

Introduction

- Although it is well known that socioeconomic factors (eg, income, rural/urban practice settings) affect health outcomes, many health service research studies do not adjust for potential socioeconomic confounders, likely because socioeconomic status (SES) indicators are generally not recorded in claims databases.
- A majority of US dialysis patients are covered by the federal Medicare program. Despite this homogenous insurance coverage, significant economic and geographic diversity exists among end-stage renal disease (ESRD) patients.
- Such diversity in the ESRD patient population has been shown to influence outcomes.
- For dialysis and renal transplant patients, SES indicators such as rural/urban geography and poverty have demonstrated negative impact on health outcomes.¹⁻³
- There is a paucity of epidemiological data examining SES factors for the US dialysis population.

Objectives

- We used geomapping techniques to ascertain the distribution of SES factors among US dialysis provider types, using provider demographic data merged with other data sources.

Methods

- Dialysis Provider Classification.** Provider data (ie, Medicare Provider Identification, zip code location, chain affiliation, and for-profit/non-profit flags) were obtained from the Dialysis Facility Compare file obtained from the Centers for Medicare and Medicaid Services. Chain-level aggregation was used to classify facilities into provider types.^{4,5}
 - Large dialysis organization (LDO): > 1,000 facilities
 - Medium dialysis organization (MDO): 10–1,000 facilities
 - Small dialysis organization (SDO): < 10 facilities
 - Hospitals/university/government dialysis organization (HUG): 1 facility
 - For-profit (FP) dialysis organization
 - Non-profit (NP) dialysis organization
- Poverty Classification.** Poverty was classified by zip code using county poverty data from 2012 US Census Bureau data.
 - Average poverty: ± 0.67 standard deviations (SD; approximately 50% of the data)
 - High/low poverty: ± 1.15 SDs (approximately 75% of the data)
 - Very high/low poverty: ± 2 SDs (approximately 95% of data)
 - Extreme poverty: > 2 SDs

Methods

- Geography Classification.** Rural versus Urban geography was designated using Office of Management and Budget definitions as follows:
 - Metropolitan: ≥ 1 urbanized area and population ≥ 50,000
 - Micropolitan: ≥ 1 urbanized area and population 10,000-50,000
 - Rural: population < 10,000
 - Metropolitan and Micropolitan groups were combined to create the Urban group
- Geomapping and Statistical Comparisons.** To determine geomapping parameters, we used the 2010 County Adjacency File (US Census Bureau). Local Indication of Spatial Autocorrelation analysis was conducted using SQL and spreadsheet processing to determine concentrated versus outlier poverty counties. To determine statistical differences between provider types, the Local Indicator of Spatial Association was calculated for poverty in each county. By county, the index of special autocorrelation was calculated based on neighboring counties with which it shares a border.

Results

Table 1. Distribution of Dialysis Provider Type by Poverty and Geography

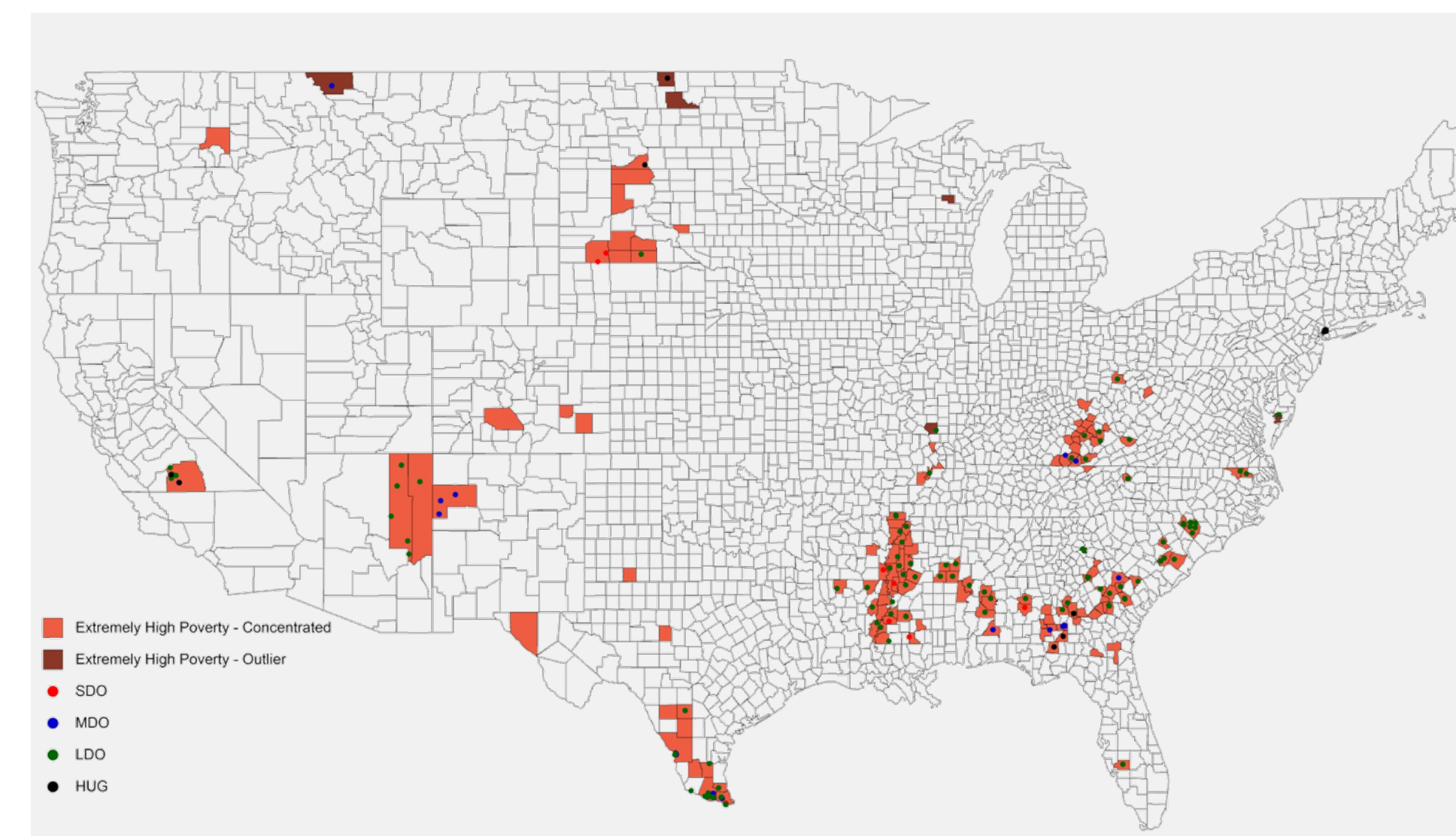
	Poverty			Average/Low Poverty			Total
	Metro ^a	Micro ^b	Rural ^c	Metro ^a	Micro ^b	Rural ^c	
Distribution by Size							
LDO, n (%)	566 (69)	235 (75)	158 (75)	3,007 (69)	338 (66)	157 (58)	4,461 (69)
MDO, n (%)	91 (11)	39 (13)	19 (9)	533 (12)	50 (10)	24 (9)	756 (12)
SDO, n (%)	80 (10)	22 (7)	25 (12)	439 (10)	45 (9)	26 (10)	637 (10)
HUG, n (%)	80 (10)	16 (5)	10 (5)	403 (9)	80 (16)	63 (23)	652 (10)
Total, n	817	312	212	4,382	513	270	6,506
Distribution by Tax Status							
FP, n (%)	690 (84)	264 (85)	190 (90)	3,645 (83)	388 (76)	186 (69)	5,363 (82)
NP, n (%)	104 (13)	42 (13)	20 (9)	602 (14)	113 (22)	78 (29)	959 (15)
Unknown, n (%)	23 (3)	6 (2)	2 (0.9)	135 (3)	12 (2)	6 (2)	184 (3)
Total, n	817	312	212	4,382	513	270	6,506

Abbreviations: FP, for-profit organization; HUG, hospital/university/government dialysis organization; LDO, large dialysis organization; NP, non-profit dialysis organization; MDO, medium dialysis organization; n, count; SDO, small dialysis organization.

^a Metropolitan: ≥ 1 urbanized area and population ≥ 50,000.
^b Micropolitan: ≥ 1 urbanized area and population 10,000-50,000.
^c Rural: population < 10,000

Results

Figure 1. Distribution of Dialysis Provider Type by Poverty



Abbreviations: HUG, hospital/university/government dialysis organization; LDO, large dialysis organization; MDO, medium dialysis organization; SDO, small dialysis organization.

Table 2. Distribution of Dialysis Provider Type by Extreme Poverty

	Extreme Poverty	Other Poverty	Total N
Distribution by Size			
LDO, n (%)	131 (67)	4,330 (69)	4,461 (69)
MDO, n (%)	30 (15)	726 (12)	756 (12)
SDO, n (%)	22 (11)	615 (10)	637 (10)
HUG, n (%)	14 (7)	638 (10)	652 (10)
Total, n	197	6,309	6,506
Distribution by Tax Status			
FP, n (%)	171 (87)	5,192 (82)	5,363 (82)
NP, n (%)	23 (12)	936 (15)	959 (15)
Unknown, n (%)	3 (2)	181 (3)	184 (3)
Total, n	197	6,309	6,506

Abbreviations: FP, for-profit organization; HUG, hospital/university/government dialysis organization; LDO, large dialysis organization; NP, non-profit dialysis organization; MDO, medium dialysis organization; n, count; SDO, small dialysis organization.

- A total of 6,506 US dialysis clinics were characterized by this study.
- A majority of US dialysis clinics were owned by LDOs (4,461 [69%]) and FP providers (5,363 [82%]).
- LDOs (315 [65%]) disproportionately served rural areas as did FP providers (376 [78%]).
- In areas of poverty, LDOs owned a majority of clinics (Metropolitan, 69%; Micropolitan, 75%; Rural, 75%).
 - In areas of extreme poverty, LDOs owned 67% of the clinics.
- In areas of poverty, FP providers owned a majority of clinics (Metropolitan, 84%; Micropolitan, 85%; Rural, 90%).
 - In areas of extreme poverty, FP providers owned 87% of the clinics.

Conclusions

- Our analysis suggested that large, FP dialysis providers operate a disproportionate number of clinics in areas with low SES.
- Patient outcome comparisons between US dialysis providers types should be made using adjustments for SES indicators as likely confounders.

References

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