Analyzing the Impact of Incentive Programs on Retention of Family Practice Providers in Rural Nebraska

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A PROFESSIONAL PROJECT

NEBRASKA
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DEPT. OF HEALTH AND HUMAN SERVICES

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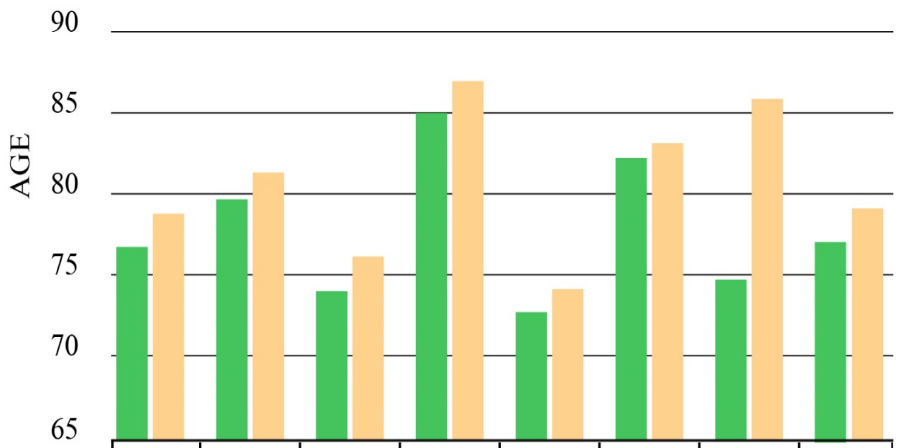
UNIVERSITY OF Nebraska Lincoln

Rural/Urban Health Disparities

Metro / non-metro life expectancy



	All	Female	Male	Asian	Black	Hispanic	Native American	White
Non-Metro Counties	76.8	79.7	74.1	84.9	72.8	82.2	74.8	77.2
Metro Counties	78.8	81.3	76.2	86.9	74.2	83.1	85.8	79.2

Source: Singh, 2014

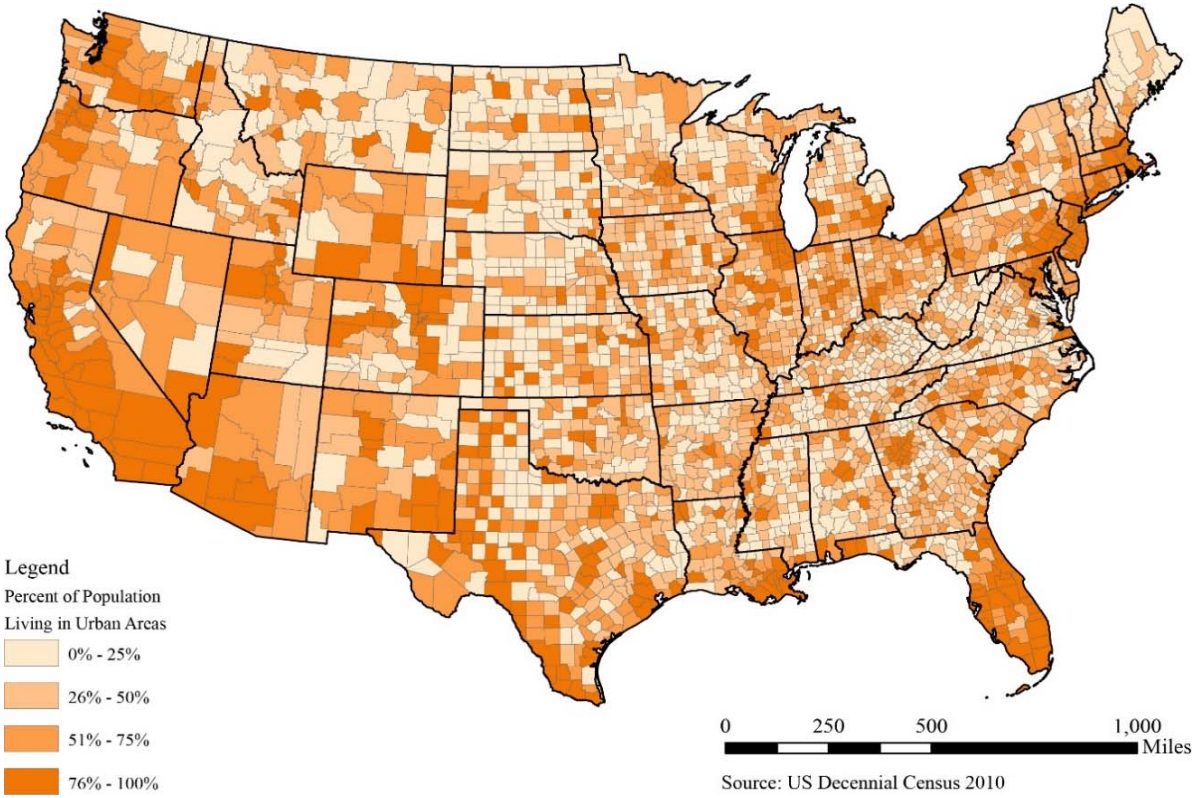
Metro / non-metro mortality rates per 100,000 population

	Non-metropolitan Counties		Metropolitan Counties		
	With a city ≥ 10,000 Population	**Without a city ≥ 10,000 population**	**Large central**	**Large fringe**	**Small**
Infant mortality	6.8	7	6.8	5.7	6.7
COPD	79.9	81.9	56.2	60.6	70.9
Ischemic heart disease	197.2	206.5	192.9	174.9	173.8
Unintentional injuries	58.9	52.7	32.1	33.1	40.8
Motor vehicle traffic-related injuries	23.3	19.5	7.9	9.3	12.1
Suicide	18.2	20	12.8	13.7	16.1

Source: Meit, et al., 2014

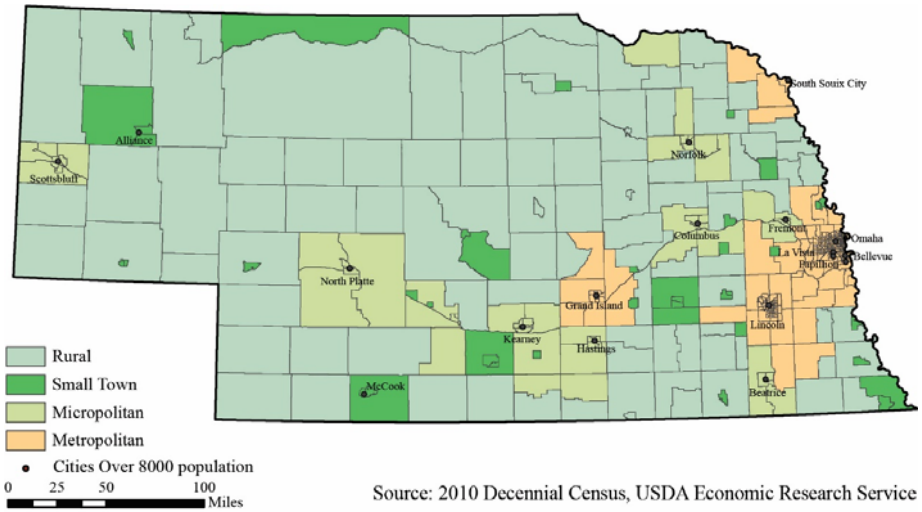
What is Rural?

- Rural is an inexact term
- Definition changes depending on spatial scale, intensity of development and population density of an area
- Generally refers to areas with populations living outside of high density metropolitan regions



What is Rural?

RUCA

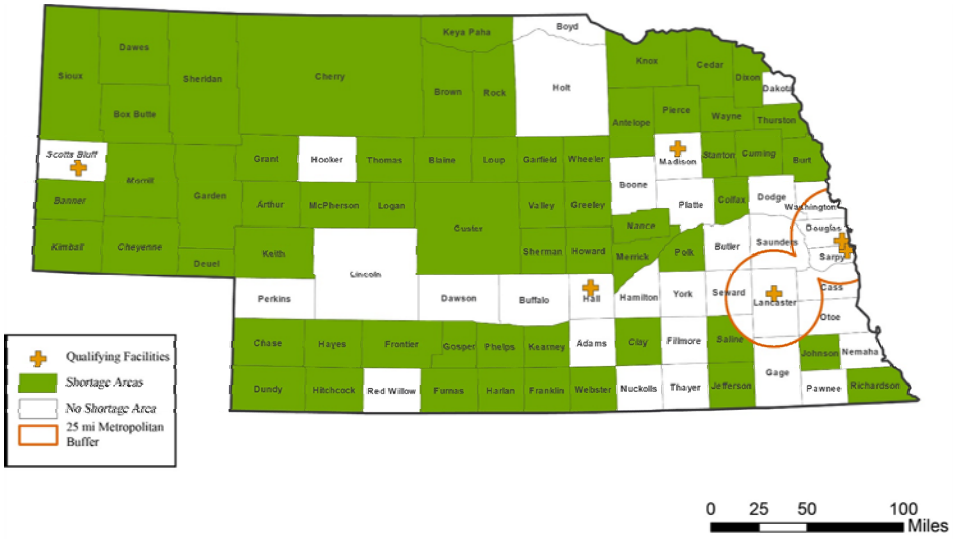


Source: 2010 Decennial Census, USDA Economic Research Service

	Code	Classification description	Number of Census Tracts	Pop.	Total Land Area (sq. MI)
Metropolitan	1: Metropolitan area core: primary flow within an urbanized area (UA)		312 (58.6%)	1,114,990 (61.1%)	5,890.6 (7.7%)
	1.1	Secondary flow 30% to 50% to a larger UA			
	2: Metropolitan area high commuting: primary flow 30% or more to a UA				
	2.1	Secondary flow 30% to 50% to a larger UA			
	3: Metropolitan area low commuting: primary flow 10% to 30% to a UA				
Micropolitan	4: Micropolitan area core: primary flow within an urban cluster of 10,000 to 49,999 (large UC)		81 (15.2%)	301,323 (16.5%)	9,591.3 (12.5%)
	4.1	Secondary flow 30% to 50% to a UA			
	5: Micropolitan high commuting: primary flow 30% or more to a large UC				
	5.1	Secondary flow 30% to 50% to a UA			
	6: Micropolitan low commuting: primary flow 10% to 30% to a large UC				
Small Town	7: Small town core: primary flow within an urban cluster of 2,500 to 9,999 (small UC)		44 (8.3%)	166,039 (9.1%)	5,398.0 (7.0%)
	7.1	Secondary flow 30% to 50% to a UA			
	7.2	Secondary flow 30% to 50% to a large UC			
	8: Small town high commuting: primary flow 30% or more to a small UC				
	8.1	Secondary flow 30% to 50% to a UA			
	8.2	Secondary flow 30% to 50% to a large UC			
	9: Small town low commuting: primary flow 10% to 30% to a small UC				
Rural	10: Rural areas: primary flow to a tract outside a UA or UC		95 (17.9%)	243,989 (13.4%)	55,944.3 (72.8%)
	10.1	Secondary flow 30% to 50% to a UA			
	10.2	Secondary flow 30% to 50% to a large UC			
	10.3	Secondary flow 30% to 50% to a small UC			
Source: USDA Economic Research Service			**532**	**1,826,341**	**76,824.20**

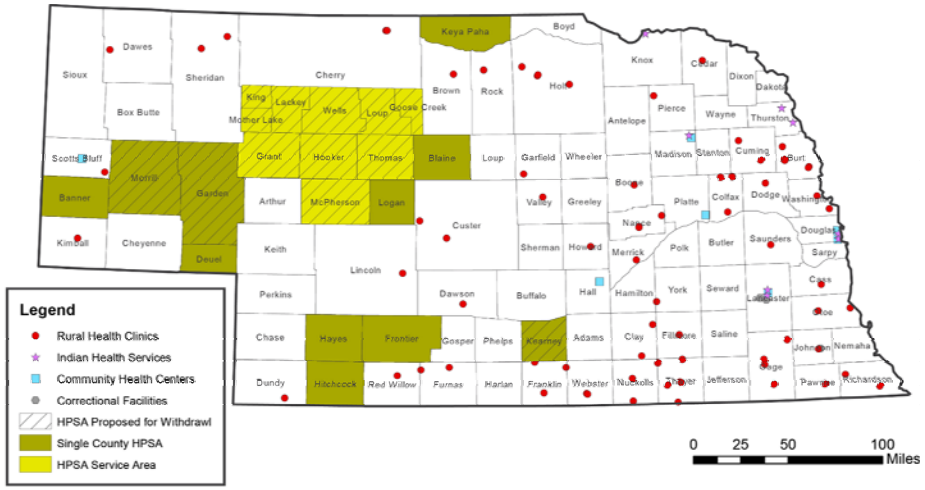
Shortage Areas

State Designated Shortage Area
Family Practice



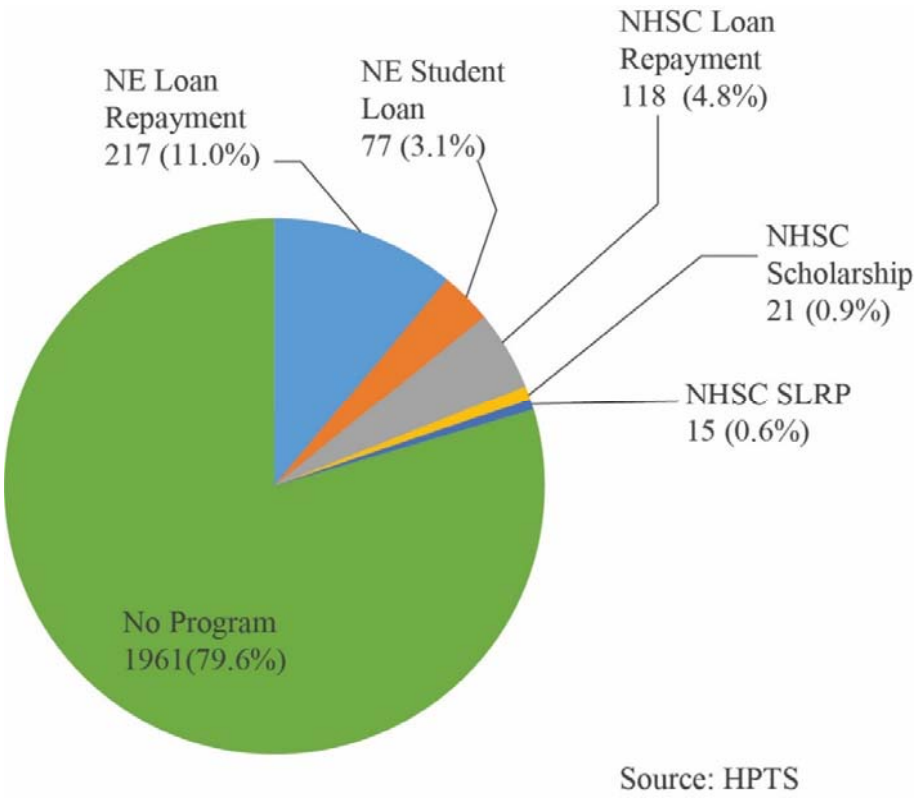
Source: Nebraska Department of Health and Human Services: Office of rural Health

Federal Health Profession Shortage Area
Primary Care



Source: Nebraska Department of Health and Human Services: Office of rural Health

Programs



Program	State / Federal	Eligible Providers	Eligible Facilities	Payout	Obligation	Penalty for Default
NE Student Loan	State	MD, PA, DDS, Masters Level Mental Health	State Designated Shortage Areas	$15,000-$30,000 /year up to 4 years	1 year for each year of loans	150% repayment plus 8% interest
NE Loan Repayment	State	MD, APRN,PA, DDS, Licensed Mental Health, Pharmacists, OT, PT	State Designated Shortage Areas	$15,000-$30,000 / year up to 3 years. Plus community match.	3 years	150% repayment plus 8% interest
NHSC Loan Repayment	Federal	MD, APRN, PA, DDS, Masters Level Mental Health, Dental Hygienist, Certified Nurse Midwives	Federal HPSAs	Up to $50,000 depending upon HPSA score	2 years	$7,500 for each obligated month not served
NHSC Scholarship	Federal	MD, DDS, APRN, PA, Nurse-midwife, Masters Level Mental Health	Federal HPSAs	Dependent upon tuition and fees	2 years for each year of scholarship	Scholarship repayment with interest
NHSC SLRP	Federal /State	MD, APRN, PA, DDS, Masters Level Mental Health, RN, Pharmacist	Federal HPSAs	$25,000-$50,000	2 years for each year of loan repayment	Repayment plus interest

Data and Methods

- Data were obtained from the University of Nebraska Medical Center: Health Professions Tracking Service (HPTS)
- HPTS was developed in 1995
- Tracks location and demographic information for healthcare providers throughout Nebraska and Western Iowa
- Regularly updated
- Cross referenced from provider surveys, facility surveys, and NE licensure

- General statistical breakdown
- Kaplan-Meier
  - Generates a graphic representation of "survival" over time
  - Generates an estimate of mean and median length of retention
- Cox Proportional Hazards
  - Quantifies the magnitude of difference between rate of failure for each group

- Statewide, approximately 20% of family medicine providers have participated in incentive programs
- In metropolitan and micropolitan areas, a lower proportion of providers has participated (10-16%)
- In small town and rural areas, approximately 40% of providers have participated

	Total (% of total)	Program (% of program providers)	Non-program (% of non-program providers)
All Locations	**n=2431**		
Gender			
F	1357 (55.8%)	270 (57.4%)	1087 (55.4%)
M	1074 (44.2%)	200 (42.6%)	874 (44.6%)
Profession			
APRN	537 (22.1%)	88 (18.7%)	449 (22.9%)
MD	1230 (50.6%)	197 (41.9%)	1033 (52.7%)
PA	664 (27.3%)	185 (39.4%)	479 (24.4%)
Total (% of total)	**2431 (100%)**	**470 (100%)**	**1961 (100%)**
Metropolitan	**n=1430 (58.8% of statewide providers)**		
Gender			
F	816 (57.1%)	82 (56.2%)	734 (57.2%)
M	614 (42.9%)	64 (43.8%)	550 (42.8%)
Profession			
APRN	327 (22.9%)	31 (21.2%)	296 (23.1%)
MD	756 (52.9%)	62 (42.5%)	694 (54.0%)
PA	347 (24.3%)	53 (36.3%)	294 (22.9%)
Total (% of total)	**1430 (100%)**	**146 (100%)**	**1284 (100%)**
Micropolitan	**n= 563 (23.2% of statewide providers)**		
Gender			
F	320 (56.8%)	50 (53.8%)	270 (57.4%)
M	243 (43.2%)	43 (46.2%)	200 (42.6%)
Profession			
APRN	155 (27.5%)	24 (25.8%)	131 (27.9%)
MD	246 (43.7%)	33 (35.5%)	213 (45.3%)
PA	162 (28.8%)	36 (38.7%)	126 (26.8%)
Total (% of total)	**563 (100%)**	**93 (100%)**	**470 (100%)**

	Total (% of total)	Program (% of program providers)	Non-program (% of non-program providers)
Small Town	**n=523 (21.5 % of statewide providers**		
Gender			
F	281 (53.7%)	120 (58.0%)	161 (50.9%)
M	242 (46.3%)	87 (42.0%)	155 (49.1%)
Profession			
APRN	71 (31.6%)	25 (12.1%)	46 (14.6%)
MD	236 (45.1%)	89 (43.0%)	147 (46.5%)
PA	216 (41.3%)	93 (44.9%)	123 (38.9%)
Total (% of total)	**523 (100%)**	**207 (100%)**	**316 (100%)**
Rural	**n= 543 (22.3% of statewide providers)**		
Gender			
F	314 (57.8%)	136 (59.4%)	178 (56.7%)
M	229 (42.2%)	93 (40.6%)	136 (43.3%)
Profession			
APRN	125 (23.0%)	50 (21.8%)	75 (23.9%)
MD	220 (40.5%)	89 (38.9%)	131 (41.7%)
PA	198 (36.5%)	90 (39.3%)	108 (34.4%)
Total (% of total)	**543 (100%)**	**229 (100%)**	**314 (100%)**

- Over half of all program participants statewide have participated in the NE Loan Repayment Program
- Nearly 25% of program participants have participated in the NHSC Loan Repayment Program
- Participants in the NE Student Loan Program, the NHSC Scholarship, and the NHSC SLRP program make up less than 25% of all program participants
- The primary program in small town and rural areas is the NE Loan Repayment Program
- In metropolitan areas, NHSC Loan Repayment and NE Loan repayment each constitute approximately 40% of programs.

	Statewide n=2431	**Metropolitan** n=1430	**Micropolitan** n=563	**Small Town** n=523	**Rural** n=543
NE Loan Repayment (% of total)	271 (54.0%)	66 (41.8%)	56 (55.3%)	144 (65.2%)	141 (57.3%)
NE Student Loan (% of total)	77 (15.3%)	20 (12.7%)	14 (13.9%)	38 (17.2%)	40 (16.3%)
NHSC Loan Repayment (% of total)	118 (23.5%)	62 (39.2%)	23 (22.8%)	30 (13.6%)	48 (19.5%)
NHSC Scholarship (% of total)	21 (4.2%)	10 (6.3%)	5 (5.0%)	2 (0.9%)	8 (3.3%)
NHSC SLRP (% of total)	15 (3.0%)	0 (0.0%)	3 (3.0%)	7 (3.2%)	9 (3.7%)
Total Program Providers	**502 (100.0%)**	**158 (100.0%)**	**101 (100.0%)**	**221 (100.0%)**	**246 (100.0%)**

Source: HPTS

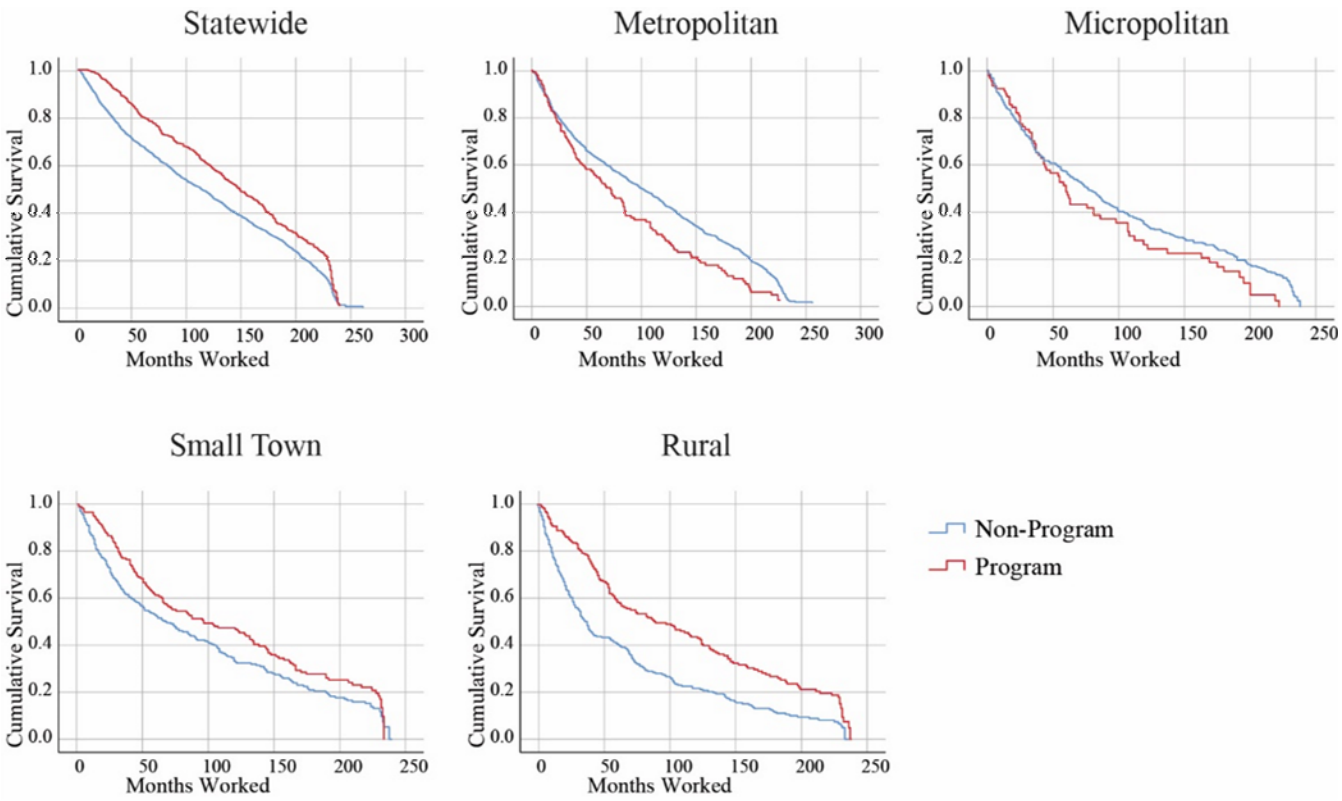
Economic Impact

- Based on the cumulative number of years worked program providers have had a significant economic impact on the state
  - NE Loan Repayment: $2.7 Billion
  - NE Student Loan: $965.6 Million
  - NHSC Loan Repayment: 1.3 Billion
  - NHSC Scholarship: $230 Million
  - NHSC SLRP:$80.9 Million

Program	Total	Total Months Worked (years)	Average Months Worked (Years)
NE Loan Repayment	271	30,462 (2,538.5)	112.4 (9.4)
NE Student Loan	77	10,939 (911.6)	142.1 (11.8)
NHSC Loan Repayment	118	14,670 (1,222.5)	124.3 (10.4)
NHSC Scholarship	21	2,631 (219.3)	125.3 (10.4)
NHSC SLRP	15	931 (77.6)	62.1 (5.2)
No Program	1,961	193,304 (16,108.7)	98.6 (8.2)
All Providers	**2,431**	**248,287 (20,690.6)**	**102.1 (8.5)**

Kaplan-Meier

- Kaplan-Meier plots show cumulative survival over time
- Statewide, small town, and rural charts show that program providers have longer retention than non-program providers
- Metropolitan and micropolitan program providers had shorter retention than non-program providers



Kaplan-Meier

- Kaplan-Meier results show a shorter median length of retention for non-program providers in small town and rural areas
- Median length of retention was longer for non-program providers in metropolitan and micropolitan areas
- Logrank test shows that results for micropolitan areas are not statistically significant

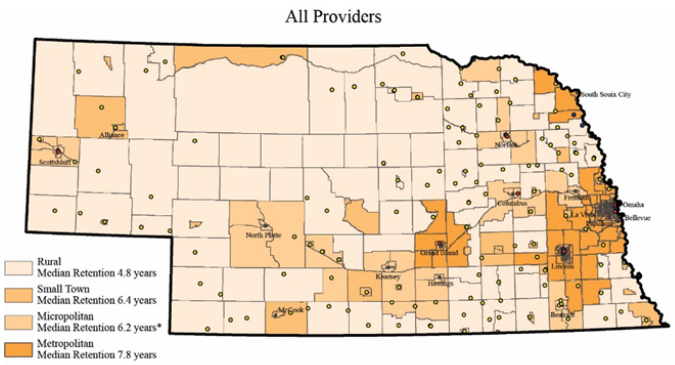
					Logrank test		
	n=	Censored (% of cohort)	Median months worked	Mean months worked	Chi-square	df	P-value
Statewide	2431	550 (22.6%)	120	121.9	24.904	1	0.000
Non-program	1961	415 (21.2%)	112	117.0	-	-	-
Program	470	135 (28.7%)	147	141.9	-	-	-
Metropolitan	1430	297 (20.8%)	94	106.5	13.723	1	0.000
Non-program	1284	265 (20.6%)	99	108.8	-	-	-
Program	146	32 (21.9%)	69	84.7	-	-	-
Micropolitan	563	147 (26.1%)	74	96.0	2.852	1	0.091
Non-program	470	123 (26.2%)	77	98.1	-	-	-
Program	93	24 (25.8%)	60	84.2	-	-	-
Small Town	523	155 (29.6%)	77	102.7	6.48	1	0.011
Non-program	316	87 (27.5%)	68	94.2	-	-	-
Program	207	68 (32.9)	96	114.7	-	-	-
Rural	543	135 (24.9%)	58	87.7	31.181	1	0.000
Non-program	314	68 (21.7%)	38	69.6	-	-	-
Program	229	67 (29.3%)	90	111.6	-	-	-

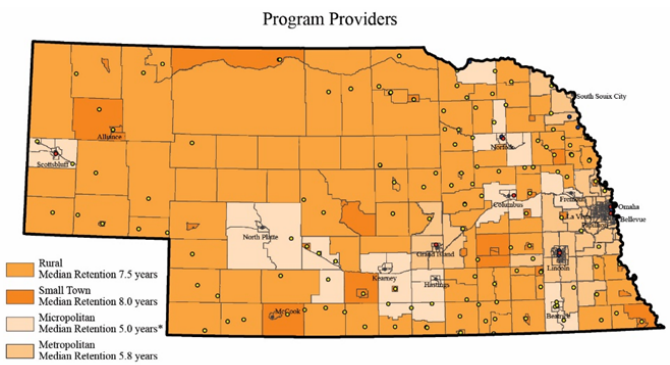
Median Months Worked

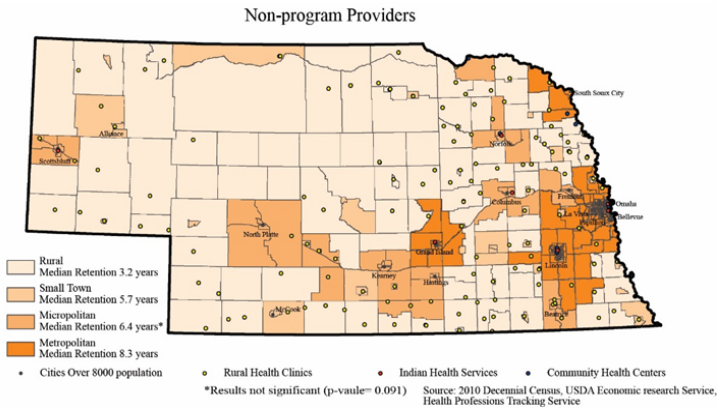
- Median length of retention for all providers statewide shows shorter retention in rural areas and longer retention in metropolitan areas

- Program providers have the longest median length of retention in small town and rural areas. Retention is shortest in metropolitan and micropolitan areas

- Non-program providers have a longer median length of retention in metropolitan areas and a relatively short median length of retention in rural areas







Cox Proportional Hazard

- CPH analysis generates a Hazard Ratio that compares the rate of "failure" between program and non-program providers
- Statewide, program providers leave the state at a rate 25.7% lower than non-program providers
- In small town areas program providers leave at a rate 23.7% lower than non-program providers
- In rural areas, program providers leave at a rate 42.9% lower than non-program providers
- For metropolitan and micropolitan areas, program providers left at rates higher than non-program providers

	B	SE	df	P-value	Hazard Ratio	HR 95% Confidence Interval Lower	HR 95% Confidence Interval Upper
Statewide							
Non-program	-	-	-	-	-	-	-
Program	-0.297	0.060	1	0.000	0.743	0.661	0.837
Metropolitan							
Non-program	-	-	-	-	-	-	-
Program	0.365	0.100	1	0.000	1.441	1.185	1.751
Micropolitan							
Non-program	-	-	-	-	-	-	-
Program	0.223	0.133	1	0.094	1.25	0.963	1.623
Small Town							
Non-program	-	-	-	-	-	-	-
Program	-0.271	0.108	1	0.012	0.763	0.618	0.942
Rural							
Non-program	-	-	-	-	-	-	-
Program	-0.560	0.102	1	0.000	0.571	0.468	0.698

Planning Implications

- Found statistically significant evidence that state and federal incentive programs positively influence the retention of family medicine providers in rural and small town areas of Nebraska.
    - Reinforces the importance of incentive programs and the role they play in the retention of rural healthcare providers
- Economic analysis based on years worked, show a significant economic benefit associated with rural healthcare providers. This benefit far outweighs the financial investment in incentive programs
- Established a methodology that can be implemented using HPTS data to explore other factors that could influence retention
    - Does program type effect retention?
    - Does facility type influence retention?