

# Travel Distance as a Potential Impediment to Clinical Trial Participation: a GIS Analysis of NCI-Designated Centers.

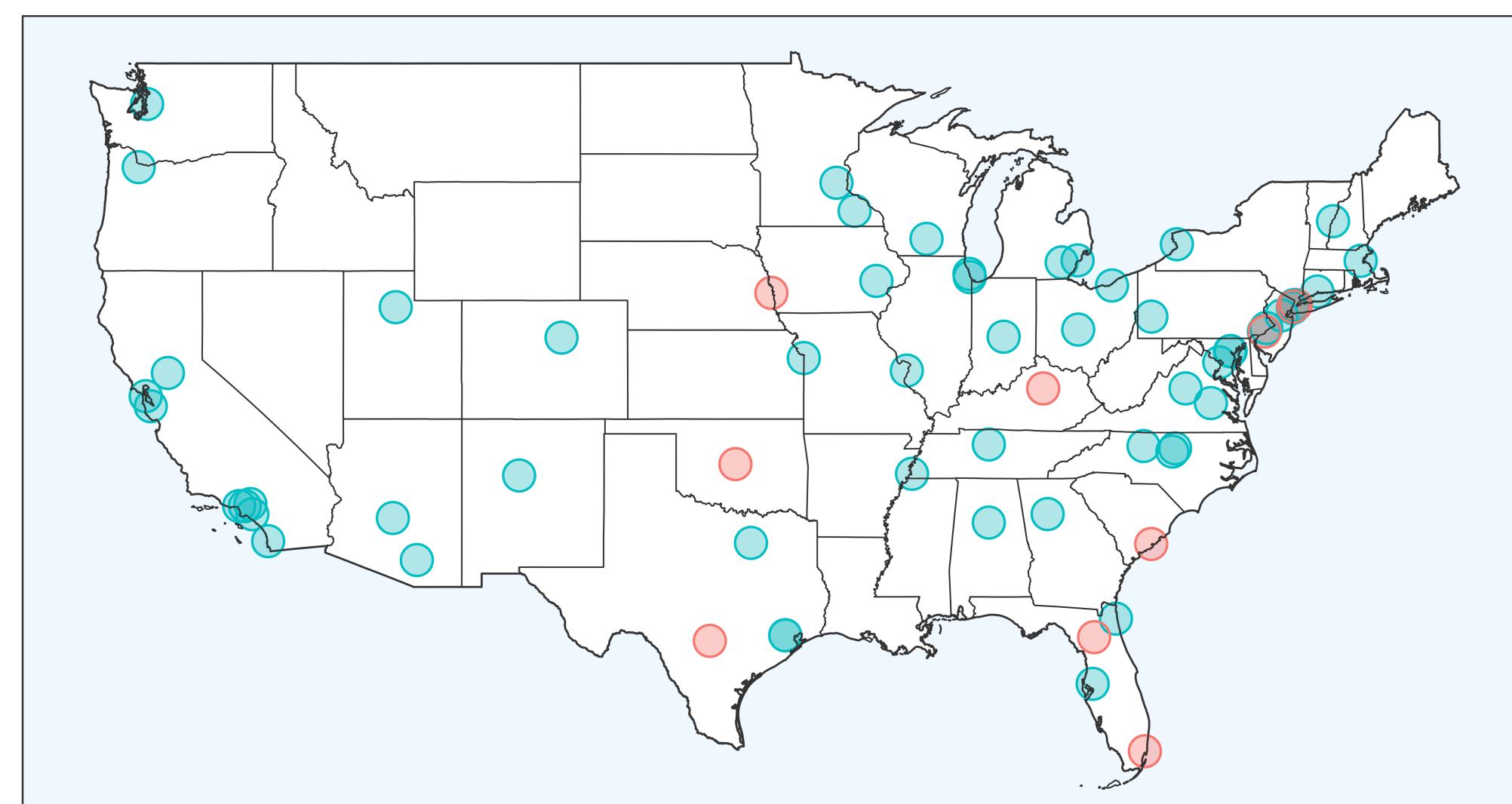
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Clinical Cancer  
Informatics and Data  
Science (CCIDS)  


## Background

- Clinical trials offer experimental treatments that may outperform the standard of care
- A patient's ability to access a trial depends on a variety of factors
  - Travel distance
  - Travel time
- NCI-designated cancer centers offer the largest breadth of trials in their catchment areas
- Patients with longer driving-times to NCI-designated clinics may have less access to cutting edge treatments through clinical trials
- We investigated disparities in driving-time to the nearest NCI-designated clinic



Facility Type: ● Cancer Center ● Comprehensive Cancer Center

**Figure 1.** Location of patient-serving NCI-designated clinics. Comprehensive Cancer centers have an especially strong track record of well-rounded clinical research.

## Research Question

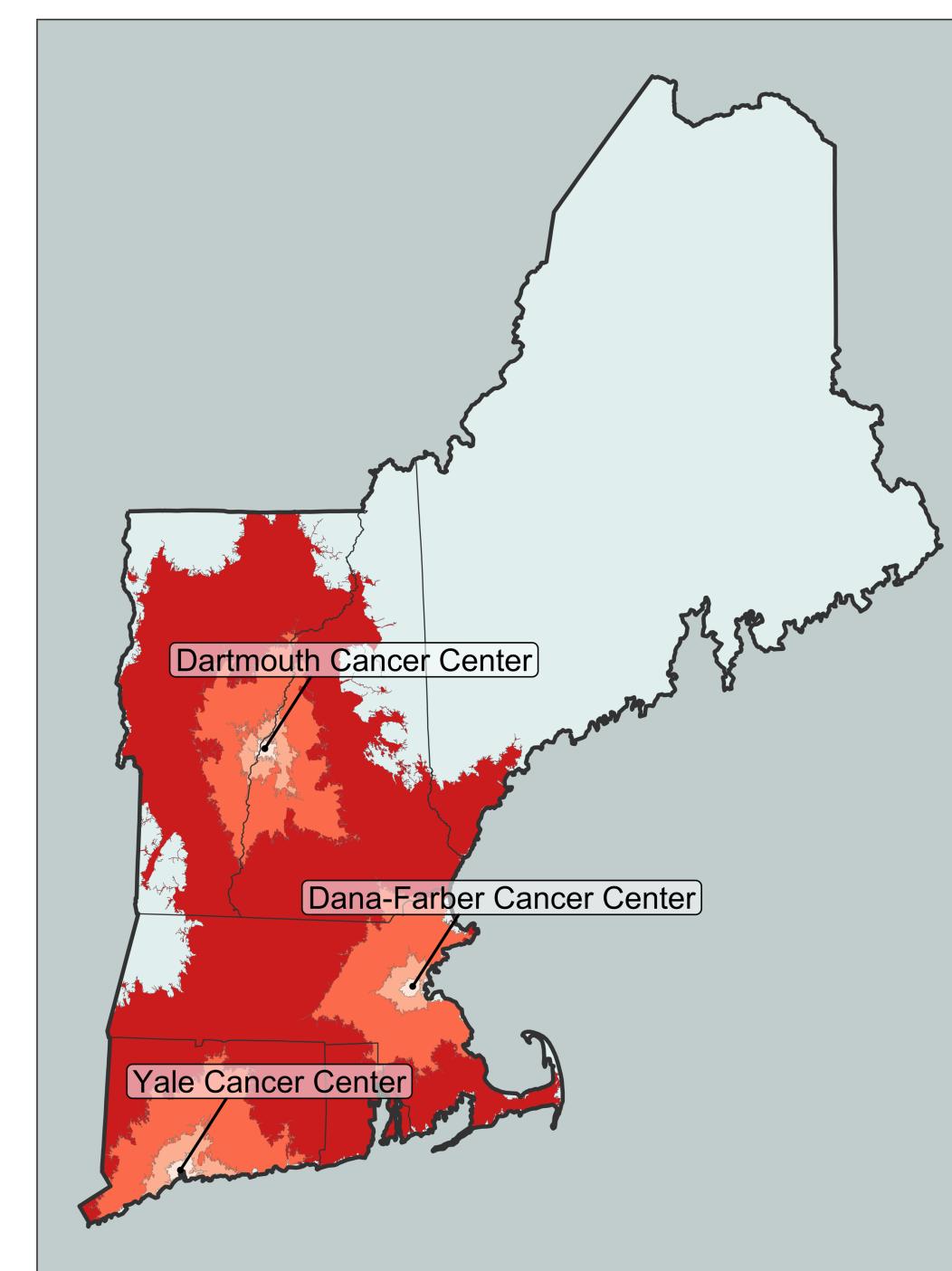
- Can we identify US sub-populations with longer driving times to the nearest NCI-designated clinic

## Methods

- NCI-designated clinics addresses were geocoded using ArcGIS to obtain coordinates
- Travel-time catchment areas around NCI-designated clinics were calculated using ArcGIS
- 2020 decennial census data was apportioned into catchment areas using the tidycensus R package

## Results

- Most patients in CT, MA, NH, RI, and VT can access an NCI-designated clinic in under <2 hours
- Over 80% of Maine residents require >2 hours to reach an NCI-designated clinic



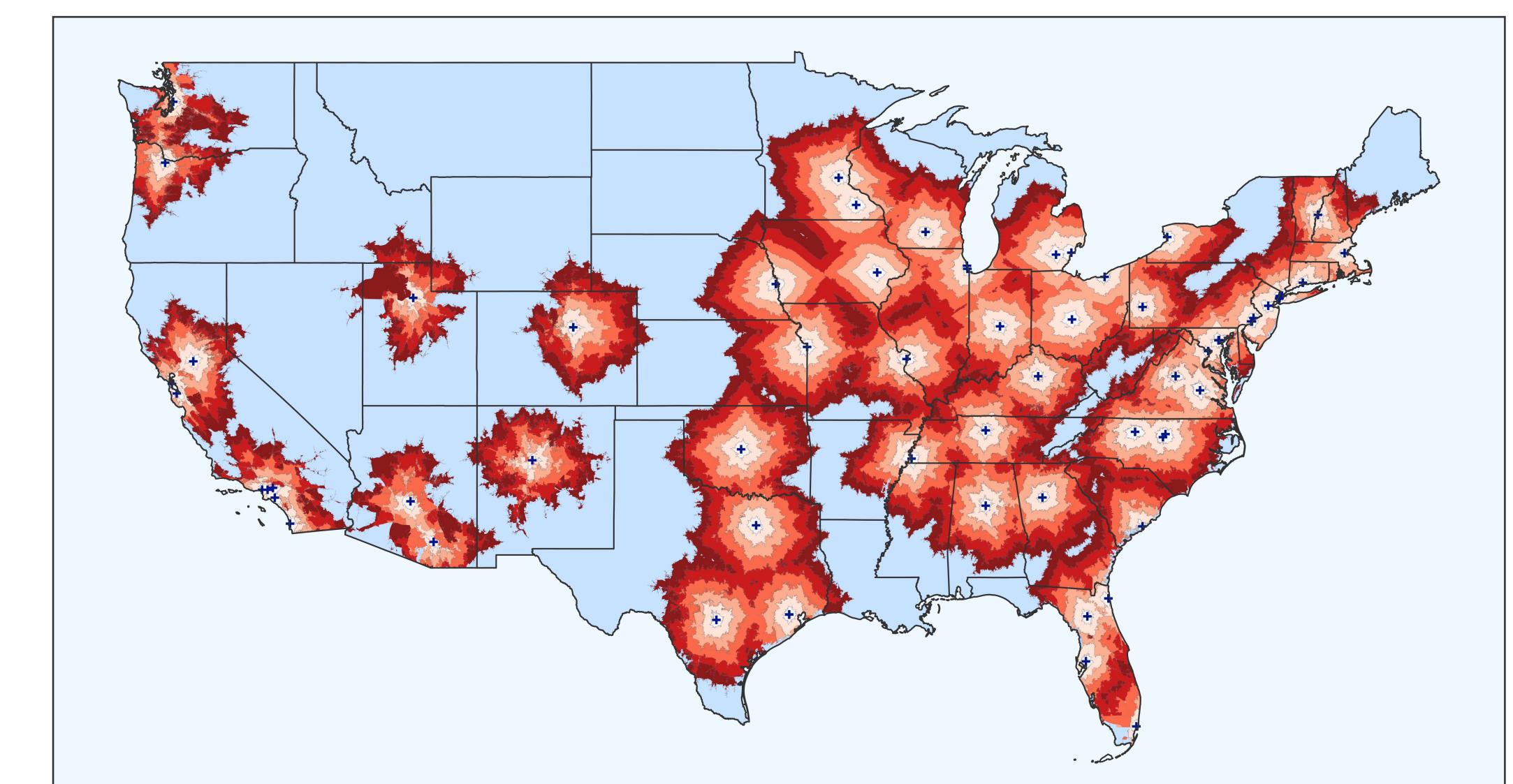
Driving Time (min): ■ 60-120 ■ 30-60 ■ 15-30 ■ 0-15  
Figure 2: New England NCI-designated Clinic Catchment Areas  
The locations of NCI-designated clinics are marked with black points and floating labels.

**Table 1:** NE States' NCI-designated clinic catchment Area Population Counts and Percentages

State	Typical travel time to closest NCI-CC, n (%)				
	< 15 min	15-30 min	31-60 min	61-120 min	> 120 min
CT	271k (8%)	559k (15%)	2.04M (57%)	722k (20%)	9178 (<1%)
ME	0 (0%)	0 (0%)	0 (0%)	247k (18%)	1.11M (82%)
MA	593k (9%)	1.31M (19%)	2.87M (41%)	2.09M (30%)	137k (2%)
NH	21k (2%)	19k (1%)	182k (13%)	1.09M (79%)	62k (5%)
RI	0 (0%)	0 (0%)	111k (10%)	982k (90%)	2802 (<1%)
VT	6466 (1%)	16k (2%)	69k (11%)	472k (73%)	80k (12%)

## Results Cont.

- Many western, midwestern, and southern patients are isolated from NCI-designated clinics



Driving Time (min): ■ 150-180 ■ 90-120 ■ 30-60  
■ 120-150 ■ 60-90 ■ 0-30

**Figure 3.** Driving-time catchment areas around patient-serving NCI-designated clinics. Clinic locations are indicated by small dark blue crosses.

- Native and Rural Americans have longer drive times to the nearest NCI-designated clinic

**Table 1:** Percent of demographic sub-populations that resides in each catchment area threshold

Field	0 - 30	30 - 60	60 - 90	90 - 120	120 - 150	150 - 180	>180
Total	27.5	25.1	14.9	11	7.5	4.6	9.4
White	21.5	24.5	17	12.6	8.7	5.4	10.3
African American	36.3	24.8	11.7	9.9	6.5	3.3	7.5
Native American	24.4	18	11.5	10.1	8.9	7.8	19.3
Asian	48.9	30.9	7.5	4.9	2.5	1.8	3.5
Pacific Islander	33.1	27	12.9	6.7	4.9	2.8	12.6
Some other race	38.4	26.1	12.4	7.2	4.6	3.5	7.8
Two or more races	32	26	13.3	9.1	6	3.7	9.9
Hispanic or latino	36.3	25.6	12.3	7.6	5.1	3.5	9.6
Urban	33.8	27.3	13.4	9	5.8	3.4	7.3
Rural	2.3	16.4	21.2	18.8	14.3	9.5	17.5

Note: The percentages in this table correspond to the fraction of a demographic sub-population in a specific catchment area, not the percent of a sub-population relative to the whole US population

## Conclusion

- There are large disparities between US sub-populations in the drive-time accessibility of NCI-designated clinics