

**EVALUATING PRIMARY CARE SAME
DAY ACCESS AS A METHOD TO
REDUCE AVOIDABLE
HOSPITALIZATIONS RELATED TO
AMBULATORY CARE SENSITIVE
CONDITIONS**

by

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Abstract

Current evidence in support of measures to reduce hospital admissions associated with Ambulatory Care Sensitive Conditions (ACSC) is extensive and represents decades of global research. My study improves this by examining primary care access from the perspective of same day care. This aggregate analysis emphasizes the importance of primary care access as the primary intervention to reduce avoidable ACSC admissions. This study expands on existing research by being the first to examine the relationship between same day accesses with their provider and ACSC admissions through a cross-sectional analysis of 140 Veteran Affairs hospitals during fiscal year 2017. The secondary purpose is to evaluate contemporary recommendations on maximizing PC access to develop a comprehensive tool-kit for VHA administrators to reduce ACSC admissions, decrease costs and improve quality of care. The results and evidence presented in this article indicate a significant inverse relationship exists between same day access and ACSC admissions.

Introduction

With the persistent rise of rural hospital closures across the country, many Americans are forced to rely on their local primary care provider to keep them healthy and medically safe. The North Carolina Rural Health Research Program (NC|RHRP) has been tracking the number of rural hospital closures since 2010, and as of March 28, 2018, their list displays a total of 83 hospital closures representing over 3,000 beds¹. This diminished acute care capacity places an increasing demand on and importance of primary care providers (PCP) to manage the acute and chronic conditions of their patients and to prevent any avoidable hospitalizations.

One set of acute and chronic conditions referred to as Ambulatory Care Sensitive Conditions (ACSC) include diagnoses related to diabetes, heart failure, chronic obstructive pulmonary disease (COPD), pneumonia, asthma, and urinary tract infections. For the last forty years², ACSCs have been rigorously evaluated by the medical community with the preponderance of evidence indicating that effective primary care access has an inverse relationship with the number of ACSC hospitalizations. The reasoning is because most of the conditions can be effectively managed in the outpatient setting with routine check-ups, medication adjustments and education from their primary care team. When they are admitted to acute care, their lengths of stay are often short lasting only one to two days suggesting that the admission may have been prevented with better access to primary care and their health care team.

The construct of primary care access has been evaluated previously as PCP Full Time Equivalent (FTE), PCP panel size, panel capacity, delivery model, visit utilization, PCP continuity, patients perception of access and the availability of PCPs in a given geographic

1. *North Carolina Rural Health Research Program*, 2018, <http://www.shepscenter.unc.edu/programs-projects/rural-health/rural-hospital-closures/>.

2. David D Rutstein et al., "Measuring the quality of medical care: a clinical method," *New England Journal of Medicine* 294, no. 11 (1976): 582-588.

area. This report aims to expand on the existing work by considering a new primary care access variable defined as same day access (SDA) with their assigned PCP and then analyzing its effect on ACSC admissions. I accomplish this by completing a cross-sectional analysis of facilities within the Veteran Hospital Administration (VHA) health care system during fiscal year 2017 (FY17) (October to September). Using the VHA to study the relationship is important for several reasons; it serves millions of veterans who are located in all fifty states reducing the likelihood of geographical bias, the entire population can be examined at once as opposed only a sub-set and lastly, the VHA recently implemented the Secretary's mandate to have same day access (SDA) for primary care and mental health by the end of 2016. This recent mandate provides a unique opportunity to investigate the effect of same day access on ACSC hospitalizations in the nation's largest health care system.

There are several reasons why SDA should reduce ACSC admissions beyond the aforementioned reasons of short duration admissions and effective outpatient care. First, a patient with an established longitudinal relationship should prefer their care being delivered by someone they trust over an emergency department (ED) provider. Second, going by ambulance to the ED and the subsequent care after being admitted is much more expensive than the cost of a PCP co-pay. Finally, waiting 3-4 hours for treatment is laborious and straining on loved ones waiting for the results. The only caution is that for SDA to be effective at reducing ACSC hospitalizations, the patient must have the perception that access is available and that using SDA is not a burden on the provider or team, otherwise you diminish the potential benefit against avoidable hospitalizations.

The results of my multivariate regression analysis demonstrate a significant inverse relationship exists between ACSC admissions per 1000 ACSC patients and the proportion of same day primary care appointments with their PCP ($p < 0.05$) confirming my hypothesis. This implies that on average, a one percent increase in the number of same day appointments with their PCP is associated with a 12.08 decrease in the number of ACSC admissions per

1000 ACSC patients when controlling for the rest of the other independent variables. The independent variable having the greatest significance in the model was Emergency Department (ED) Utilization ($p=0.00$) which was not surprising because going to the ED alone increases your risk of being admitted. Furthermore, the correlation between ED Utilization and ACSC admission rate per 1000 ACSC patients is strong and positive at 0.72 and explains greater than 50 percent of the variation in the dependent variable ($R^2 = 0.51$).

The implication from the above results is that SDA is an effective way to reduce hospitalizations related to ambulatory care sensitive conditions. Hospital administrators who do not offer SDA at their hospital and are struggling to combat higher than expected ACSC rates could improve their situation by investing in primary care same day access. Facilities that have SDA but continue to struggle with high ACSC admission rates should first invest their time and energy into analyzing their ED utilization rates for outliers and process shifts to determine what quality improvement measures could be implemented.

The next section of the paper discusses the current evidence available in the literature followed by a deeper discussion of the data and methods used for the analyses. Afterwards, the bivariate regression results and the statistically significant multivariate regression results are explained in more detail. Finally, the conclusions and future research implications from this study are discussed.

Literature Review

The first set of Ambulatory Care Sensitive Conditions (ACSC) were proposed to the American medical community during its bicentennial in 1976³, and since then, admissions related to those ACSCs have been used as a method to measure a hospital's performance in terms of quality of care delivered and appropriate access to primary care (PC). The significance

3. Rutstein et al., "Measuring the quality of medical care: a clinical method."

and weight given to preventing ACSC hospitalizations cannot be understated. Most authors, clinicians and hospital administrators uniformly agree that these types of admissions are generally categorized as avoidable when timely outpatient primary care is available and effectively delivered to patients⁴. Unfortunately, ACSC admissions do not treat everybody equally and this inequality results in a significant amount of disparity with respect to race, socioeconomic status and geography. For example, in the US a study found that citizens living out west and in the northeast, minorities, older individuals and those living below the poverty line are statistically more likely to experience an ACSC admission⁵. Some of the reasons for the disparate population is because this is the same population that is often underinsured or without any insurance, lives month-to-month on a fixed income and has to make difficult decisions about whether or not to go to their specialty appointment or buy food and medications. While the inclusive list of ACSC varies slightly between countries, the authoritative organization in the United States (US) is the Agency for Healthcare Research and Quality (AHRQ) contained within the Department of Health and Human Services(HSS). The current listing is titled technical specification Version 7 (International Classification of Diseases (ICD) 10) from September 2017 and includes thirteen Prevention Quality Indicators (PQI) that include all the relevant diagnostic codes related to short-term and long-term complications of diabetes, uncontrolled diabetes, perforated appendix, Chronic Obstructive Pulmonary Disease (COPD) or asthma in older adults, hypertension, heart failure, low birth weight, dehydration, community acquired pneumonia, urinary tract infection and asthma in younger adults⁶.

AHRQ contends the PQIs serve the purpose of assisting hospital leaders in identification

4. Paolo Rizza et al., “Preventable hospitalization and access to primary health care in an area of Southern Italy,” *BMC Health Services Research* 7, no. 1 (2007): 134.

5. William N Mkanta et al., “Cost and predictors of hospitalizations for ambulatory care-sensitive conditions among Medicaid enrollees in comprehensive managed care plans,” *Health Services Research and Managerial Epidemiology* 3 (2016): 1–7.

6. *Agency for Healthcare Research and Quality Technical Specification ICD 10 version 7*, technical report (2018), http://qualityindicators.ahrq.gov/Modues/PQI_techSpec_ICD10_v70.aspx.

of significant quality concerns, availability and efficiency of primary care access with the purpose to improve the overall health care offered at an institution⁷. However, while quality and access to PC are paramount when delivering healthcare, they are not the only concerns facing healthcare leaders. ACSC admissions also cause an ever-growing financial burden related to the inappropriate utilization of acute care beds at a hospital. A recent study conducted in the United Kingdom in 2013 details the major financial liability experienced by system administrators and how their avoidable hospitalizations add an additional 12 billion pounds to their yearly expenditures⁸. Furthermore, this additional cost results in an unnecessary strain on a system already overly taxed and limits their ability to offer higher reimbursing elective services that could add to their profit margin and save them from ending the year in debt⁹. Bankruptcy and default are a real concern for a hospital in today's environment if that healthcare organizations is unable to reduce the number of ACSC admissions. Consequentially, reducing the over-utilization of secondary and tertiary care and focusing on increasing access to primary care has been studied extensively in the US¹⁰, European Union (EU)¹¹, Canada¹², South America¹³, and Australia¹⁴ over the last forty-years. Research designs for these studies include cross-sectional studies, retrospective

7. Agency for Healthcare Research and Quality - Prevention Quality Indicators Resource, technical report (2018), http://qualityindicators.ahrq.gov/Modules/pqi_resources.aspx.

8. John Busby, Sarah Purdy, and William Hollingworth, "How do population, general practice and hospital factors influence ambulatory care sensitive admissions: a cross sectional study," *BMC Family Practice* 18, no. 1 (2017): 67.

9. Ibid.

10. Bindman AB et al., "Preventable hospitalizations and access to health care," *The Journal of the American Medical Association* 274, no. 4 (1995): 305–311.

11. Sabine I Vuik et al., "Do hospitalisations for ambulatory care sensitive conditions reflect low access to primary care? An observational cohort study of primary care usage prior to hospitalisation," *British Medical Journal Open* 7, no. 8 (2017).

12. Robin L. Walker et al., "Relationship Between Primary Care Physician Visits and Hospital/Emergency Use for Uncomplicated Hypertension, an Ambulatory Care-Sensitive Condition," *Canadian Journal of Cardiology* 30, no. 12 (2014): 1640–1648.

13. Francisco dos Santos de S et al., "Assessment of primary health care from the perspective of patients hospitalized for ambulatory care sensitive conditions," *Family Practice* 33, no. 3 (2016): 243–248.

14. Odette R. Gibson, Leonie Segal, and Robyn A. McDermott, "A systematic review of evidence on the association between hospitalisation for chronic disease related ambulatory care sensitive conditions and primary health care resourcing," *BMC Health Services Research* 13, no. 1 (2013): 336.

analyses, systematic reviews, pre-post implementation and survey research evaluating the relationship between primary care access and ACSC admissions with many authors finding an inverse relationship exists between these two variables.

However, one of the biggest challenges for researchers and administrators alike is how to interpret the construct of access within a system as complex as primary care. Many of the authors reviewed deployed a different method to measure primary care access, some used appointments with their (PCP), others looked at the PCP Full Time Equivalent (FTE) or care delivery model and still others looked at the size of the PCPs panel. The variety of methods used makes it difficult to completely answer the question about the effect of primary care on ACSC admissions or to compare the results of one study to another. For example, one author completed a longitudinal study examining access after the implementation of a patient-centered medical home (PCMH) model in the Department of Veterans Affairs healthcare system (VHA) using patient care outcomes pre and post implementation and found that none of the PCMH access components - increased telephone care, access to provider and care coordination - were effective at reducing ACSC admissions¹⁵. A longitudinal study conducted in Canada examined one ACSC - uncontrolled hypertension (without vascular complications) - and primary care access in terms of utilization of visits preceding the admission related to the ACSC to those without the condition and found visit frequency and the number of hospitalizations had a positive correlation indicating visit utilization may not be the best measure of primary care access if one still assumes increased access leads to decreased ACSC admissions¹⁶. A meta-analysis on PCP capacity concluded that the majority of articles reviewed demonstrated that a provider with a smaller panel size had significantly less ACSC admissions¹⁷. In another meta-analysis they again found that a majority of the

15. Jean Yoon et al., “Early Changes in VA Medical Home Components and Utilization,” *The American Journal of Managed Care* 21 (March 2015): 197–204.

16. Walker et al., “Relationship Between Primary Care Physician Visits and Hospital/Emergency Use for Uncomplicated Hypertension, an Ambulatory Care-Sensitive Condition.”

17. Gibson, Segal, and McDermott, “A systematic review of evidence on the association between hospital-

published studies reviewed demonstrated a significant inverse relationship between primary care access and ACSC admissions. The same study also indicated a model designed around disease management may be more effective than one whose focus is on general whole-body health¹⁸. From the patient's perspective, one author wrote that the patient's perception of access accounts for greater than 50 percent of the variation in the dependent variable¹⁹.

The remaining studies evaluated the effect of provider-patient continuity²⁰ and delivering primary care to special populations serving low-income and uninsured populations²¹ and both of these studies were effective at reducing ACSC admissions because they incorporated a team-based model of care leveraging the expertise of providers, nurses, dietitians, pharmacists, and social workers to ensure every aspect of the patient health and well-being are addressed by the team. Even though most of the studies evaluated access to primary care using different methods, the majority of them clearly demonstrated a strong inverse relationship between access to primary care and potentially avoidable ACSC hospitalizations. Two of studies reviewed contrary to this finding involved a process change at a VHA hospital and another which evaluated the effect of access on one ACSC condition have important findings, but neither was without significant limitations. In the VHA study, two limitations are worth mentioning, confirmation of the process implementation was conducted by a self-reported electronic survey without an on-site survey and secondly, the study failed to include non-VA care patients in their analysis²². Both of these limitations are significant enough to question the outcome since the majority of evidence written about this topic points in the opposite

isation for chronic disease related ambulatory care sensitive conditions and primary health care resourcing.”

18. Aldo Rosano et al., “The relationship between avoidable hospitalization and accessibility to primary care: a systematic review,” *European Journal of Public Health* 23, no. 3 (2013): 356–360.

19. AB et al., “Preventable hospitalizations and access to health care.”

20. Tessa van Loenen et al., “Organizational aspects of primary care related to avoidable hospitalization: a systematic review,” *Family Practice* 31, no. 5 (2014): 502–516.

21. Marilyn Falik et al., “Comparative effectiveness of health centers as regular source of care: application of sentinel ACSC events as performance measures,” *The Journal of Ambulatory Care Management* 29, no. 1 (2006): 24–35.

22. Yoon et al., “Early Changes in VA Medical Home Components and Utilization.”

direction. In the second study, the authors limited their analysis to one ACSC and evaluated the outcomes using administrative data from a national database instead of at the facility or individual level which could have produced different results or generated an a more realistic reflection of primary care access on ACSC admissions²³.

As we have already seen in the literature, deciding how to measure primary care access is not straightforward and can take many directions . To build on the previous work completed on primary care access, I propose adding the new measure of same day access (SDA) which has gained increased public attention over the last decade. SDA itself is not revolutionary but how it is being implemented by third party companies outside of the traditional hospital network is unique. There are minute clinics or urgent care centers in just about every strip mall and big box pharmacy store nationwide. You no longer have to wait for an opening or miss work to see a doctor and in most cases, you can be in and out within an hour with medications in-hand. This paradigm shift is causing the major health systems in America to take notice by forcing them to offer the same level of on-demand access inside of the network.

My theory is this increasing trend of in-network same day primary care access will decrease the likelihood of someone going to the emergency department (ED) the next time they have an asthma attack, trouble breathing or increased fluid retention because they will prefer to see someone they have a longitudinal relationship with instead of a doctor they have never met before. Being admitted to the acute care is an emotional strain on your family and sitting in an ED waiting room for 3-4 hours waiting for care is never a desirable situation. Going to see your PCP before getting specialty care is a model familiar to most patients with insurance and allowing your primary care team the opportunity to evaluate you and determine where care is needed - in the office, on the telephone or in the ED - is a process that will reduce unnecessary admissions. I seek to address this absence in the cur-

23. Walker et al., "Relationship Between Primary Care Physician Visits and Hospital/Emergency Use for Uncomplicated Hypertension, an Ambulatory Care-Sensitive Condition."

rent literature by investigating the relationship between same day access in primary care and ACSC admissions using a recent organizational change in the VHA called 'MyVA' which was designed to transform the VA into a 21st century organization focused on getting veterans care at the right time and at the right place.²⁴.

'MyVA' started with a declaration signing by all senior leadership in the organization confirming their commitment to provide same day access in primary care and mental health by the end of 2016 as a core element. Same day access is offered either through a face-to-face visit, telephone visit, virtual visit or through a secure email with someone from their care team. After implementation, all facility directors were required to sign and send an attestation memo to the Secretary of the VA confirming their facility was offering same day access. This confirmation memo addresses one of the major limitations of the PCMH study that used a self-certification survey from the providers as a measure of successful implementation. Requiring the facility director to sign a memo to the Secretary gives us much more credibility that the initiative was implemented as the instructions indicated it was to be implemented. The other major limitation of the PCMH analysis was the exclusion of non-VA and ED utilization data as independent variables. Both of these variables will be included in this analysis because the ACSC admission data already includes non-VA care data and ED utilization will be added in as an additional independent variable to improve upon prior limitations. Since the VA was successful at implementing same day access in primary care at all sites, I have a unique opportunity to compare same day visits and ACSC admissions in 2017 to determine what effect the policy change had on reducing ACSC admissions.

24. *MyVA Declaration*, 2018, <http://vaww.pittsburgh.va.gov/employees/feature/myva-access-declaration.asp>.

Data and Methods

The data used in this cross-sectional analysis of VHA facilities during FY17 was extracted from the Patient Aligned Care Team (PACT) Panel cube, PACT Compass cube, ACSC admissions cube and the Patient Centered Medical Home model (PCMH) SHEP cube. The data contained in these cubes are proprietary data collected by the VHA during normal health care operations. To build the models used in this analysis, data was accessed multiple times and collected during January and February of 2018 . Careful attention was given to the individual level (veteran) information contained in the cubes to prevent any Personally Identifiable Information (PII) or Protected Health Information (PHI) from being extracted, evaluated or shared with anyone during the project.

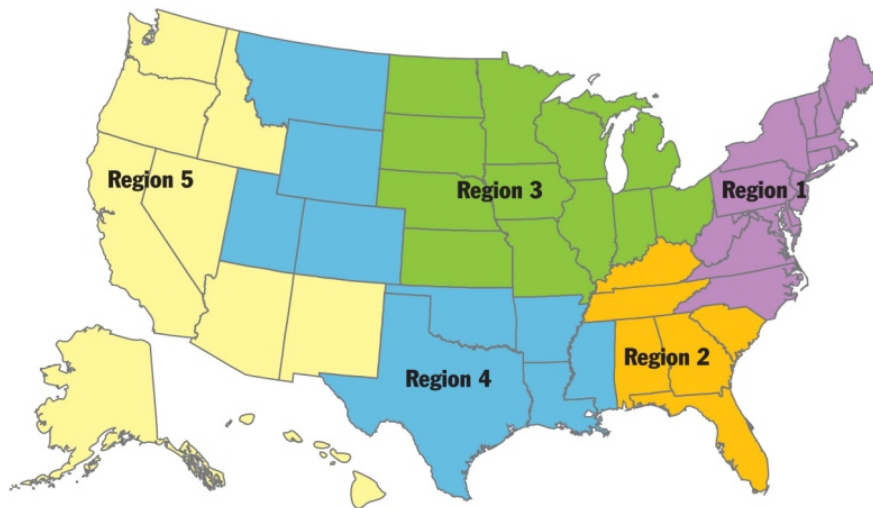
The VHA is the largest healthcare organization in the United States with a presidential mandate "... to care for him who shall have borne the battle and for his widow, and his orphan²⁵". It fulfills its mission by providing care to over nine million veterans by utilizing the 141 medical centers located in the US and Philippines²⁶. In FY17, VHA completed 84 million outpatient visits, provided 3.6 million bed days of care and had a medical care budget of 62 billion dollars²⁷. Geographically, the VHA is divided into five regions (Figure 1) and each facility is categorized by a complexity level denoting the range of specialized services offered at the given location. There are currently five complexity levels - 1a, 1b, 1c, 2 and 3 - with level 1a facilities offering the most complex services and level 3 offering the least specialized care. The population enrolled in the VHA is predominantly male (VHA average 95.6 percent), with the largest subset of Veterans serving during the Vietnam War followed closely by the Persian Gulf era veterans.

25. Abraham Lincoln, *Second Inaugural Address*, 2018, <http://www.abrahamlincolnonline.org/lincoln/education/inaugural2.htm>.

26. *Department of Veterans Affairs*, 2018, <https://www.va.gov/health>.

27. *VHA Operational Statistics*, 2018, https://securereports2.vssc.med.va.gov/ReportServer/Pages/ReportViewer.aspx?%2fMgmtReports%2fPocketCard%2fTripPack_OperationalStatisticsTable&rs:Command=Render.

Figure 1: VHA Geographic Regions



The number of veterans enrolled at each facility varies considerably depending on the population density of the area and complexity level making it unreasonable to equitably compare the number of ACSC admissions between sites. To alleviate this shortcoming, and to allow a direct comparison of facilities, the number of ACSC admissions at each facility was converted into a rate of admissions per 1000 ACSC patients enrolled at the site. A prorated calculation is necessary to properly account for the negative consequences of the admission at the facility and provider level. When a Veteran has more than one assigned VA PCP during year, their ACSC admission is prorated based on the duration of time spent with each primary care provider during the year²⁸. Therefore, the total number of admissions is the sum of the prorated time and not the unique number of admissions. Although the goal of the VHA is for each veteran to have one primary care provider, many of the retired veterans travel and have homes in different States causing them have multiple primary care providers. This nuance requires a unique approach to capturing the data and assigning responsibility for ACSC admissions equitably across multiple sites and providers. For this study, I am including all admissions that occurred at either a VHA hospital or at a community hospital

28. VHA, *Data Definitions - Ambulatory Care Sensitive Conditions*, technical report (2017).

in which the VA paid for care and where the primary diagnosis at discharge is any one of the aforementioned twelve ACSC conditions.

The primary outcome of interest in this study is the relationship between ACSC admissions and same day access in primary care. This is evaluated by completing a cross-sectional analysis of 140 VHA sites located in the United States during FY 2017²⁹. A secondary objective of the study is to test several of the existing relationships between ACSC admissions and primary care access already addressed in existing literature to determine if those relationships can be replicated in the VHA environment. The VHA population receiving care is different from the private sector population in several important regards. The VHA population is predominately male, have higher rates of suicide, depression, substance abuse than the non-veteran population, and sustain injuries specific to serving in a combat situation such as traumatic or concussive brain injuries and post-traumatic stress disorders³⁰. Because of these differences, I feel it is important to ensure the recommendations tested in the private sector translate equally to the veteran population before a list of key measures can be recommended to combat ACSC admissions in the VHA.

A growing trend in health care over the last decade has been the emergence of community urgent care centers or minute clinics that offer walk-in care for routine complaints. This on-demand type of care is popular with consumers because you can receive care when and where you want. It alleviates the structure of a formal appointment and the inconvenience of taking time off work or school and generally costs the same as a PCP visit. This new paradigm has become the expectation of consumers forcing the major health systems to implement same day appointments in an attempt to prevent consumers from utilizing care outside the health network and hurting their bottom line. The VHA is no different although the reasons for

29. The facility in the Philippines was dropped from the final analysis due to missing data needed in the multivariate model

30. Olenick Maria, Monica Flowers, and Valerie J Diaz, "US Veterans and Their Unique Issues: Enhancing Health Care Professional Awareness," *Advances in Medical Education and Practice* 6 (2015): 635-639.

the change are linked to improving veteran access and satisfaction instead of profit. The VHA officially began offering same day access in PC and mental health beginning in 2017 as part of the Secretary's MyVA Access initiative. Although this new trend is being driven by changing customer expectations and competition, I believe healthcare organizations should begin to see a significant improvement in quality as result of the same day access initiatives because improving access to primary care has repeatedly been shown to inversely affect ACSC admissions. My theory is that the recent trend in offering same day PC access will contribute to reducing ACSC admissions because patients would rather see their primary care team instead of going to the emergency room and waiting 4 hours to see someone they do not know or trust the way they do their primary care provider.

My hypothesis is that facilities with higher rates of same day appointments with their assigned primary care provider will demonstrate lower rates of ACSC admissions when compared to facilities with lower rates of same day appointments with their primary care provider. To test my hypotheses, I conducted a bivariate and multivariate regression analyses utilizing VHA facility level data with a dependent variable (DV) of ACSC admissions per 1000 ACSC patients and an independent variable (IV) of same day access (SDA) with their assigned PCP, defined by the proportion of same day primary care appointment requests where the patient was seen within a day of the patients requested date³¹. In the multivariate model, I control for other important factors that could influence the rate of admissions or have been cited in literature as a way to improve primary care access. The definitions for the additional independent variables are summarized from the data definitions of the PACT Compass³² and ACSC Admissions cubes³³.

1. **Emergency Department (ED) Utilization** - Total ED encounters for assigned PC patients in the last 12 months divided by the PC assignments.

31. VHA, *Data Definitions - Patient Aligned Care Team Compass*, technical report (2017).

32. Ibid.

33. VHA, *Data Definitions - Ambulatory Care Sensitive Conditions*.

2. **Urgent Care Utilization** - The total facility Urgent Care encounters for assigned PC patients in the last 12 months divided by the PC assignments.
3. **No PCP** - Percent of patients admitted with an ACSC condition without an assigned VHA PC provider.
4. **Same day urgent access perception** - Percent of respondents who answered Always to the question In the last 6 months, when you contacted this providers office to get an appointment for care you needed right away, how often did you get an appointment as soon as you needed?
5. **Same day response perception** - Percent of respondents who answered Always to the question In the last 6 months, when you contacted this providers office during normal office hours, how often did you get a response to your medical question that same day?
6. **PACT Staffing** - Ratio of PC support staff FTE (Clerk, LPN and RN) divided by Provider FTE.
7. **Panel Risk** - Risk assessment of panel complexity normalized at 1.0.
8. **Panel Age** - Average age of PC patients at a facility.
9. **Revisit Rate Interval** - Average number of face to face PC visits for a patient at a facility in a 12-month period.
10. **PCP continuity** - Number of visits with assigned PC provider divided by the PC visits with assigned provider + number of visits with another PC provider + ED visits + UC visits.
11. **Male** - percent of male veterans assigned to PC at a facility.
12. **Nurse Visits** - the number of PC visits by a registered or licensed practical nurse.
13. **Established Patient Wait Time** - The amount of days, on average, an assigned patient waits to be seen from when they request to be seen.

Results

In FY 17, the VHA health care system experienced a total of 87,901 prorated admissions. To allow a direct comparison of facilities, the number of ACSC admissions at each facility was converted into a rate of admissions per 1000 ACSC patients enrolled at the site. This new calculated rate is the dependent variable used in the regression analyses. The range of admissions per 1000 ACSC patients across the VHA system was 8.8 to 49.9 with a mean of 24.4 (SD 8.5), a median of 23.8 and generally conforms to a normal distribution (Figure 2). The independent variable of interest for the regression analysis is same day access with

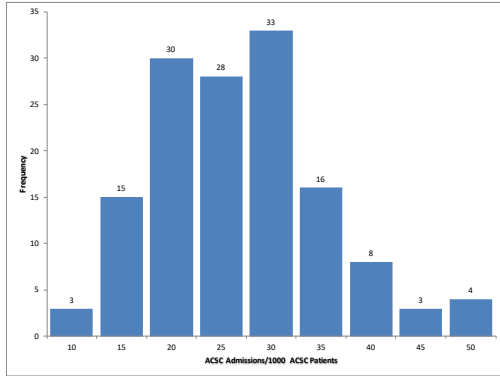


Figure 2: Histogram of Adm/1000 ACSC patients.

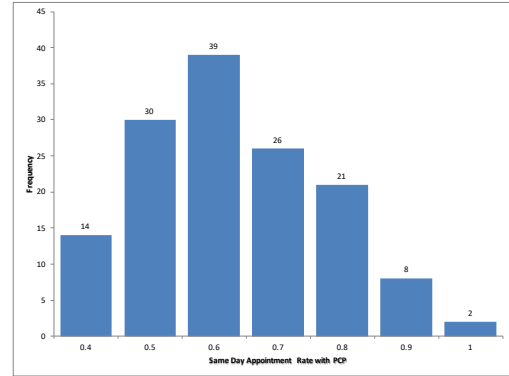


Figure 3: Histogram of SDA with PCP ratio

their assigned PCP ratio. This measure is defined as the proportion of same day primary care appointment (SDA) requests where the patient was seen within one day of the patients desired or requested date of care³⁴. The data used to determine the measure is recorded in the appointment scheduling software used by the VHA and compares three time-stamps; the date the appointment was created, the date the patient requested to be seen and the date of the completed appointment. Across the VHA, the mean score for this measure was 0.576 (SD 0.14) and the median was 0.571 with a range of 0.279 to 0.931 (Figure 3). This means that, on average, 58 percent of the appointments in primary care with their assigned PCP were completed within one day of the patient’s requested date.

The territory covered by the VHA health care system is expansive and because of this, I believe there is value in briefly discussing how organizational complexity and geographic region influence ACSC admissions before continuing with the larger analysis. Figure 4 demonstrates the percentage of ACSC admissions by complexity level and indicates 46.6 percent of all ACSC admissions occurred at a level 1a facility and 85 percent of all ACSC admissions happen at a level 1 facility (1a,1b and 1c facilities). This disparity between the Level 1 facilities and level 2 and 3 facilities is likely related to several importance differences that deserve clarification. Level 1 facilities are academic teaching centers typically located

³⁴. VHA, *Data Definitions - Patient Aligned Care Team Compass*.

in large metropolitan areas with a high density of veterans and usually partnered with a university medical school. Furthermore, level 1 facilities are able to recruit and retain high quality specialty care physicians easier than level 2 and 3 facilities because they can offer competitive pay, greater learning opportunities, academic appointments and research opportunities not available in the more rural facilities. As a result of being able to offer complex and innovate specialty care, level 2-3 patients receiving specialty care at a level 1 site will tend to migrate their primary care to have all of their care at one location subsequently increasing the number of ACSC patients at level 1 facilities.

When comparing ACSC admissions geographically, less disparity is demonstrated across the VHA health care system (Figure 5) than when comparing it by complexity level. This outcome was expected because the incidence of disease should be fairly uniform across a given population unless the disease pathogen is germane to that area or region of the country. When reviewing the data, regions 1, 2, and 3 combined represent about 22 percent of the total ACSC admissions with the highest number of admissions occurring in region 1 - Northeast US - and the least number of admissions occurring in region 4 - Southcentral US. In figures 5 and 6, the number of facilities that make up each category are contained in parentheses and while each region is composed of 20-40 individual healthcare facilities, the effect of living in a certain region seems to be less important than the complexity level of the facilities contained in a given region. For example, about 62 percent of 1a facilities are located within Region 1-3 and, as you might expect, this results in a higher number of ACSC admissions compared to the other regions in the VHA.

The results of the bivariate and multivariate regression analyses are displayed in Table 1. In the bivariate analysis, I directly compare SDA and ACSC admissions per 1000 ACSC patients to determine if any empirical relationship is present between the two variables. The results demonstrate a coefficient of (-7.30), a standard error of 5.03, and a p-value of 0.15 indicating no significant relationship exists between the DV and IV in this model. The results

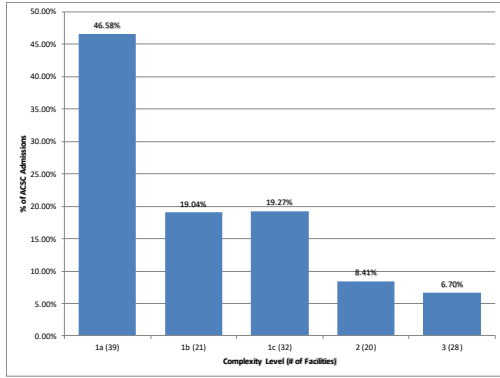


Figure 4: Admissions by complexity level.

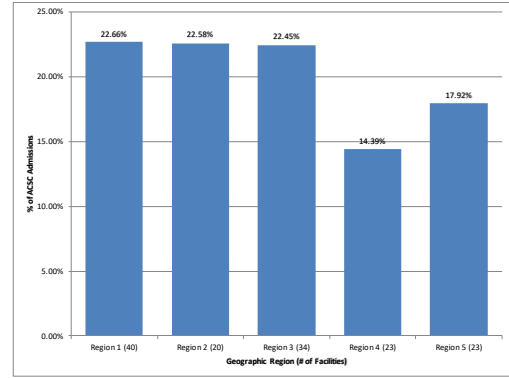


Figure 5: Admissions by Region

of the analysis support the null hypothesis that there is no difference in ACSC admissions per 1000 ACSC patients between facilities that demonstrate higher levels of same day access with their primary care provider then those that demonstrate lower levels of SDA with their assigned PCP. Furthermore, the R^2 value of 0.02 is very low and infers that only 2 percent of the variation in the DV can be directly explained by the IV. The correlation coefficient between these two variables is weak at (-0.12) (Figure 6). The statistical interpretation of model 1 clearly supports the null hypothesis, however this model does not generalize very well to the real world. In practice, these two variables do not occur in isolation, but rather function in a complicated covariate model with many factors affecting the relationship between the DV and IV that must be considered and controlled for to better understand the true effect that same day access with their primary care provider has on reducing ACSC admissions. In the next model, I examine this complicated covariate interaction in an attempt to replicate real world practice.

In the second model, thirteen additional independent variables were added as controls to better understand the real-world effect of SDA and ACSC admissions per 1000 ACSC patients. The variables chosen for inclusion into the model mirror the list of variables used by authors in the literature review as indicators of primary care access that include wait times with their primary care provider (PCP), measures of patient’s perception of access,

Table 1: The Effect of Same Day Access with PCP on ACSC Admissions

	Model 1	Model 2
Independent Variables	ACSC Admissions	ACSC Admissions
Proportion of Same Day Appointments with PCP	-7.30 (5.03)	-12.08** (3.97)
Emergency Department Utilization	-	35.49*** (5.73)
Urgent Care Utilization	-	15.23** (6.78)
No PCP	-	14.92* (8.72)
Same Day Response Perception	-	0.22 (0.143)
PACT Staffing	-	0.71 (1.04)
Same Day Urgent Access Perception	-	-13.34 (13.87)
Panel Risk	-	16.92** (6.25)
Panel Age	-	-0.25 (0.23)
Revisit Rate Interval	-	-3.97 (2.72)
PCP Continuity	-	32.42** (15.35)
Nurse Visits	-	12.88 (9.98)
Male	-	37.02 (29.72)
Established Patient Wait (Days)	-	-0.81** (0.38)
Constant	28.58 (3.0)	-41.73 (36.92)
R^2	0.02	0.64
Adjusted R^2	0.01	0.61
N	140	140

Robust standard errors in parentheses under the estimated coefficients. * $p < .10$, ** $p < .05$, *** $p < .01$.

panel risk score, revisit rate interval and PCP continuity. Using these additional variables permits a unique evaluation of whether or not prior results can be replicated in a veteran population, and if found positive, further strengthening the generalizations of their work.

The complete results of the multivariate regression analysis are displayed in Table 1. In this model, I compare SDA and ACSC admissions per 1000 ACSC patients controlling for thirteen other independent variables. The results demonstrate a coefficient of (-12.08) and a standard error of 3.97 with a p value of 0.003. These results indicate a significant inverse relationship exists ($p < 0.05$) between SDA and ACSC admissions per 1000 ACSC patients when controlling for the other IVs. This significant relationship allows for the rejection of the null hypothesis and allows me to accept the hypothesis that facilities with higher levels of SDA will demonstrate lower ACSC admissions when compared to facilities with lower rates of SDA. The interpretation of the results state that on average, a one percent increase in the number of same day appointments with their PCP is associated with a 12.08 decrease in the number of ACSC admissions rate per 1000 ACSC patients when controlling for the rest of the other independent variables in the analysis. The effect of 12 admissions per 1000 ACSC patients may seem small but its importance should not be undervalued because many of the larger facilities have greater than 10,000 ACSC patients and ACSC admissions are heavily weighted by quality organizations when ranking healthcare organizations. For example, The VHA uses its own formula to rate hospitals on a 5-Star system call SAIL (Strategic Analytics for Improvement and Learning) and gives ACSC admissions the highest weighting of all the quality indicators at 7.2³⁵.

When reviewing the remaining independent variables demonstrating p-values < 0.10 , the variable with the lowest level of significance in the multivariate regression model was ED Utilization ($p = 0.00$). This outcome was expected because in the real world a certain percentage

35. *Strategic Analytics for Innovation and Learning*, technical report (2018), https://www.va.gov/QUALITYOF CARE/measure-up/SAIL_definitions.asp.

of those going to the ED will always be admitted to acute care. Furthermore, the correlation between ED Utilization and ACSC admission rate per 1000 ACSC patients is strong and positive at 0.72 (Figure 7) and this variable alone explains greater than 50 percent of the variation in the dependent variable ($R^2 = 0.51$) when viewed in isolation. This strong relationship suggests that any efforts to decrease ACSC admissions should give attention to reducing ED utilization of primary care patients as a primary tactic.

The remaining independent variables found to demonstrate significance in the multivariate model include Urgent Care (UC) Utilization, Panel Risk, No PCP, PCP Continuity and Established Patient Wait. UC utilization ($p=0.03$) has a positive relationship with the number of ACSC admissions for much the same reasoning as ED utilization, in that, if you present to an urgent care center you are more likely to need acute medical attention thereby increasing your risk for an acute care admission. Panel Risk ($p=0.008$) is the result of a regression analysis used by the VHA to predict the complexity of a panel and/or a patient. It is used to adjust panel size and equalize workload based on the complexity assigned to a provider. The positive relationship with ACSC admissions was expected because more complex patients need more greater care management and adjustments to their medial goals then less complex patients.

PCP Continuity ($p=0.037$) demonstrates a positive relationship with ACSC admissions but this relationship runs counter to real world observations and literature on the subject. PCPs believe that continuity is one of the most important elements in providing primary care because it is the foundation for establishing a longitudinal relationship that creates trust, compliance in treatment and greater patient satisfaction. The results of the model indicate that, on average, every one percent increase in PCP continuity is associated with an increase of 32.42 ACSC admissions per 1000 ACSC patients controlling for the other independent variables in the model. This large increase in the number of ACSC admissions associated with increasing PCP continuity was completely unexpected and deserves future attention by other

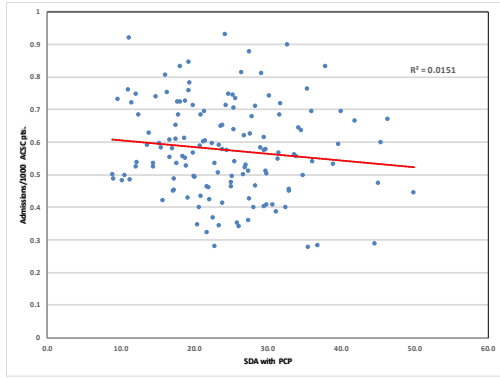


Figure 6: Correlation of SDA and ACSC Adm. rate.

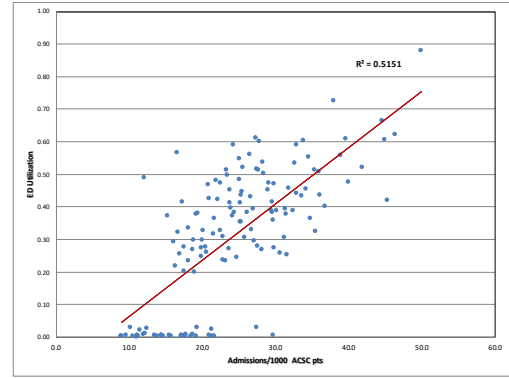


Figure 7: Correlation of ED Utilization and ACSC Adm. rate.

researchers investigating ACSC admission in the VHA. When evaluating No PCP ($p=0.09$), a positive relationship is demonstrated which is consistent with conventional thought on the matter. Simply having any PCP will reduce the likelihood of a future ACSC admission and suggests that receiving care from your assigned PCP may be less important than just receiving care from a provider. The final significant variable of Established Patient Wait ($p=0.03$) shows an inverse relationship with ACSC admissions that is contrary to expected outcomes. This relationship indicates that on average a 1 day increase in wait time is associated with a 0.81 per 1000 patients decrease in ACSC admissions when controlling for the other independent variables. This outcome is another area that needs additional research to better understand the relationship with ACSC admissions because the findings are contrary to conventional theories.

When evaluating the remaining independent variables not reaching any conventional levels of significance you find variables that both conforms with and go against established real-world expectations. In terms of the patient's perception of Same Day Urgent Access ($p=0.34$) the expected inverse relationship exists but when viewing the perception of a Same Day Response ($p=0.13$) the relationship is positive and contrary to normative expectations. One would expect that the more confident a patient feels about receiving timely communication with their PC team the less likely they would be to go to the ED or call 911. However,

it is likely that a patient only calls for routine questions and advice and that during a truly emergent situation the value of a PC office visit or telephone call has already passed.

Two variables demonstrating expected but not significant results are Nursing Visits ($p=0.20$) and Revisit Rate Interval (RRI) ($p=0.15$). Nursing visits are an important part of Patient Aligned Care Team (PACT) operations and routinely function as the initial triage or to complete work that does not require the skills of a provider. However, if you have a facility that over-utilizes nurse visits you risk the chance of missing subtle clues or presentations that are associated with more serious diagnoses resulting in more ACSC admissions than a facility that utilizes less nursing visits and more provider visits. The second variable, RRI displays the average times a patient visits their provider during a year. A provider with a high percentage of patients with ACSCs needs to spend more time managing the condition to prevent a hospitalization and as a result will have a higher RRI when compared to a provider that has a low percentage of ACSC patients.

The secondary objective of this study was to test several of the existing relationships between ACSC admissions and primary care access already addressed in existing literature to determine if those relationships can be replicated in the VHA environment. In the majority of the cases the independent variables supported conventional wisdom and match the expected outcomes documented in current literature. Of the two variable that did not exhibit the expected outcome, the biggest outlier was Provider Continuity. One possible explanation for the unexpected outcome is because many veterans have other health insurance and receive part of their care in the community and only use the VHA for service connected conditions or to supplement their insurance plans. In this scenario, it is possible that many ACSC admissions go unreported to the VHA because the veteran uses their other health insurance to pay for the hospitalization. The other possible reason is because many veterans travel and have multiple providers within the VHA causing the ACSC admissions to become diluted over multiple providers and facilities reducing the effect of provider continuity on reducing

ACSC admissions.

For VHA administrators struggling to reduce the number of ACSC admissions at their facilities, I can recommend the following set of tactics to implement or at least investigate as potential solutions to improving the quality of care. In no particular order, the recommendations would focus on reducing the unnecessary utilization of the ED and UC by PC patients, identify the ACSC patients not assigned to a PCP and get them assigned, increase awareness of same day access in primary care and work to improve the patients perception of access, match panel size with panel risk, limit the over-utilization of nurse visits and to reduce the urge to ask PCPs to reduce their revisit rate when they have a high number of complex patients. Not every measure will be appropriate for every location, but this set of tools should be effective to either maintain good levels or reduce high levels of ACSC admissions. All the aforementioned measures have proven success in current literature and in this study and should be generalizable to any VHA facility.

Conclusion

The major finding of this report is that same day access with their assigned PCP can be used as a method to reduce hospitalizations related to ACSCs. This conclusion is important because the number of ACSC admissions are an recognized predictor of quality of care for a health care system. Health care organizations that have a high number of ACSC admissions, infection rates, and mortality have a lower rating and receive less reimbursement from the Centers for Medicare and Medicaid Services (CMS), Blue Cross/Shield and other insurance companies compared to healthcare organizations that score high in quality measures. Improving primary care access has been proven to reduce ACSCs and adding in same day access as an additional tactic strengthens the organizational ability to improve the quality they offer their patients without any additional fixed cost to the organization and offers an

evidenced-based solution to a significant concern for health care organizations.

A secondary finding of this reports is the confirmation that measures of primary care access tested in a civilian health care system translate well to the VHA. This is important because veterans are a unique population with characteristics that do not always translate well to the civilian population. Knowing this increases the options available to VHA administrators and quality improvement personnel to reduce ACSC admissions without having to trial something to determine if it will work at their hospital. Using available research shortens the cycle time to implementation and leads to results faster than it would by starting with no measures or a couple of unproven anecdotal ideas.

However, this report has several limitations that deserve attention. First, the data is limited to one year and measured directly after the implementation of same day access in primary care nationwide. It is possible that SDA was not equally implemented or implemented in a different way than a comparable site making it difficult to compare its effect on ACSC admissions. Using one year of data makes it challenging to know if the observed effect of same day access on ACSC admissions was related to the implementation of SDA or if the effect was already present. Second, the VHA is meticulous with collecting scheduling data that might not be available in the civilian hospitals making it difficult to test the theory outside the VHA world because you need a way to identify when the patient wants to be seen. Finally, the set of ACSCs used by the VHA is slightly different from the civilian hospitals and the VHA includes acute care admissions from skilled nursing facilities that the private sector does not include because the VHA typically owns and operates their skilled nursing homes unlike the civilian market. This last mention could limit the external validity of this work and shows the difficulty in directly comparing the VHA to civilian health care networks.

Future work on this topic can improve on this work in three important ways. First, expand the timeframe from one to three or five years to see if the results are consistent

and if any of the variables changed with respect to their level of significance or relationship with the dependent variable. Second, expand the study to include the civilian market to test whether or not the same results can be obtained. I have already demonstrated that the studies conducted in the private sector can be translated to the VHA, but it would be interesting to know if it worked in the opposite direction. Finally, a deeper examination of PCP continuity is needed in the VHA market. The results of this study indicated PCP continuity has a significant effect on increasing ACSC admissions which is contrary to the established literature. If PCP continuity is not as significant to providing optimal care, then it allows for different models of care to be trialed such as an open access where patients get care from whoever has an opening.

Around the world, hospital administrators are always on the lookout for tactics to improve their hospital's quality, satisfaction and reputation to increase their market share and improve their bottom line. Reducing the number of avoidable hospitalizations is one way to address all three areas at once. This study provides them with an additional tool based on evidence and statistical analysis that can be implemented with no additional fixed cost to the organization. Medical consumers are researching hospital quality measures and rankings more than ever and are willing to travel or even take a medical vacation to a foreign country to get treatment at the best hospitals and by the doctors with the best outcomes. Failure to recognize the changing market will likely lead to a shrinking patient population and eventual extinction. Change is inevitable and the hospitals that succeed are the ones who embrace change and are proactive with implementing with new ideas. SDA is one such idea and embracing this can set you apart from your competitors and give you a competitive edge in a challenging field.

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Biographical Sketch

Dr. Jason Patrick Fay was born in Philadelphia, Pennsylvania in 1971. After graduating high school in 1989, he volunteered to serve in the U.S. Army spending four years in Alaska as a member of the 1st Battalion 501st Parachute Infantry Regiment (Airborne). In the service, he completed 25 parachute jumps, participated in multiple cold weather operations and was promoted to the rank of Corporal (E-4). After the Army, he attended Slippery Rock University (SRU) earning a B.S. in Health Sciences and a Doctorate in Physical Therapy. He was very involved with campus activities at SRU serving as President of his Fraternity, Vice-President of Student Government and a member of Phi Sigma Pi National Honor Society.

Following SRU, he practicing Physical Therapy (PT) at multiple organizations in Southwestern Pennsylvania working his way up from staff clinician to PT team leader before beginning his career at the VA Pittsburgh Healthcare System (VAPHS) in 2010. His true passion to serve veterans made this organization a perfect fit for his abilities and conviction. He started as the Rehabilitation Supervisor then moved up to the Business Manager in Primary Care and now serves as the facility's Ambulatory Care Operations Director giving him oversight and management of access to care related functions. He is a member of the hospital's Veteran Advisory Board and participates in outreach events to for the homeless population and underserved veterans.

In the Fall of 2014, he began his studies at Johns Hopkins University in pursuit of a Master of Science in Government Analytics. He plans to graduate in May 2018 after presenting his capstone project EVALUATING PRIMARY CARE SAME DAY ACCESS AS A METHOD TO REDUCE AVOIDABLE HOSPITALIZATIONS RELATED TO AMBULATORY CARE SENSITIVE CONDITIONS. After graduation, he plans to continue serving veterans at VAPHS by utilizing the skills he learned at JHU to improve veteran access and customer service with special focus on disparate populations.