NATIONAL CONSORTIUM OF
TELEHEALTH
RESOURCE CENTERS

The Classic Tale of the Haves and the Have-Nots: Disparities in Telehealth Availability in Rural Hospitals

June 16, 2022

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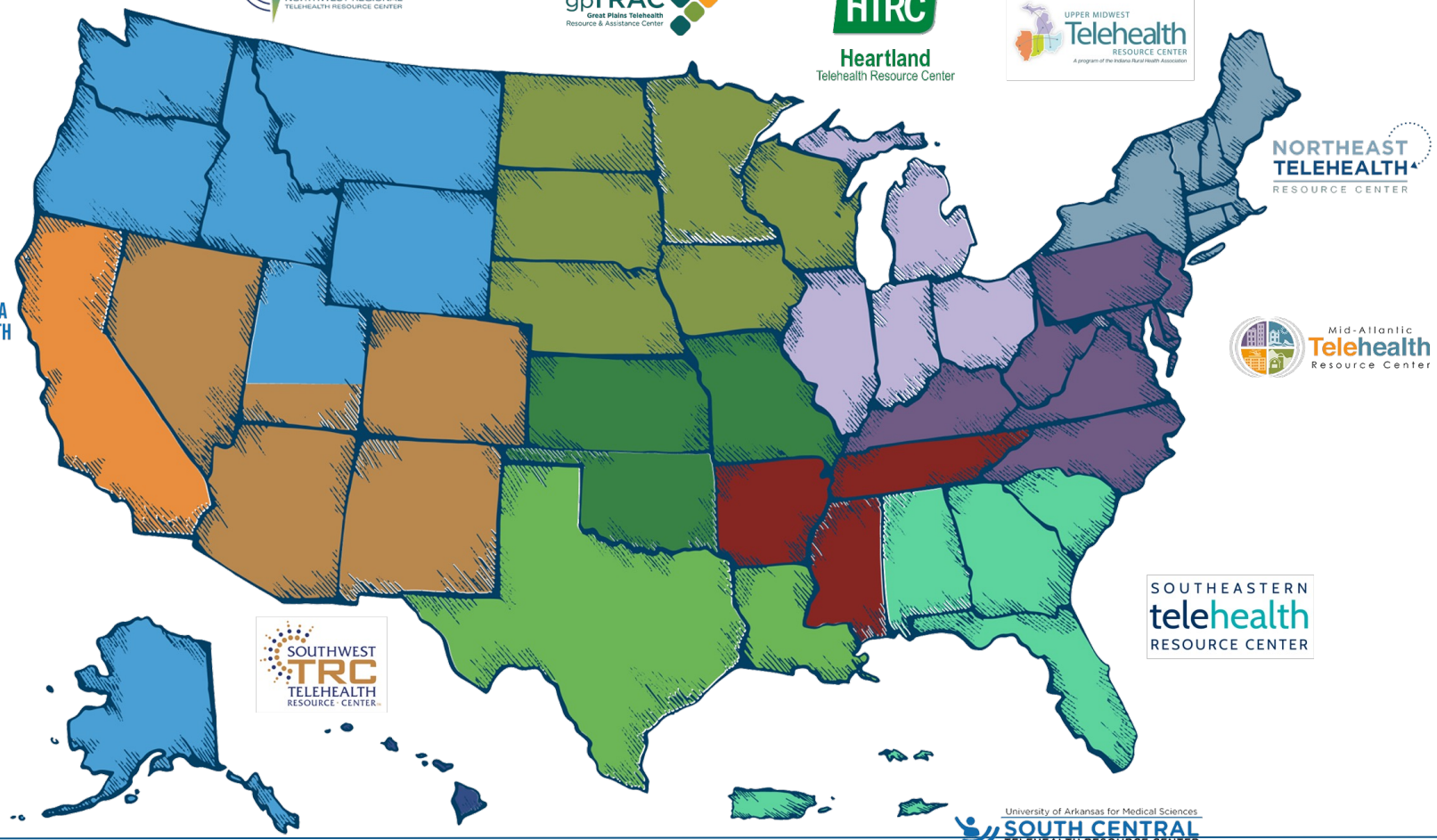

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THE CLASSIC TALE OF

the HAVES and the HAVE-NOTS

Disparities in Telehealth Availability in Rural Hospitals

Association of Telehealth Technology and Financial Performance in Rural Hospitals

The Rural Telehealth Evaluation Center (RTEC) is funded by the Federal Office of Rural Health Policy (FORHP), the US Health Resources and Services Administration (HRSA) (Grant # U3GRH4001) to conduct evaluation research on telehealth services, which aligns with Section 711 of the Social Security Act.

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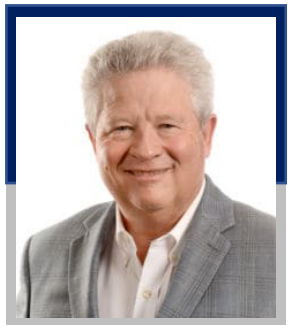

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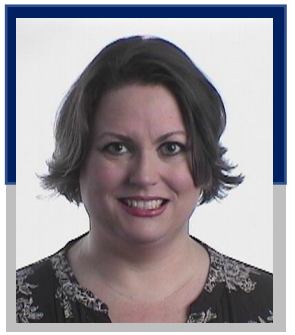

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THE CLASSIC TALE OF

the HAVES and the HAVE-NOTS

Disparities in Telehealth Availability in Rural Hospitals

AGENDA

- Defining "HAVES" and "HAVE-NOTS"
- Background
- Study Motivation
- Research Hypothesis & Objective
- Research Methods
- Results & Conclusions
- Next Steps

the haves /hævz/

noun [plural]

Definition of *the haves*

: people who have a lot of money and possessions **:** wealthy people

the have-nots /ˈhav ˌnäts/

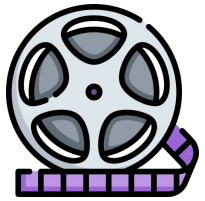
noun [plural]

Definition of *the have-nots*

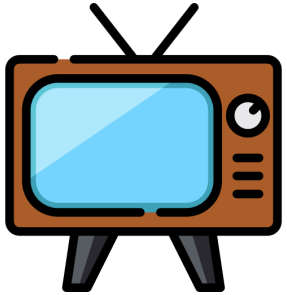
: people who have little money and few possessions : poor people

HAVES & HAVENOTS

Books & Stories



Hollywood Movies



Television Shows

Researchers & Policy Makers

Study Background – Rural Hospitals & Telehealth

Rural Hospitals make up >50% of all hospitals in the U.S. – providing essential access to inpatient, outpatient and emergency medical services in rural communities.

CHALLENGES:

- Low reimbursement rates
- Reduced patient volume
- Uncompensated care
- Low profit margins
- Limited access to technology
- Difficulty recruiting and retaining providers
- Increased reliance on Medicare & Medicaid reimbursement

Study Background – Rural Hospitals & Telehealth

Telehealth assists on expanding access and improve quality of **rural healthcare**.

Technology to help with the delivery of clinical healthcare services provided at a distance.

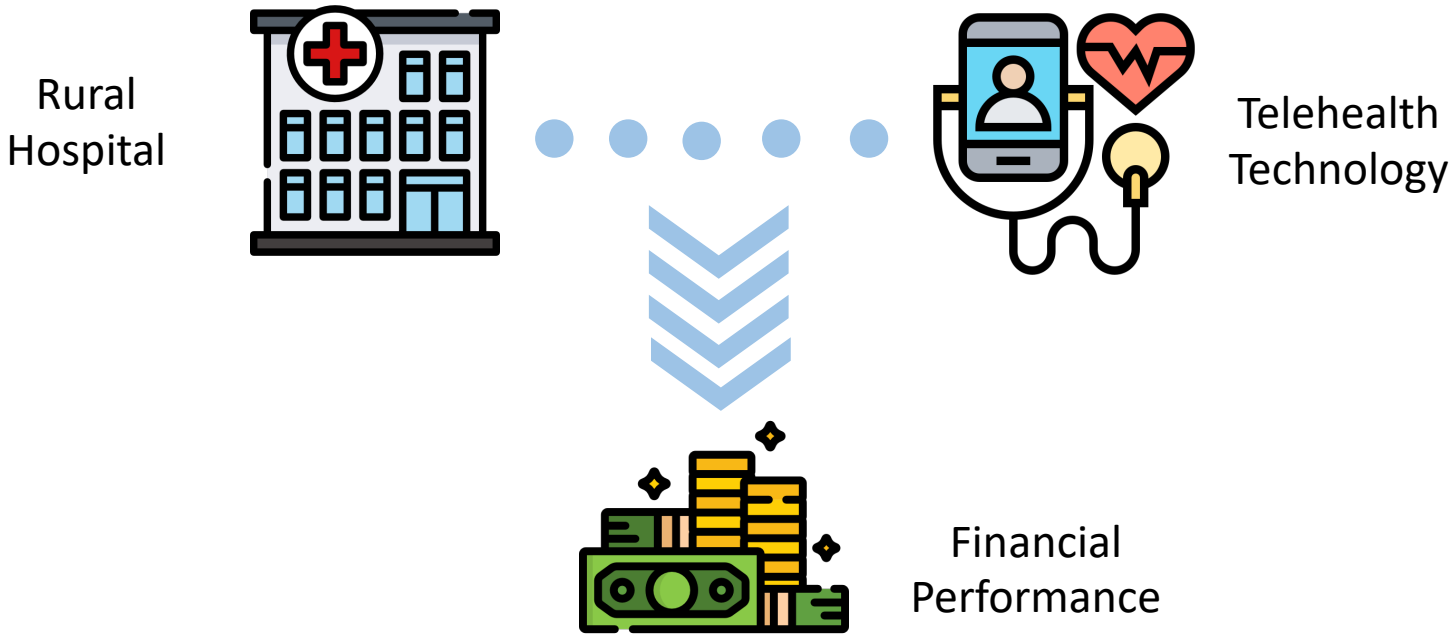
BENEFITS:

- Increase patient volume
- Increase quality of care
- Reduce costs by reducing readmission
- Increase patient access to specialty care
- Improve patient outcomes
- **Increase patient revenue & decrease costs**

Study Motivation

RESEARCH OBJECTIVE*

To determine the association of **telehealth technology** and **financial performance** on rural hospitals.



**FORHP & HRSA funded objective (Grant # U3GRH4001) to conduct evaluation research on telehealth services.*

Study Motivation

Rural Hospital

Telehealth Technology

Financial Performance

Treatment

Control (✕ Telehealth) "HAVENOTS"

Always (✓ Telehealth) "HAVES"

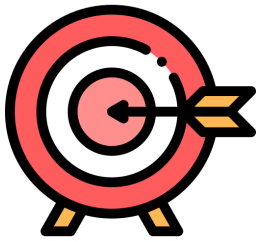
FORHP

HAVES & HAVE-NOTS

Research Hypothesis & Objectives

HYPOTHESIS

Telehealth adoption in rural hospitals may be related to financial health, hospital and community characteristics.

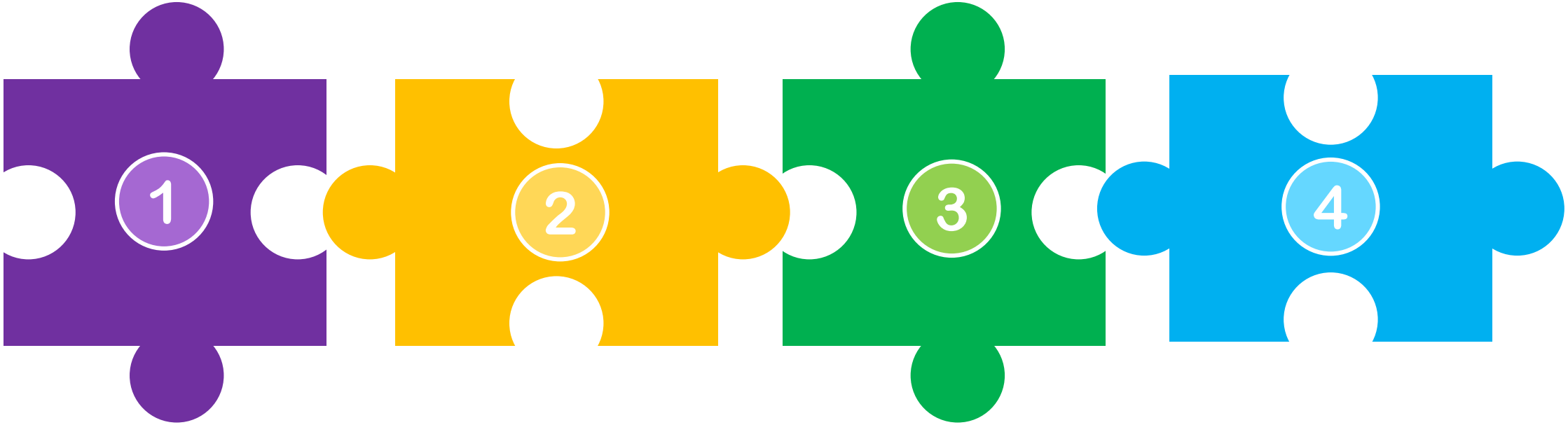


OBJECTIVES

This study investigates the relationship between financial, hospital and community factors and telehealth adoption in rural hospitals.

Research Methods

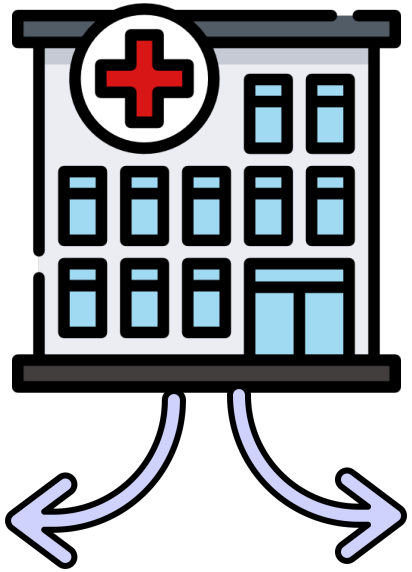
DATA SOURCES



HCRIS (Healthcare Cost Report Information System); AHA (American Hospital Association).

Research Methods

HOSPITAL STUDY SAMPLE



Rural Hospitals*
(2009 to 2019: 11 years)

EXCLUSIONS

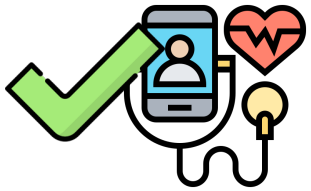
- Hospitals closed from 2009 to 2021.
- Hospital treatment group.

INCLUSIONS

- Hospitals with 1-year days in period reporting (~365 days).
- Hospital "**Haves**" & "**Have-Nots**."

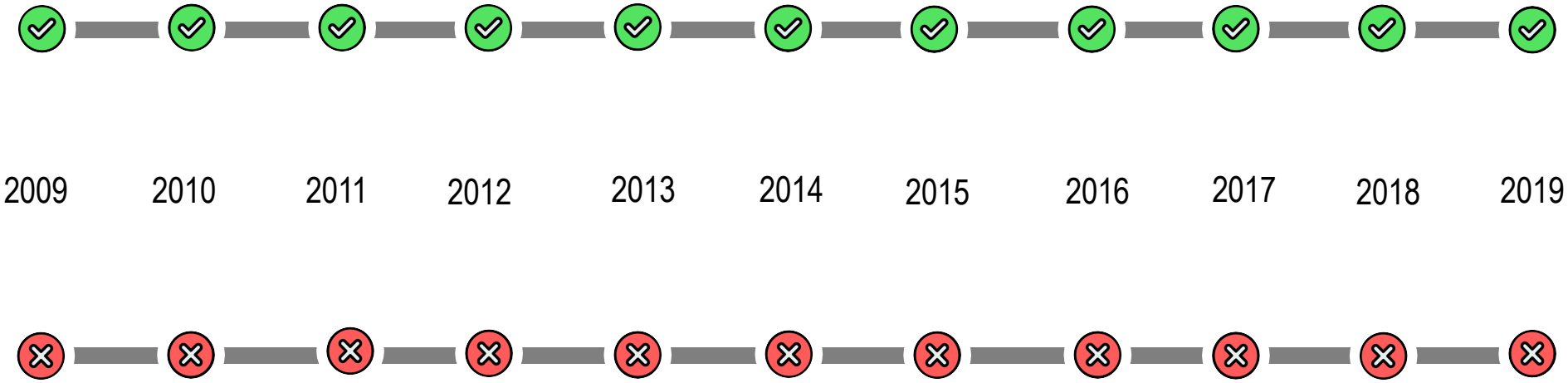
*Rural hospitals were defined as short-term general acute nonfederal facilities with special payment designations, as well as hospitals with no special payment designations located in a nonmetropolitan county or in a subcounty area with a Rural Urban Commuting Area codes of 4 or greater; this is the definition used by the Federal Office of Rural Health Policy as well as other federal programs.

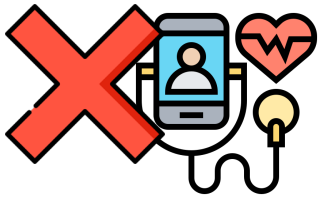
Research Methods



Always
(✓ Telehealth)
"HAVES"

Rural Hospital





Control
(✖ Telehealth)
"HAVE-NOTS"

Research Methods

VARIABLES – DEPENDENT VARIABLE

OPERATING MARGIN

Measure of hospital profitability from patient services.

TOTAL MARGIN

Measure of overall hospital profitability from operating and non-operating sources.

Research Methods

VARIABLES – INDEPENDENT CONTROL VARIABLE

Hospital Characteristics

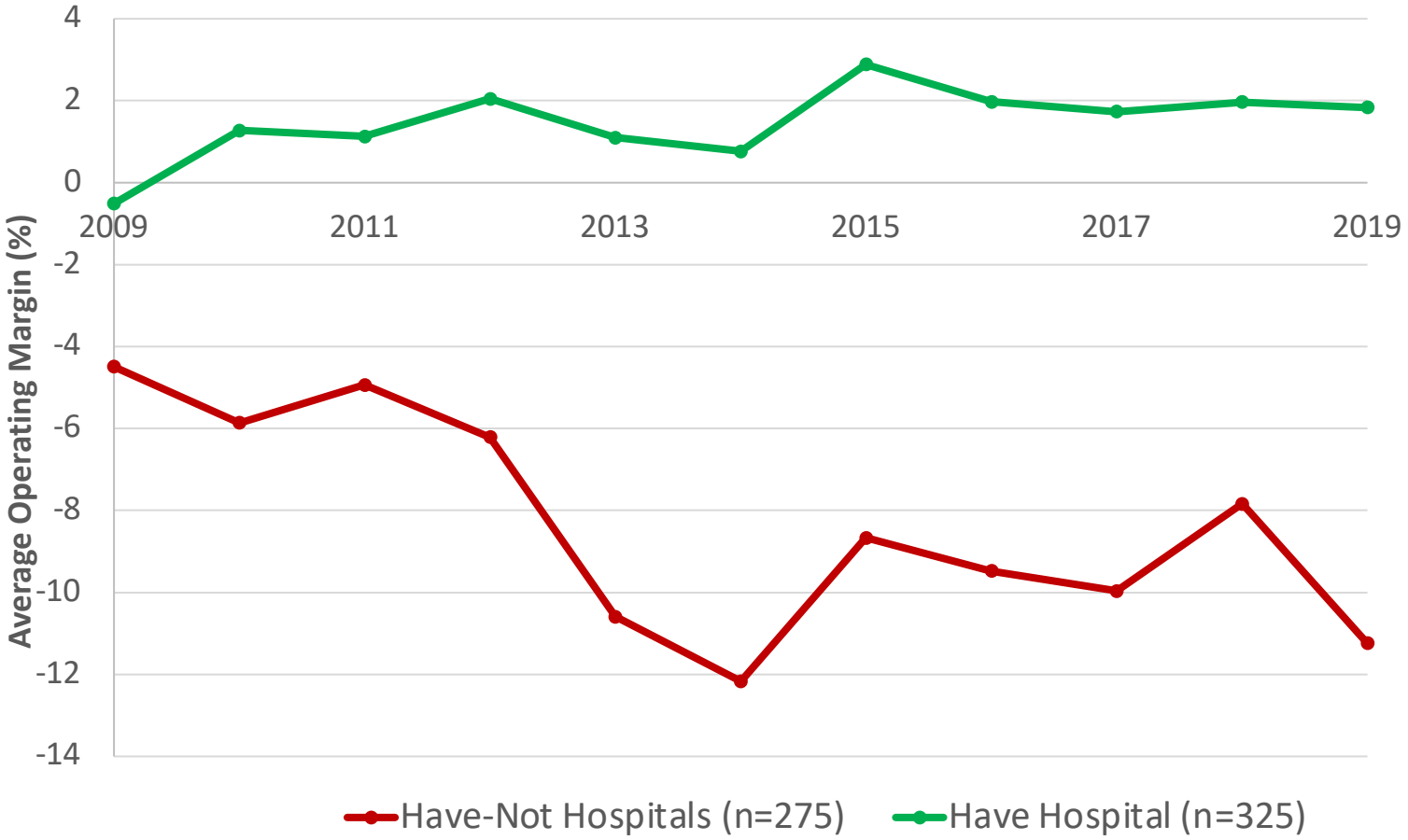
- Hospital ownership
- Patient mix (Medicare & Medicaid)
- Hospital size (bed size)

Community Characteristics

- Percent seniors (≥ 65 years)
- Poverty rate
- Unemployment rate
- Per capita income
- Population density
- Hospital concentration

Results & Conclusions

UNADJUSTED AVERAGE OPERATING MARGIN (%)



Haves Hospitals

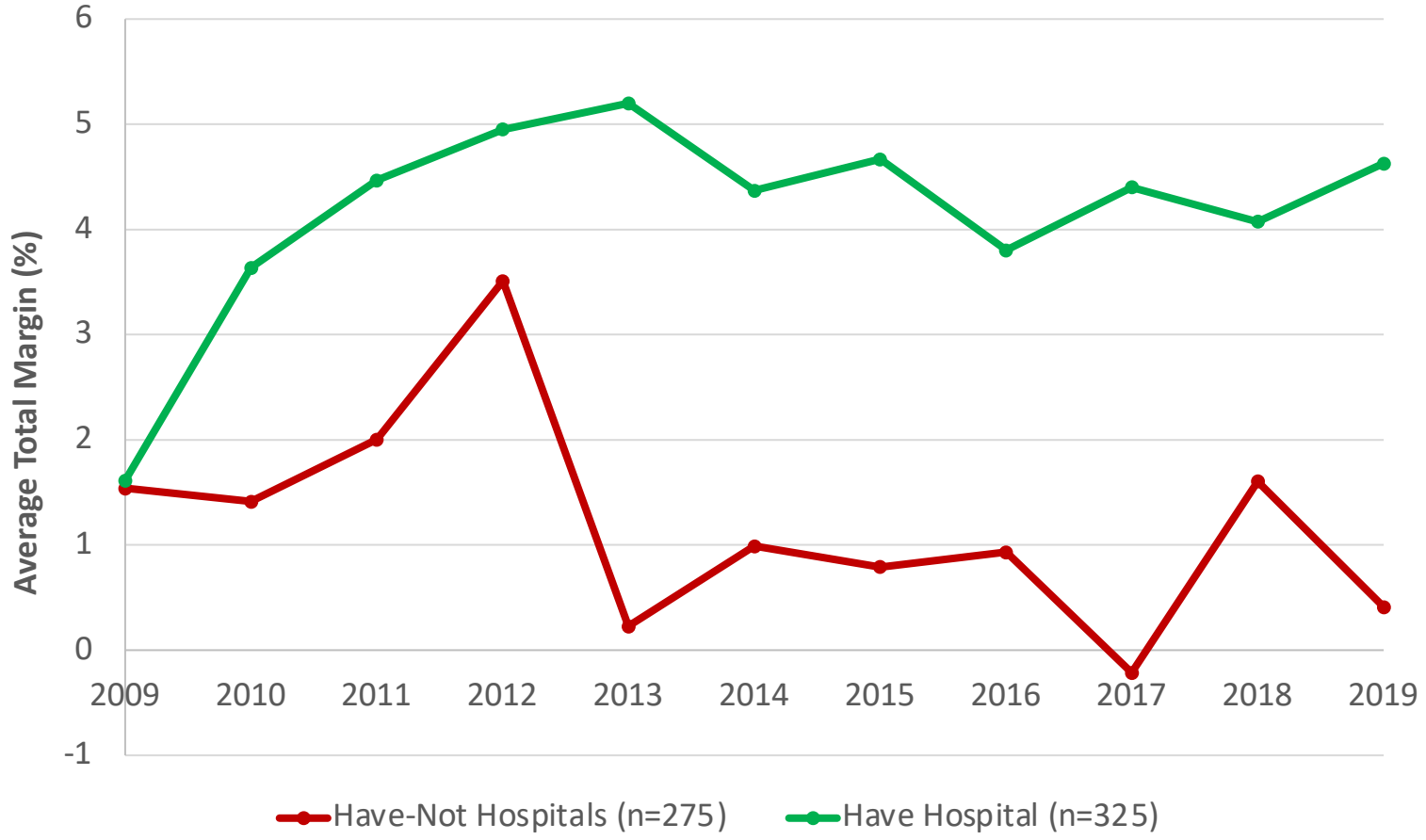
- n=325 hospitals
- Average: 1.49%

Have-Not Hospitals

- n=275 hospitals
- Average: –7.73%

Results & Conclusions

UNADJUSTED AVERAGE TOTAL MARGIN (%)



Haves Hospitals

- n=325 hospitals
- Average: 4.14%

Have-Nots Hospitals

- n=275 hospitals
- Average: 1.35%

Results & Conclusions

HOSPITAL CHARACTERISTICS

Variables	Have Hospitals (n=325 Hospitals)	Have-Not Hospitals (n=275 Hospitals)	P value
Hospital Ownership (%)			
Not-for-profit	1,090 (65.0%)	386 (38.7%)	
For-profit	187 (11.2%)	168 (16.8%)	<0.001
Government	400 (23.9%)	444 (44.5%)	
Total Beds ($\bar{x}$, sd)	151.53 (239.1)	67.18 (121.2)	<0.001
% Medicare inpatient days ($\bar{x}$, sd)	46.25 (14.58)	52.44 (17.4)	<0.001
% Medicaid inpatient days ($\bar{x}$, sd)	10.9 (8.9)	10.3 (9.8)	0.121

Have-Not Hospitals = 998 hospital-year observations; Have Hospitals = 1,677 hospital-year observations.

RESULTS & CONCLUSIONS

COMMUNITY CHARACTERISTICS

Variables	Have Hospitals (n=325 Hospitals)	Have-Not Hospitals (n=275 Hospitals)	P value
Population density (persons per sq. mile) ($\bar{x}$)	547.3 (5,248.7)	308.4 (2,657.5)	0.181
Percent seniors (>65 years) ($\bar{x}$)	17.5 (3.9)	17.3 (4.3)	0.204
Unemployment Rate (%) ($\bar{x}$)	6.4 (3.2)	7.1 (3.2)	<0.001
Percent <65 years without health insurance ($\bar{x}$)	13.6 (5.4)	16.6 (6.5)	<0.001
Per capita income ($) ($\bar{x}$)	$41,181.7 (14,135.4)	$37,952.9 (10,759.2)	<0.001
Poverty rate (%) ($\bar{x}$)	15.8 (5.5)	16.9 (6.1)	<0.001
Hospital concentration (# of hospitals in the county)	3.1 (7.9)	2.3 (3.5)	<0.001

Have-Not Hospitals = 998 hospital-year observations; Have Hospitals = 1,677 hospital-year observations.

Results & Conclusions

LOGISTIC REGRESSION RESULTS [P(Y=HAVE | X_i)]

Independent Variables	Telehealth Status: Haves Versus Have-Nots	
	Marginal Effects (dy/dx)	Standard Errors
Hospital characteristics		
Government hospitals[a]	–.17***	.021
For-profit hospitals[a]	–.16***	.029
Total beds	.00060***	.00010
Medicare patient mix percentage	–.0037***	.00070
Medicaid patient mix percentage	–.000094	.0011
Community characteristics		
Population density (persons per square mile)[b]	–.020*	.0086
Percent seniors (>65 years)	.0046	.0026
Unemployment rate (%)	.00073	.0042
Percent <65 years without health insurance	–.013***	.0021
Per capita income ($)[b]	–.072	.058
Poverty rate (%)	–.0019	.0023
Hospital concentration (# of hospitals in the county)	.0042*	.0016

*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

Results & Conclusions

ORDINARY LEAST SQUARES REGRESSION RESULTS

Independent Variables	Operating Margin (%)		Total Margin (%)	
	Marginal Effects (dy/dx)	Robust Standard Errors	Marginal Effects (dy/dx)	Robust Standard Errors
Hospital telehealth status (Have)[a]	6.92***	.54	2.18***	.41
Hospital characteristics				
Government hospitals[b]	–4.48***	.56	–.30	.40
For-profit hospitals[b]	3.39***	.81	.46	.70
Total beds	.0025	.0014	.0033**	.0011
Medicare payer mix percentage	–.019	.022	–.058***	.016
Medicaid payer mix percentage	.16***	.032	–.055**	.024
Community characteristics				
Population density (persons per square mile)[c]	.19	.25	–.49**	.18
Percent seniors (>65 years)	–.39***	.079	–.34***	.063
Unemployment rate (%)	.13	.11	–.040	.087
Percent <65 years without health insurance	–.55***	.076	–.0087	.049
Per capita income ($)[c]	–5.26**	1.84	2.71*	1.27
Poverty rate (%)	–.17*	.070	–.068	.054
Hospital concentration (# of hospitals in the county)	–.044	.030	–.040*	.019

*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

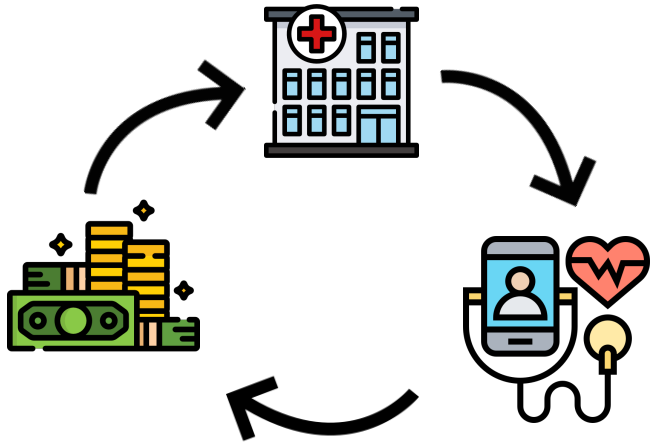
Results & Conclusions

VARIATION IN "HAVES" & "HAVE-NOT" RURAL HOSPITALS

Always "HAVES" ≠ Control "HAVE-NOTS"

- Access
- Quality
- Outcomes

CANNOT INFER CAUSALITY – TELEHEALTH ADOPTION & FINANCIAL PERFORMANCE



.....WHICH CAME FIRST?

Results & Conclusions

STUDY LIMITATIONS

1 **Telehealth Identification**

- Annual variation in telehealth definition & creating a dichotomous indicator.
- Hospital variation of telehealth status reporting.
- Missing data.

2 **Cost Report Data**

- Hospital financial reporting >365 days (i.e., 450 days).
- Outliers in financial data.
- Missing data.

Next Steps

YEAR 2

- Urban versus rural hospital differences in telehealth adoption – financial performance, market share, etc.

YEAR 1

- Assess the association of telehealth adoption on financial performance of rural hospitals.

YEAR 3 PROPOSED

- Telehealth adoption by rural hospitals during COVID-19 pandemic.
  [HAVE-NOTS pre-pandemic to HAVES during pandemic].

THANK YOU!

Our Next Webinar

The NCTRC Webinar Series

Occurs 3rd Thursday of every month.

Telehealth Topic: TBA
Hosting TRC: Pacific Basin Telehealth Resource Center (PBTRC)
Date: July 21, 2022
Times: 11 AM – 12 PM (PT)

***Please check the NCTRC website for more information on the upcoming webinar.**

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