
Eastern Washington University, Department of Urban and Regional Planning, The Small Urban Regional Tribal Center on Mobility

Zachary R. Becker, MUP candidate, disnehmer@ewu.edu
Jason Y. Scully, PhD, MUP, assistant professor, jscully@ewu.edu
Margo Hill, JD, MUP, assistant professor, mhill1@ewu.edu
Dick G. Witchen, PhD, FAICP, ditchesell@ewu.edu
Michael A. Rolland, rolland@rollandassociates.com

Travel Time to Nearest Primary Care Clinic from Residential Parcels on American Indian Reservations in Washington State

Travel Time to Nearest Hospital from Residential Parcels on American Indian Reservations in Washington State

Abstract
Health disparities among both rural and American Indian/Alaskan populations have been well documented (Jones, 2006), with rural communities seeing significantly lower health outcomes than urban populations. One of the possible factors that may affect these negative health outcomes is limited accessibility to healthcare resources. This research introduces the concept of “healthcare deserts” to describe the gap between rural and American Indian/Alaskan popula-
tions located within Washington State and lack of emergency medical services, primary care services, and specialty care services. Using GIS, we performed network routing queries from every residential parcel in the state of Washington to the following: nearest hospital, hospital with a cardiac center, hospital with an intensive care unit, hospital with access to kidney dialysis, nearest health clinic, health clinic with primary care, and the nearest five health clinics. These medical facilities were chosen based on observed and documented health disparities found in both rural and American Indian populations, as well as concerns of equal-
ity in relation to accessibility to healthcare resources. The results provide an illustration of the perceived gaps in primary care, emergency health services, and gaps in access to specialized care for specific disparities that disproportionately affect AI populations.

This poster documents the first steps of a larger research project that looks to explore the concept of access and health care deserts at the parcel level within the entire state of Wash-
ington. The goal of this project is to provide a comparative analysis between rural, urban, and tribal lands within the state, providing both public health and planning professionals a data set that will assist in the identification of healthcare deserts in Washington State.

Methodology
The main tool used when constructing the data for this project was the Network Analysis Tool used on ArcMap 10.6. The type of analysis used was an OD Cost Matrix Analysis. Using the OD Cost Matrix Analysis instead of the Closed Facility Analysis was important in the development of the data due to the amount of unnecessary data, such as turn by turn directions, that the Closed Facility Analysis produces. This extra data production makes the process of analyzing network distances more difficult and can lead to out-of-memory errors while constructing data at such a large scale.

The network used to run the analysis was constructed by StreetMap North America (ESRI, 2017). The parcel data for the residential parcels in Washington State was obtained through the Washington State Parcel Database Project, developed by the University of Washington Geographic Information Service and the School of Environmental and Forest Sciences. The loca-
tions of both hospitals and primary health care clinics in Washington State were provided by the Washington State Department of Health.

Results
The distribution of travel times amongst the reservations allowed for categorization of the reservation based on levels of access. For hospital times, the reservations within a 15 minute drive include: Muckleshoot, Puyallup, Tulalip, Quinault, Upper Skagit, Yakima, Fish, and Cowich. Most of these reservations are located in, or close to metropolitan areas which allows them shorter travel times. Lower Elwha, Skokomish, Swinomish, Nisqually, Tulalip, Chehalis, Squal-
ain Island, Kalapuy, Makah, Sxooa’sax, Jamestown S’Klallam, Lummi, Cowlitz, Port Madison, and Nooksack are all located between 15 and 30 minutes away from a hospital. These reser-
vation tend to be located primarily more on the outskirts of metropolitan areas, or in the case of the Cowlitz reservation, have their own hospital, but are large reservations with their pop-
culation widely dispersed. Last, the Port Gamble, Nisqually, Spokane, and Quinault res-
vervations are all located over 30 minutes away from a hospital. These reservations, in general, are also larger reservations with widely dispersed populations, but are also located in more rural areas.

The distribution of travel times to primary health care clinics also allows for categorization. The Sacajawea, Upper Skagit, Quinault, Puyallup, Swinomish, Kalapuy, Muckleshoot, Port Gamble, Makah, and Nisqually reservations are all located within a five minute drive of a primary health care clinic. These reservations probably have their own healthcare clinics located next to their primary housing complex, or are located in metropolitan areas. The Fir, Yakima, Tulalip, Chehalis, Tulalip, Jamestown S’Klallam, Port Madison, Cowlitz, Nooks-
ack, Quinault, Lummi, Cowlitz, and Lower Elwha are located between 5 and 15 minutes away from a primary health care clinic. These reservations, again, in general, tend to be larger, which makes the drive to the clinic take a little more time. And finally, both the Squaxin Island and Spokan reservations are located between 15 and 30 minutes away from a prima-
ry health care clinic. These clinics are located in more rural areas, or in the case of Squaxin Island, on an island, and are fairly large, which causes the travel times to the area clinics to increase.

This data may prove useful to regional planners and public health professionals who are attempting to identify vulnerable populations in the state of Washington, and specifically American Indian reservations.

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tion, Federal grant number 0943551/742712.

Table 1: Primary Care Clinic and Hospital Analysis Data Averages

<table>
<thead>
<tr>
<th>Name</th>
<th>Population</th>
<th>Primary Care Clinic</th>
<th>Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cowlitz</td>
<td>1,500</td>
<td>5 minutes</td>
<td>15 minutes</td>
</tr>
<tr>
<td>Ediz</td>
<td>2,000</td>
<td>7.5 minutes</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Nisqually</td>
<td>3,500</td>
<td>10 minutes</td>
<td>45 minutes</td>
</tr>
<tr>
<td>Quinault</td>
<td>4,000</td>
<td>12.5 minutes</td>
<td>60 minutes</td>
</tr>
<tr>
<td>Yakima</td>
<td>5,000</td>
<td>15 minutes</td>
<td>75 minutes</td>
</tr>
</tbody>
</table>

Limitations
Some of the major limitations of this project include the availability of parcel data for all of the reservations in Washington State. At the time this analysis was performed, parcel data was available for 28 of the 38 reservations in Washington State. The two reservations where data was not available were the Quinault reservation and the Shoalwater Bay reservation. Another limitation of this study included the processing power required to analyze the numerous distances using the OD Cost Matrix Analysis. The amount of available RAM greatly affected the amount of parcels able to be processed at once. This was resolved by packaging out the parcels and running the analysis using smaller parcel groups.

References