

# **The Relationship Between County Composition & Public Health Performance for Regional Public Health Systems: A Nebraska Study**

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# Acknowledgment

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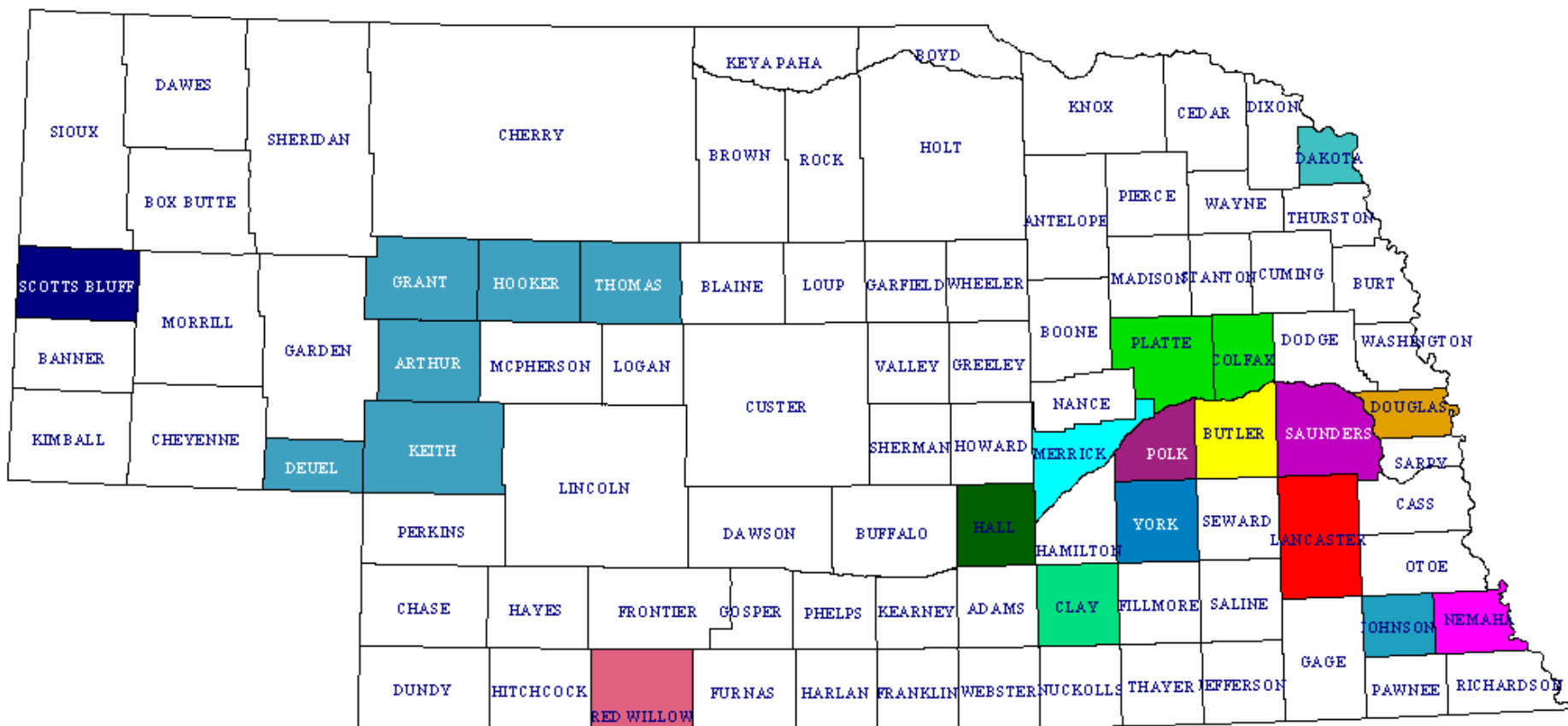
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# Nebraska's Regional Public Health Agencies

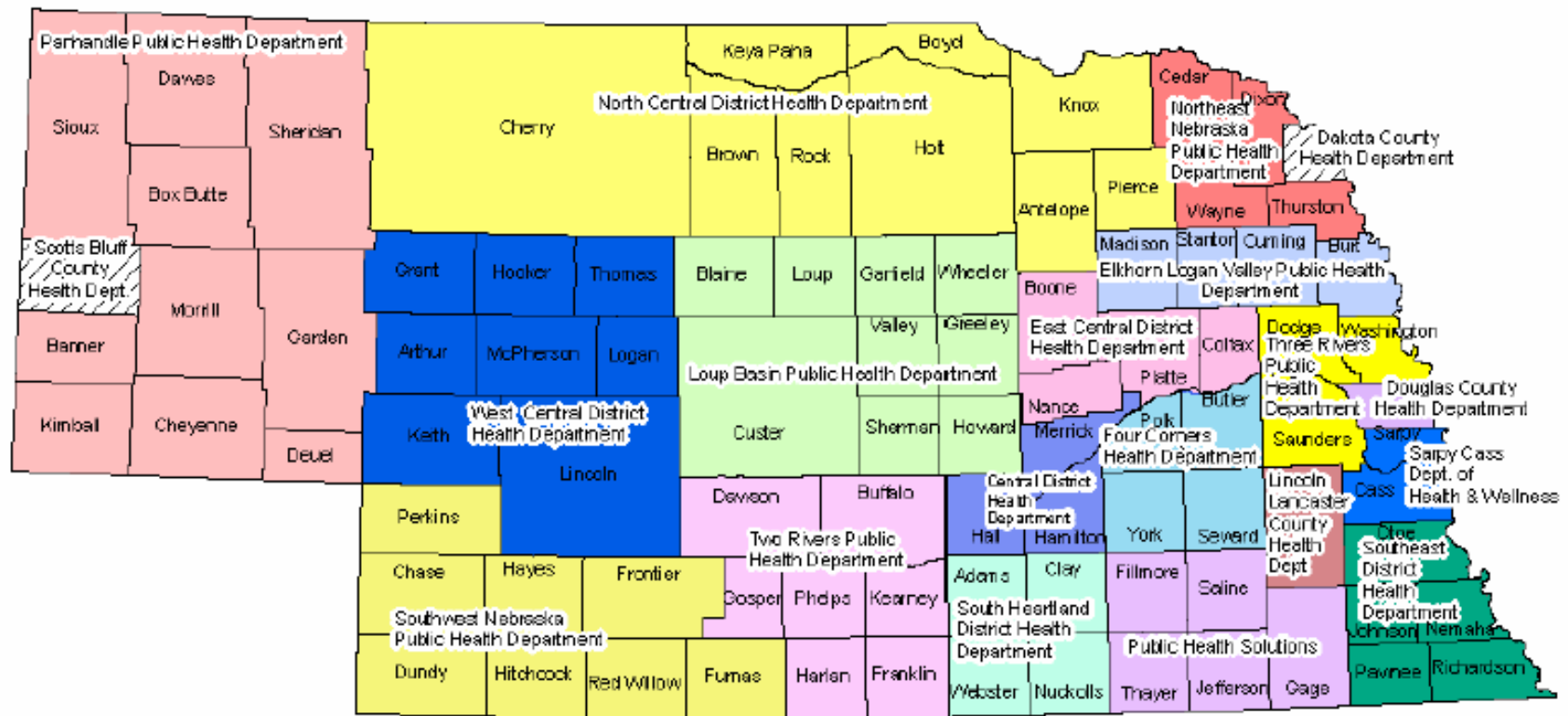
- Prior to 2001, local health departments (LHDs) covered only 22 of the state's 93 counties.
- In 2001, the State Legislature passed the Nebraska Health Care Funding Act (LB 692).
- LB 692 allocated an annual appropriation of \$5.7 million from the Tobacco Settlement Fund to build local public health infrastructure across the state.
- These new dedicated state funds helped to organize 16 new regional LHDs.
- By 2004, every county was covered by a LHD.

# Nebraska Local Health Departments

## September 11, 2001



# Nebraska Local Health Departments under the Health Care Funding Act (\*LB 692)



**Legend**

- Solid Colored Areas Represent Local Health Departments Eligible Under the Nebraska Health Care Funding Act (LB 692)
- Counties Covered by Local Health Departments but do not Qualify for LB 692 Funding

\*LB 692 passed during the 2001 Legislative Session and provides funds to qualifying local public health departments.

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# Study Objective

To examine the relationship between county composition and the performance of regional public health systems in Nebraska.

# Performance of Public Health Systems

- The **Macro Context**: The public health system is engaged in a dynamic relationship with a host of factors external to its own mission and purpose. (Handler, Issel, and Turnock 2001).
  - **Social, political** and **economic** forces operating in the overall society
  - extent of **demand and need** for public health services within the population
  - forces external to the public health system that exert pressure (e.g., **health care delivery system**)
- Activities performed by a public health system are likely to be shaped by resources available, how resources are organized, and the **characteristics of the community or market served by the system** (Mays et al 2006).

# Performance of Public Health Systems

(continued)

- **Population size, poverty rate, and the physician-to-population ratio** were significantly associated with the performance of public health essential services (Mays et al. 2006).
- Communities with high performing systems had larger populations, higher **per capita incomes**, and higher **educational levels** (Kennedy 2003).
- The **age-adjusted death rate** was higher in high performing systems while the **premature death rate** was lower in these systems (Kennedy 2003).
- Demographic and socioeconomic characteristics such as the percentage of **minority population** and **median household income** predict the performance of local public health agencies (Hajat et al. 2009).

# Gap in Literature

Little has been studied or written about:

- The determinants of performance for **regional** public health systems
- The relationship between **county composition** and performance for regional public health systems

# Data Collection: Performance Measures

- A Mail survey of LHD directors in Nebraska was conducted in May 2008 .
- All 16 regional LHDs returned completed surveys.
- Survey included a 20-question tool developed by Turnock, et al. (1998) and modified by Suen & Magruder (2004). Each question refers to a specific performance measure relating to the IOM's 3 core functions of public health (Assessment, Assurance, Policy Development).

# Data Collection: County Composition

- **Geographic**
  - Land size (2000)
  - Population density (2000)
- **Demographic**
  - Foreign born residents (2000)
  - Not speaking English at home (2000)
  - Minority population (2005)
  - Elderly population (2000)
  - Average household size (2005)
- **Economic**
  - Per capita Income (2005)
  - Median household income (2007)
  - Unemployment rate (2006)
  - Poverty rate (2004)

Data Source: U.S. Census Bureau

# Data Collection: County Composition

(continued)

- **Education**

- Bachelor degree attainment (2000, U.S. Census Bureau)
- High school drop out rate (2003-2004, Nebraska Dept. Education)

- **Social**

- Crime arrest (2004, Nebraska Comm. Law Enforcement & Criminal Justice)
- Teen-aged births (2000-2004, Nebraska Health and Human Services)
- New families at risk (2000-2004, Nebraska Health and Human Services)

- **Maternal and Child Health**

Data Source: Nebraska Health and Human Services, 2000-2004

- Infant mortality
- Low birth weight
- Women smoking during pregnancy
- Initiation of prenatal care during 1<sup>st</sup> trimester

# Data Collection: County Composition

(continued)

- **Healthcare Provider**

Data Source: Nebraska Health Professions Tracking Center, 2007

- Dentists
- Pharmacists
- Physicians
- Primary care physicians
- Psychiatrists
- Specialty care physicians

Data Source: Nebraska Health and Human Services, 2007

- Registered Nurses
- Certified License Practical Nurses

- **Morbidity**

Data Source: Nebraska Health and Human Services, 2000-2004

- Sexually transmitted diseases incidence rate
- Tuberculosis incidence rate
- Chronic hepatitis incidence rate

- **Mortality**

- Age adjusted death rate (2000-2004, Nebraska HHS)

# Methods

- Performance Measures (% of “yes” responses to questions):
  - Total Performance
  - Core Function Specific Performance (Assessment, Assurance, and Policy Development)
- Measures for County Composition: Variation among member counties in each of the macro context factors (County composition score based on the rank of CV)
- Correlation analyses were conducted between performance measures and county composition measures for 16 regions.

# Results



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## Public Health Core Function Performance Scores for the Nebraska's 16 Regional Public Health Jurisdictions

<b>Variables</b>	<b>Range</b>	<b>Mean</b>
<b>Assessment (%)</b>	(50.0, 100)	83.3
<b>Assurance (%)</b>	(50.0, 100)	75.0
<b>Policy Development (%)</b>	(66.7, 100)	89.6
<b>Total Performance (%)</b>	(60.0, 95.0)	81.8

## Coefficients of Variation (CV) in Population Density (per square mile) for the Nebraska's 16 Regional Public Health Jurisdictions

Region	Standard Deviation	Regional mean	Coefficient of Variation (CV)	Rank (based on CV)
Region 1	3.41	4.45	0.77	7
Region 2	4.83	3.45	1.40	16
Region 3	4.63	5.39	0.86	12
Region 4	4.28	5.23	0.82	9
Region 5	2.58	3.79	0.68	6
Region 6	13.84	16.70	0.83	11
Region 7	23.05	20.88	1.10	14
Region 8	46.71	44.07	1.06	13
Region 9	17.79	22.58	0.79	8
Region 10	7.74	20.45	0.38	2
Region 11	22.68	27.53	0.82	10
Region 12	4.39	16.68	0.26	1
Region 13	20.71	47.40	0.44	5
Region 14	328.95	276.10	1.19	15
Region 15	6.80	15.94	0.43	3
Region 16	7.52	17.50	0.43	4

## Coefficients of Variation (CV) in Land Size (square miles) for the Nebraska's 16 Regional Public Health Jurisdictions

<b>Region</b>	<b>Standard Deviation</b>	<b>Regional mean</b>	<b>Coefficient of Variation (CV)</b>	<b>Rank (based on CV)</b>
<b>Region 1</b>	174.40	771.34	0.23	12
<b>Region 2</b>	251.58	713.06	0.35	14
<b>Region 3</b>	118.66	760.04	0.16	5
<b>Region 4</b>	98.92	712.67	0.14	16
<b>Region 5</b>	144.16	728.96	0.20	15
<b>Region 6</b>	60.65	790.50	0.08	11
<b>Region 7</b>	50.87	764.75	0.07	1
<b>Region 8</b>	65.10	771.63	0.08	2
<b>Region 9</b>	143.98	751.73	0.19	8
<b>Region 10</b>	97.38	726.45	0.13	3
<b>Region 11</b>	82.51	751.53	0.11	4
<b>Region 12</b>	216.73	782.18	0.28	9
<b>Region 13</b>	47.23	766.10	0.06	10
<b>Region 14</b>	31.04	839.95	0.04	13
<b>Region 15</b>	91.01	797.44	0.11	7
<b>Region 16</b>	56.40	784.14	0.07	6

## Rank of Coefficients of Variation in Geographic Variables for the Nebraska's 16 Regional Public Health Jurisdictions

<b>Region</b>	<b>Land size</b>	<b>Population Density</b>	<b>Geographic County Composition Score</b>
<b>Region 1</b>	12	7	19
<b>Region 2</b>	14	16	30
<b>Region 3</b>	5	12	17
<b>Region 4</b>	16	9	25
<b>Region 5</b>	15	6	21
<b>Region 6</b>	11	11	22
<b>Region 7</b>	1	14	15
<b>Region 8</b>	2	13	15
<b>Region 9</b>	8	8	16
<b>Region 10</b>	3	2	5
<b>Region 11</b>	4	10	14
<b>Region 12</b>	9	1	10
<b>Region 13</b>	10	5	15
<b>Region 14</b>	13	15	28
<b>Region 15</b>	7	3	10
<b>Region 16</b>	6	4	10

## Rank of Coefficients of Variation in Demographic Variables for the Nebraska's 16 Regional Public Health Jurisdictions

Region	% Residents Not speaking English at home	Average Household Size	% of NonWhite population	% of elderly population	Demographic County Composition Score
Region 1	9	12	6	13	40
Region 2	12	15	16	14	57
Region 3	2	5	9	4	20
Region 4	1	8	13	8	30
Region 5	4	6	4	10	24
Region 6	16	10	10	15	51
Region 7	11	11	14	12	48
Region 8	14	2	11	6	33
Region 9	15	14	8	7	44
Region 10	5	1	15	2	23
Region 11	10	13	5	1	29
Region 12	7	16	1	9	33
Region 13	3	9	3	5	20
Region 14	6	7	2	3	18
Region 15	8	4	7	11	30
Region 16	13	3	12	16	44

# Various County Composition Scores for the Nebraska's 16 Regional Public Health Jurisdictions

Region	Geographic	Demographic	Economic	Social	Education	Health Provider	Morbidity	Maternal & Child	Mortality
1	19	40	46	37	22	67	20	48	14
2	30	57	68	44	28	113	38	55	16
3	17	20	45	23	18	86	37	49	11
4	25	30	35	27	17	71	25	40	10
5	21	24	62	45	24	79	32	36	13
6	22	51	48	23	24	85	39	41	5
7	15	48	28	20	16	81	26	22	3
8	15	33	56	24	23	52	27	24	6
9	16	44	25	24	18	71	26	33	12
10	5	23	42	14	4	38	32	18	9
11	14	29	50	11	16	106	16	41	7
12	10	33	30	46	15	63	32	40	15
13	15	20	35	19	11	47	12	9	2
14	28	18	13	20	8	40	9	23	1
15	10	30	47	21	7	50	19	42	8
16	10	44	50	10	21	41	24	23	4

# Correlation Analysis Results Between Various County Composition Measures and Public Health Core Function Performance

County Composition Variable	Assessment	Assurance	Policy Development	Total Performance
Geographic	-0.071	-0.468 *	-0.240	-0.495 *
Demographic	-0.034	0.000	-0.316	-0.135
Economic	-0.412	-0.034	-0.562 **	-0.404
Social	-0.064	-0.021	-0.609 **	-0.276
Education	-0.157	-0.223	-0.536 **	-0.446 *
Health care provider	-0.472 *	-0.304	-0.271	-0.532 **
Morbidity	-0.599 **	-0.319	-0.475 *	-0.671 ***
Maternal & Child Health	-0.484 *	-0.205	-0.297	-0.467 **
Mortality	-0.429 *	0.100	-0.434 *	-0.254

\* indicates p<0.1; \*\* indicates p<0.05; \*\*\* indicates p<0.01

# Conclusions

- In general, greater heterogeneity among member counties is associated with lower performance of public health core functions for regional LHDs.
- The greater county heterogeneity in population health and health care provider supply may impose a greater challenge to regional LHDs in assessing community health.
- The greater county heterogeneity in socio-economic and education factors may impose a greater challenge to regional LHDs in developing public health policies.
- The greater county heterogeneity in geographic factors may impose a greater challenge to regional LHDs in ensuring the provision of essential public health services.

# Policy Implications

- Administrators and practitioners of regional LHDs can use these findings to design interventions based on the type and degree of heterogeneity among counties within their jurisdiction to improve the performance of specific public health core functions.
- Whenever possible, the formation of regional LHDs should follow geographic boundaries within which the heterogeneity of county composition is minimized.

# Limitations

- Small Sample Size
- Bivariate Analysis
- Assumption of Equal Weight for Variables
- Generalizability



# THANK YOU

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# Performance Questions

## ASSESSMENT

*For the communities in the jurisdiction served by your local health department...*

- Is there a community health needs assessment process that systemically describes the prevailing health status of the community?
- In the past three years, has the LHD assessed the local population for behavioral risk factors?
- Are timely investigations of adverse health events, including communicable disease outbreaks and environmental health hazards, conducted on an ongoing basis?
- Are the necessary laboratory services available to the LHD to support investigations of health events and meet routine diagnostic and surveillance needs?
- Has an analysis been completed of the determinants and contributing factors of priority health needs, adequacy of existing health resources, and the population groups most impacted?
- In the past three years, has the LHD conducted an analysis of age-specific participation in preventive and screening services?

# Performance Questions (continued)

## POLICY DEVELOPMENT

*For the communities in the jurisdiction served by your local health department...*

- Is there a network of support and communication relationships that includes health-related organizations, the media, and the general public?
- In the past year, has there been a formal attempt by the LHD at informing elected officials about the potential public health impact of decisions under their consideration?
- Has there been a prioritization of the community health needs that have been identified from community needs assessments?
- In the past three years, has the LHD implemented community health initiatives consistent with established priorities?
- Has a community health action plan been developed with community participation to address community health needs?
- In the past three years, has the LHD developed plans to allocate resources in a manner consistent with the community health action plans?

# Performance Questions<sub>(continued)</sub>

## ASSURANCE

*For the communities in the jurisdiction served by your local health department....*

- Have resources been deployed as necessary to address the priority health needs identified in the community health needs assessments?
- In the past three years, has the LHD conducted an organizational self-assessment (e.g., strategic planning)?
- Are age-specific priority health needs effectively addressed through the provision of or linkage to appropriate services?
- In the past year, has the LHD provided reports to the media on a regular basis?
- Have there been regular evaluations of the effects of public health services on community health status?
- In the past three years, has the LHD used professionally recognized process and outcome measures to monitor programs and to redirect resources as appropriate?
- Is the public regularly provided with information about current health status, health care needs, positive health behaviors, and health care policy issues?
- In the past three years, has there been an instance in which your LHD has failed to implement a mandated program or service?