

# 2019 NPCR MONTANA SUCCESS STORY

## Montana Cancer Registry: Heather Zimmerman

### Improving Geocoding Precision through the Addition of Local Data

# NATIONAL PROGRAM OF CANCER REGISTRIES SUCCESS STORY

**SUMMARY:** The Montana Central Tumor Registry (MCTR) began geocoding all cases using the North American Association of Central Cancer Registries (NAACCR) Geocoder in 2015. However, not all cases are able to be geocoded to the exact address point. In Montana, about 17% of cases could not be matched more precisely than the street segment (GIS quality code 3 or higher). MCTR coordinated with both the Montana State Library and Texas A&M University GIS staff to upload Montana structures and address data into the NAACCR Geocoder. We then re-geocoded all cases diagnosed from 2008 to 2012 who had previously been geocoded with a precision of the street segment or worse. More than a third (35%) of cases had improved precision after being re-geocoded.

**CHALLENGE:** Geocoding physical address at diagnosis is essential for sub-county analysis. Geocoding results allow for cases to be assigned to a census tract, block group, and block. Calculations of cancer incidence for these sub-county areas are often needed to address cancer cluster concerns. MCTR started geocoding all cases using the NAACCR Geocoder in 2015 and have completed geocoding for diagnosis years 1995 and later. However, some addresses cannot be precisely matched to the national address databases that are included in the NAACCR geocoder. In Montana, about 17% of cases with a physical address could not be matched more precisely than the street segment (GIS quality code 3 or higher). These cases were assigned a latitude and longitude by the geocoder. However, the assigned point on the map was not a precise representation of the actual location of the home, but an approximation based on what information could be matched. Cases whose street could be matched (GIS quality code 3-5, about 11% of MT cases) will be placed on the matching street but the point along the street is approximated. Cases without even a matching street (GIS quality code 6 or higher, the remaining 6% of cases) are placed at the centroid of the zip code or city area. Cases with less precise geocoding could potentially be assigned to the incorrect census tract and adversely affect sub-county analysis.

**SOLUTION:** The Montana State Library maintains many geospatial databases for the state including a comprehensive database of structures and addresses in Montana. The state library combines data from local, state, federal, and private data providers into one standardized database that is updated often. The current structures and addresses database was last updated on September 20, 2019. The NAACCR Geocoder (built and maintained by Texas A&M University) allows for local data to be uploaded in recognition that local data sources are often more complete and up-to-date than national data sources. The MCTR connected the Montana State Library and the Texas A&M University GIS staff to allow the Montana data to be uploaded into the NAACCR Geocoder. Once the data were uploaded MCTR re-geocoded all Montana cases diagnosed from 2008 to 2017 whose GIS quality code was 3 or higher (excluding PO Box only cases) to see if their geocoding precision was improved.

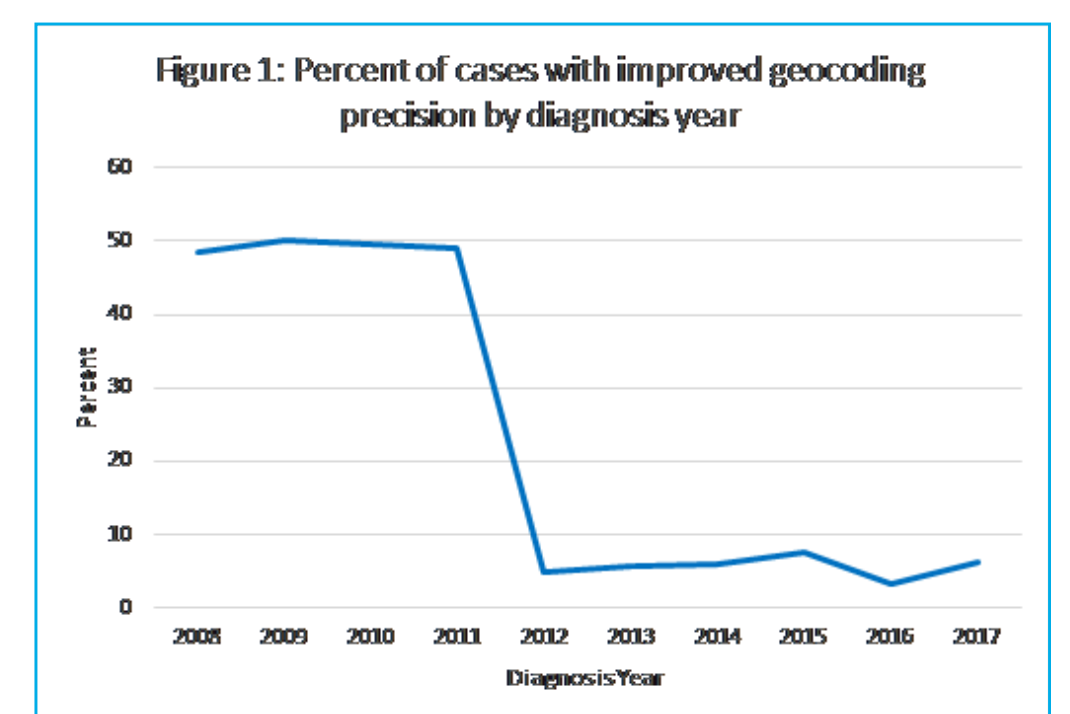
**RESULTS:** About 8,000 cases were re-geocoded with the addition of the Montana specific address data. About 70% (5,700) of these cases had been geocoded to the street segment and the remaining 30% (2,300) of cases were geocoded to the centroid of their zip code or city. After being re-geocoded, more than a third (35%) of the cases had improved geocoding precision (shaded in green in Table 1). This included 2,690 cases that were able to be exactly geocoded to an address point and 87 cases that were previously coded to the centroid of their zip code and were able to be matched to the street segment. About 200 (3%) cases had less precise geocoding results (shaded in red in Table 1).

Table 1: Number of cases by Previous Geocoding Precision and Updated Geocoding Precision

Updated Precision	Previous Precision				Total
	Street Segment	Zip Code Centroid	City Centroid	Unknown	
Address point	2,384 (30%)	306 (4%)	0	0	2,690
Street Segment	3,121	87 (1%)	0	0	3,208
Zip Code Centroid	182 (2%)	1,829	0	1 (<1%)	2,012
PO Box Zip Centroid	13 (<1%)	79	0	0	92
City Centroid	0	0	2	0	2
County Centroid	0	0	0	1	1
<b>Total</b>	<b>5,700</b>	<b>2,301</b>	<b>2</b>	<b>2</b>	<b>8,005</b>

The largest improvement was seen in cases diagnosed from 2008 to 2011 (Figure 1). About 50% of cases diagnosed prior to 2012 had improved geocoding precision while about 5% of cases diagnosed in 2012 or after had improved precision. This suggests that a large portion of the improvement may be due to ongoing improvements to the NAACCR Geocoder and not only due to the addition of Montana

local data. However, the 5% improvement in more recent cases may be mostly attributed to the addition of Montana data. Overall, the precision of geocoding results was significantly improved.



**SUSTAINING SUCCESS:** MCTR will continue to coordinate with the Montana State Library and Texas A&M University to ensure the Montana structures and addresses database is uploaded in to the NAACCR Geocoder every time it is updated. Additionally, MCTR is actively looking at ways to obtain physical address for cases that are reported with PO Box only. About 16% of Montana cases are reported without a physical address and these cases are geocoded to the centroid of their zip code. Obtaining the physical address for these cases would greatly improve the overall precision of geocoding in Montana. MCTR is currently working on a data sharing agreement with the Montana Secretary of State's office to get access to voter registration data. Once access is obtained, we will match MCTR records with the voter data using name, birthdate, and mailing address. It is our hope that linking to voter data will prove to be an efficient way of filling in missing physical addresses and continuing to improve the precision of geocoding.

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