

Development of a Health Care Resource Index

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At the Heart of Public Health Policy

Rural Access to Care

- Provider shortages / maldistribution
 - ◆ PCPs
 - ◆ Specialists
- Hospital availability, closures
- Services may be limited (obstetrics)
- Travel for care
- Poorer outcomes



So why an index?

- RWJF County Health Rankings
 - ◆ County based
 - ◆ Mix of outcomes, resources, process measures, SES measures
- America's Health Rankings
 - ◆ Also county based
 - ◆ Mix of outcomes, policy, utilization, resources, and environment



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So Why an Index?

- Looking for a single measure of health care resources in an area
- E.g. lack of a hospital doesn't tell the full story
- Comprehensive, across the care continuum



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Developing the HCRI

- Health Care Resource Index (HCRI)
- Area Health Resource File, 2016-2017 version
 - ◆ Most available data from 2014
- County based
- Began by examining all the resource measures
 - ◆ Providers
 - ◆ Facilities
 - ◆ Other organizations



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Narrowing it down

- Operationalized in several forms:
 - ◆ Per 1,000 residents
 - ◆ Raw count (1,2,3, etc)
 - ◆ Yes / No (is there at least one)
- Correlation Matrix
 - ◆ Eliminated those with a $Rho > .80$
 - ◆ Some were close, but kept (e.g. RNs associated with specialists, hospital beds)



Final List

- Primary care providers [per 1,000]
- Total specialists (Allergy/Immunology, Cardiology, Dermatology, Gastroenterology, Pulmonology, Neurology, Orthopedics, Otolaryngology, Colorectal, Thoracic, Urology, Podiatry, Radiology) [per 1,000]
- Obstetrics /gynecology providers [per 1,000]
- Pharmacists [per 1,000]
- Dentists [Number per 1,000]
- Physician extenders (PA, NP, APRN) [per 1,000 residents]
- Registered nurses [per 1,000]
- Hospital beds [Number per 1,000 residents]
- Total community-based acute inpatient facilities (including VA facilities) [Yes/No]
- Facilities with an obstetrics unit [Yes/No]
- Home health and hospice facilities [Number]
- Community mental health facilities [Yes/No]
- Number of long term care beds [Number per 1,000 residents]
- Community clinics (rural health clinics, FQHCS) [Number]



Factor Analysis

	Factor1 Workforce	Factor 2 General Care Facilities	Factor 3 Specialized Care Facilities
Specialists	.86	-.10	.17
Reg. Nurses	.82	.42	.50
Phys. Extenders	.78	.19	.60
OB/GYN	.76	-.15	.22
Primary Care Providers	.73	.40	.14
Pharmacists	.69	.23	.30
Dentists	.62	-.09	.24
VA Hospitals	.22	-.10	.83
Clinics	.10	-.50	.77
Comm. Mental Health Facilities	.10	-.30	.53
Hospital Beds / 1,000	.32	.79	.1
Long Term Beds / 1,000	.01	.56	.01
Home Health/Hospice Facilities	-.30	.26	-.50



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HCRI Computation

- Standardized, zero-centered mean
- Number of general acute care hospital facilities, facilities with an obstetrics unit, and community mental health facilities
 - ◆ 1/-1
- HCRI = sum of above
- Subset into quartiles



Covariates

Anderson's Model

◆ Predisposing factors

- ☞ % non-white
- ☞ % male
- ☞ % military veteran

◆ Enabling factors

- ☞ % without a high school diploma
- ☞ % with a college degree
- ☞ % uninsured (< 65 years old and those <19 years old)
- ☞ % unemployed
- ☞ % in poverty

◆ Need factor -- % aged 65 years or older.

◆ Environmental

- ☞ Rurality -- Urban Influence Codes (UICs)
- ☞ metropolitan (UICs 1, 2), micropolitan (UICs 3, 5, 8), small adjacent (UICs 4, 6, 7) and remote rural (UICs 9, 10, 11, 12).
- ☞ Region -- Northeast, Midwest, South, and West



Outcomes

- Number of ED visits per 1,000 Medicare beneficiaries
- 3-year overall age-adjusted mortality
- Risk-adjusted standardized per-capita Medicare expenditures.



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HCRI Overview

- 3137 counties included in the analysis
- HCRI values ranged from -9.30 to 116.89
- Median: -1.51
- Mean: 0.0004
- SD: 7.42
- IQ Range: 7.47.

	Mean	Median
Urban	2.22	0.18
All Rural [†]	-1.32	-2.09
Micropolitan [†]	0.20	-0.36
Small Adjacent [†]	-3.08	-3.59
Remote [†]	-1.04	-1.90

[†] Significantly different from Urban, $p < 0.05$



Associations, mean by HCRI quartile

	% Non-White	% Male	% 65+	% Vets.	% W/o a HS Diploma	% W/ College Degree	% Uninsured	% <19 Uninsured	% Unemployed	% in Poverty
All	8.0	49.6	17.3	8.2	13.6	17.9	14.0	6.5	6.0	15.8
0-25 th	6.5	50.0	18.0	8.4	17.3	14.3	15.9	7.8	6.2	16.6
25 th -										
50 th	6.3	49.7 [†]	17.6 [†]	8.2	15.0 [†]	15.8 [†]	14.3 [†]	6.6 [†]	6.2	16.6
50 th -										
75 th	7.2	49.6 [†]	17.6 [†]	8.3	12.4 [†]	18.8 [†]	13.0 [†]	6.1 [†]	6.1	15.4 [†]
75 th -										
100 th	12.7 [†]	49.2 [†]	15.7 [†]	7.8 [†]	11.4 [†]	24.4 [†]	12.9 [†]	5.7 [†]	5.8 [†]	15.2 [†]

† Significantly different from the 25th Percentile, p < 0.05



Outcome Measures

	ED visits/ 1,000 residents	3-year Mortality Rate	Standardized Risk-adjusted Per-capita Medicare Expenditures
All	659	10.5	9,399
0-25 th	634	10.8	9,390
25 th -50 th	688 [†]	11.0	9,510 [†]
50 th -75 th	666 [†]	10.7	9,437
75 th -100 th	651 [†]	9.6 [†]	9,288

[†] Significantly different from the 25th Percentile, $p < 0.05$



Discussion

- First ‘swipe’ at a comprehensive index
- Utility for studies, provide context
- Further analytic, component needs
 - ◆ Facilities?
 - ◆ HH/Hospice
 - ◆ Policy?
 - ◆ Coverage?
- Associations with outcomes – what is the driving factor?



Questions / Comments?

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 - ◆ rhr.sph.sc.edu
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