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Tribal Health Improvement Index (HII) estimates

Acknowledgments

Primary author

Alex Merrill, DHHS Office of American Indian/Alaska Native Health and Family Services

Contributors

Jeremy Taylor, DHHS Office of American Indian/Alaska Native Health and Family Services

Erica Bennion, DHHS Family Health

Shelly Wagstaff, DHHS Population Health

Amanda Smith, DHHS Deputy State Epidemiologist

Ozzy Escarate, DHHS Office of American Indian/Alaska Native Health and Family Services

Danielle Conlon, DHHS Public Affairs and Education

Kassie John, DHHS Office of American Indian/Alaska Native Health and Family Services


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Utah Department of Health and Human Services

Office of American Indian/Alaska Native Health & Family Services

armerrill@utah.gov

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The purpose of this report is to address the issue of tribal disparities being obscured in the Health Improvement Index (HII) by approximating HII scores for American Indian/Alaska Native (AI/AN) populations on tribal lands. This will allow for the direct comparison of tribal reservations with Utah small areas.

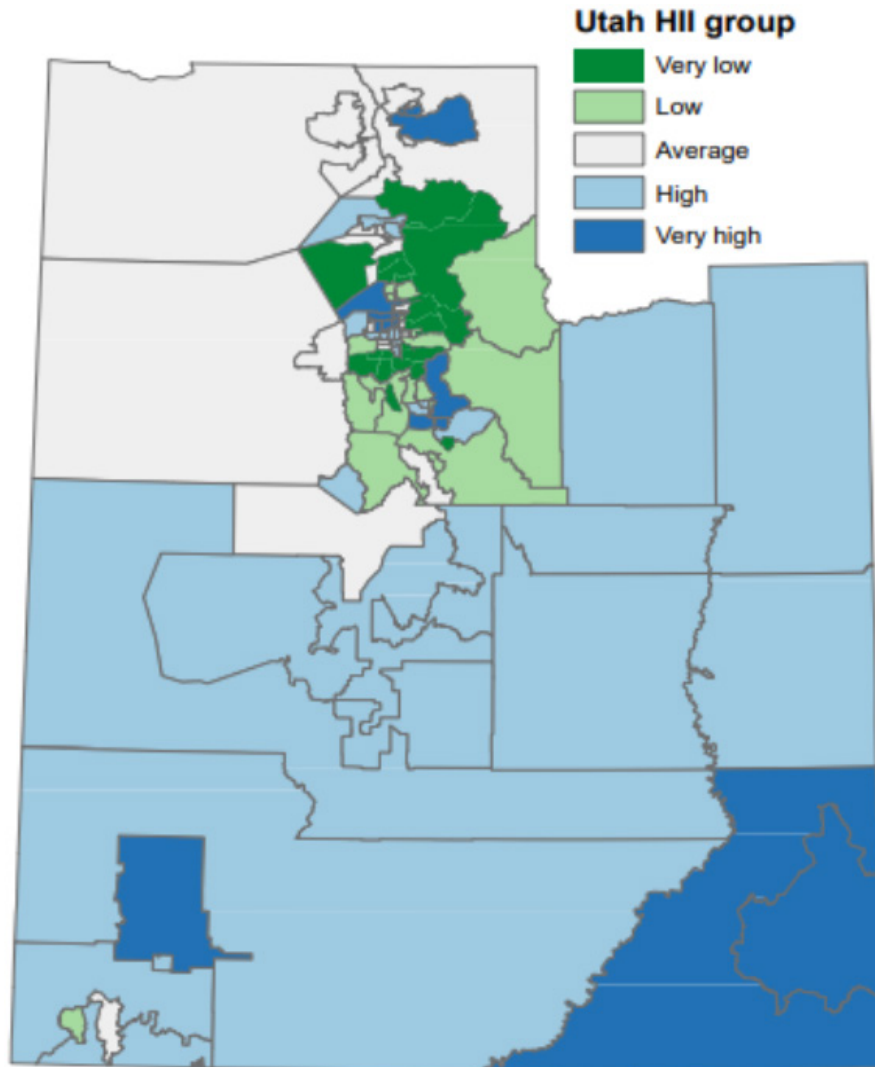
The Utah Health Improvement Index (HII) uses social determinants of health to identify geographic disparities and inform local decision making.¹ The HII calculates a score using 9 indicators pulled from the Behavioral Risk Factor Surveillance Survey (BRFSS) and the American Community Survey (ACS).¹ Those indicators include the following:

- Population over 25 years with less than a 9th grade education, %
- Population over 25 with at least a high school diploma, %
- Median Household Income, %
- Income disparity (Gini coefficient)
- Civilian labor force population over 16 years of age that is unemployed, % (unemployment rate)
- Owner-occupied housing units, % (homeownership rate)
- Population below the federal poverty level, %
- Population below 150% of the federal poverty level, %
- Single-parent households with children aged <18 years, %

Each score is then grouped into one of 5 categories: very low (<80.00), low (80-94.99), average (95.00-104.99), high (105-119.99), and very high (\geq 120.00).¹ The higher the score, the more vulnerable an area is to health disparities.

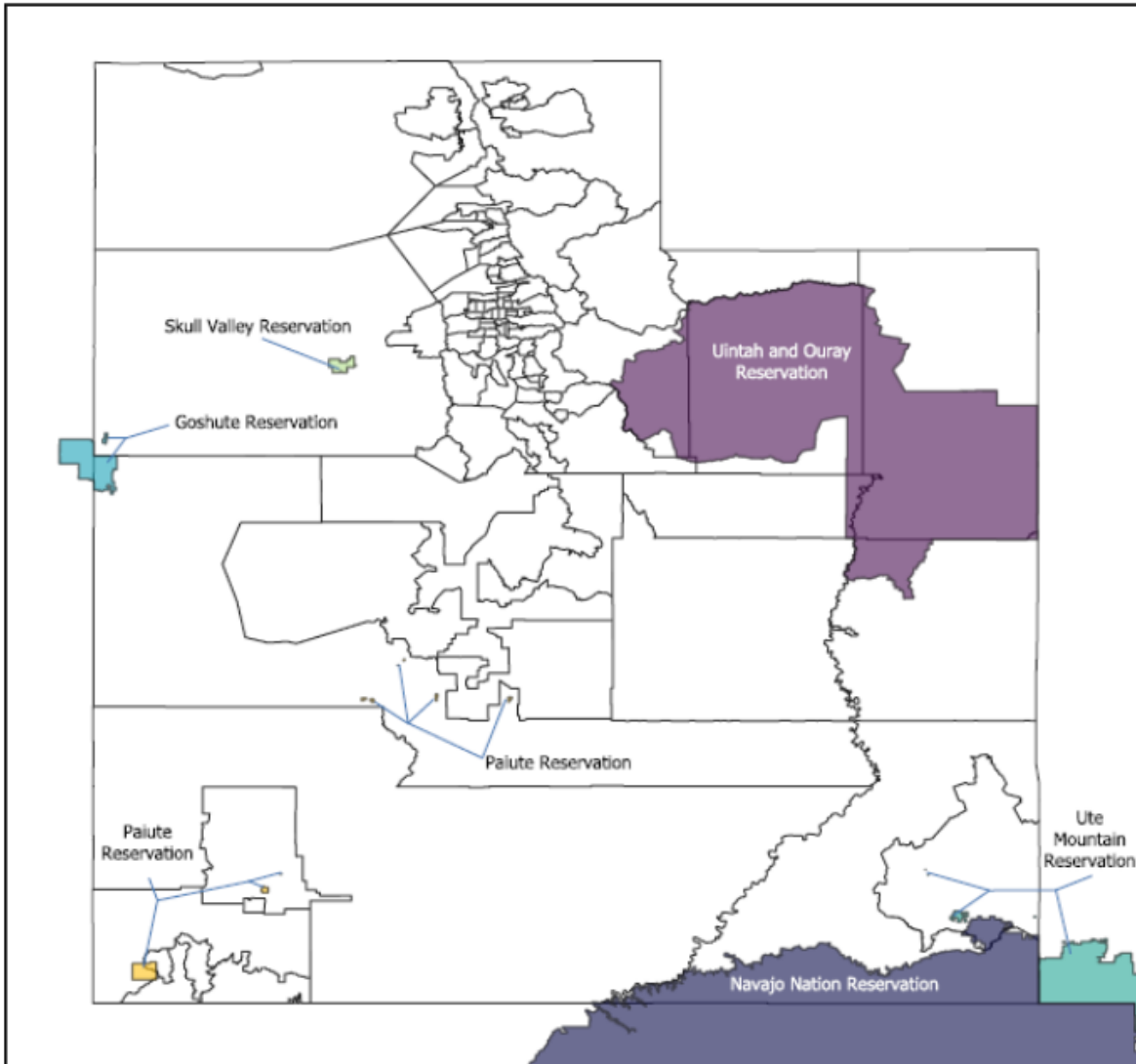
Each of the 99 small areas in Utah has a calculated HII score.¹ Each small area is created from zip codes and county boundaries. They have relatively small population sizes and are designed to provide data at a community level to facilitate local public health assessments and inform local policies (Figure 1).^{1,2}

Figure 1: Map of Utah small areas by HII group.



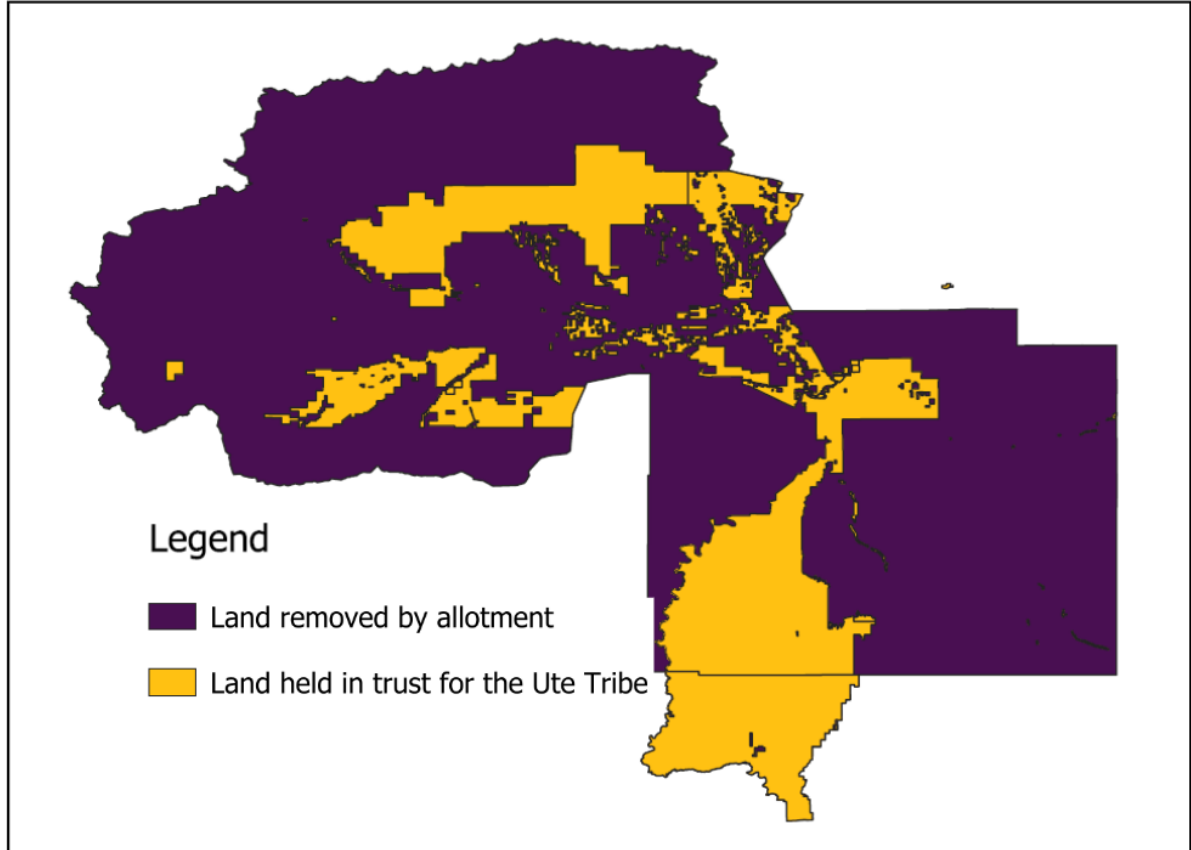
Utah is home to 8 federally recognized tribes, 6 of which have populated tribal reservation lands. A tribal reservation is land held in trust by the federal government “for a tribe or tribes under treaty or other agreement with the United States, executive order, or federal statute or administrative action as permanent tribal homelands.”⁷³ One limitation to using the HII to evaluate tribal disparities is that 5 out of the 6 tribal reservations in Utah span multiple small area, county, and/or state boundaries (Figure 2). When communities, such as tribal reservations, are divided into 2 or more areas, disparities affecting that community can be obscured and difficult to address.

Figure 2: Populated reservations overlaying the 99 small areas used in the HII



An additional difficulty in representing tribal communities in state maps and indexes was introduced by the Dawes Act of 1887. This act allowed parcels of reservation land to be removed by the federal government and sold to non-Indians in what is referred to as the allotment process.⁴ This led to a “checker-board” of non-Indian settlement in Indian Country, allowing for non-Indian communities to live on allotted land within tribal reservation boundaries. This affected all tribes in Utah, but was implemented most clearly on the Uintah and Ouray Reservation (Figure 3).

Figure 3: “Checker-board” of the Uintah and Ouray Reservation



Methods

The original HII was created in 3 main steps. First, data were pulled from the BRFSS and ACS and aggregated to the small area level. Next, values for the indicators were multiplied by coefficients derived from the 2000 Singh Coefficients and added together to calculate the raw score.⁵ Lastly, raw scores were normalized using the raw score's mean and standard deviation. A more detailed description of the methods used to create the original index can be found in this document.⁶

For the tribal HII estimates, data were pulled from the same or similar sources as the original HII (Table 1). For the portions of the tribal reservations located in Utah, ACS indicators were pulled using census.gov. When available, indicators were restricted to the AI/AN alone population.⁷ The ninth indicator, single-parent households with children aged <18 years, was pulled from the 2017-2021 ACS rather than the BRFSS or the 2016-2020 ACS because it could be pulled at the tribal reservation level through the ACS, and the 2016-2020 ACS had insufficient data. The specific tables at census.gov accessed for each ACS indicator can be seen in Table 1.

BRFSS indicators were pulled using Utah’s Public Health Indicator Based Information System (IBIS).⁸ Due to the nature of how BRFSS data is collected, these indicators could not be pulled at the reservation level. To make BRFSS indicators applicable to tribes, they were restricted to the AI/AN population living in the small areas that overlapped populated areas of the tribal reservation. The small areas used for each tribe can be seen in Table 2.

Table 1. Data source for each HII indicator

Indicator	HII source	Tribal HII estimate source	Restricted to AI/AN	Table number (for ACS Data)
Population over 25 years with less than a 9th grade education	2016-2020 ACS PUMS data	2016-2020 ACS PUMS data	No	S1501
Population over 25 years with at least a high school diploma	2016-2020 ACS PUMS data	2016-2020 ACS PUMS data	No	S1501
Median household income	2016-2020 ACS PUMS data	2016-2020 ACS PUMS data (AI/AN specific)	Yes	B19013C
Income disparity (Gini coefficient)	2016-2020 ACS PUMS data	2016-2020 ACS PUMS data	No	B19083
Unemployment rate	2016-2020 ACS PUMS data	2016-2020 ACS PUMS data (AI/AN specific)	Yes	C23002C

Home ownership rate	2018-2020 BRFSS data	2018-2020 BRFSS data (AI/AN specific)	Yes	N/A
Population below poverty level	2018-2020 BRFSS data	2018-2020 BRFSS data (AI/AN specific)	Yes	N/A
Population below 150% of poverty level	2018-2020 BRFSS data	2018-2020 BRFSS data (AI/AN specific)	Yes	N/A
Single-parent households with children aged <18 years	2018-2020 BRFSS data	2017-2021 ACS PUMS data	No	DP02

Table 2. Small area names and identification numbers used to estimate BRFSS indicators for AI/AN alone population on reservation

Reservation	Small Areas (#)
Goshute Reservation	Tooele County (Other) (40.1) Central (Other) (54.4)
Navajo Nation	Blanding/Monticello (57.3) San Juan County (Other) (57.4)
Paiute Reservation	Cedar City (60) Central (Other) (54.4) Ivins/Santa Clara (59.4) St. George (58) Washington County (Other) (59.1)
Skull Valley Reservation	Tooele County (Other) (40.1)
Uintah and Ouray Reservation	Daggett and Uintah County (53.1) Duchesne County (53.2)
Ute Mountain Reservation	Blanding/Monticello (57.3)

After pulling the indicators, raw scores were calculated using the coefficients found in the HII methods document.⁶ Only the Navajo Nation and Uintah and Ouray Reservations had raw scores calculated. The other 4 reservations could not be given a score because of the small number of AI/AN people sampled in those areas. These small samples led to unreliable or suppressed data for 1 or more of the indicators.

The raw scores for the Navajo Nation Reservation and the Uintah and Ouray Reservation were then normalized using the mean and standard deviation of small area raw scores. The normalizing equation can be found in the methods document.⁶

To make sure that the estimated tribal HII scores were comparable to published Utah small area HII scores, HII scores were calculated for 6 small areas using the same methodology as the tribal estimates. The calculated small area scores were then compared to the published HII scores.

The 6 small areas selected for quality assurance represent a single county. This allows for data to be pulled directly from census.gov and IBIS.^{7,8} The 6 small areas, their tribal methodology estimate, published HII score, and the difference between scores is shown in Table 3.

Table 3. Comparison of estimated HII score and actual HII score for 6 small areas.

Small Area/County	Tribal Methodology Estimate	Published HII score	Difference
Carbon County	115.90	115.02	0.88
Duchesne County	112.60	112.54	0.06
Emery County	104.90	105.94	-1.04
Grand County	114.22	112.17	2.05
Morgan County	75.16	74.01	1.15
Wasatch County	91.81	92.63	-0.82

Of the quality assurance estimates, the score for Grand County had the largest difference from the published HII scores, being off by 2.05 points. In contrast, the estimate for Duchesne County was most accurate, being off by 0.06 points. All tribal methodology estimates were within ± 2.05 points of the published HII, providing confidence in the comparability of the tribal HII estimates and published small area HII scores.

Results

As previously discussed, HII estimates for the Paiute Reservation, the Utah portion of the Ute Mountain Reservation, the Utah portion of the Goshute Reservation, and the Skull Valley Reservation could not be calculated due to their small AI/AN sample size. The small sample size resulted in 1 or more of the indicators being suppressed. The Utah portion of the Navajo Nation Reservation has an estimated HII score of 179.82. The Uintah and Ouray Reservation has an estimated HII score of 140.92.

When the calculated tribal HII scores were numerically ordered with the 99 published small area HII scores, Navajo Nation Reservation had the highest HII score and the Uintah and Ouray Reservation had the 7th highest score.

Tribal reservations have higher scores than the small areas that intersect their boundaries. The Utah portion of the Navajo Nation Reservation (estimated HII score of 179.82) intersects the Blanding/Monticello and San Juan County (Other) small areas, which have HII scores of 121.99 and 152.80 respectively. Both of the intersected small areas and the Utah portion of the Navajo Nation Reservation are in the very high HII category.

The Uintah and Ouray Reservation (estimated HII score of 140.92) is intersected by the Duchesne County and Daggett and Uintah County small areas, which have HII scores of 109.45 and 112.54 respectively. These small areas have a high HII category, while the Uintah and Ouray Reservation is in the very high HII category.

Discussion

There are several limitations to this analysis. First, the tribal HII estimates were not included in the calculation of the mean and standard deviation used to normalize the scores. While this would have improved comparability between small areas and tribal areas, including tribal areas in the mean and standard deviation calculations would result in the recalculation of all 99 small areas that have already been published.

Additionally, while the original HII was calculated by aggregating zip codes and counties into small areas, the data for the tribal estimates was taken directly from census.gov and IBIS. This potentially introduced error through rounding differences or slight methodological variation in categorizing data. This may explain the differences between the calculated HII estimates and the published HII scores.

Finally, many indicators in the tribal estimate were restricted to those who identified as AI/AN alone. Not everyone who identifies as AI/AN alone in an area is an enrolled tribal member, and many who identify as AI/AN in combination with another race may be enrolled tribal members.

The HII estimates for the Utah portion of the Navajo Nation Reservation and the Uintah and Ouray Reservation demonstrate the disparities that exist among tribal communities in Utah. Due to data suppression and unreliable rates, HII estimates for 4 of the reservations were not calculated, however, the socioeconomic disparities measured by the index have been well documented among tribal populations and are regularly discussed during state consultation with the tribes.^{9,10,11}

A stated goal of the HII is to inform local decision making. However, tribal lands were not included in the HII because their boundaries do not align with the small areas.¹ Tribes face different issues and have different decision making channels than other adjacent communities. To better inform tribes, the state must consult with them throughout the formulation and use of state indexes, such as the HII. Tribal consultation is more than community engagement, it is the formal process of communicating with tribes on a government-to-government basis, and must occur regardless of tribal population or reservation size. In Utah, consultation is mandated via Governor's Executive Order EO/2014/005 and in the Department of Health and Human Services (DHHS) tribal consultation policy.^{12,13} When drawing up maps and indexes, if a proposed boundary intersects with or contains a reservation, consultation with that tribe should always occur. To begin the consultation process, reach out to Jeremy Taylor, the tribal health liaison for the Utah DHHS at jeremytaylor@utah.gov.

In conclusion, the existing HII does not account for tribal boundaries, which obscures disparities experienced by the tribes in Utah. The estimates provided in this report allow for direct comparisons between only the Utah small areas and the Utah portion of the Navajo Nation Reservation and the Uintah and Ouray Reservation. These estimates should be used in conjunction with tribal consultation to inform public health interventions and resource allocation decisions.

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