

Research Article

Assessment and Visualization of the Physician Role in the Opioid Crisis in New Hampshire Utilizing Geographic Information Systems

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Abstract

This project utilizes GIS to map data pertaining to the physician role in combating this epidemic. There is a positive correlation between the number of opioid prescribers per county and the number of opioid prescriptions in that county and the number of opioid prescriptions and opioid deaths per county; most evident in Stafford and Grafton counties. We concluded that the physician plays a role in the opioid epidemic, but if we continue research, education, and improve resource allocation, this can help remediate the opioid crisis in New Hampshire.

Keywords: GIS; New Hampshire; Opioid

Introduction

The increasing prevalence of opioid use is a complex, ongoing problem in the United States [1]. During the last eighteen years, the rate of Drug-Overdose (OD) deaths in America has more than tripled. Rates of drug-overdose mortality involving all opioids have increased more than 4-fold, while those for non-methadone synthetic opioids increased 30-fold, and those involving heroin increased 7-fold [2]. Because the number of opioid related deaths has been so dramatic for the past two decades, the United States have declared the opioid crisis a public health emergency [3]. New Hampshire was ranked third in the nation for opioid-related deaths in the year 2020 [1]. The

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opioid crisis has posed a substantial burden on the public health of the state of New Hampshire [1]. Tools such as Geographic Information Systems (GIS) mapping can be utilized to track and visualize certain factors involved in remediating the opioid crisis. This project utilizes GIS to map data pertaining to the physician role in combating this epidemic.

Methods

The data in this study was collected from publicly available data sets. Data was analyzed and organized by county and normalized by population per 10,000 people utilizing ArcGIS Software. Data sets include maps of poverty rate, overdose deaths per 10,000 people, MAT for OUD per county, number of spoke providers, naloxone distribution sites per county, number of ED visits related to opioids per 10,000 people, number of opioid prescribers per 10,000 people.

Results

Coos county had the highest poverty rate at 12.5% (Figure 1). Rockingham County demonstrated the lowest poverty rate at 4.64% (Figure 1). Rockingham County experienced 1.16 overdose deaths per 10,000 people (Figure 2). Coos County experienced 1.8 overdose deaths per 10,000 people (Figure 2). Sullivan County demonstrated the lowest number of overdose deaths per 10,000 people at 0.68 per 10,000 people (Figure 2). Stafford County had the highest OD deaths with 2.41 overdose deaths per 10,000 people (Figure 2). Hillsborough County demonstrated the county with the most resources for Opioid Use Disorder (OUD) management with the highest number of MAT for OUD per 10,000 at 4 (Figure 3) and the highest number of spoke providers per 10,000 people at 121 (Figure 4). Hillsborough had the most Naloxone distribution sites at 49 per county, Rockingham had 43, and counties Carroll and Coos tied for the lowest at 1 each per county (Figure 5). Stafford County had 74.56 ED visits per 10,000 people related to opioids (Figure 6). Stafford County has the second most opioid prescribers in NH at 3.56 per 10,000 people (Figure 7). Correlation analysis showed significant relation between the number of opioid providers and the number of opioid prescriptions with a 0.780 Pearson Correlation. Additionally, significant correlation was shown between the number of opioid prescriptions and the number of opioid deaths with a 0.780 Pearson Correlation. No significant relationship was found between the number of OD deaths in NH and Medications for Opioid Use Disorder (MOUD).

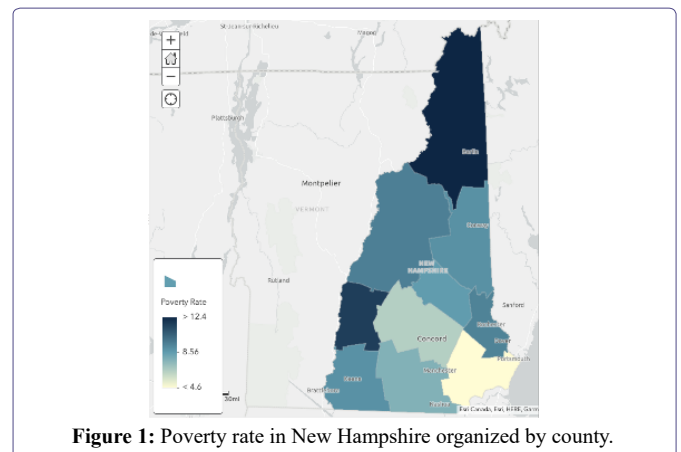


Figure 1: Poverty rate in New Hampshire organized by county.

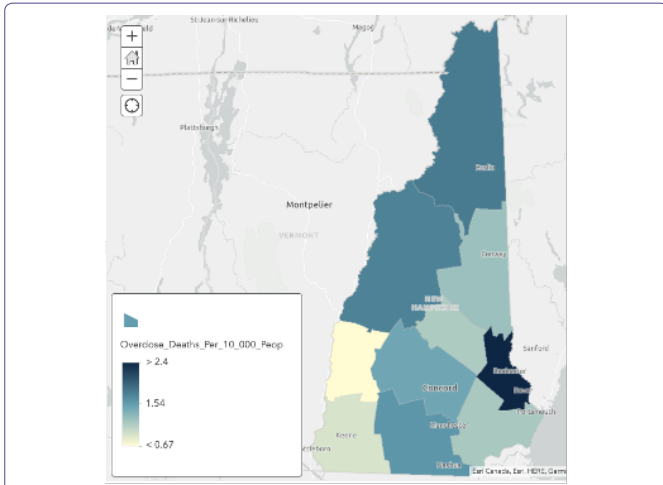


Figure 2: Overdose deaths in New Hampshire per 10,000 people organized by county.

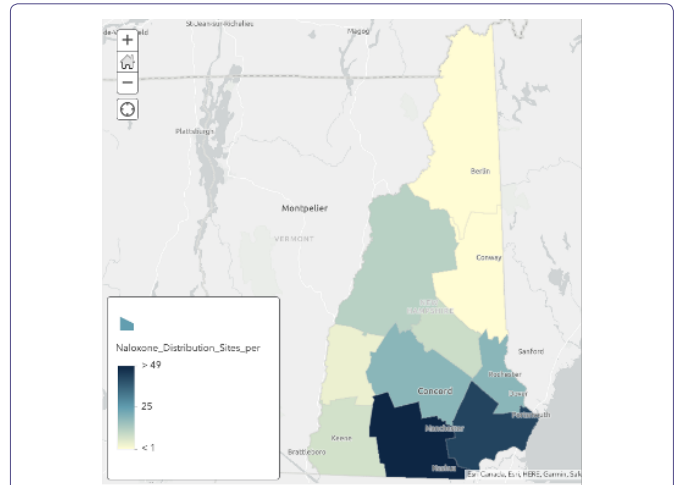


Figure 5: Naloxone distribution sites in each county in New Hampshire organized by county.

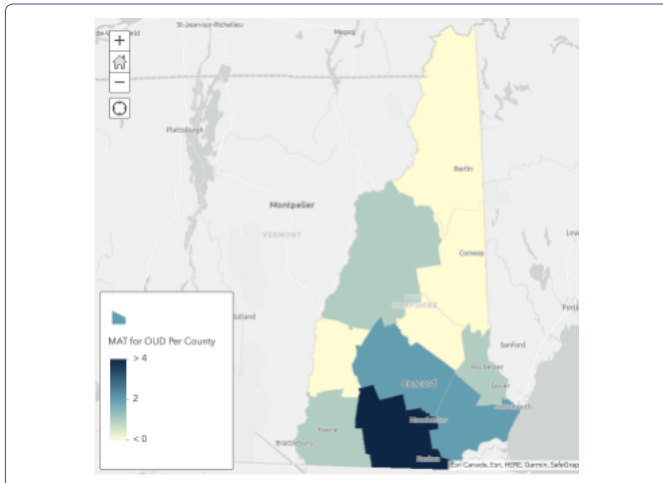


Figure 3: MAT for OUD per county in New Hampshire organized by county.



Figure 6: Number of ED visits related to opioid use in New Hampshire organized by county.

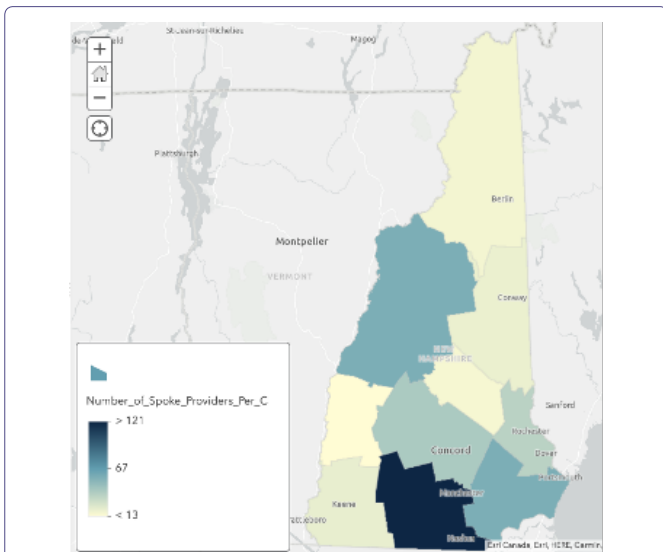
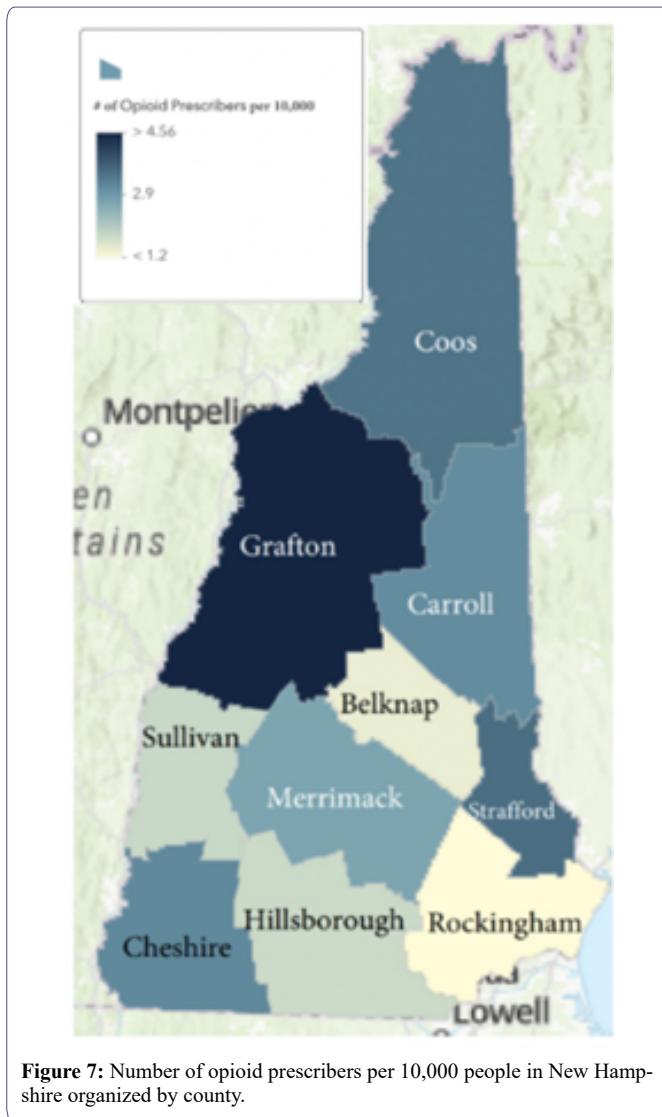


Figure 4: Number of spoke providers in each county in New Hampshire organized by county.



Figure 6: Number of ED visits related to opioid use in New Hampshire organized by county.



Conclusion

There is a positive correlation between the number of opioid prescribers per county and the number of opioid prescriptions in that county. A positive correlation exists between the number of opioid prescriptions and opioid deaths per county. This relationship is most evident in Stafford and Grafton counties. This correlation indicates that the physician plays a role in the opioid epidemic, though the causative impact is not certain. There is an inverse relationship between MOUD and OD. Thus, we conclude that providing additional training in the use of MOUD for all opioid-prescribing physicians could decrease opioid-related overdose deaths in New Hampshire. Of note, the only Chronic pain/Addiction Medicine fellowship is located in Grafton county and produces merely two trained physicians annually. Increasing the number of physicians trained in this specialty would likely help facilitate a reduction in OD. Of note, Grafton County represented the only county in New Hampshire with a Chronic Pain/Addiction Medicine Fellowship program for physician training, holding only 2 spots each year. Further studies are needed to investigate other factors, such as rates of non-prescription opioid use in patients with a history of opioid prescription, contributing to the opioid epidemic in the Granite State.

Sources of Support

Not Applicable.

Conflict of Interest Declaration

None.

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