

## Background

Black lung disease, also known as coal workers' pneumoconiosis (CWP), is a debilitating occupational lung disease caused by overexposure to coal mine dust. Although individuals diagnosed with CWP are able to seek care, education and counseling at Black Lung Clinics established through funding from the Health Resources and Services Administration, the rate of service utilization is unknown.

## Purpose

- To examine the geographical distribution of health care utilization patterns among Medicare beneficiaries with CWP and other related pneumoconiosis.
- To conduct spatial analysis of health care utilization among Medicare beneficiaries with CWP and other related pneumoconiosis.

## Methods

We used Medicare beneficiaries Limited Dataset from 2011-2014. Patients with a diagnosis of ICD-9-CM 500.xx-505.xx (any CWP) (Table 1) were included in this study. Patients were initially selected from the inpatient and/or carrier files using the study period of January 1, 2011 through December 31, 2014. The date of first diagnosis of CWP served as the patient's index date. If the patient did not have a diagnosis of CWP then the date of first diagnosis of 501, 502, 503, 504, or 505 served as the index date. Patients were followed from the first observable diagnosis of CWP to death or censorship.

Multivariable logistic regression analysis was conducted to determine the association between CWP and mortality adjusted for age, sex, and race.

**Table 1. ICD-9-CM codes**

ICD-9-CM Code	Description
500	Coal workers' pneumoconiosis
501	Asbestosis
502	Pneumoconiosis due to other silica or silicates
503	Pneumoconiosis due to other inorganic dust
504	Pneumonopathy due to inhalation of other dust
505	Pneumoconiosis, unspecified

## Methods (continued..)

### Health Care Utilization

The total counts for the utilization for patients with ICD-500 or those with ICD-501 – 505 were calculated by summing office visits (a), emergency room visits (b), and hospitalizations (c) at the county-level. The resulting total was divided by total number of Medicare beneficiaries in the county.

$$U = \frac{\sum(a + b + c)}{N} * 100,000$$

### Mapping

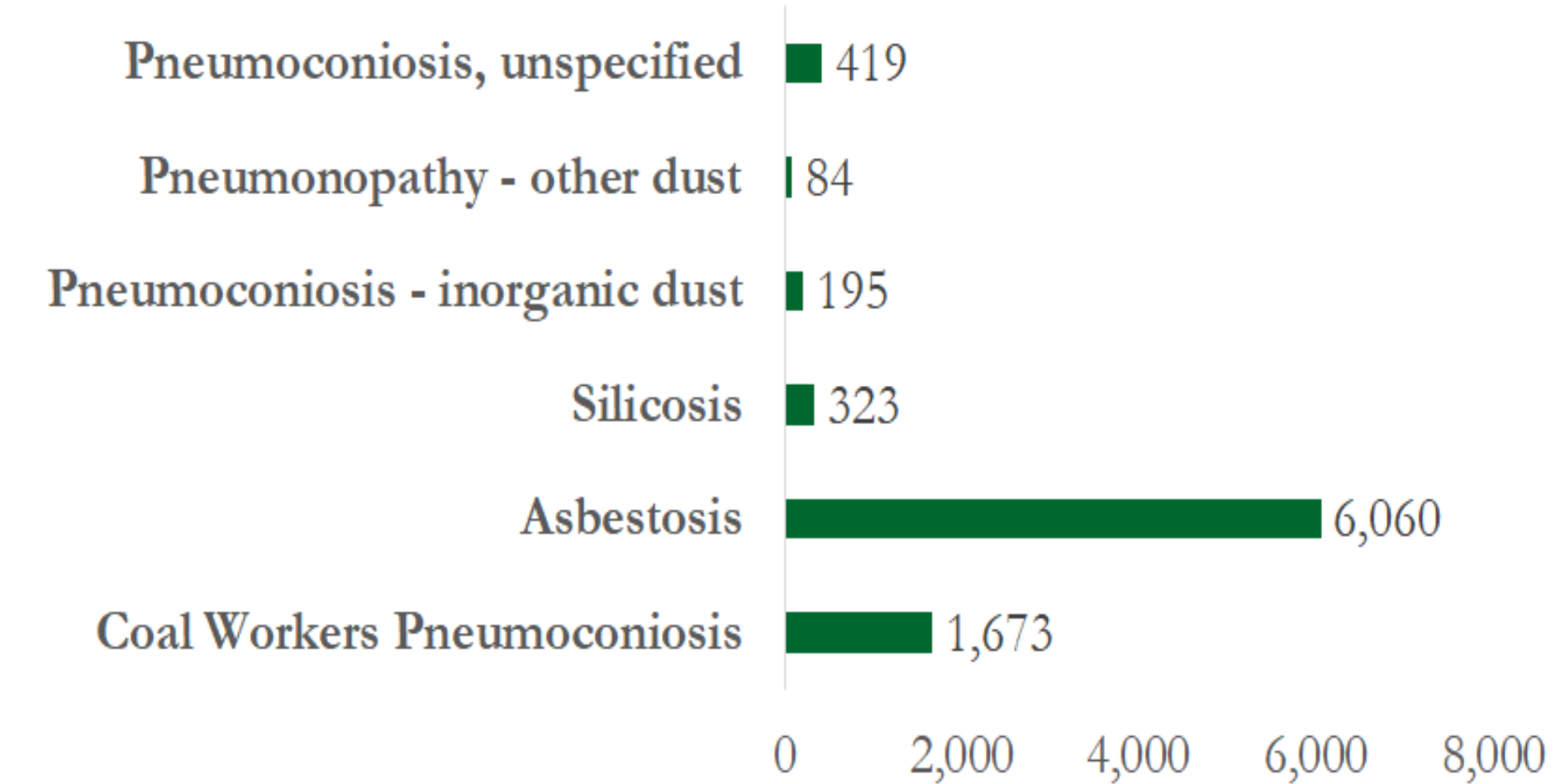
County-level counts and four years rates of utilization for Medicare beneficiaries with CWP and other-related pneumoconiosis were mapped using ArcGIS 10.6.

Cluster-outlier analysis to determine counties with significantly high clustering of health care utilization for CWP and other-related pneumoconiosis.

## Results

There were a total of 1673 Medicare beneficiaries with CWP 7081 were diagnosed with other-related pneumoconiosis (Figure 1). The majority of Medicare beneficiaries were white, male, and over 65 years old.

**Figure 1. Distribution of Medicare beneficiaries with CWP and other-related pneumoconiosis**

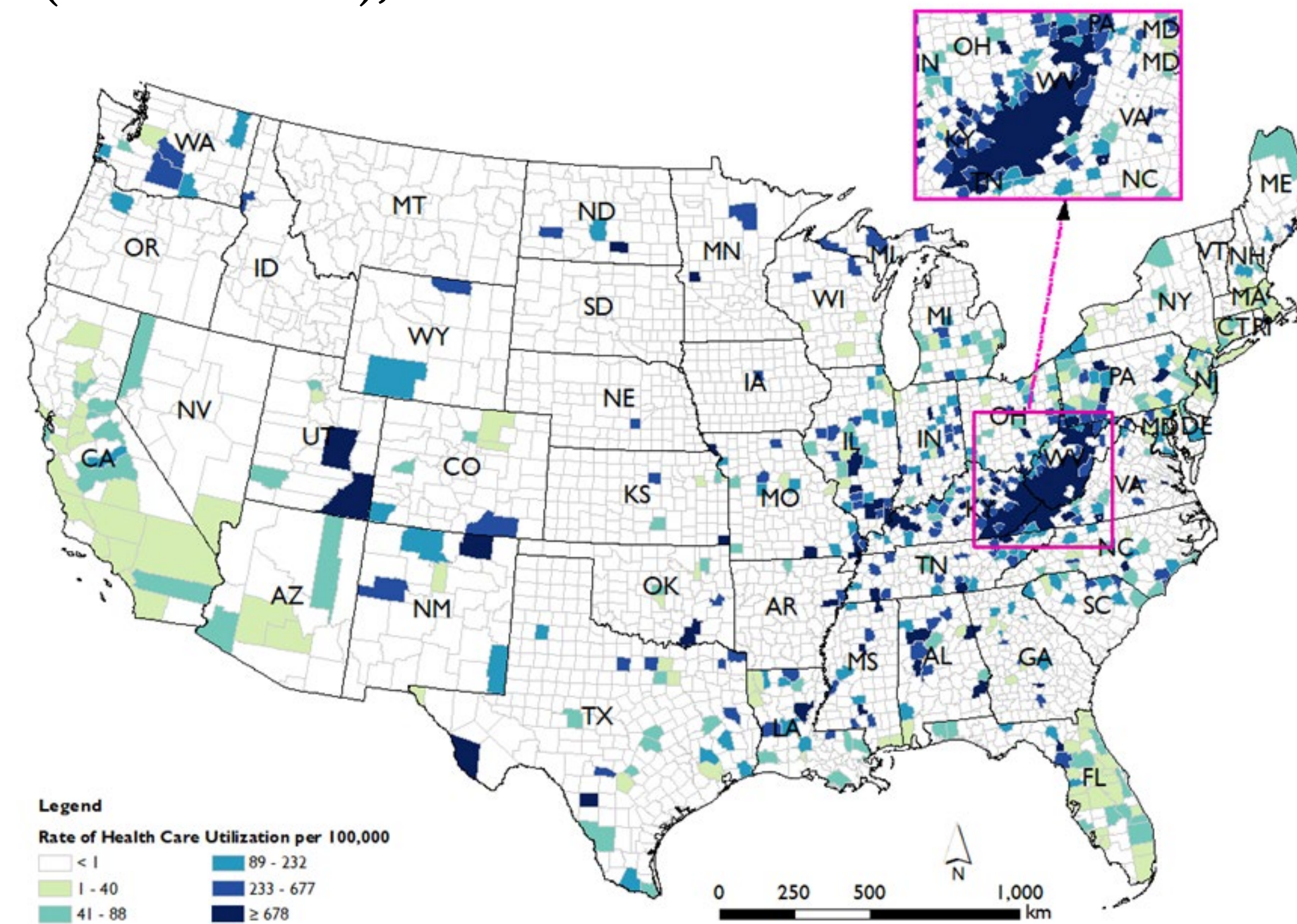


**Table 2. Total Health Care Utilization**

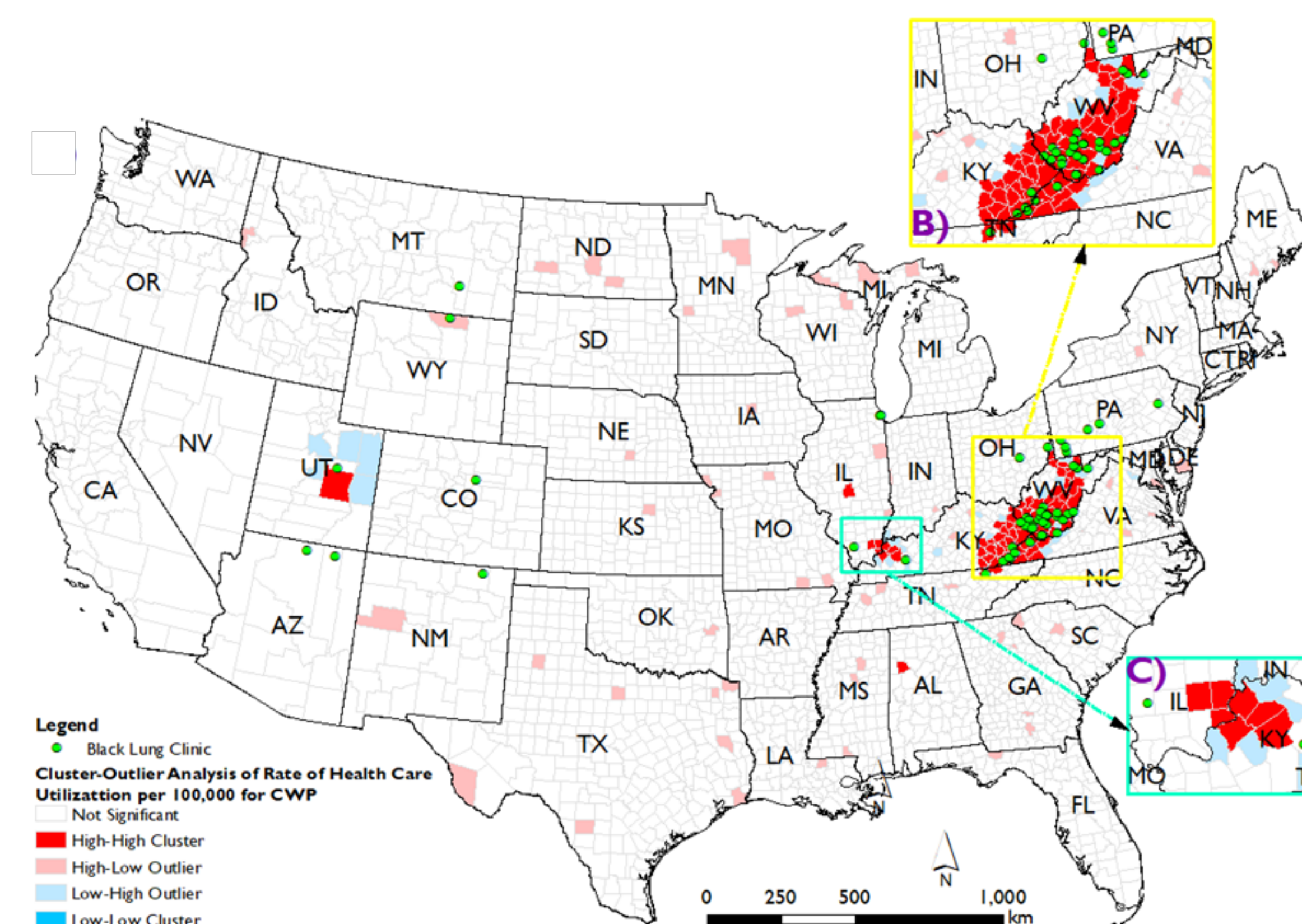
	All Patients	Patients with ICD-9-CM: 500	Patients with ICD-9-CM: 501-505
<b>Total Office Visits</b>	113,525	20,749	92,776
<b>Total Hospitalizations</b>	18,566	3,585	14,981
<b>Total ER visits</b>	58,312	11,781	46,531

## Results (continued..)

**Figure 2. Rates of Health Care Utilization for CWP (ICD-9 CM 500), 2011-2014**



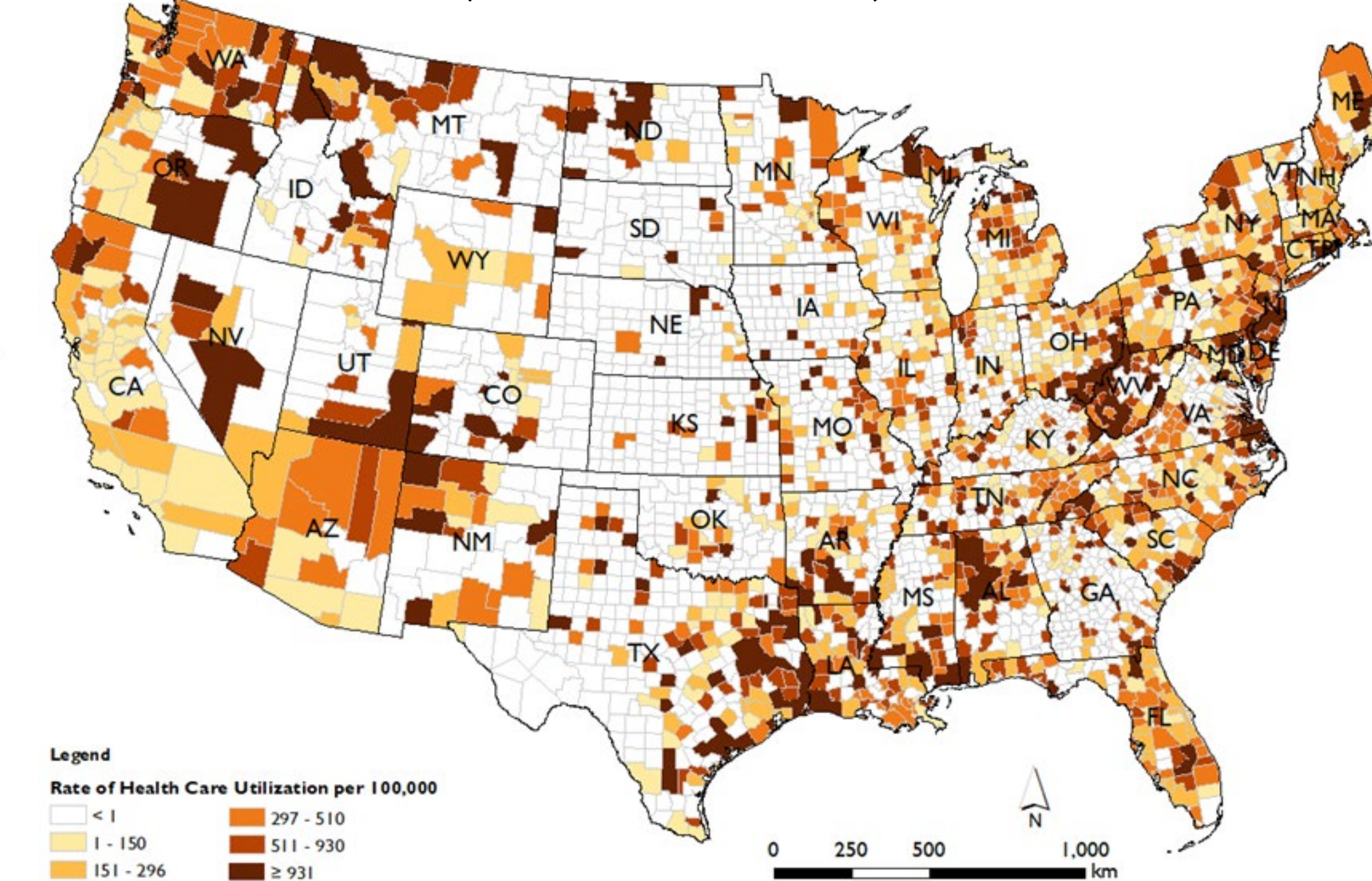
**Figure 3. Cluster-outlier analysis of Health Care Utilization for CWP (ICD-9 CM 500), 2011-2014**



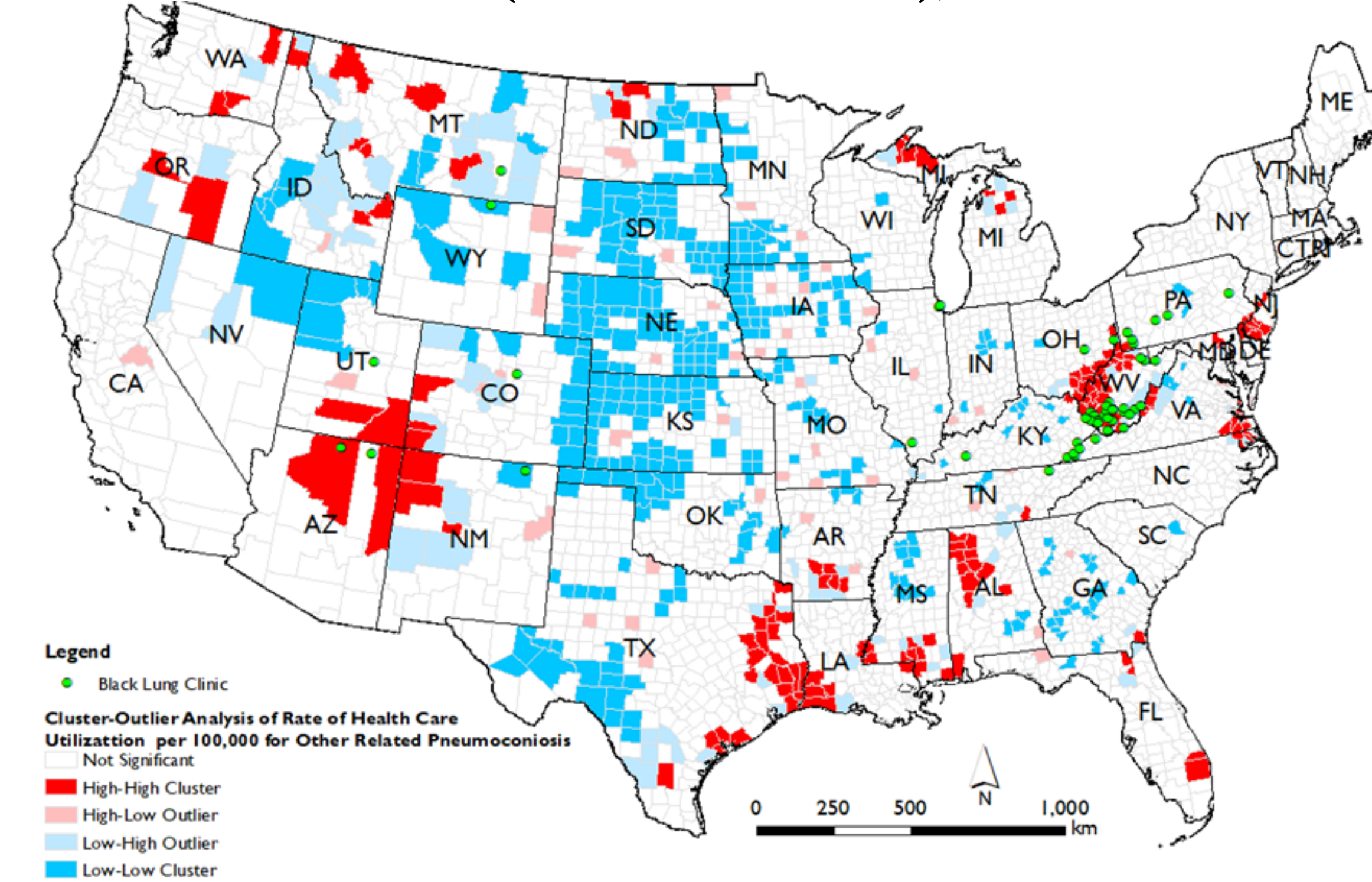
**Table 3. Association between CWP and mortality among Medicare beneficiaries, 2011-2014**

Outcome: Mortality	Coal Workers' Pneumoconiosis
	Odds Ratio (95% CI)
Model 1: Adjusted for age	1.20 (1.06-1.36)
Model 2: Adjusted for age, sex, and race	1.24 (1.09-1.41)

**Figure 4. Rates of Health Care Utilization for Pneumoconiosis (ICD-9 CM 501-505), 2011-2014**



**Figure 5. Cluster-outlier analysis of Health Care Utilization for Pneumoconiosis (ICD-9 CM 501-505), 2011-2014**



## Conclusion

- In counties with no proximity to black lung clinics and high rates of utilization, beneficiaries may experience geographical barriers to access and care.
- Medicare beneficiaries with CWP had a higher risk of death as compared to beneficiaries with other related pneumoconiosis.

## Funding

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