

Veterans' Use of and Outcomes from VA and Non-VA Hospitals

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Disclaimer

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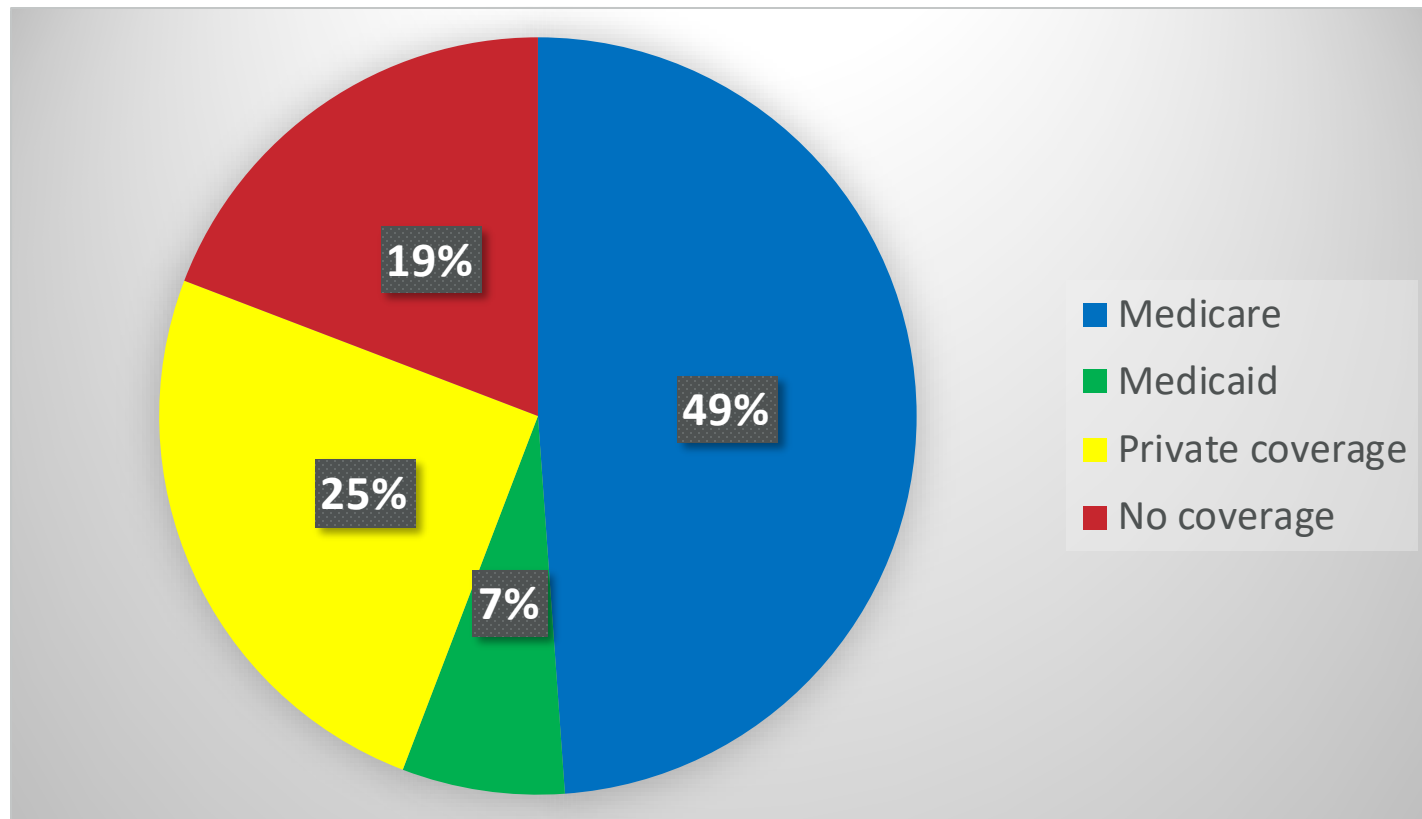
Outline

- Background
- VA-state discharge data linkage
- Research Questions
 - How did Veterans' use of VA and non-VA hospitals change after access expansions?
 - What patient and hospital factors affected Veterans' use of VA or non-VA hospitals?
 - How did outcomes in VA hospitals compare with outcomes in non-VA hospitals?
- Summary

Background

- More than 9 million Veterans enrolled in Veterans Affairs (VA) health care system
- 171 VA medical centers including outpatient care, inpatient care, rehabilitation, long-term care
 - 140 with acute medical/surgical beds
- VA purchases care from the community when services unavailable on site
- Many Veterans also enrolled in insurance programs (e.g., Medicare, Medicaid, employer-based care, CHAMPUS).

Most Veterans Enrolled in VA Have Other Sources of Health Insurance



Source: VA Enrollee Survey, 2021

Factors Influencing Use of VA Care

- 61% of VA enrollees used any VA care during the year and 31% used only VA care (VA Enrollee Survey, 2021)
- More VA use among Veterans living closer to VA site, higher priority for care, having substance abuse and mental health disorders
- Veterans more likely to use VA hospitals who had mental health conditions, eye conditions, amputations, or infectious/parasitic conditions.

Veterans' Choice Act



Whistleblower Says VA Hospital Problems, Delayed Care
Dr. Samuel Foote was the first to allege that in an effort to improve care, he kept a secret unofficial list of veterans.

VA Office of Inspector General

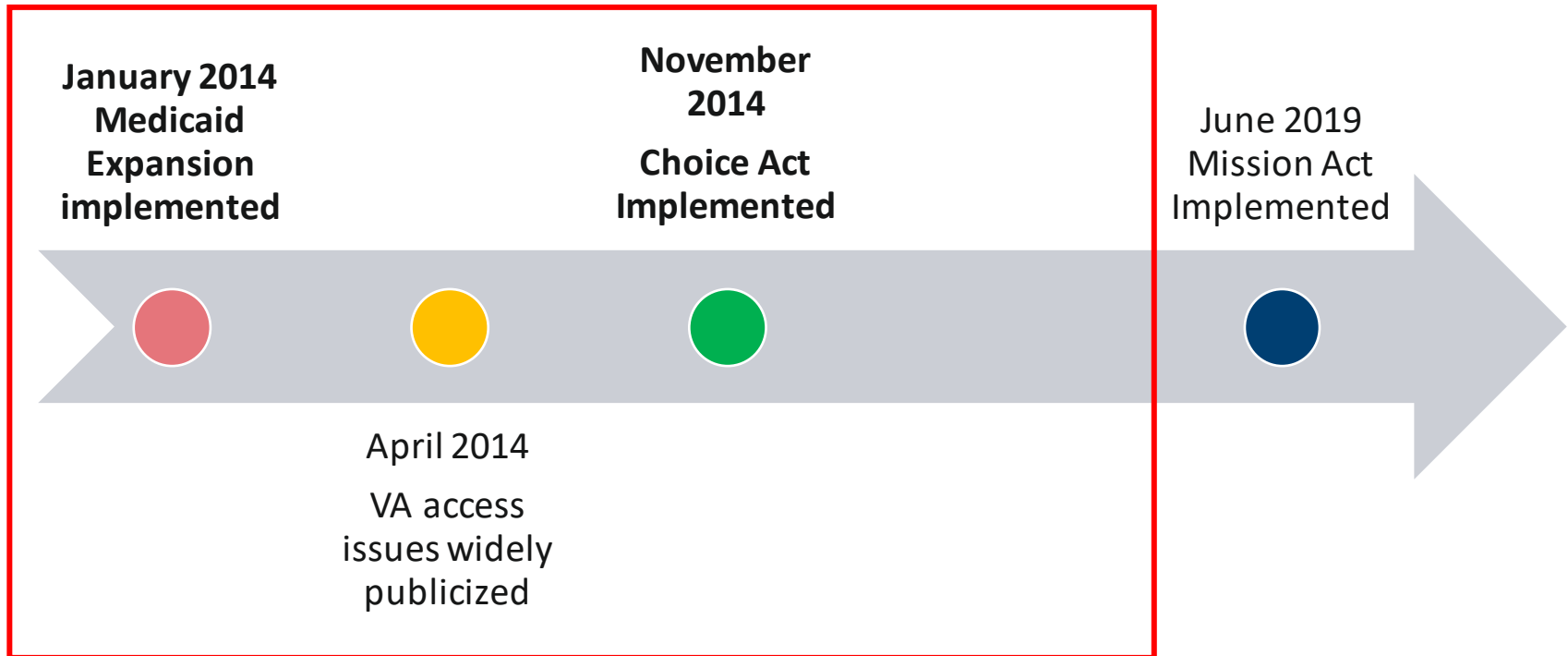
Veterans Health Administration - Interim Report -

Review of Patient Wait Times, Scheduling Practices, and Alleged Patient Deaths at the Phoenix Health Care System



- Long wait times for VA care widely publicized in 2014
- Veterans Access, Choice and Accountability Act (Choice Act) expanded purchased care for Veterans with geographic, wait time, or other barriers
- Choice Act implemented November 2014

Timeline for Non-VA Care Access Expansions



Prior Studies on VA Vs. Non-VA care

- Many studies showing better process quality and outcome measures for VA care versus non-VA care
 - Inpatient surgery, ED care, receipt of preventive care*
- Studies preceded expansions to non-VA care through Choice Act and Affordable Care Act
- Comparisons usually for VA versus Medicare
- Lack of data on other payers for younger Veterans

*Nuti SV, Qin L, Rumsfeld JS, et al. Association of admission to veterans affairs hospitals vs non-veterans affairs hospitals with mortality and readmission rates among older men hospitalized with acute myocardial infarction, heart failure, or pneumonia. *Jama*. 2016;315(6):582-592.

George EL, et al. Comparing Veterans Affairs and Private Sector Perioperative Outcomes After Noncardiac Surgery. *JAMA surgery* 2021.

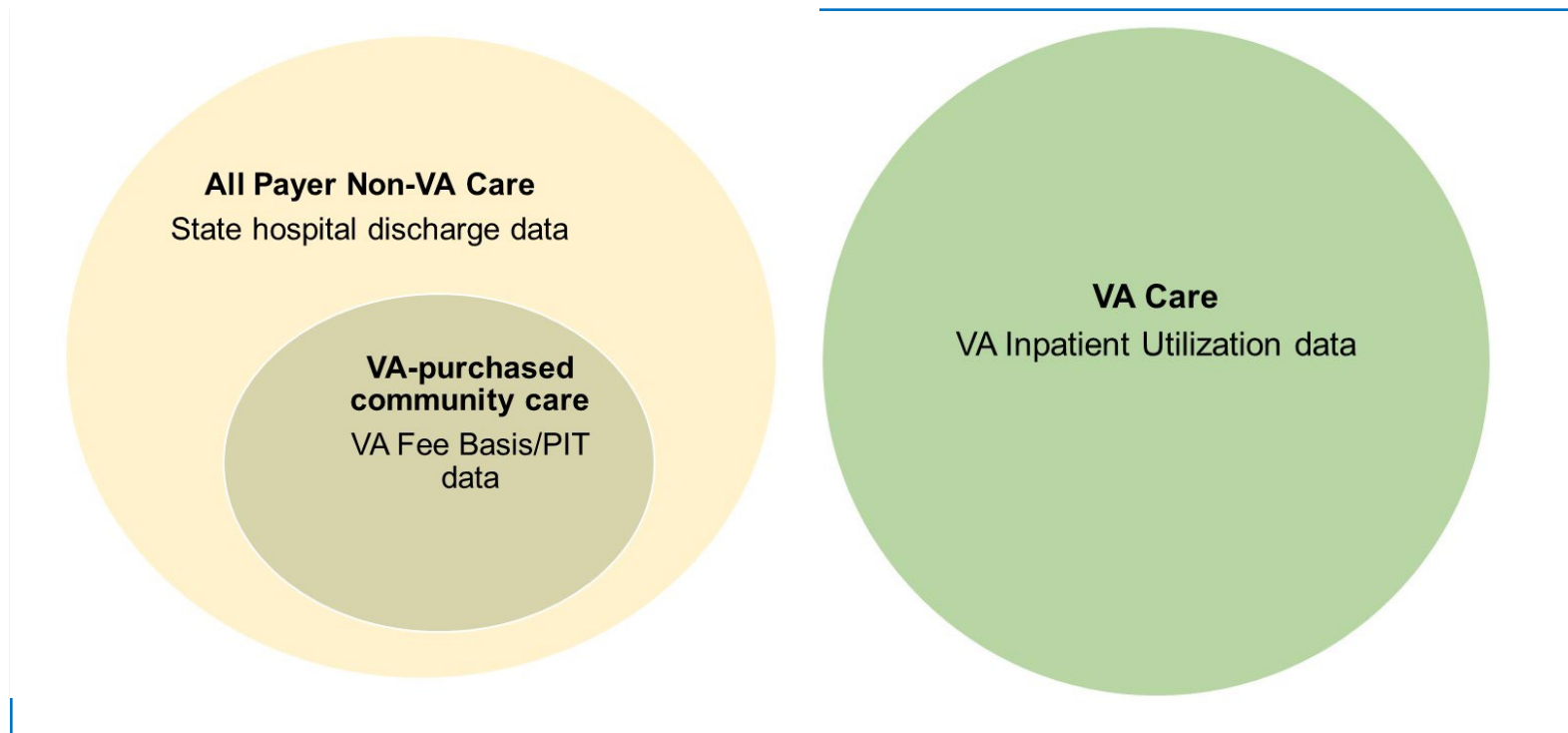
Chan D C, et al. Mortality among US veterans after emergency visits to Veterans Affairs and other hospitals. *BMJ* 2022

Kerr EA, Gerzoff RB, Krein SL, et al. Diabetes care quality in the Veterans Affairs Health Care System and commercial managed care: the TRIAD study. *Annals of internal medicine*. 2004;141(4):272-281.

VA-State Discharge Data Linkage

- Most states collect discharge data on all non-federal hospitals licensed in the state
- States make discharge data available to researchers
- Linkage of VA enrollment data with state discharge data using personal identifiers limited to small number of states (11 total)
 - VAMCs can share data on VA patients under Federal System of Record
- Challenges of linking PHI, transferring encrypted data, review of state data use agreements, variation in state regulations

Comprehensive Dataset of Hospital Records for VA Enrollees



Changes in Veterans' Use of VA and Non-VA Hospitals Following Access Expansions

Yoon J, Kizer KW, Ong MK, Zhang Y, Vanneman ME, Chow A, Phibbs CS. Health Care Access Expansions and Veterans' Use of Veterans Affairs and Other Hospitals. JAMA Health Forum. 2022;3(6):e221409

Dizon MP, Kizer KW, Ong MK, Phibbs CS, Vanneman ME, Wong E, Zhang Y, Yoon J. Differences in Use of Veterans Health Administration and non-VHA Hospitals by Rural and Urban Veterans After Access Expansion. J Rural Health. 2023. Published online



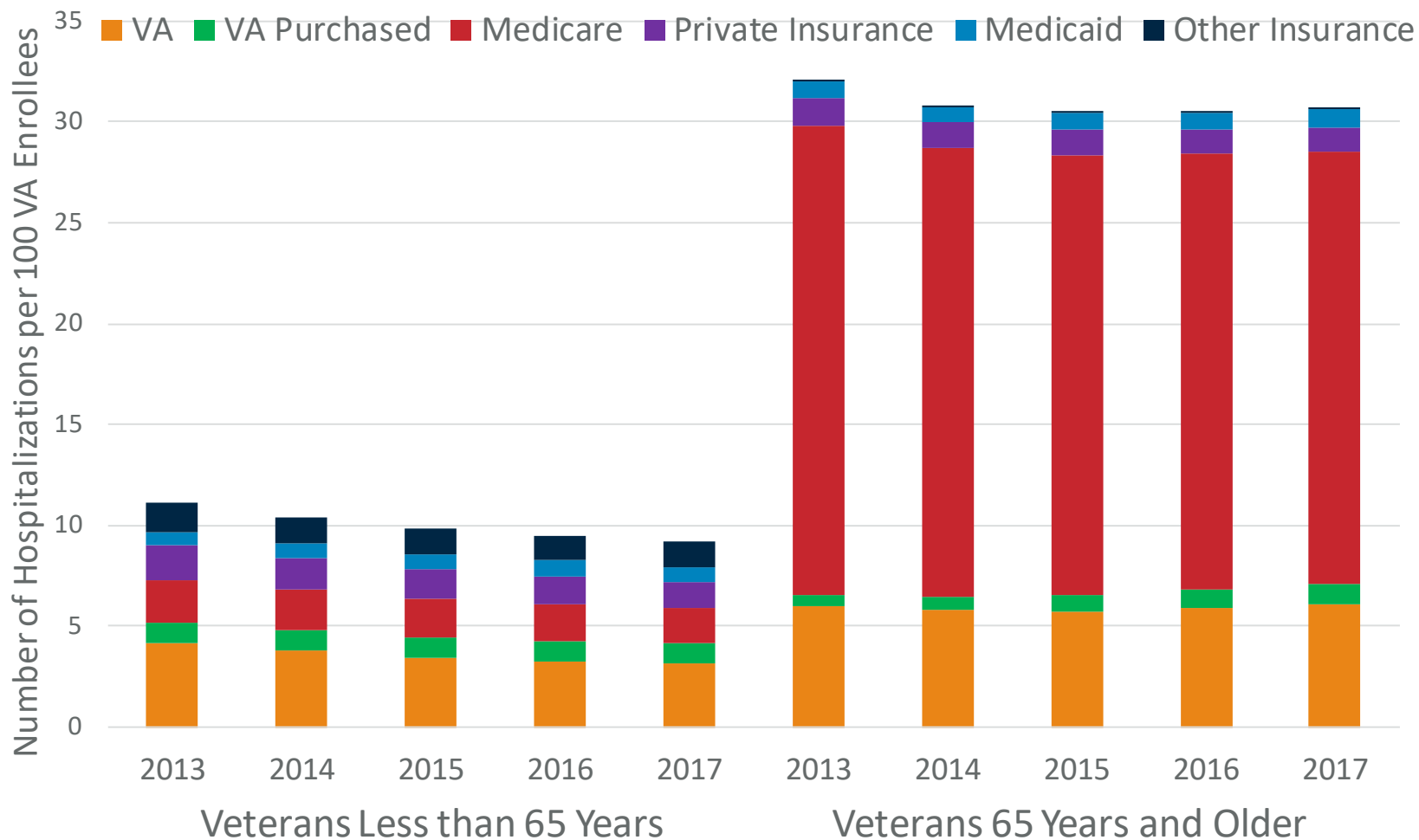
Research Questions

- Unknown how Veterans' Choice Act and Medicaid Expansion affected Veterans' use of VA and non-VA hospitals.
 - Estimated total number of acute hospitalizations in VA hospitals and non-VA hospitals by payer (included VA-purchased care), 2012/2013-2017
 - Initially 5 states and updated later for 11 states
 - Examined changes in use of VA and non-VA hospitals in rural areas.
 - Compared changes for elective versus non-elective hospitalizations and rural versus urban veterans
 - Measured changes in distance traveled to hospitals

Methods

- Identified all VA enrollees in study states and their use of VA and non-VA hospitals in each year
- Negative binomial models estimated number of hospitalizations for each system/payer
- Separate models for changes occurring pre/post:
 - Medicaid expansion by state and year
 - VCA period beginning with 2015, the first full year of implementation.
- Models adjusted for yearly trend, enrollee and community characteristics, state, and enrollee random effects
- Separate analysis for changes in VA and community care hospitalizations for rural/ urban veterans and elective/non-elective hospitalizations
- Estimated travel distance to admitted hospital pre/post VCA

Results: Number of Acute Hospitalizations by System/Payer, 2013-2017*



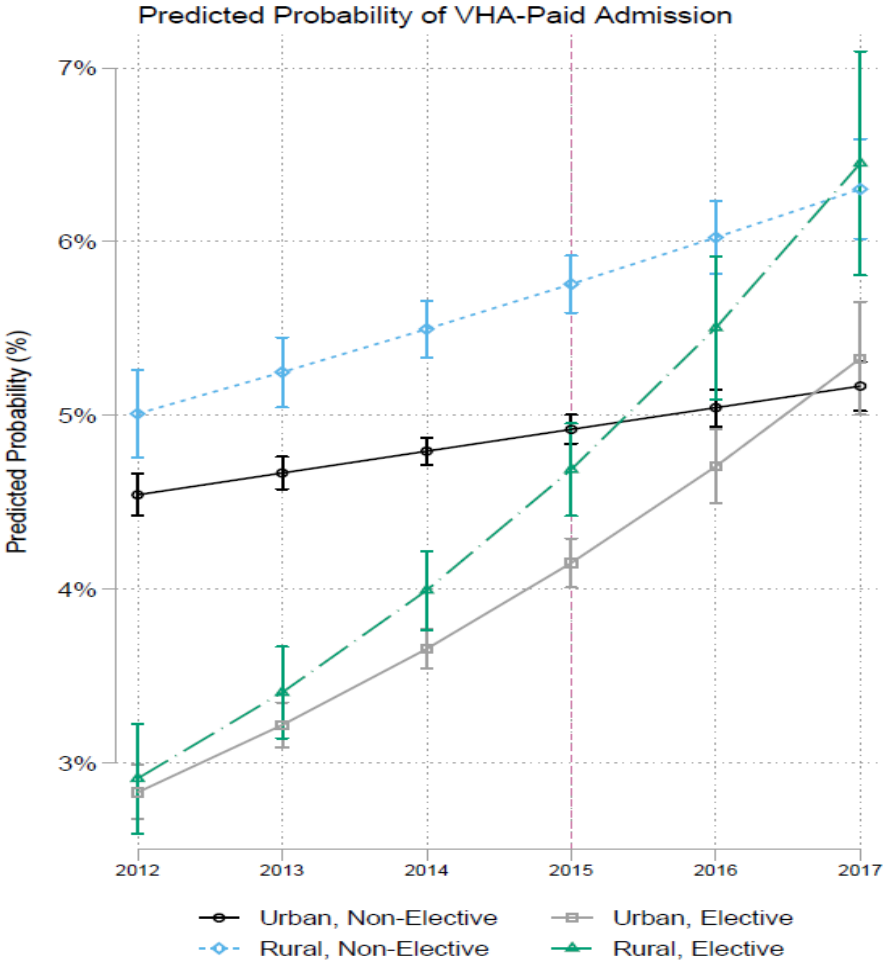
*11 state analysis

Results: Decrease in VA Hospitalizations, Increase in Purchased and Medicaid Hospitalizations*

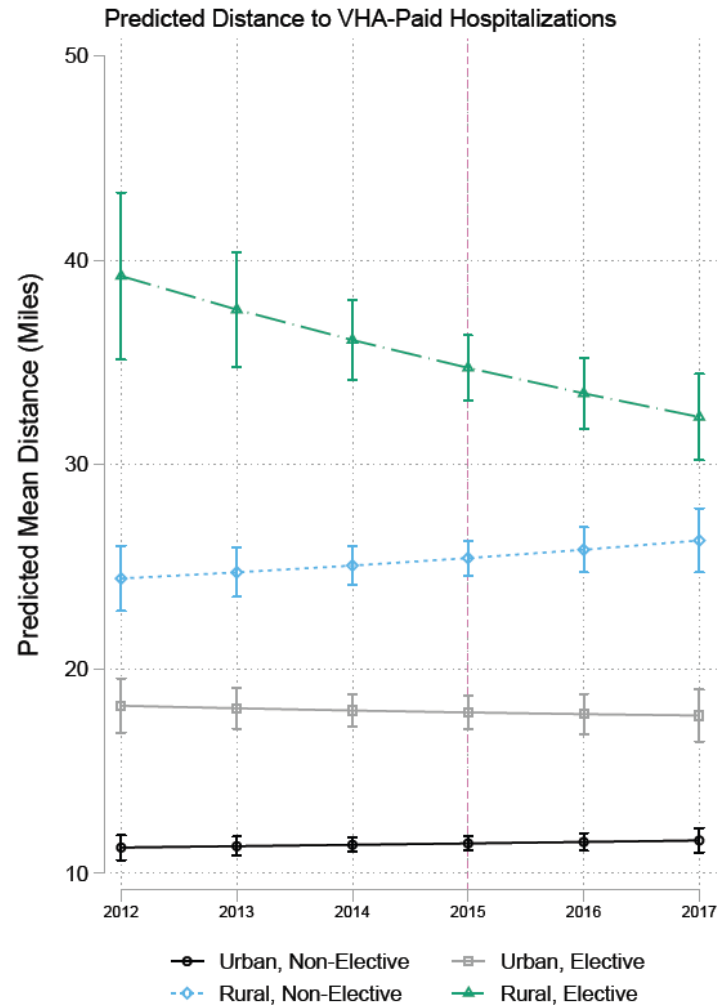
	Mean Difference in Outcome Probability (95% CI)			
	VA hospitalization	VA-purchased community hospitalization	Medicaid hospitalization	Mortality
Post-VCA Period	-4.3% (-5.3, -3.2)	5.0% (2.6, 7.3)	--	0.02% (-0.02, 0.06)
Medicaid Expansion	-2.5% (-3.4, -1.5)	--	19.3% (15.9, 22.7)	0.002% (-0.03, 0.04)

*5 state analysis

Probability of VA-Purchased Hospitalizations Increased the Most for Rural, Elective Hospitalizations



Decrease in Mean Distance Traveled for VA-Purchased Hospitalizations for Rural, Elective Hospitalizations



Summary

- Significant decrease in VA hospitalizations and significant increases in VA-purchased care and Medicaid-covered hospitalizations after VCA and ACA.
- Largest increases in VA-purchased care for elective hospitalizations in rural areas.
- Significant decrease in travel distance for VA-purchased care for elective hospitalizations in rural areas.
- Veterans in rural areas appeared to benefit more from increased access to community care.

Patient and Hospital Factors Affecting Veterans Use of VA and Non-VA Hospitals

Yoon J, Ong MK, Vanneman ME, Zhang Y, Dizon M, Phibbs CS. Hospital and Patient Factors Affecting Veterans' Hospital Choice. Med Care Res Rev. 2024;81(1):58-67.

Research Question

- Increased access to hospital care post-VCA and ACA enables veterans to choose hospitals providing better care or having attributes patients prefer (e.g. higher quality, closer, larger size)
- Period post-VCA and ACA allows observation of which hospitals patients were treated in
 - How hospital factors (e.g. VA affiliation, patient experience, size) affected which hospitals chosen
 - How patient characteristics related to VA or non-VA hospital

Methods

- McFadden conditional choice model used to explain discrete choices
- Patients have utility U from hospital (and other health services) based on characteristics of hospitals/providers such as quality and patients' access to them.
- Choice theory that patients choose hospital from several alternatives based on certain hospital attributes
- Probability of choice j expressed as:

$$Pr_i(j) = \frac{\exp\{V(X_i, H_j)\}}{\sum_j \exp\{V(X_i, H_j)\}}$$

- H is hospital characteristics, X is patient characteristics, that influence choice of hospital.

Conditional Logit Model

- Hospitalizations limited to elective since often preplanned.
- Categorized hospitals in veteran's hospital service area (HSA) as: 1. VA hospital, 2. Large non-VA hospital 200+ beds, and 3. Small non-VA hospital <200 beds
- Alternative-specific conditional logit model with each observation a patient's potential hospital alternative, binary outcome for chosen alternative among all alternatives with covariates for patient and hospital factors.
 - Patients' age, gender, race/ethnicity, marital status, VA priority, Elixhauser-van Walraven comorbidity index, mental health comorbidity, area median income and unemployment rates
 - Hospital academic affiliation, patient experience rating using the percent of patients reporting they were most likely to recommend their hospital to others, number of hospitals of each type, mean travel distance

Results: Frequency of Hospital Type Chosen

Hospital Type	Mean Number in HSA (SE)	Probability of being chosen (SE)
VA Hospitals, N=44	1.1 (0.3)	0.53 (0.50)
Large (200+ beds) Non-VA Hospitals, N=184	5.9 (4.3)	0.40 (0.49)
Small (<200 beds) Non-VA Hospitals, N=158	5.7 (5.5)	0.10 (0.29)

All HSAs included a VA hospital, but not all HSAs included both large and small non-VA hospitals, so numbers do not sum to one.

Hospital Factors Related to Hospital Choice

Hospital Factors	Odds Ratio (SE)
Academic Affiliation	1.77 (0.020)*
Patient experience rating, std	1.08 (0.005)*
Distance to hospital in miles	0.95 (0.001)*
Number of hospitals of chosen type	1.11 (0.001)*

Patient Factors Related to Hospital Choice

Patient Factors	Odds Ratio (SE) Relative to Large Non-VA Hospitals	
	VA Hospital	Small Non-VA Hospital
Year	1.032 (0.00594)*	1.062 (0.0107)*
Post-Choice Period	0.918 (0.0182)*	0.972 (0.0323)
Elixhauser comorbidity score	0.980 (0.000717)*	1.009 (0.00112)*
Age	0.987 (0.000390)*	1.011 (0.000692)*

Patient Factors Related to Hospital Choice

Patient Factors	Odds Ratio (SE) Relative to Large Non-VA Hospitals	
	VA Hospital	Small Non-VA Hospital
Male Gender	1.848 (0.0354)*	1.046 (0.0364)
Female	Ref	Ref
White Race/ethnicity	Ref	Ref
Black	1.424 (0.0188)*	0.864 (0.0209)*
Hispanic	1.174 (0.0244)*	0.947 (0.0361)
Currently married	Ref	Ref
Divorced/separated/widowed	2.349 (0.0243)*	1.153 (0.0207)*
Single never married	2.229 (0.0349)*	1.178 (0.0341)*
VA Priority group 1-2 (highest)	3.064 (0.0416)*	1.103 (0.0237)*
VA Priority group 3-4	2.601 (0.0397)*	1.210 (0.0284)*
VA Priority group 5-6	3.378 (0.0462)*	1.150 (0.0254)*
VA Priority group 7-8 (lowest)	Ref	Ref

Patient Factors Related to Hospital Choice

Patient Factors	Odds Ratio (SE) Relative to Large Non-VA Hospitals	
	VA Hospital	Small Non-VA Hospital
Depression and other mood disorders	0.831 (0.0121)*	1.323 (0.0304)*
Serious mental illness	1.625 (0.0434)*	2.170 (0.0843)*
Substance use disorders	2.047 (0.0407)*	1.692 (0.0582)*
PTSD	2.159 (0.0495)*	0.924 (0.0401)
Area median income, std	1.059 (0.00619)*	0.938 (0.0116)*
Unemployment rate, std	1.003 (0.00641)	1.243 (0.0152)*

Summary

- Hospital factors (academic affiliation, higher patient experience measure, shorter travel distance, more common type) higher likelihood of being chosen
 - VA hospitals may need to improve patient experience and maintain academic affiliations to retain patients
- Patient factors (younger, less comorbidity, male, Black and Hispanic, not married, higher VA priority group, mental comorbidity) higher likelihood of choosing VA vs non-VA hospital

Outcomes in Veterans Affairs Hospitals Compared to Other Hospitals Following Access Expansions

Yoon J, Phibbs CS, Ong MK, Vanneman ME, Chow A, Redd A, Kizer KW, Dizon MP, Wong E, Zhang Y. Outcomes of Veterans Treated in Veterans Affairs Hospitals versus Non-Veterans Affairs Hospitals. JAMA Network Open. 2023. 6(12): e2345898-e2345898.



Study Objectives

- To compare hospital outcomes in VA and non-VA hospitals after patients had expanded access to non-VA care.
 - Mortality, readmissions, length of stay (LOS), costs
- Include Veterans' care in non-VA hospitals purchased by the VA and covered by insurance (e.g. Medicare, Medicaid) using all-payer inpatient discharge records.
- Compare outcomes for younger Veterans (<65 years) and older Veterans (65+ years) separately

Study Design

- Longitudinal study with repeated cross-sections of hospitalizations of Veterans enrolled in VA
- Hospitalizations with discharge date 2013-2017
- Non-VA hospitalization records from all-payer discharge data from 11 states (AZ, CA, CT, FL, IL, LA, MA, MO, NY, PA, SC)
- VA hospitalization records obtained from Inpatient files in Corporate Data Warehouse
- Acute medical/surgical hospitalizations
 - AMI, CABG, GI bleed, HF, pneumonia, stroke
- Non-elective hospitalizations to limit selection issues

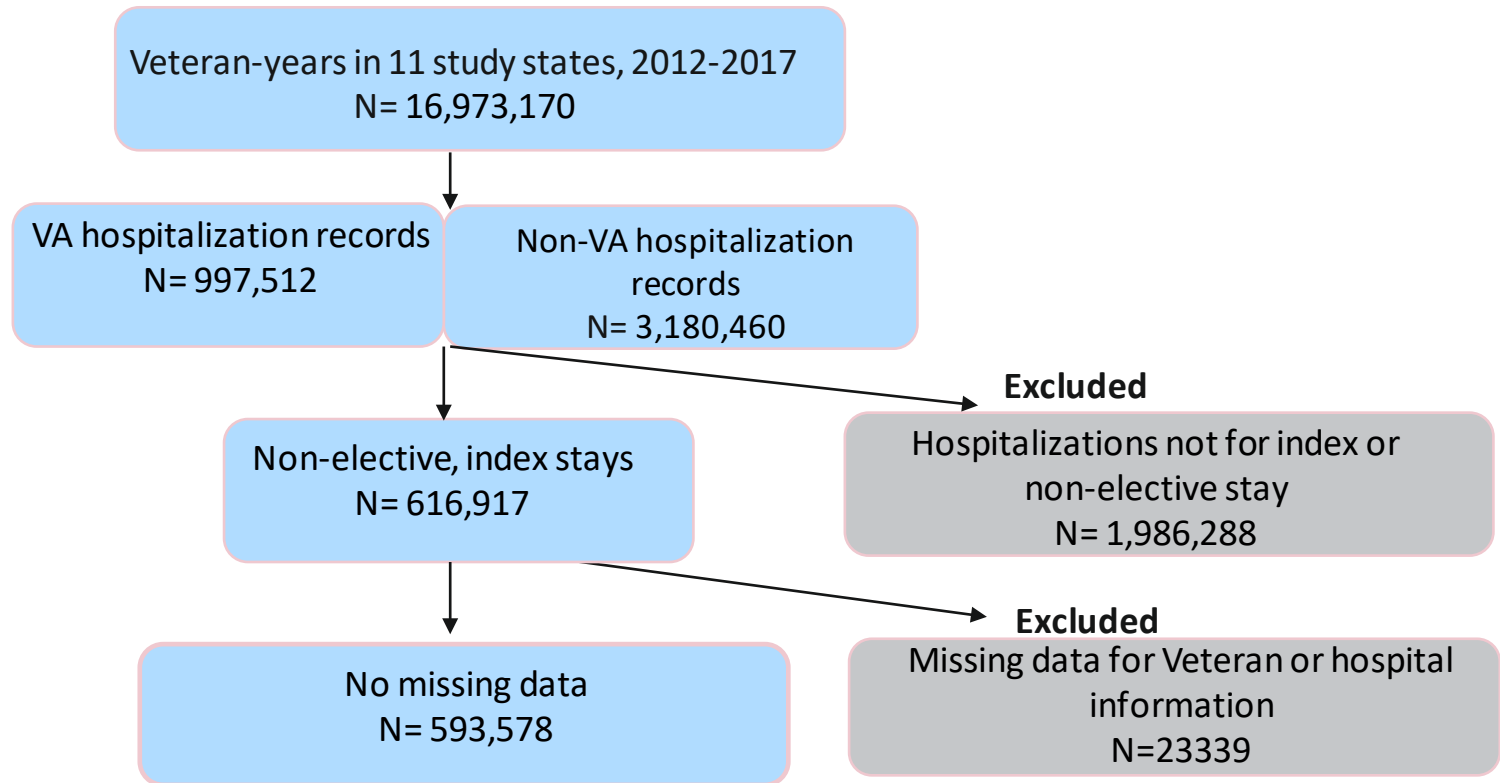
Study Measures

- VA and Non-VA hospitalizations
 - Non-VA included VA-purchased care, Medicare, Medicaid, Private insurance, Other (e.g. other public, CHAMPUS)
- Hospital Outcomes
 - 30-day hospital mortality for all-cause deaths (excludes CA and PA)
 - 30-day readmissions for all causes including planned and unplanned (excludes CA)
 - Inpatient costs
 - Non-VA cost-adjusted charges + estimated professional fees
 - VA production costs
 - Length of stay (LOS)

Analytic Methods

- Adjusted analysis with covariates for: patient characteristics (age, gender, VA priority status, distance to hospital, primary diagnostic category, Elixhauser comorbidity, mental health conditions, rural/urban location) and hospital occupancy rate
- Inverse-probability weighted regression adjustment used to balance patient characteristics between VA and non-VA hospitals with a treatment equation and outcomes equation
- Observations weighted by inverse conditional probability of treatment (admitted to a VA hospital)
- Regression adjustment of outcomes
- Outcomes were estimated for each condition and age group separately

Study Sample



Patient Characteristics, VA and Other Hospitals

Patient Characteristics	Patients Age <65		Patients Age 65+	
	VA N=30,372	Non-VA N=75,440	VA N=70,266	Non-VA N=417,500
Age, mean (SD)	57 (7)	57 (7)	77 (9)	80 (9)
Male, (%)	95%	95%	98%	98%
Elixhauser Comorbidity Score, mean (SD)	4.6 (6.8)	5.7 (7.5)	7.4 (6.5)	9.1 (7.3)
Black Race, (%)	32%	26%	17%	8%
Currently Married, (%)	34%	44%	46%	65%
Service-connected disability 30%+, (%)	32%	29%	35%	21%
Rural, (%)	18%	26%	22%	28%
Distance to admitted hospital, in miles	26 (28)	15 (32)	26 (28)	12 (25)

Hospital Characteristics, VA and Other Hospitals

Hospital characteristics	Patients Age <65		Patients Age 65+	
	VA	Non-VA	VA	Non-VA
	N=45	N=1446	N=45	N=1552
Total beds, Median (SD)	124 (57)	214 (219)	125 (58)	203 (215)
Occupancy rate, Mean (SD)	0.66 (0.18)	0.54 (0.19)	0.65 (0.17)	0.54 (0.20)
Academic affiliation, Mean (SD)	0.58 (0.50)	0.36 (0.48)	0.64 (0.48)	0.34 (0.47)
Patient experience, Mean (SD)	63.6 (10.9)	69.1 (9.5)	63.5 (10.5)	69.3 (9.6)

30-Day Mortality

Average Treatment Effect for VA hospitals – Other hospitals (95% CI)

	Probability of 30-Day Mortality	P-value
AMI		
Age <65	-0.007 (-0.016, 0.003)	0.17
Age 65+	0.012 (-0.009, 0.033)	0.26
CABG		
Age <65	not estimable	
Age 65+	0.009 (-0.004, 0.021)	0.17
GI Hemorrhage		
Age <65	-0.001 (-0.010, 0.008)	0.80
Age 65+	0.004 (-0.009, 0.016)	0.58
HF		
Age <65	-0.003 (-0.009, 0.004)	0.41
Age 65+	-0.017 (-0.027, -0.006)	0.001
Pneumonia		
Age <65	-0.001 (-0.008, 0.006)	0.76
Age 65+	-0.004 (-0.015, 0.008)	0.54
Stroke		
Age <65	-0.033 (-0.045, -0.022)	<.001
Age 65+	-0.053 (-0.074, -0.031)	<.001

30-Day Readmission

Average Treatment Effect for VA hospitals – Other hospitals (95% CI)

	Probability of 30-Day Readmission	P-value
AMI		
Age <65	0.037 (0.014, 0.060)	0.002
Age 65+	0.001 (-0.022, 0.025)	0.90
CABG		
Age <65	-0.035 (-0.060, -0.011)	0.00
Age 65+	-0.045 (-0.074, -0.017)	0.001
GI Hemorrhage		
Age <65	-0.043 (-0.060, -0.026)	<.001
Age 65+	-0.0001 (-0.019, 0.021)	0.91
HF		
Age <65	-0.049 (-0.066, -0.032)	<.001
Age 65+	-0.008 (-0.024, 0.008)	0.31
Pneumonia		
Age <65	-0.042 (-0.056, -0.028)	<.001
Age 65+	-0.029 (-0.043, -0.015)	<.001
Stroke		
Age <65	-0.109 (-0.132, -0.086)	<.001
Age 65+	-0.130 (-0.158, -0.101)	<.001

Length of Stay

Average Treatment Effect for VA hospitals – Other hospitals (95% CI)

	Mean Length of Stay (in days)	P-value
AMI		
Age <65	0.97 (0.50, 1.4)	<.001
Age 65+	1.41 (1.09, 1.7)	<.001
CABG		
Age <65	2.31 (1.77, 2.84)	<.001
Age 65+	3.00 (2.43, 3.57)	<.001
GI Hemorrhage		
Age <65	0.28 (0.09, 0.47)	0.003
Age 65+	0.50 (0.30, 0.70)	<.001
HF		
Age <65	1.22 (0.99, 1.45)	<.001
Age 65+	1.29 (1.12, 1.46)	<.001
Pneumonia		
Age <65	0.53 (0.32, 0.73)	<.001
Age 65+	0.57 (0.41, 0.74)	<.001
Stroke		
Age <65	0.88 (-0.13, 1.89)	0.09
Age 65+	2.34 (1.58, 3.10)	<.001

Inpatient Costs

Average Treatment Effect for VA hospitals – Other hospitals (95% CI)

	Mean Costs in \$ (Log transformed)	P-value
AMI		
Age <65	-0.07 (-0.11, -0.02)	0.003
Age 65+	0.21 (0.17, 0.25)	<.001
CABG		
Age <65	0.32 (0.28, 0.35)	<.001
Age 65+	0.39 (0.35, 0.44)	<.001
GI Hemorrhage		
Age <65	0.24 (0.21, 0.27)	<.001
Age 65+	0.40 (0.36, 0.44)	<.001
HF		
Age <65	0.38 (0.35, 0.41)	<.001
Age 65+	0.50 (0.48, 0.53)	<.001
Pneumonia		
Age <65	0.36 (0.33, 0.39)	<.001
Age 65+	0.47 (0.45, 0.50)	<.001
Stroke		
Age <65	0.04 (-0.01, 0.09)	0.10
Age 65+	0.40 (0.33, 0.48)	<.001

Summary

- VA hospitalizations had better outcomes vs. non-VA hospitalizations
 - Lower mortality for heart failure and stroke in VA hospitals
 - Fewer readmissions for CABG, heart failure, stroke and pneumonia but greater readmissions for AMI in VA hospitals
- VA hospitalization costs higher and longer LOS compared to non-VA hospitalizations

Discussion

- First study since Choice Act and Medicaid expansion to estimate changes in Veterans' hospitalizations utilizing all-payer hospital data.
- Veterans increased use of non-VA hospitals paid by VA and Medicaid and decreased use of VA hospitals when access to non-VA care expanded.
- VA hospitalizations had lower mortality for only 2 conditions but fewer readmissions for most conditions compared to non-VA hospitalizations
- Higher resource use in VA hospitals
 - VA hospitals fewer incentives to reduce LOS
 - May be related to lower readmissions

Limitations

- Data from 11 states may not be generalizable to all VA hospitals
- No clinical-based measures of risk, so limited adjustment for patient risk
- Included all readmissions (planned readmissions only 8% of readmissions)
- Differences in cost estimation methods for non-VA hospitalizations and VA hospitalizations
- Data precede MISSION Act implemented in 2019

Implications

- Expanding access to non-VA care addresses barriers to VA care due to geographic and wait time barriers
- Tradeoffs with potentially worse outcomes for certain conditions
- Likely that MISSION Act increased community care further and could lead to diverging trends in outcomes in Veterans using VA and non-VA hospitals

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Questions?

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