INTRODUCTION

- Estimating available physician resources has been a common practice and a topic of interest for health services and policy researchers, health system administrators, and commercial entities.
- This information is useful for intervention planning, resource allocation, and disparities research.
- Physician density is traditionally calculated as the number of physicians divided by the target population.
- However, the traditional calculation can give an unrealistic picture of the supply of available physicians, as it weights all physicians the same, regardless of the volume of services.

METHODS

SAS Version 9.4 and R were utilized for data management and analyses. ArcGIS was used to extract and geocode. We produced descriptive statistics for the utilization of colonoscopy over the study period by state and county. Cancer Profiles of adults aged 50 years and older. Additionally, we compared the traditional and volume-based density measures for those physicians performing colonoscopy to CMS beneficiaries in a state.

RESULTS

- In 2014, there were >2 million colonoscopies provided to the Medicare population by 16,886 physicians.
- These physicians were present in 1,717 US counties (85% of all US counties), including the District of Columbia.
- The average number of colonoscopies performed per physician was 159 (SD=142).
- At the state-level, Nevada had the lowest difference in the two density measures (1.08), and Wyoming had the largest difference (10.59).

Table 1. County-level summary statistics of the traditional and volume-weighted physician density per 100,000 population of adults age 50 years and older.

<table>
<thead>
<tr>
<th></th>
<th>Traditional Density</th>
<th>Weighted Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attributable</td>
<td>Median Mean</td>
<td>Q1</td>
</tr>
<tr>
<td>Traditional</td>
<td>0.81</td>
<td>0.69</td>
</tr>
<tr>
<td>Density</td>
<td>16.0 (3.8)</td>
<td>17.82</td>
</tr>
<tr>
<td>Volume-Weighted</td>
<td>0.16</td>
<td>3.20</td>
</tr>
<tr>
<td>Density</td>
<td>12.8 (2.6)</td>
<td>72.77</td>
</tr>
</tbody>
</table>

Figure 1. Standardized differences between the traditional and volume-weighted density for US counties for population of adults 50 years and older.

CONCLUSION

- Incorporating physicians procedure volume resulted in improved associations between provider density and colorectal cancer screening rates.
- The associations between county provider density and colorectal cancer incidence and mortality were very low but in the expected negative direction, unlike the state-level correlations.
- Although this study focused on colonoscopy providers and colorectal cancer, the density calculation formula developed here may be useful for quantifying density of providers for other service types.

Future Directions

This study utilized county boundaries, which do not truly separate populations receiving services. This method can be improved by incorporating spatial accessibility measures, like catchment areas, to capture the spillover of populations.

About SC Rural Health Research

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