

Understanding Selected Health Outcomes Between Kansas Counties: Does Where a County Falls on a Rural Urban Classification Continuum Matter?

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Field Experience:

- ▣ 180 hours with Riley County Extension
- ▣ SHICK training and Medicare Part D counseling
 - ▣ 28-hours of training and successful examinations
- ▣ Community presentations
- ▣ Medicare Moments project



2015 Medicare- Open Enrollment Period									
	# Plan Comparisons Done	# changing plans	Staying on current plan	New to Medicare D	Office Visits	Message/ Phone Calls	Total Savings*	Average *Savings/ Person	Average *Savings/ Person Changing Plans
Total	216	92	124	6	159	57	\$87,880	\$407.00	\$955.00

Background:

- Patterns of disease have changed from acute infectious disorders to chronic disorders
- Medical Model → Population Health Model
- Social Determinant of Health:
 - the conditions in the social, physical, and economic environment in which people are born, live, work, and age that influence the individual's health attainment.
- Social Ecological Framework



Background: Health Outcomes in Rural America

- Rural Americans are a population burdened by significant health disparities.
- A **health disparity** being a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. -Healthy People 2020
- Broadly stated, rural populations experience higher rates of chronic illness and poorer overall health compared to urban populations.
- Health disparities manifest differently by region and degree of rurality

Purpose and Research Questions

- The objective of this study was to compare characteristics of urban and rural counties in Kansas in order to identify and seek explanations for differences in health factors and population health outcomes.
- Are there differences in population health outcomes between urban and rural areas in Kansas?
- Do population health outcomes differ between rural areas based on degrees of rurality?

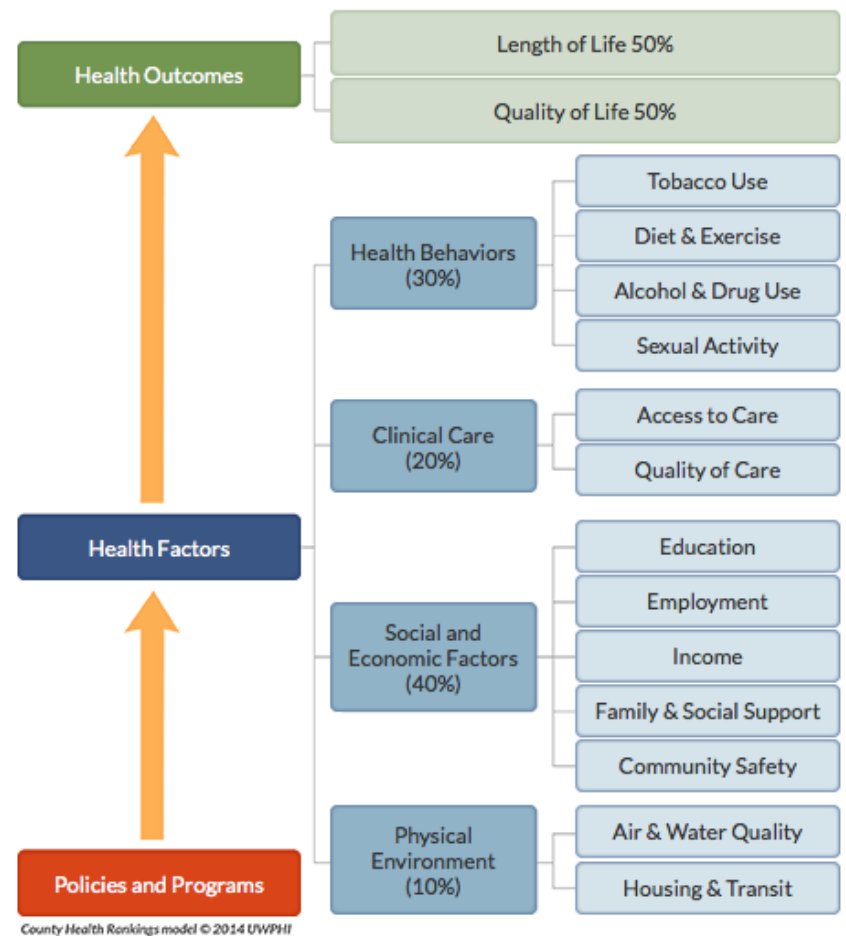
Expected Results

- Hypothesis 1: There will be differences in population health outcomes that would differentially favor Kansas urban counties.
 - compromised socioeconomic position
 - more limitations in the built environment
 - less access to health care providers

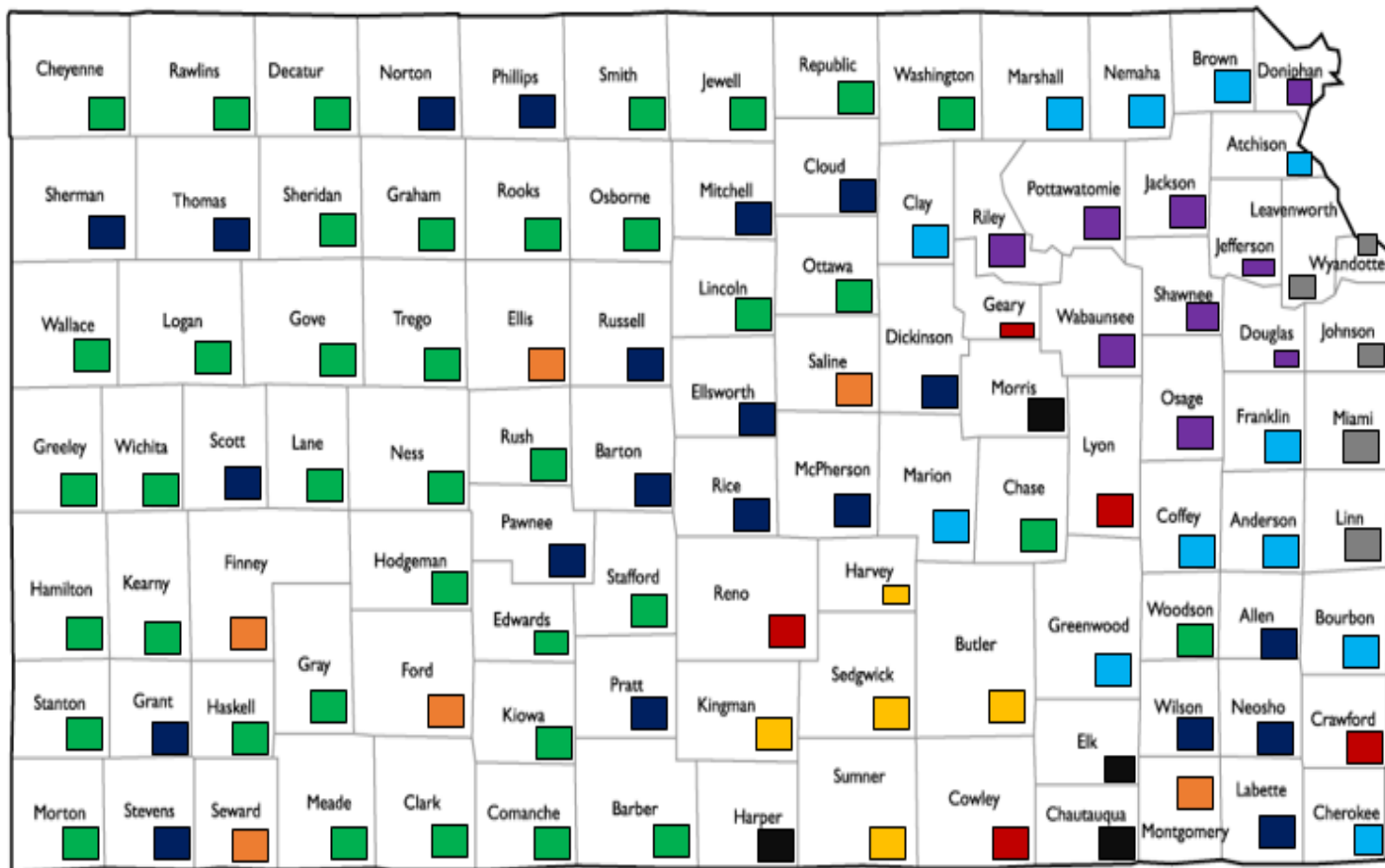
- Hypothesis 2: Significant population health outcomes differences between rural and urban areas would not be as discrete as others have expected.
 - varying health disparities only captured with rural-urban continuum

Methods

- Data from the County Health Rankings
- USDA, Economic Research Service 2013 Rural-Urban Continuum Code classification scheme
- Compare the 86 rural vs. 19 urban counties in Kansas



Kansas Counties by RUC



Nonmetro counties:

RUC 4 Urban population of 20,000 or more, adjacent to a metro area

RUC 5 Urban population of 20,000 or more, not adjacent to a metro area

RUC 6 Urban population of 2,500 to 19,999, adjacent to a metro area

RUC 7 Urban population of 2,500 to 19,999, not adjacent to a metro area

RUC 8 Completely rural or less than 2,500 urban population, adjacent to a metro area

RUC 9 Completely rural or less than 2,500 urban population, not adjacent to a metro area

Metro counties:

RUC 1 Counties in metro areas of 1 million population or more

RUC 2 Counties in metro areas of 250,000 to 1 million population

RUC 3 Counties in metro areas of fewer than 250,000 population

Methods

- ▣ Variables to be studied:

- ▣ Environment

- ▣ Severe housing problems
 - ▣ Access to exercise opportunities
 - ▣ Food environment index
 - ▣ Limited Access to Healthy Food

- ▣ Social and Economic

- ▣ Educational attainment
 - ▣ Unemployment
 - ▣ Income inequality
 - ▣ Children in poverty
 - ▣ Children in single-parent homes
 - ▣ Population without health insurance

Methods

- ▣ Variables to be studied:
 - ▣ Health Behaviors
 - ▣ Adult Smoking
 - ▣ Physical inactivity
- ▣ Health Outcomes:
 - ▣ Differences anticipated in:
 - ▣ Adult obesity
 - ▣ Alcohol-impaired driving deaths
 - ▣ Injury deaths
 - ▣ Preventable hospital stays
 - ▣ Overall premature death

Analyses

- The analyses conducted were:
 - Pearson correlation coefficient
 - Measure of linear correlation between variables
 - T-test comparisons
 - Assesses whether the means of two groups are significantly different
 - Analysis of Variance (ANOVA)
 - Assesses whether the means of three or more groups are significantly different
 - Stepwise selection procedure
 - Selects from candidate variables those that have a significant effect on the response

Analyses

- Rural vs. Urban t-test comparison
 - All RUCs 1-3 vs all RUCs 4-9
- Analysis of Variance (ANOVA) for differences between RUCs
 - T-test was conducted to compare those RUCs that were significantly different
- Stepwise selection procedure
 - All independent variables were considered candidate predictors for each health outcome

Results

- Hypothesis 1: There will be differences in population health outcomes that will differentially favor Kansas urban counties.
 - **Actually** urban vs. rural comparison showed urban more disadvantaged
 - Yet, rural had more rates of injury death, preventable hospital stays, and premature death
 - Suggested something was not being captured
- Hypothesis 2: Significant population health outcomes differences between rural and urban areas may not be as discrete as others have expected.
 - RUC comparison revealed rural more disadvantaged

Results: Urban vs. Rural

- ▣ **Social and Economic Factors:**
- ▣ Disadvantaged Urban:
 - ▣ More **Violent crime rate** ($p < 0.025$)
 - ▣ More **Children eligible for free lunch** ($p < 0.049$)
 - ▣ More **food insecurity** ($p < 0.012$)
 - ▣ Less **Social association rate** ($p < 0.000$)
 - ▣ More **Unemployed** ($p < 0.000$)
- ▣ Advantaged Urban:
 - ▣ More **post-secondary education** ($p < 0.015$)
 - ▣ Less **uninsured people** ($p < 0.000$)

Results: Urban vs. Rural

▣ Environmental Factors:

▣ Disadvantaged Urban:

- ▣ More **severe housing problems** ($p < 0.001$)

▣ Health Behaviors:

▣ Advantaged Urban:

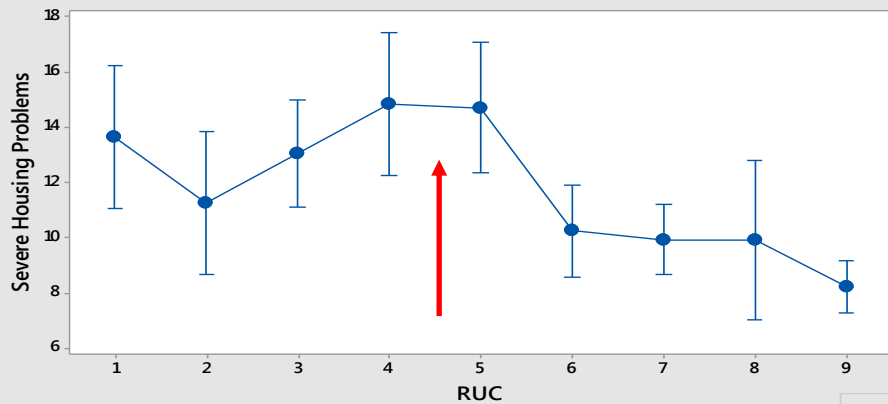
- ▣ Less **physically inactive people** ($p < 0.000$)

▣ Health Outcomes:

- ▣ The **injury death rate**, **preventable hospital stays** and **premature death** each showed significant differences and each **greater in rural areas** ($p < 0.000$, $p < 0.000$, $p < 0.007$)

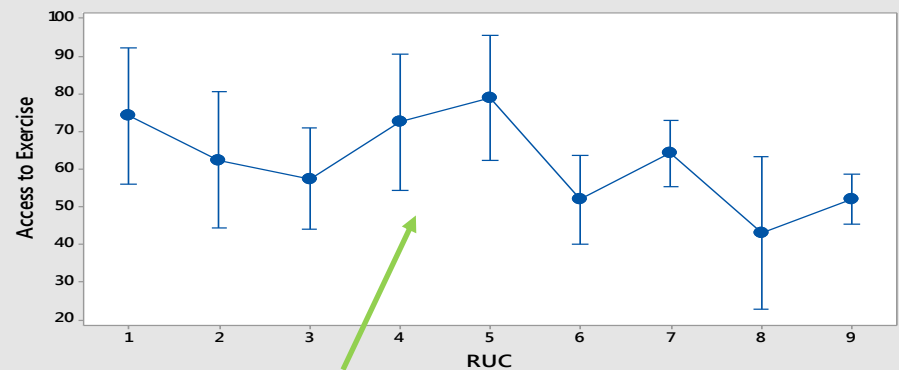
Results: RUC Comparisons

Interval Plot of Severe Housing Problems vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

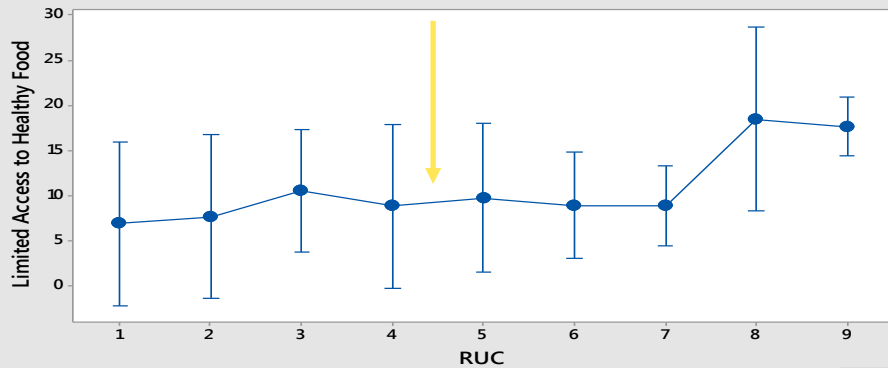
Interval Plot of Access to Exercise vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

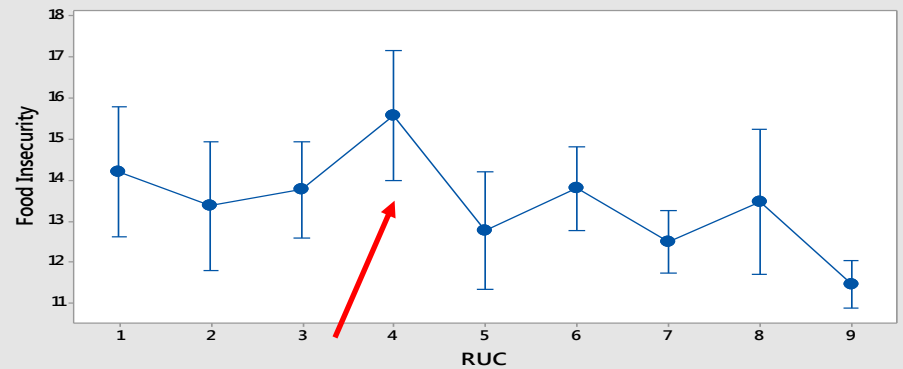
Results: RUC Comparisons

Interval Plot of Limited Access to Healthy Food vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

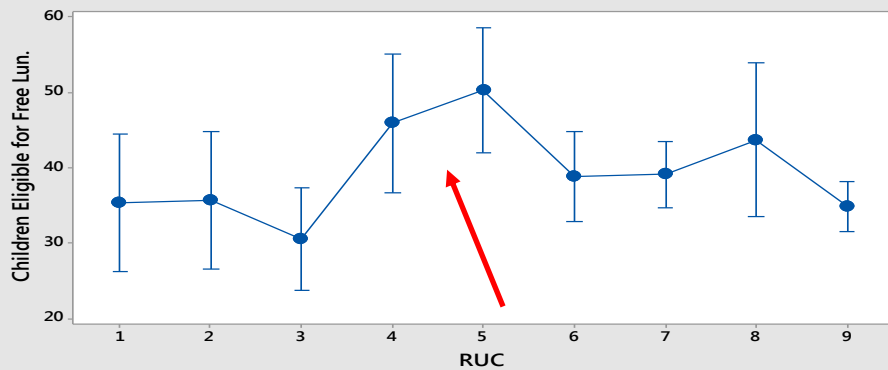
Interval Plot of Food Insecurity vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

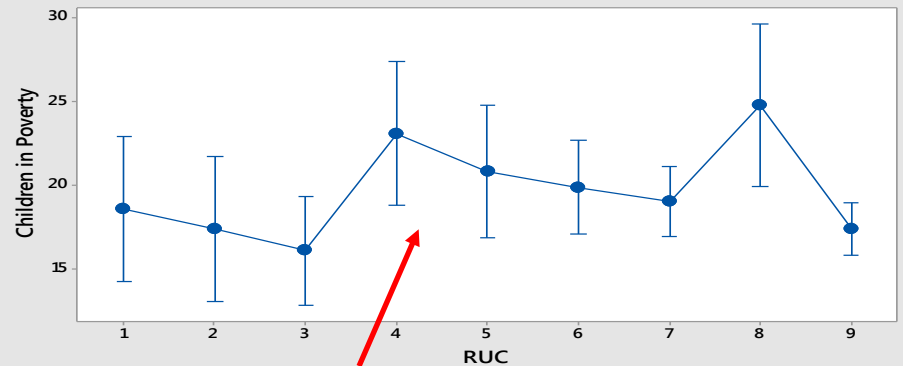
Results: RUC Comparisons

Interval Plot of Children Eligible for Free Lun. vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

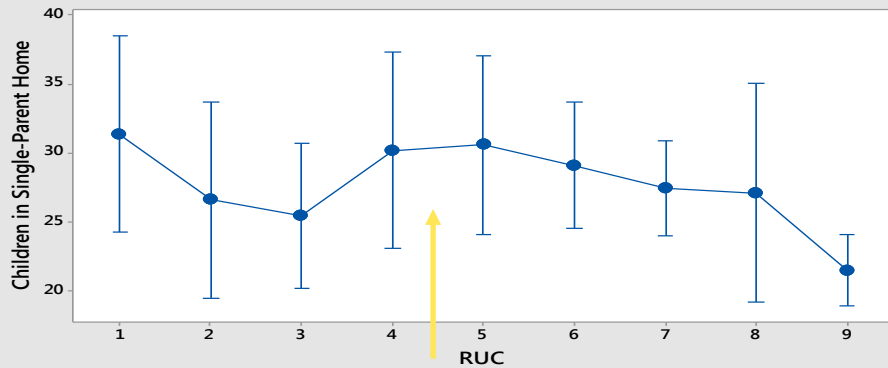
Interval Plot of Children in Poverty vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

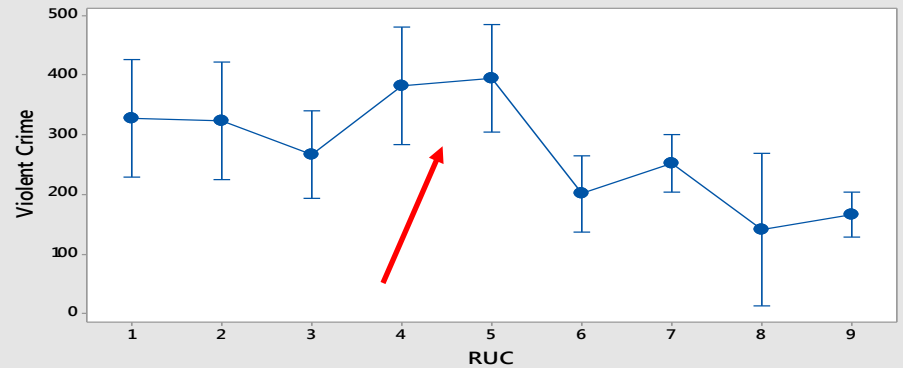
Results: RUC Comparisons

Interval Plot of Children in Single-Parent Home vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

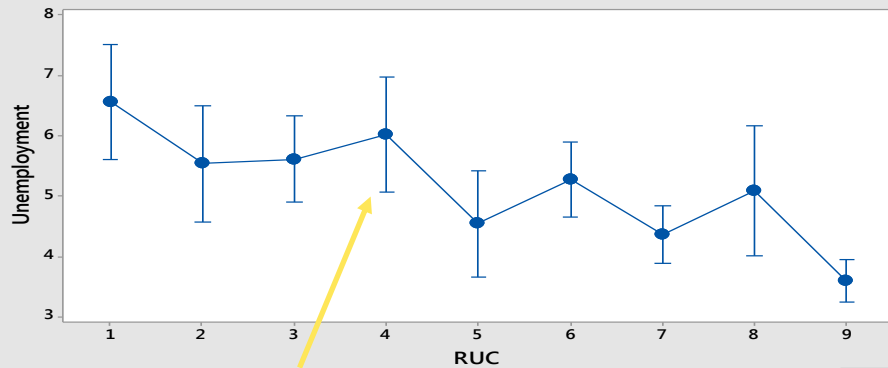
Interval Plot of Violent Crime vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

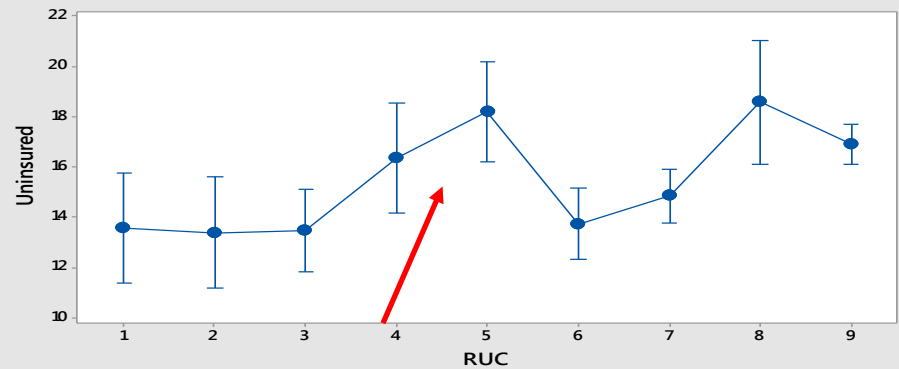
Results: RUC Comparisons

Interval Plot of Unemployment vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

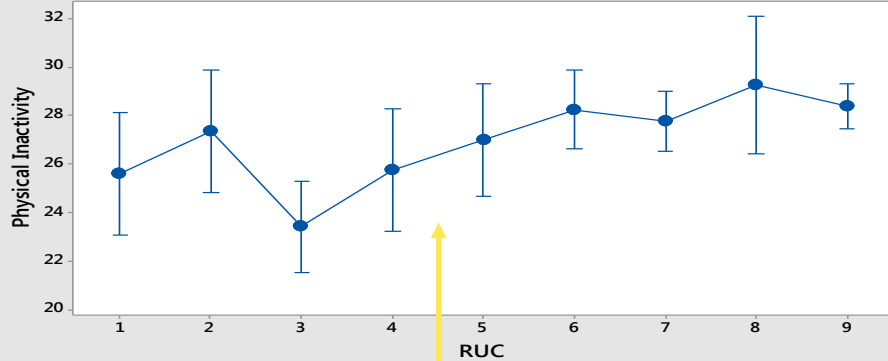
Interval Plot of Uninsured vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

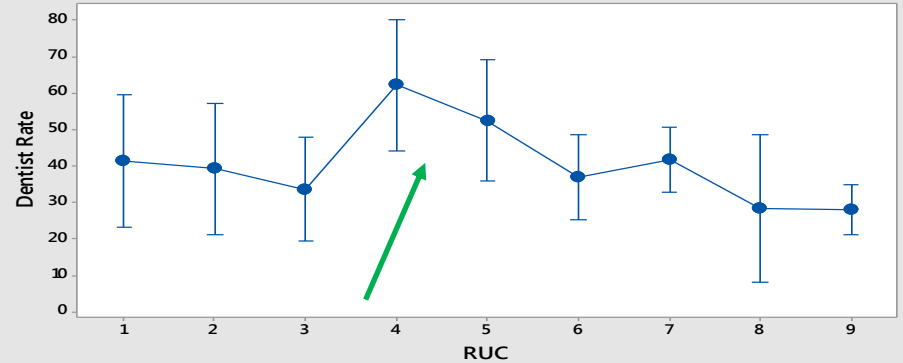
Results: RUC Comparisons

Interval Plot of Physical Inactivity vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

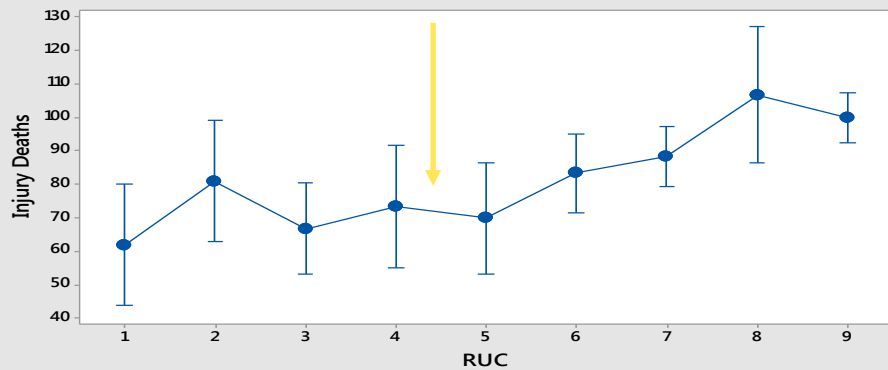
Interval Plot of Dentist Rate vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

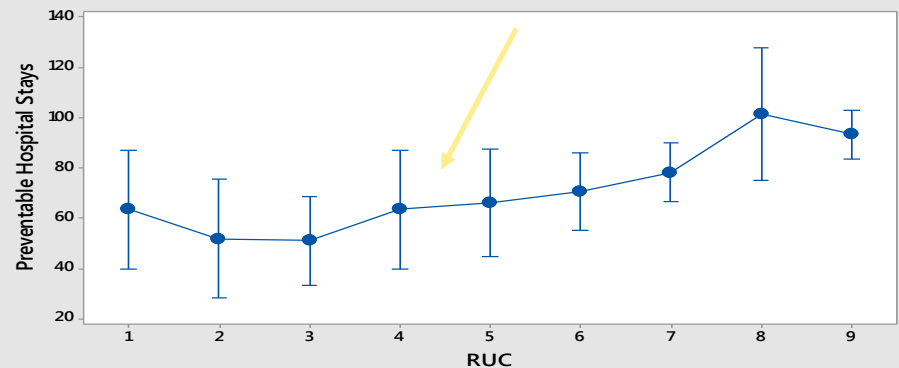
Results: RUC Comparisons

Interval Plot of Injury Deaths vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

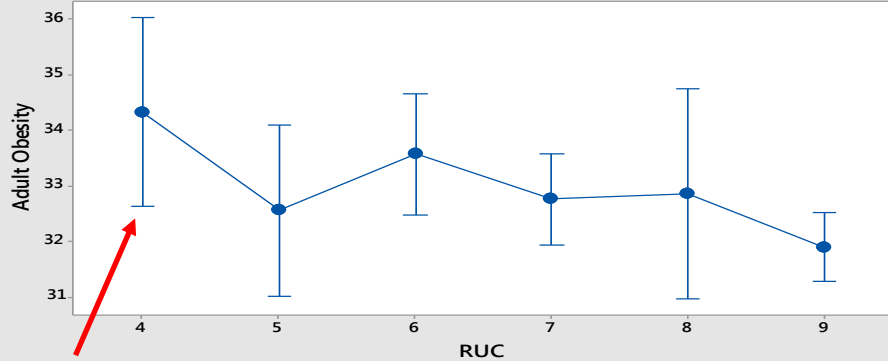
Interval Plot of Preventable Hospital Stays vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

Results: RUC Comparisons

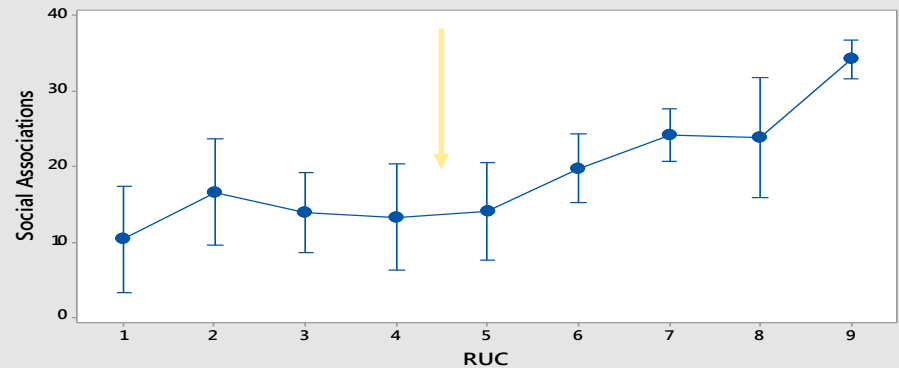
Interval Plot of Adult Obesity vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.



Interval Plot of Social Associations vs RUC
95% CI for the Mean



The pooled standard deviation is used to calculate the intervals.

RUCs 4 and 5

+ ADULT OBESITY

+ SEVERE HOUSING PROBLEMS

+UNINSURED

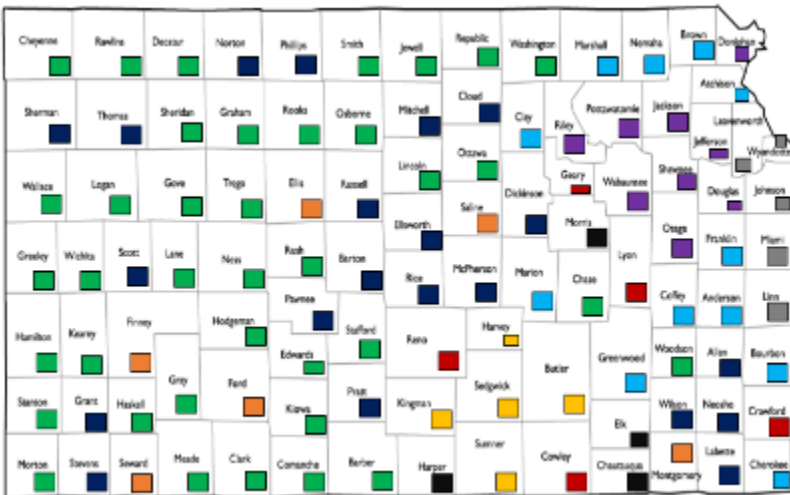
+ CHILDREN IN SINGLE-PARENT HOMES

+CHILDREN IN POVERTY

+FOOD INSECURITY

+VIOLENT CRIME

+UNEMPLOYMENT



County	RUC	% African American	% Asian	% Native Hawaiian/ Other Pacific Islander	% Hispanic	% Non-Hispanic white
Finney	5	2.4	4.0	0.1	47.9	44.3
Ford	5	2.5	1.7	0.3	52.0	42.2
Seward	5	3.3	2.9	0.2	58.4	33.7
Wyandotte	1	24.0	3.4	0.2	27.1	42.7
Grant	7	0.4	0.5	0.0	46.6	51.4

Results: Stepwise Regression Procedure

Adult Obesity:

Regression Equation

Adult Obesity = 32.24 + 0.1996 Children in Poverty + 0.1440 Physical Inactivity - 1.712 % Asian + 3.59 % Native Hawaiian/ Other Pacific - 0.0404 % Non-Hispanic white - **0.4224 RUC**

Results: Stepwise Regression Procedure

Alcohol-Impaired Driving Deaths:

Regression Equation

Alcohol-Impaired Driving Deaths = 15.6 + 13.79 Income Ratio -
1.055 Social Associations + 2.59 % < 18 + 3.95 % 65 and over + 6.40
% Asian- 3.38 % Female + **2.66 RUC**

Results: Stepwise Regression Procedure

Injury Death Rate:

Regression Equation

Injury Deaths = $-9.0 + 1.397 \text{ Adult Smoking} + 3.385 \% 65 \text{ and over} + 0.446 \% \text{ Hispanic}$

Results: Stepwise Regression Procedure

Preventable Hospital Stays:

Regression Equation

Preventable Hospital Stays = 83.3 - 0.567 Dentist Rate -
1.371 Adult Smoking + 71.0 % Native Hawaiian/ Other Pacific
+ 5.47 RUC

Results: Stepwise Regression Procedure

Premature Death:

Regression Equation

Years of Potential Life Lost R. = $2764 + 13.88 \text{ PCP Rate} + 185.0$
Children in Poverty + $64.3 \text{ Adult Smoking} - 618 \% \text{ Asian}$

Conclusion/Discussion

- Differences between rural and urban were made apparent
- The specific RUCs uncovered greater nuances
- Where you live influenced majority of health outcomes examined (3 out of 5)
- Ultimately, context is essential to effective population health interventions and other policy

Limitations

- Cross-sectional descriptive study: no causation could be established
- Data from 2006 to 2013
- There are many other systems used for rural and urban classification
- There were some variables of interest precluded from the study due to missing data in excess of 15 percent
- Stepwise regression procedure

Questions?