter 1 2021 RHINO records.
Tribal land layers are in gray.

Next Steps

The misclassification of AIAN people as other races in Washington RHINO results in large underestimates in counts of traffic injury-related emergency visits in this population. Both NPAIHB and DOH are exploring options to utilize the findings of this project to improve the accuracy of RHINO data for AIAN communities in Washington. The Washington RHINO program is currently investigating options for updating race information (locally and in the National Syndromic Surveillance Program's ESSENCE platform) for records that linked with the Northwest Tribal Registry. Some of the potential challenges to integrating linkage results include:

- Overwriting of updated race by subsequent messages related to a patient
- Ability to retrospectively update race but difficulty in prospectively updating race
- Apparent discontinuity in demographic breakdowns between RHINO data that has been updated compared with RHINO data that has not yet been updated
- Capacity of NPAIHB and DOH staff to continue linkages and updates on an ongoing basis

To complete retrospective updates of existing RHINO data, the linkage process that was performed in this project will be repeated for additional quarters of data where matching variables are available. The matched visits will be flagged in the local DOH RHINO database. Datasets pulled from NSSP ESSENCE for analysis can then be updated with the corrected race data by joining to the RHINO database. This functionality will allow DOH and NPAIHB to utilize the updated race field in the near term before the process for correcting data within NSSP ESSENCE is implemented.

Prospective updates can be made on a limited basis using the match flag in the DOH database. As new visits are processed in real-time, individuals who match existing flagged records can be updated to reflect accurate AIAN status, given that the visit occurs within the same facility as a previously matched visit, and the individual is assigned the same patient ID. This match flag can also be used to ensure update messages for previously matched visits do not overwrite the updates that were put in place. These processing functions (prospective updates and overwrite protection) would require development in collaboration with DOH Health Technology Services (HTS) staff to implement, and are subject to resource limitations of HTS.

Given the limitations of the prospective updates, continued efforts to link new visits will be needed to capture matches that have not been previously flagged. On a quarterly basis, RHINO will pull the latest complete quarter's hospital visits (ED and inpatient) and share linkage variables with NPAIHB. Visits that match to the registry will be flagged in the DOH RHINO database.

Updating data available to all ESSENCE users on the NSSP platform can be done using different methods. One method, using the back-end support of NSSP, is still being evaluated by NSSP staff for feasibility. If that method is not available, DOH has developed a process that can produce the updates desired within NSSP ESSENCE data.

NSSP process for applying race code updates to ESSENCE

1. DOH will supply NSSP with a list of C_BioSense_IDs for visits to which we want the AIAN race code appended
2. NSSP will then apply the code through back-end processing on the ESSENCE databases
3. If possible, a hidden flag will remain on the updated visits, and prevent update messages that lack the AIAN race code from overwriting the "corrected" values. This will be useful if development of the overwrite protection steps by DOH is not complete before NSSP implements the race code updates, or if update messages are missed by DOH's overwrite protection steps once they are in place.

DOH process for applying race code updates to ESSENCE

1. DOH will pull the latest message for each visit we want to update using the flag in the local RHINO database, or generate a standalone A08 update message using a template that is populated with the visit's unique ESSENCE identifier and the latest race code(s) sent in PID 10
2. Within PID 10, DOH will append the AIAN race code
3. DOH will submit the messages in the outbound data feed to NSSP

DOH and NPAIHB will continue to explore these and other options to integrate the linkage results in ways that are protective of individual and tribal confidentiality and sustainable for both organizations.