

## ABSTRACT

Title of Dissertation: EVALUATING THE IMPACT OF DUAL ELIGIBLE  
SPECIAL NEEDS PLANS (D-SNP) ON THE RATES OF  
HOSPITALIZATION AND READMISSION AMONG  
THE BENEFICIARIES IN WASHINGTON, D.C USING  
A CROSS-SECTIONAL SURVEY

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According to the Centers for Medicare and Medicaid Services (CMS), inpatient hospitalization remains the sector with the highest level of Medicare FFS spending growth, jumping from \$125 billion in 2006 to \$141 billion in 2014. A segment of beneficiaries who qualify for both Medicare and Medicaid, also known as dual-eligible beneficiaries are some of the main drivers of this spending growth. Dual eligibles are individuals who qualify for and whose health services are covered by Medicaid and Medicare. They have an option to receive all their benefits through a health plan with the

opportunity for enhanced benefits through Special Needs Plans (D-SNP) created as part of the Medicare Advantage Coordinated Care Plan.

Dual eligibles experience higher hospitalizations since they tend to be older or younger with disabilities, generally poorer, and have worse health outcomes when compared to similar Medicare-only beneficiaries. Some of the hospitalizations are avoidable presenting opportunities for improved health outcomes and lower healthcare cost. This study, therefore, aimed at examining the impact of D-SNP on the hospitalization and readmission rates among dual eligibles using beneficiary survey.

This study is a primary data analysis using a 37-question survey instrument that was administered via telephone over two months across all Washington, DC wards. The sample includes 217 D-SNP members and 112 non-D-SNP members (n=329). Responses from the survey questionnaires were analyzed using univariate, bivariate, and multivariate analyses.

Our results using Logistic regression show that beneficiaries enrolled in D-SNP had a 70% lower hospitalization rate when compared to non-enrolled beneficiaries [OR, CI: 0.3 (0.12, 0.62)]. Using Poisson regression, our results show the hospitalization incidence rate ratio (IRR) of beneficiaries enrolled into D-SNP was 40% lower for each hospitalization incident compared to non-D-SNP members [IRR, CI: 0.6 (0.49, 0.73)]. Similar lower rates of 30-day readmission rates was noted with D-SNP members when compared to non-D-SNP members; 50% fewer odds of readmission [OR, CI: 0.5 (0.29, 0.86)] and 70% fewer readmission incidence rate [IRR, CI: 0.3 (0.18, 0.56)]. Our results, therefore, suggest that enrollment of dual eligibles into D-SNP can significantly improve health outcomes, reduce acute inpatient care utilization and lower Medicare spending.

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## **Dedication**

I dedicate this dissertation to my wife, Dr. Nneoma Obiejemba and to my children Ethan, Simone and Nathan who stuck with daddy through the long hours, days, and weekends of researching and writing. This dissertation is also dedicated to my parents for all the sacrifices you made towards your children's education and success.

I thank God for the perseverance to forge through the many difficult moments that presented throughout the course of this doctoral process.

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## Table of Contents

Table of Contents .....	vii
List of Tables .....	xi
List of Figures .....	xii
List of Abbreviations .....	xiii
Chapter 1: Introduction .....	1
Medicare and Medicaid .....	3
Medicare-Medicaid Dual Eligible Coverage .....	4
Medicare-Medicaid Dual Eligible Beneficiaries .....	5
Cost of Dual Eligible Beneficiaries .....	6
Fragmented Health Benefits for Dual Eligible Beneficiaries .....	7
Evolution of Dual Eligible Special Need Plans (D-SNP).....	8
Growth of Dual Eligible Special Need Plans (D-SNP) .....	10
Rationale and Significance of the Study.....	11
Chapter 2: Literature Review .....	13
Hospitalization and Readmission .....	13
Characteristics associated with Dual Eligibles, Hospitalizations and Readmissions	13
Age and chronic disease .....	13
Region and physician follow-up.....	14
Integrated care or care coordination .....	15
Medicare Advantage.....	17
Dual Eligible Special Needs Plans .....	18

Medicaid and D-SNP .....	18
Health Policy and D-SNP .....	19
D-SNP Model of Care .....	20
Model of care goals .....	22
Conceptual Framework for D-SNP Model of Care .....	26
Explanation of the levels of the Social Ecological Model (SEM).....	27
Application of SEM to D-SNP Model of Care.....	28
Other Theoretical Frameworks Considered for the Study .....	31
D-SNP and Other Team-Based Care Models .....	33
Gaps in Literature .....	40
Research Questions.....	43
Chapter 3: Methodology .....	44
Research Hypotheses .....	44
Study Design.....	44
Study Population.....	44
Exclusion criteria.....	45
Sample Size Determination .....	45
Participant Recruitment .....	46
Data Collection .....	47
Dependent Variable .....	48
Independent Variables .....	48
Enrollment in D-SNP. ....	48

Post-Hospitalization support .....	48
Covariates .....	49
Statistical Analysis.....	50
Univariate analysis .....	50
Bivariate analysis.....	50
Multivariate Analysis .....	50
Ethical Considerations.....	51
Chapter 4: Results .....	52
Final Sample .....	52
Demographics and Baseline Health Characteristics .....	52
Usual Source of Care .....	56
History of Hospitalizations and Readmissions .....	59
Medication Adherence.....	62
Hospital Admissions in Last 4 Years.....	64
30-Day All-Cause Hospital Readmission.....	66
Support in execution of the post-hospitalization plan offered through D-SNP leads to reduction in readmission rates.....	68
Enrollment into D-SNP will reduce hospitalization rates among dual eligible beneficiaries in Washington D.C.....	69
Enrollment into D-SNP will reduce hospitalization rates among dual eligible beneficiaries in Washington D.C.....	72

Enrollment into D-SNP will reduce readmission rates among dual eligible beneficiaries in Washington D.C.....	75
Enrollment into D-SNP will reduce readmission rates among dual eligible beneficiaries in Washington D.C.....	77
Chapter 5: Discussion and Conclusion .....	80
Summary of the Findings.....	80
Conceptual Framework Support .....	89
Strengths and Limitations of the Study .....	92
Strengths .....	92
Limitations.....	93
Recommendations for Future Research.....	94
Implications for Public Policy .....	96
REFERENCES .....	98
APPENDICES .....	110

## List of Tables

Table 3.1	Estimated Sample Size for Two-Sample Comparison of Proportions.....	46
Table 4.1.	Sociodemographic and Baseline Characteristics of D-SNP and non-D-SNP Study Participants .....	54
Table 4.2.	Characteristics of the Usual Source of Care by Enrollment into D-SNP .....	58
Table 4.3.	Characteristics of Hospitalizations and Re-admissions by Enrollment into D-SNP .....	60
Table 4.4.	Characteristics of Medication Adherence by Enrollment into D-SNP .....	63
Table 4.5.	Bivariate Analysis of Predictors of Hospital Admission in the Last 4 Years .....	64
Table 4.6.	Bivariate Analysis of predictors of 30-day readmission.....	67
Table 4.7.	Post- Hospitalization Support Services Predicting 30-day Readmission ....	69
Table 4.8.	Multivariable Logistic Regression of predictors of hospital admission in the last 4 years .....	70
Table 4.9.	Multivariable Poisson Regression of Predictors of Hospital Admission in the Last 4 Years .....	73
Table 4.10.	Multivariable Logistic Regression of Predictors of 30-day Readmission .....	75
Table 4.11.	Multivariable Poisson Regression of Predictors of 30-day Readmission.....	77

## **List of Figures**

Figure 2.1. Conceptual Model of D-SNP Model of Care. ....	28
Figure 2.2. Diagrammatic representation of the application of the SEM to the D-SNP Model of Care. ....	31

## **List of Abbreviations**

ACA: Affordable Care Act or Patient Protection & Affordable Care Act of 2010

BBA: Bi-Partisan Budget Act of 2018

CAHPS: Consumer Assessment of Healthcare Providers and Systems Survey

CHIP: Children's Health Insurance Program

CI: Confidence Interval

CMS: Centers for Medicare and Medicaid Services

COPD: Chronic Obstructive Pulmonary Disease

C-SNP: Disabling Chronic Conditions Special Needs Plans

D-SNP: Dual Eligible Special Needs Plan

ED: Emergency Department

ER: Emergency Room

ESRD: End-Stage Renal Disease

FFS: Fee for Service

FQHC: Federally Qualified Health Centers

HEDIS: Health Effectiveness Data Information Set

HF: Heart Failure

HHS: U. S. Department of Health and Human Services

HMO: Health Maintenance Organization

HOS: Health Outcomes Survey

HRA: Health Risk Assessment

HRRP: Hospital Readmissions Reduction Program

ICP: Individualized Care Plan

IOP: Institute of Medicine

IRR: Incidence Rate Ratio

I-SNP: Institutional Special Needs Plans

MCO: Managed Care Organization

MedPAC: Medical Payment and Advisory Commission

MedPAR: Medicare Provider Analysis and Review

MIPPA: Medicare Improvements for Patients and Providers Act

MMCO: CMS Medicare and Medicaid Coordination Office

MOC: Model of Care

NCM: Nurse Case Manager

NCQA: National Committee of Quality Assurance

NP: Nurse Practitioner

OR: Odds Ratio

PCP: Primary Care Provider

QMB: Qualified Medicare Beneficiary

ResDAC: Research Data Assistance Center

SEM: Social Ecological Model

SPA: State Plan Amendment

TCM: Transition Care Model



## **Chapter 1: Introduction**

Hospitalization refers to a state when an individual is formally admitted into the hospital by a qualified professional such as a physician or a nurse practitioner for a variety of reasons, including tests, procedures, surgery, emergency medical treatment, or to stabilize or monitor an existing condition (Centers for Medicare and Medicaid Services [CMS], 2015b). CMS defines a hospital readmission as the admission of an individual to an acute care hospital within a specified time period following initial discharge from the same or another acute care hospital (Centers for Medicare and Medicaid Services [CMS], 2015b). CMS uses an "all-cause" definition for hospital readmission, meaning that the cause of the readmission does not need to be related to the cause of the initial hospitalization. The CMS set time frame is 30 days since most readmissions during this period can be influenced either by the quality of care received during the initial hospitalization or the quality of the discharge planning (Centers for Medicare and Medicaid Services [CMS], 2015b).

According to the Centers for Medicare and Medicaid Services (CMS), inpatient hospitalization is the main driver for Medicare FFS spending growth jumping from \$125 billion in 2006 to \$141 billion in 2014 (CMS, 2015b). U.S. healthcare spending grew 5.8% to reach \$3.2 trillion in 2015, while Medicare spending grew 4.5% to \$646.2 billion in 2015, or 20% of total national health expenditure.

Aggregate Medicare spending for Fee-for-Service (FFS) beneficiaries increased at an average of 1.5% per year from 2006 to 2014 (Medicare Payment Advisory Commission [MedPAC], 2017). Spending for this group however, declined 1.9%

between 2014 and 2015 attributable to shift from service volume to outpatient services as well as decline into FFS enrolment, evidence that certain health policies may bend the cost curve (MedPAC, 2017).

However, this spending has not translated into superior health outcomes in the U.S. (Squires & Anderson, 2015). According to 2017 data from Medical Payment and Advisory Commission (MedPAC), the per capita healthcare spending more than doubled for a sector of beneficiaries who qualify for both Medicare and Medicaid, also known as dual-eligible beneficiaries (MedPAC, 2017). Dual-eligible beneficiaries are individuals who qualify for and whose health services are covered by Medicaid and Medicare (Crowe, 2014). Dual eligibles qualify for Medicare through age ( $>$  age 65) or disability and meet the eligibility requirements for Medicaid of 133% of federal poverty level. Of the eleven million individuals who are enrolled in both Medicare and Medicaid benefits, over 50% qualified for Medicare based on disability, not age (CMS, 2015b; Crowe, 2014). Dual eligibles denote a medically and socially vulnerable population. Since certain aspects of their care are covered by Medicare and others not covered by Medicare are paid for by Medicaid. This misalignment in financial incentives leads to poor care coordination and hence fragmentation in (Gold, Jacobson, & Garfield, 2012; Grabowski, 2007).

Dually eligible beneficiaries tend to be seniors, individuals younger than 65 with disabilities, mostly low income and persons with worse health status when directly compared to other Medicare beneficiaries (Segal, 2011). These population also tend to use more health care services, and account for a disproportionate share of Medicare

spending (Segal, 2011). A major driver for higher spending among dual eligible beneficiaries is their health service utilization, mainly inpatient hospitalizations. According to a CMS policy brief, about 25% of the hospitalizations for dual eligible beneficiaries in 2005 were potentially avoidable and Medicare and Medicaid spending for those potentially avoidable hospitalizations was nearly \$6 billion, or about 20% of total spending on inpatient care for the dual eligible (Segal, 2011).

### **Medicare and Medicaid**

It is worth distinguishing the major differences between Medicare and Medicaid. Medicare is the federal health insurance program for individuals who are 65 years or older, individuals with End-Stage Renal Disease (ESRD) or permanent kidney failure requiring dialysis or a transplant, or individuals below the age of 65 but have certain disabilities (CMS, 2015b). Medicare has four parts and each part cover specific services. Medicare Part A covers inpatient hospital stays, care in a skilled nursing facility, hospice care, and some home health care; Medicare Part B covers outpatient services such as doctor visits, medical supplies, and preventive services; Medicare Part C or Medicare Advantage Plans is a type of Medicare health plan offered by private insurance companies that contract with Medicare. These health insurance Plans cover Medicare Parts A and B benefits (CMS, 2015b). The last part is the Medicare Part D or the prescription drug coverage. Part D benefits are offered by private insurance companies approved by Medicare.

Medicaid on the other hand is a joint federal and state-sponsored health insurance program for qualified individuals below the age 19 or 133% of federal poverty level

(CMS, 2015b). Medicaid provides health coverage for millions of Americans including eligible low-income adults, pregnant women, children, older adults, and individuals with disabilities. The program is administered by states that have federally approved state plans to determine benefits and eligibility, and differ by state. A Medicaid state plan is an agreement between a state and the Federal government describing how that state administers its Medicaid programs. Both Medicaid and Medicare were authorized by the Title XIX of the Social Security Act (CMS, 2015b). Medicaid typically covers benefits not covered by Medicare such as long-term support and services including nursing home care and personal care services.

### **Medicare-Medicaid Dual Eligible Coverage**

Dual eligibles' Medicare coverage may cover primary and acute care, such as primary care visits, lab tests, hospitalization, and post-acute care, such as a short-term stay at rehabilitation/skilled nursing facilities especially for patients transitioning out of the hospital (Crowe, 2014). Their Medicaid coverage may cover Medicare's cost-sharing requirements and may cover services not offered by or partially covered by Medicare. Medicaid may cover benefits such as long-term care, dental care, vision, and other long-term support services, such as personal assistance; however, coverage differs by state depending the approved federal waivers or state plan amendments. Waivers or state plan amendments are used along with federal, state, and local programs to provide Medicaid to populations beyond what traditionally can be covered under the state plan (CMS, 2015b).

Under current law, duals may receive Medicare and Medicaid benefits through either a traditional fee-for-service (FFS) plan or a private managed care plan (Kim, Charlesworth, McConnell, Valentine, & Grabowski, 2017). There are about five coverage models available to dual eligible beneficiaries. The first coverage model available to duals include Medicare FFS and Medicaid FFS. Secondly, duals may receive benefits through Medicare FFS and Medicaid Managed Care. Third, duals may receive benefits through Medicare Advantage (Medicare Managed Care) and Medicaid FFS. Fourth, duals may receive benefits through Medicare Advantage and Medicaid Managed Care. Finally, the fifth model is of two subtypes and is dependent on alignment status of Medicare Advantage and Medicaid Managed Care Plans. In “aligned” plans, a single insurance company provides benefits and bears financial risk for both Medicare and Medicaid programs, while in “nonaligned” plans, Medicare and Medicaid coverage are provided by different insurance companies and financial risk is not shared (Kim et al., 2017).

### **Medicare-Medicaid Dual Eligible Beneficiaries**

When a general comparison of dual eligibles are made to other Medicare beneficiaries, they are mostly low income, female, under age 65, and a racial minority (Crowe, 2014). While ethnic minorities make up just 16% of the general Medicare population, they represent over 42% of the dual eligible population (Crowe, 2014). Low income Americans below the age of 65 with incomes at 133 percent of the federal poverty level across all the states were for the first time extended access to Medicaid coverage of health services through the Affordable Care Act of 2010 (CMS, 2015b). This

new coverage eligibility of 133 percent of the federal poverty level was also extended to children in every state. States had the option to cover children with higher income levels as well as adults with income at or below 133 percent of the federal poverty level (CMS, 2015b).

When the earnings and financial status of duals are made to other Medicare beneficiaries, a 2008 data analyzed by Kaiser Family Foundation's show that about 86% of duals had incomes below 150% of the poverty line compared to 22% of all other Medicare beneficiaries (Crowe, 2014). An Inspector General with the U.S. Department of Health and Human Services issued a report in 2012 showing that 55% of dual eligibles have an annual income below \$10,000 compared to 6% of all other Medicare beneficiaries (Crowe, 2014). The latest figures from 2013 showed that 59% of dual-eligible beneficiaries lived below the federal poverty level, and 96% of them lived below 200% of the federal poverty level. Most duals compared to non-duals lack a high school diploma, have general physical or mental limitations mainly from disability, live in a rural area or may reside in an institution (MedPAC, 2017).

### **Cost of Dual Eligible Beneficiaries**

Dual eligible beneficiaries make up a large share of Medicare Fee-for-Service (FFS) expenditures. Notwithstanding that duals comprised of only 18% of the Medicare FFS population in 2013, they grossly accounted for about 32% of cumulative Medicare FFS expenditures that year (MedPAC, 2017). In the same year, an aggregate of \$19,789 was spent per dual-eligible beneficiary, whereas less than half of that amount \$9,035 was spent on average for the non-dual-eligible beneficiaries. Following the same expenditure

trend for the same year 2013, total cost of care paid by all payers including Medicare, Medicaid, and supplemental insurance companies was about \$31, 894 per each dual eligible beneficiary. About half of that amount was spent on other Medicare beneficiaries who were not dual eligibles (MedPAC, 2017). Inpatient hospital expenditures account for the largest expense among dual-eligible beneficiaries and is more than twice the cost for non-dual-eligible beneficiaries according to the MedPAC analysis of the Medicare Current Beneficiary Survey, Cost and Use file 2013. Higher average per capita spending for dual-eligible beneficiaries is a function of a higher health care utilization by dual-eligible beneficiaries compared to non-dual-eligible beneficiaries.

### **Fragmented Health Benefits for Dual Eligible Beneficiaries**

The fragmentation of health benefits and payment structure often creates conflicting incentives for Medicare and Medicaid. It is this bureaucratic web that often leads to uncoordinated care as both programs tend to limit their payments and shift costs to the other programs resulting in the high cost of care associated with dual eligibles (Grabowski, 2007, 2009). Zhang and Diana (2017) showed that health services delivered by nursing homes are less expensive than those by hospitals, and appropriate interventions implemented in nursing homes could reduce avoidable hospitalizations. Their studies show that the utilization of more nursing home services and less hospital services means more payment by Medicaid and cost savings for Medicare. Hence, Medicaid programs have little to no incentive to encourage nursing home utilization and fewer hospitalizations. Consequently, the authors concluded that coordinating health care delivery between nursing homes and hospitals could generate cost savings. These

conflicts also exist in home health services, which both Medicare and Medicaid cover for dual eligibles. Most states have an incentive to maximize Medicare payments while limiting their Medicaid payments (Grabowski, 2007). These scenarios and many others often lead to unnecessary healthcare utilization and increased costs.

### **Evolution of Dual Eligible Special Need Plans (D-SNP)**

The Medicare Modernization Act of 2003 established a Medicare Advantage Coordinated Care Plan specifically designed to provide targeted care to special needs individuals (CMS, 2015b). Under this Act, Congress categorized special need individuals as: 1) institutionalized individuals (I-SNP), i.e., individuals who reside in a nursing home; dual eligible individuals (D-SNP), i.e., individuals who qualify for both Medicare and Medicaid; and individuals with severe or disabling chronic conditions (C-SNP), such as chronic alcohol and other drug dependence, autoimmune disorders, cancer (excluding pre-cancer conditions), cardiovascular disorders, chronic heart failure, dementia, diabetes mellitus, end-stage liver disease, End-Stage Renal Disease (ESRD) requiring any mode of dialysis, severe hematologic disorders, HIV/AIDS, chronic lung disorders, chronic and disabling mental health conditions, neurologic disorders, and stroke (CMS, 2015b). D-SNP is a type of plan that may be offered to these categories. States have to apply to CMS for approval to implement these plans. Dual Eligible Special Needs Plans (D-SNPs) enroll beneficiaries who are entitled to both Medicare (Title XVIII) and Medical Assistance from a State Plan under Title XIX (Medicaid), and offer the opportunity of enhanced benefits by combining those available through Medicare and Medicaid (CMS, 2015b).



Special Needs Plans were subject to annual reauthorization and have been reauthorized numerous times by various acts of Congress. It was most recently extended through December 31, 2018, via section 206 of the Medicare Access and CHIP Reauthorization Act (MACRA) of 2015. However, a major event happened in February 2018 when Congress through the Bi-Partisan Budget Act (BBA), gave permanent authorization to Medicare Advantage Special Needs Plans including D-SNPs. This was characterized as the most significant regulatory change supporting the integration of Medicare and Medicaid services through D-SNPs ever since the program was created in 20103 (Health Management Associates [HMA], 2018). Under the permanent authorization, States now have an option to use D-SNPs as a permanent pathway to fully integrate Medicare and Medicaid services for their dually eligible beneficiaries (HMA, 2018). Other requirements were included in the BBA including the authority to develop rules and guidance governing alignment and integration, oversight of D-SNPs, and additional resources for states interested in the program. The CMS Medicare and Medicaid Coordination Office (MMCO) was granted all these authorities by Congress (HMA, 2018).

Additionally, on July 31<sup>st</sup>, 2018, “CMS issued guidance for default enrollment, or automatic enrollment -formerly referred to as seamless conversion of dually eligible beneficiaries who are enrolled in a Medicaid managed care plan and are newly eligible for Medicare, into an integrated D-SNP offered by the same organization (HMA, 2018).” CMS also set rules for D-SNPs across all the states to submit new default enrollment

proposals by 1<sup>st</sup> of October 2018, with effective dates of January 1, 2019, and later (HMA, 2018).

### **Growth of Dual Eligible Special Need Plans (D-SNP)**

There has been a steady growth in D-SNP enrollment although this number is dependent on plan availability in an area (Zhang & Diana, 2017). The D-SNP program is available to eligible members residing within the program's service area, meeting dual eligibility status requirements, and voluntarily applying to a plan. Dual eligibility qualification is determined by the member's participation in the federally administered Medicare program and the state-administered Medicaid program based on low income, assets, and age or disability status.

In 2015, approximately 9.6 million individuals nationwide were eligible for D-SNP. Of this number, only 17%, or about 1,755,163, were enrolled in a D-SNP (CMS, 2015a; Verdier et al., 2015). In Washington D.C, over 30,000 individuals are eligible for DSNP with about 6,000 individuals enrolled as of October, 2016; however, the enrollments have continued to grow to reach 8,084 as of March, 2018 (Jacobson, Casillas, Damico, Neuman, & Gold, 2016; Lester & Chelminsky, 2018). This difference in eligibility vs. enrollment further illustrates that D-SNP is a voluntary program and not mandatory. Eligibility simply means that the individual qualifies for both Medicare and Medicaid to cover their health service utilization cost, while enrollment is when an individual actually joins a qualified health plan. Qualified beneficiaries have the option to join a plan or choose to receive their Medicare and Medicaid services directly from the agencies. Less than half (42%) of these enrollees are under age 65, meaning they

qualified for Medicare based on disability or End Stage Renal Disease (ESRD). This reflects the national average where in 2013, 44% of dual-eligible beneficiaries were under age 65 and disabled compared with 13% of the non-dual-eligible population (MedPAC, 2017).

### **Rationale and Significance of the Study**

Previous studies on duals have traditionally used Medicare claims data. Granting that these earlier researches has suggested that Medicare Advantage does a better job than traditional Medicare at lowering hospital readmission rates, some new research have shown otherwise (Panagiotou et al., 2019). In a retrospective cohort study by Panagiotou et al, the researchers superimposed data from 2011 to 2014 from the Medicare Provider Analysis and Review (MedPAR) file, to the Healthcare Effectiveness Data and Information Set (HEDIS). Their innovative approach showed that health insurance plans may have excluded some hospitalizations that should have otherwise been categorized as a readmission (Panagiotou et al., 2019).

While many studies have shown significant reduction in hospitalization and readmission associated with duals enrolling into a D-SNP plan, the literature has not provided conclusive results on the relationship between enrollment into D-SNP and lower hospitalization and readmission rates. Therefore, this study intends to examine the relationship between enrollment in a D-SNP and reduction in hospitalization and readmission rates among dual eligible beneficiaries in Washington, D.C using a survey of the beneficiaries. This study hopes to present a picture of the various aspects of the D-SNP module of care and its influence on hospitalization and readmission rates.

Another recent study evaluated the ethnic disparities in health care cost before and after an epileptic seizure requiring hospitalization (Pisu et al., 2019). Their findings show that compared with other races and ethnic groups, African American Medicare beneficiaries have higher costs following an epileptic event (Pisu et al., 2019). After adjusting for demographic, clinical, economic, and treatment quality variables, the authors identified poor adherence to antiepileptic drugs and a higher number of comorbidities as the reasons for the higher cost of care (Pisu et al., 2019). This study aims to inform effective strategies and policies towards reducing health disparities among dual eligibles.

This study will contribute to the existing literature by providing the beneficiaries perspective on the relationship between D-SNP enrollment and acute inpatient utilization. Given the disproportionate amount of health spending associated with dual eligibles, identifying opportunities to decrease costs while maintaining quality of care is critical. Findings from this study showing care coordination initiatives offered through D-SNP present an opportunity upon which other large-scale programs can be based.

## **Chapter 2: Literature Review**

### **Hospitalization and Readmission**

It is worth discussing hospitalization and readmission again in this section since both are our outcome variables and are discussed throughout this paper. CMS defines hospitalization as a situation when a patient is formally admitted into the hospital following a physician or other qualified practitioner order. On the other hand, hospital readmission is defined as the admission of an individual to an acute care hospital within a specified time period classically 30 days, of a previous acute care hospitalization from the same or another acute care hospital (CMS, 2015b). CMS uses an "all-cause definition, meaning that there may be no correlation from the cause of the initial hospitalization to the cause of the readmission (CMS, 2015b).

### **Characteristics Associated with Dual Eligibles, Hospitalizations, and Readmissions**

**Age and chronic disease.** A 2016 study by Bennett and Probst looked at 30-day readmission rates among dual eligible beneficiaries using data from the 2009 Medicare claims file. Their study found that dual eligibles had higher hospitalization and more 30-day readmission rates when compared to Medicare-only beneficiaries (Bennett & Probst, 2016). Using multivariate regression, their study demonstrated that dual eligibility, younger age, and specific chronic diseases such as heart failure, diabetes, chronic obstructive pulmonary disease, cancer, and depression were major contributors of a 30-day readmission (Bennett & Probst, 2016). Therefore, focusing our attention on these common chronic illnesses occurring in older dual eligibles may have the most impact in quality of care.

**Region and physician follow-up.** The same study also highlighted other interesting findings. First, rural dual eligible beneficiaries had lower readmission rates when compared to their urban counterparts because many took advantage of physician follow up care following hospitalization (Bennett & Probst, 2016). Second, dual eligibles completed more physician follow ups within 30 days of discharge when compared to Medicare-only beneficiaries (Bennett & Probst, 2016). Third, amongst rural residents, there was no difference in 30-day readmission rates between dually eligible beneficiaries and Medicare-only beneficiaries (Bennett & Probst, 2016). Fourth, among Medicare-only beneficiaries, those who did not have physician follow up within 30 days of discharge had higher 30-day readmission rates when compared to those who had follow up visits (Bennett & Probst, 2016). Finally, the opposite was the case with urban dual-eligible beneficiaries, those who had physician follow up within 30 days of discharge had slightly higher 30-day readmission rate when compared to their counterparts who did not have a physician follow up (Bennett & Probst, 2016). Their overall findings echo findings in some studies which show higher hospitalization and readmission rates among dual-eligible beneficiaries (Bennett & Probst, 2016). While the findings from this study offers unique perspective in comparing rural to urban duals, the study did not inform us as to whether the duals in this study are enrolled into a D-SNP or not. Duals traditionally have higher hospitalization than Medicare only beneficiaries. One other factor distinguishing urban and rural dwellers is the proximity to an acute care hospital. Many hospitals are located within close proximity to urban dwellers.

**Integrated care or care coordination.** A study by JEN Associates (2008) compared dual eligible beneficiaries across the state of Massachusetts on the rates of hospitalization and institutionalization. The authors reported that dual eligibles who were enrolled into the state of Massachusetts health plans had lower rates of institutionalization compared to those not enrolled into health plans. Additionally, researchers analyzing claims data among duals and others with complex health needs in Texas, found that duals who were enrolled in Medicaid health plans experienced lower rates of emergency room and inpatient admissions compared to duals not enrolled into plans (Texas Health and Human Services Commission, 2005). Amidst these studies, other publications have highlighted that the core ingredient of care coordination used by these plans is the driving force behind lower hospitalizations, and hence the potential cost savings (Thorpe, 2011).

In a 2015 study, the authors used administrative claims from 2007 to 2009 to examine differences in 30-day rehospitalization between dual eligible beneficiaries participating in Massachusetts Senior Care Options- an integrated managed care program, and dual eligible beneficiaries in Medicare fee-for-service. They used a longitudinal cohort study design and multivariable logistic regression models for their main outcome of the study which was “all-cause” 30-day readmission (Jung, Trivedi, Grabowski, & Mor, 2015). They looked at patient demographics including age, gender, race, disability status, initial hospital length of stay, comorbidities, surgical history, county of residence, and the quarter and year of admission (Jung et al., 2015). Their study found no differences in readmission rates among the two groups even though they expected a significant difference (Jung et al., 2015). Their results suggest that simply coordinating

financial incentives alone may not be sufficient to address the problems of inefficiency and fragmentation within the dual eligible population (Jung et al., 2015).

In his testimony on promoting integrated and coordinated care for Medicare beneficiaries before the Subcommittee on Health of the House Committee on Ways and Means on June 7, 2017, Grabowski called for all D-SNPs to be both clinically and financially integrated with Medicaid. He cited the above 2015 study as one of the compelling reasons behind the call for reform in financial and clinical integration of services for these frail and vulnerable beneficiary population (Grabowski, 2017).

An article by Dr. Atul Gawande in the June 2009 New Yorker on the health care cost conundrum examined why McAllen, a small town in Texas with the lowest household income in the country ranks among the most expensive health care markets in the country (Gawande, 2009). The article was inundated with comments on the disparity of health care quality and costs across the country. He pointed out that some regions in the US experience significantly higher costs and lower quality while other regions experience significantly lower costs and higher quality of care (Gawande, 2009). These disparities in care and outcomes measures promoted by Gawande has been documented in several publications (most notably The Dartmouth Atlas of Health Care work) and characterizes the inefficiencies of the US health care system which is the costliest when compared to other industrialized nations (Epstein, 2010).

Majority of duals have preexisting and debilitating chronic medical conditions and require complex and ongoing support in care. That alone is the reason they are ranked among the most vulnerable beneficiaries. We have alluded to this in the past that



these beneficiaries have to navigate through Medicare and Medicaid—both separate but large health programs which often results in a fragmented, inefficient, and costly care. The role of government in financing and managing the care of the chronically ill population which is often expensive has been raised in some corners (Buhler-Wilkerson, 2007). These individuals usually need social support, mental health support, specialized health services from specialists and a large number of health providers, hence lending credence to the need for better care coordination (Buhler-Wilkerson, 2007). When the individuals are not enrolled into plans which are both financially and logically aligned offering care coordination, they are often left to coordinate their own care which is far from the reality of strong continuity of care (Buhler-Wilkerson, 2007). Some private health systems serving local areas and smaller numbers of individuals have embarked on models of care that promote continuity of care and seamless transitions for individuals with serious and/or multiple chronic conditions. However, these models though effective for some individuals, have not been shown to be very effective for large populations (L&M Policy Research, 2011).

### **Medicare Advantage**

Medicare Advantage is Medicare Part A and B offered by a private health insurance company that contracts with Medicare. Medicare Advantage Plans provides all Part A and Part B benefits, and may offer optional coverage such as vision, dental and/or prescription (CMS, n.d.-a). Medicare Advantage Plans may be a Health Maintenance Organizations, Preferred Provider Organizations, Private Fee-for-Service Plans, Special Needs Plans, or Medicare Medical Savings Account Plans.

## **Dual Eligible Special Needs Plans**

Dual Eligible Special Needs Plans (D-SNPs) are a type of Medicare Advantage plan (Medicare Part C) offered by private health plans to serve dual eligible beneficiaries enrolled into Medicare and Medicaid. In order to operate in a state where the plan intends to facilitate coordination of Medicare and Medicaid services for the enrollees, it must first contract with that state. “The Medicare Improvements for Patients and Providers Act (MIPPA) of 2008, as amended by the Affordable Care Act of 2010, required D-SNPs to have a contract with the state Medicaid agency in each state in which they operate to provide Medicaid benefits (Verdier et al., 2015).” In the absence of a contract, D-SNPs cannot continue to operate in a state. Similarly, states are not obligated under current laws to contract with D-SNPs (Verdier et al., 2015).

**Medicaid and D-SNP.** Medicaid was authorized by Title XIX of the Social Security Act and signed into law in 1965 alongside Medicare. Even though participation was voluntary, all states, the District of Columbia, and the U.S. territories implemented a Medicaid state plan. A Medicaid state plan is an agreement between a state and the Federal government describing how that state administers its Medicaid and CHIP programs. Even though the federal government establishes certain parameters for state Medicaid agencies to follow, each state may administer their Medicaid program differently. The state plan outlines the groups of individuals to be covered, services to be provided, methodologies for providers to be reimbursed and the administrative activities that are underway in the state. This results in variations in Medicaid coverage across the U.S. (CMS, n.d.-b).

If a state Medicaid agency would like to make a change to its program policies, operational approach, expand or limit services, service area or population, the state Medicaid agency must submit a state plan amendment (SPA) or a waiver to CMS for review and approval. States submit SPAs to request permissible program changes, make corrections, or update their Medicaid state plan with new information. Meanwhile, they submit waivers to waive federal requirements related to eligible populations, service area, service and other application federal requirements.

The Affordable Care Act of 2012 authorized states to expand Medicaid eligibility to individuals under age 65 in families with incomes below 133 percent of the Federal Poverty Level (FPL) starting from 2014. The law also standardized the rules for determining eligibility and providing benefits through Medicaid, CHIP and the health insurance Marketplace (CMS, n.d.-b).

The structure of the state's Medicaid program will determine a Dual eligibles coverage. Traditionally, Medicaid may provide full benefits or cost sharing depending on eligibility category and services offered. For example, some Medicaid agencies offer managed long-term services and supports to Dual eligible, while others may offer these services in an FFS setting. D-SNP provides an opportunity to coordinate health services and cost between Medicare and Medicaid for dual eligibles (Verdier et al., 2015).

**Health Policy and D-SNP.** Special Needs Plans (SNPs) were created as part of the Medicare Modernization Act of 2003. In 2008, CMS contracted with the National Committee for Quality Assurance (NCQA) to develop a strategy to evaluate the quality of care provided by SNPs. In 2011, the Patient Protection and Affordable Care Act

(ACA) mandated further SNP program changes requiring all SNPs to submit Models of Care (MOCs) that comply with an approval process based on CMS standards and requiring NCQA to review and approve these MOCs.

### **D-SNP Model of Care**

Each D-SNP program must develop a Model of Care (MOC) and a Quality Improvement Plan to evaluate its effectiveness. Models of Care are considered a vital quality improvement tool and integral component for ensuring that the unique needs of each beneficiary enrolled in a SNP are identified and addressed. In 2010, the ACA reinforced the importance of the MOC as a fundamental component of SNP quality improvement. Each MOC must have a description of the SNP Population, Care Coordination, SNP Provider Network, and MOC Quality Measurement and Performance Improvement. Health plans are scored based on the quality measurement and performance improvement score. Seventy percent (70%) is the minimal score for a health plan to pass, and a health plan with a score of 75% or greater gets multi-year approval of either two or three years (CMS, 2015b).

In Washington, D.C., over 93% of D-SNP beneficiaries are enrolled with United Healthcare dual complete plan (Jacobson et al., 2016). Thus, the United Healthcare MOC will be described here. The target population for the MOC includes individuals who are dually-eligible for Medicare and Medicaid who are enrolled in United Healthcare Dual Special Needs Plan (D-SNP). Enrollment into D-SNP is voluntary and provides the members with specialized services based on the population needs. Overall membership composition is reviewed and addressed through multiple avenues, including the Health

Outcomes Survey (HOS) to determine member demographics, quarterly prevalence reports to identify top diagnoses, and other data points and reporting to gather indicators such as socioeconomic status. The Medicare network includes those providers and services important to the Special Needs population including primary care physicians (PCP), long term care specialists, specialist physicians, and hospitals. The ancillary network includes pharmacists, dialysis centers, mental health centers, physical/occupational therapists and speech pathologists, and radiology and laboratory specialists. With regards to care management and coordination, the MOC uses health risk assessment (HRA), a tool used with new members upon enrollment and annually thereafter to stratify them according to their care needs.

The MOC uses an Interdisciplinary Care Team approach (CMS, 2015b). This team includes the member, the member's support system, the member's primary care provider (PCP), nurse practitioners (NP), nurse case managers (NCM), and other clinical team members including a medical director and patient care coordinators. Approach to management is through a local market-based team responsible for member outreach, visit scheduling, in-home assessments, and care coordination services. The team is responsible for all members, at all times, in all places, and through all transitions between care locations. Team members work in collaboration with the primary care providers, specialty care teams including hemodialysis, transplant, and other community-based services to manage care. The D-SNP model of care strives to (1) improve quality, (2) increase access, (3) create affordability, (4) integrate and coordinate care across specialties, (5) provide seamless transitions, (6) improve use of preventive health

services, (7) Encourage appropriate utilization and cost effectiveness, and (8) improve member health. Aspects of the model of care were borrowed from other existing continuity of care models such as the Transitional care model (Verhaegh et al., 2014).

**Model of care goals.** Below is a detailed summary of the model of care goals.

1. Improve quality of care through early intervention and education. D-SNP members are initially risk-stratified based upon Health Risk Assessment Scores (HRAs) obtained via telephone outreach (CMS, 2015b). HRAs help identify members with the most urgent needs. They are an important part of the member's care coordination and contain member self-reported information as well as information from other claims databases (CMS, 2015b). Members are then categorized into three tiers- high risk, medium risk, and low risk. High risk tier includes the most vulnerable members, including those at risk for unplanned transitions of care, medium risk tier includes members that are generally enrolled in several disease-specific programs, low risk tier includes the most stable D-SNP members. The classifications are done based primarily on complexity of chronic or acute illnesses. The risk level determines frequency of nurse practitioner (NP) home visits and intensity of telephonic case management. High risk members are seen monthly by the NP, medium risk members are seen quarterly, and low risk members are seen annually and all with defined telephonic nurse case managers. Using this health information, the NP then develops the individualized care plan (ICP) for each member seen. The NP captures information for the Health Effectiveness Data

Information Set (HEDIS) gaps in care. HEDIS is a tool used by most health plans to measure performance on important dimensions of care and service.

The ICP also contains the member's current medications, medical diagnoses, and certain lab results (including Hemoglobin A1C for diabetes screening).

The HRA, ICP, and NP clinical summary are then transmitted to the primary care provider in real time.

2. Increase access to care and essential services. Nurse case managers (NCMs) and patient care coordinators help members obtain primary care providers, specialists, as well as home and community-based resources.
3. Create access to affordable care. D-SNP members get transportation assistance up to 24 one-way trips annually. They also receive quarterly allowances to purchase over-the-counter drugs and other medical supplies such as adult diapers, canes, and etc.
4. Integrate and coordinate care across specialties. While the member's primary care provider remains the central point of contact, D-SNP members get additional care coordination through the NP and NCMs. Members get assistance with appointment scheduling, medication refills, and telephone access to their NP.
5. Provide seamless transitions. All members receive a phone call within 24 to 72 hours from the NCM after being discharged home from the hospital or rehab. A follow-up post hospitalization visit is scheduled with the NP within seven days of discharge. During the calls and the visit, the NP and/or the

NCM helps the member understand discharge diagnosis and instructions, facilitates follow-up appointments, assists with needed home health and equipment, resolves barriers to obtaining medications, and educates the member on new or continuing medical conditions. Following the visit, the NP may place the member into a higher risk tier if the member has changes in condition/status. This visit is separate from other follow up visits arranged by the discharging hospital for a nurse visit.

6. Improve use of preventive health services. To improve access to preventive health services, the United Healthcare dual complete plan provides preventive medical services with no copay for CMS required services, outreach and education describing the importance of these services, assistance with making appointments for preventive screenings, and arranging non-emergency transportation up to 24 one-ways trips annually. In addition, the plan rewards the D-SNP member with credits for preventive care services. During the home visits, the NP identifies gaps in preventive health maintenance and members are advised to follow up with pcp to close gaps. Some gaps are closed during the visit such as rapid HbA1c (glycated hemoglobin) test for diabetes, vital signs and BMI (body mass index).
7. Encourage appropriate utilization and cost effectiveness. Through team coordination, members are referred to specialized clinical programs based on their individual needs and/or conditions such as transplant, hemodialysis, diabetes, heart failure, and chronic obstructive pulmonary disease. The MOC



aims to give members the right care, at the right time, in the right setting to enable the best health outcome.

8. Improve member health outcomes through reducing hospitalizations. All D-SNP members are required to have an interdisciplinary care plan. The monthly NP home visits coordinated with NCM phone calls is in place to assist high tier D-SNP members who are at risk for hospitalization. During the visits, specific disease conditions such as diabetes, chronic obstructive pulmonary disease or congestive heart failure are discussed. Member education regarding medications and understanding of health conditions are assessed. Vital signs including weights are monitored. Real time coordination with primary care physician is done and prescriptions called in to pharmacy when needed. Part of the MOC includes complex care management for members with frequent emergency department (ED) use and/ or recurrent readmissions. Increased care management intensity is used to help prevent relapse including referral and scheduling for diet and nutritional counselling, referral to local free home meal delivery, behavioral health services, end-of-life support services, social work support and home and community-based services partnerships. Members who have physical, mental, or functional impairments that keep them from visiting their primary care provider are referred by the NCM to local house call physicians within Washington, DC, and pharmacies that offer free home delivery of prescriptions. In addition, the member gets monthly nurse practitioner visits.

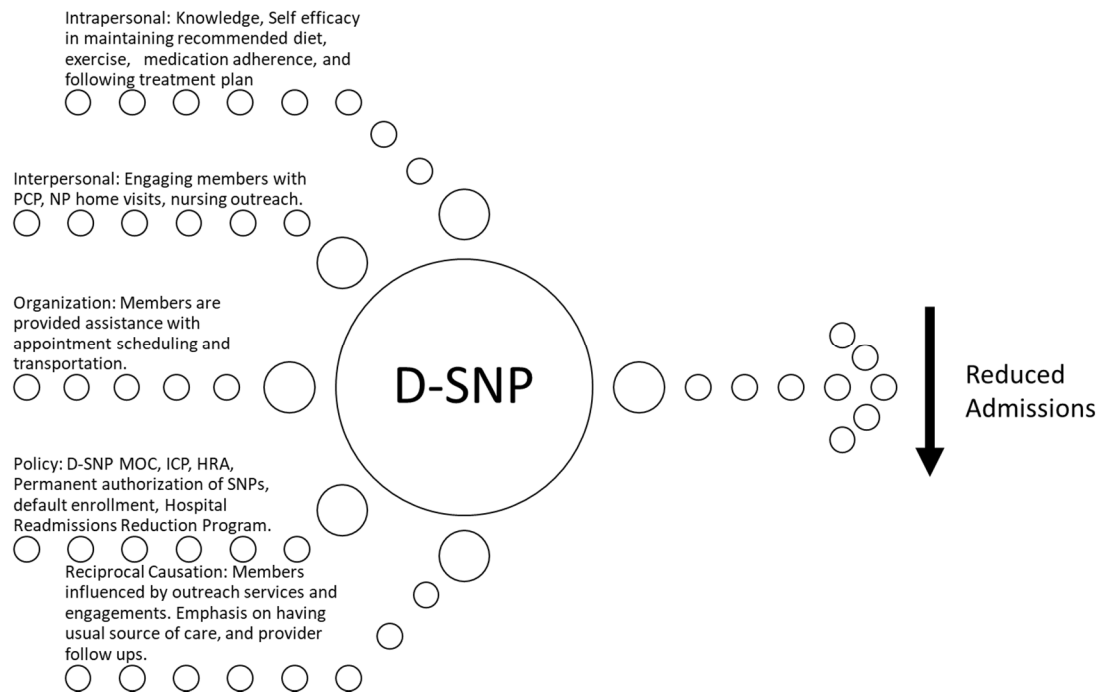
The D-SNP model of care in summary, offers an opportunity for health care providers to work together for the benefit of the members through improved communication, concentrating on each individual member's special needs, bringing care management programs to support with the member's medical and non-medical needs, and supporting the member's plan of care.

### **Conceptual Framework for D-SNP Model of Care**

The conceptual framework for this study is grounded in the Social Ecological Model (SEM). The core concept of the SEM is that behavioral influences, in this case hospitalization, can be influenced at multiple levels (National Cancer Institute [NCI] & U.S. Department of Health and Human Services [DHHS], 2012). The SEM is a theory-based framework for understanding the complex and interactive effects of personal and environmental factors that determine behaviors, and for identifying behavioral and organizational leverage points and intermediaries for health promotion within establishments (NCI & DHHS, 2012). There are five hierarchical levels of the SEM: Individual, Interpersonal, Organizational, Community, and Policy. The most effective approach to public health prevention and control uses a combination of interventions at all levels of the model. The second key concept of this model is reciprocal causation which suggests that people both influence and are influenced by those around them (NCI & DHHS, 2012). An ecological perspective shows the advantages of multiple interventions that combine behavioral and environmental components (NCI & DHHS, 2012).

**Explanation of the levels of the Social Ecological Model (SEM).** The next section examines the social ecological model at the individual, interpersonal, organizational, community and policy levels of the ecological perspective.

- The Individual/ Intrapersonal: Characteristics of an individual that influence behavior change, including knowledge, attitudes, behavior, self-efficacy, developmental history, gender, age, religious identity, racial/ethnic identity, economic status, financial resources, values, goals, expectations, and literacy (NCI & DHHS, 2012).
- Interpersonal: Formal (and informal) social networks and social support systems that can influence individual behaviors, including family, friends, peers, co-workers, networks, customs, or traditions (NCI & DHHS, 2012).
- Organizational: Organizations or social institutions with rules and regulations for operations that affect how services are provided to an individual or group (NCI & DHHS, 2012).
- Community: Relationships among organizations, institutions, and informational networks within defined boundaries, including the built environment such as parks, hospitals, clinics, schools, associations, community leaders, businesses, and transportation (NCI & DHHS, 2012).
- Policy/ Enabling Environment: Local, state, and federal laws and policies, including policies regarding the allocation of resources for access to healthcare services (NCI & DHHS, 2012).



*Figure 2.1. Conceptual Model of D-SNP Model of Care.*

**Application of SEM to D-SNP Model of Care.** This section examines the application of the social ecological model to the D-SNP model of care.

- **Intrapersonal:** The innermost level of the SEM represents the individual who might be hospitalized at a more increased frequency. The D-SNP model of care aims to increase the individual's knowledge and influence his or her attitudes toward and beliefs regarding knowledge about chronic illnesses, medications, treatment plan, self-efficacy to make changes in diet, physical activity, and medication and treatment adherence as well as risks and benefits of poor chronic disease management.
- **Interpersonal:** The second level of the SEM surrounds the individual level and represents acute inpatient care utilization prevention activities

implemented at the interpersonal level. These activities are intended to facilitate individual behavior change by affecting social and cultural norms and overcoming individual-level barriers. Friends, healthcare providers, and patient navigators represent potential sources for interpersonal messages and support. Under the D-SNP model, patients get reminders, monthly phone calls, and visits. Patient navigators help locate difficult-to-reach members. The primary medical team plays a large role in helping these individuals live healthy, adhere to treatment plans, and thus decrease hospitalization.

- **Organizational:** The third level of the SEM surrounds the interpersonal level and represents acute care utilization prevention activities implemented at the organization level. At this level, individuals get assistance with appointment scheduling, transportation, and allowance for over-the-counter drugs and personal care supplies as well as other resources available in the community.
- **Community:** The fourth level of the SEM surrounds the organizational level and represents hospitalization prevention activities implemented at the community level. These activities are intended to facilitate individual behavior change by leveraging resources and participation of community-level institutions such as outpatient clinics of the Washington, D.C area hospitals, specialty clinics, federally qualified health centers where most beneficiaries receive care, and community advocacy groups- which

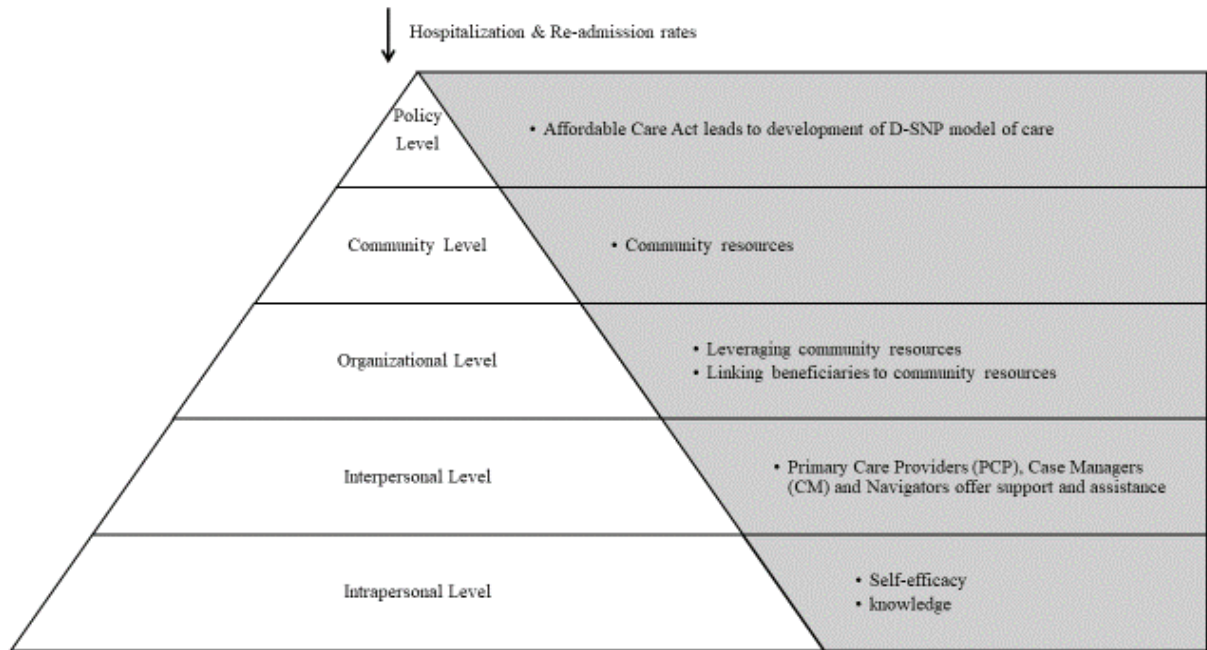
represent potential sources of community communication and support.

The D-SNP model establishes relationships and networks within the local market so that collaboration is enhanced. Health information obtained from health risk assessments as well as post hospitalization visits is relayed in real time to medical teams including specialists so that timely follow up visits are scheduled.

- **Public Policy:** The fifth and outermost level of the SEM surrounds the community band and represents hospitalization prevention activities at the policy level. Local, state, and federal policies and laws such as ACA, Medicare, Medicaid, and D-SNP, I-SNP, and C-SNP that support care coordination and practices for disease prevention, early detection, control, and management. With D-SNP, emphasis is placed on chronic disease management through care coordination and individualized care plans.

This study for all its purposes, intends to examine the relationship between enrollment into D-SNP and reduction in acute hospitalizations and readmissions by surveying the beneficiaries. The social ecological model ties in with the D-SNP model of care at various levels. The collective impact of the multiple levels of influence tend to promote health behaviors that could conversely lead to lower acute inpatient utilization. This study could potentially assist in identifying avenues susceptible to intervention strategies at multiple levels of influence, to ultimately improve the life of the individual and create cost savings for the whole system. This study to the best of our knowledge is

the first of its kind to explore the relationship between the theoretical framework of the socioecological model and Dual Special Needs Plans.



*Figure 2.2.* Diagrammatic representation of the application of the SEM to the D-SNP Model of Care. Adapted from “The behavioral ecology of secondhand smoke exposure: A pathway to complete tobacco control,” by Hovell, M. and Hughes, S., 2009, *Nicotine and Tobacco Research* 11(11), 1254-1264. Copyright 2009 by the John Wiley & Sons., San Francisco, CA. Adapted with permission.

### **Other Theoretical Frameworks Considered for the Study**

One of the more common conceptual frameworks for this type of study is the Andersen-Newman Model of health care utilization. The framework proposed that an individual's access to and use of health services is a function of three distinct features which include predisposing factors, enabling factors and need factors (Lix et al., 2005).

Predisposing factors are the socio-cultural characteristics of individuals that exist prior to their illness and include factors such as social structure (education, occupation, ethnicity, social networks, social interactions, and culture), health beliefs (attitudes, values, and knowledge that people have concerning and towards the health care system) and demographics such as age and gender (Lix et al., 2005).

The second feature of the Andersen-Newman Model is the enabling factor and it includes the logistical aspects of obtaining health care. Notable components of this feature are an individual's means and knowledge of how to access health services. Also included in this category are factors such as income, health insurance, a regular source of care, travel, extent and quality of social relationships, available health personnel and facilities in the community, as well as genetic factors and psychological characteristics (Lix et al., 2005).

The third feature of this model are need factors and they refer to the most immediate cause of health service use. Need is further divided into perceived need and evaluated need. Perceived need refers to how individuals view their overall health, symptoms of illness and care seeking behaviors. Evaluated need refers to the treatment provided to an individual after their initial presentation to a medical care provider (Lix et al., 2005).

This model compares as well as contrasts with the Socioecological Model (SEM) used in the study. Some aspects of the D-SNP module of care can be addressed using the Andersen-Newman Model but other aspects may not. Both models have striking similarities in that, they address factors that influence health care utilization. The SEM



comprises of five distinct levels of behavioral influence, while the Andersen-Newman Model has three characteristics, although, the constructs of the models are quite similar. The added advantage of the SEM is the fifth and outmost level which is the policy level. The policy level comprises of laws, regulations and policies classically designed to effect change. This is the primary reason I chose the SEM model for this study over the Andersen-Newman Model.

The sole aim of laws, regulations and policies are to increase or decrease various activities and to influence behavior. An example is the Hospital Readmissions Reduction Program where CMS requires hospitals to reduce readmission rates. Laws and policies also aim to get people or institutions to substitute one activity for another, such as the addition of module of care to D-SNP, or inclusion of individualized care plan to D-SNP model of care. Legal regulations or policies can accomplish its goals directly, through fear of sanctions or desire for rewards (Bilz & Nadler, 2014). But it can also do so indirectly, by changing attitudes about the regulated behaviors. Most notably, this indirect path can be the most efficient one, particularly if the regulation changes attitudes about the underlying issue (Bilz & Nadler, 2014).

### **D-SNP and Other Team-Based Care Models**

The D-SNP model of care is similar to various team-based care models. Team-based care models when applied to patients with complex chronic illnesses have been shown to reduce hospitalizations, readmissions, and decreases in nursing home admissions (JEN Associates, 2008). Despite the evidence that team-based care models improve quality of care and lower spending through improved care coordination, an

overwhelmingly high number of dual eligibles are enrolled in a collaborative model. Fewer than 18% of dual eligible beneficiaries are enrolled in a coordinated care program that manages all their Medicare and Medicaid covered benefits (MedPAC, 2017). There is little incentive under current Medicare and Medicaid policies for the states to coordinate care of their dual eligible beneficiaries. These disincentives are highlighted by what healthcare costs are covered by Medicare and Medicaid. While Medicare typically pays for acute care services such as hospitalizations, physician services, and drug coverage, Medicaid covers nursing home care, Medicare cost-sharing, and premiums for low income beneficiaries. Since Medicare covers hospitalization and ER visit costs, there is no incentive for a state program to focus on lowering these expenditures. There appears to be shortsightedness in realizing that these individuals with complex health care needs when enrolled in well managed team-based care may save the states money in the long term. As they bounce between hospitals, nursing homes and back, states tend to pick up other costs not covered by Medicare.

One cannot discuss D-SNP model of care without examining other successful continuity of care models and care coordinated programs from where the model of care was derived. Some of the functions performed by these programs include transitional care planning, health coaching/ patient education, and medication adherence, management, and reconciliation. These models have been shown to be successful in reducing hospital readmissions (Verhaegh et al., 2014). One of the models is the Transitional Care Model (TCM). Transitional care planning aims to improve patient care transitions from hospital

to home and to reduce hospital readmissions for chronically ill patients (Rennke & Ranji, 2015).

The principal idea behind this model is having a nurse- generally referred to as the transitional care nurse. Her role is designed to streamline care plans as the individual beneficiary transitions from hospital to home. This helps reduce patterns of frequent hospitalization and readmission as well as improve overall health out of the hospital. Notwithstanding that the TCM has a nurse at the center, its multidisciplinary nature ensures that other health team members such as physicians, social workers, discharge planners, and pharmacists are involved. The focus of everyone in the team is to increase the individual or the caregiver's ability to understand the illness trajectory and take control. There is huge emphasis on care coordination, continuity of care, prevention of complications, recognitions of deconditioning, and timely offering of palliative care services. All these goals are achieved through open communication between the providers and the beneficiaries and their caregivers (Rennke & Ranji, 2015).

Among Medicare beneficiaries suffering from congestive heart failure, approximately half of the 700,000 patients discharged from non-federal short-stay hospitals will be readmitted within six months at an average cost of \$7,000 per readmission (Phillips et al., 2004). Well-managed TCM have been shown in several literature publications to improve quality outcomes and lower acute inpatient stays (Thorpe, 2011). One of the publications reviewed 18 separate studies from eight countries using meta-analysis, and their findings show that complete discharge planning in addition to post-discharge support for individuals hospitalized due to congestive heart failure

lowered readmissions by nearly 25% (Epstein, 2009). Other publications from the University of Pennsylvania and the University of Colorado showed that nurse-led transition care programs can lower preventable readmissions by up to 56% (Coleman, Parry, Chalmers, & Min, 2006; Naylor et al., 2004). Both studies used randomized trials to arrive at their conclusions. An estimate by MedPAC showed that the costs of potentially preventable readmissions within 30 days were \$12 billion in 2005, and nearly \$245 billion over a ten-year budget window from 2006 to 2025 (Thorpe, 2011). Their estimates show that a 40% reduction in potentially preventable readmissions could generate up to \$100 billion in savings over this ten-year period (2006 to 2025). Care coordination as outlined in the D-SNP model of care could reduce preventable hospitalizations and readmissions, and thus produce substantial health system savings. Hospital discharge data from several states were analyzed by the Agency for Healthcare Research and Quality over a number of years, and their findings show that compared to Medicare FFS, Medicare Advantage plan enrollees had lower rates of risk-adjusted inpatient admissions, hospital readmission rates, and avoidable readmissions (America's Health Insurance Plans [AHIP], 2010).

Another vital function performed by care coordinating programs is health coaching and patient education. Health coaching empowers individuals to achieve the goals outlined in their personalized care plans provided by their healthcare team (Thorpe, 2011). These goals are often simple, measurable and timely and include lifestyle changes such as better diet and nutrition, increased medication and treatment adherence, fluid restrictions, exercise, and smoking cessation among others. Research in behavioral health

have shown the benefits of behavior change theory and its impact on behavioral change in practice. There has also been demonstrations in several randomized controlled trials that health coaching and patient education programs can improve the management of a broad spectrum of chronic illnesses including pain management, diabetes, heart failure, chronic obstructive pulmonary disease, and obesity (Edelman et al., 2006).

Health coaching shows particular promise for more effectively managing patients with chronic illnesses (Thorpe, 2011). At the Dartmouth Hitchcock Clinic, nurses trained as health coaches were embedded within a physician practice and offered customized information and support to patients managing chronic illnesses (Thorpe, 2011). The nurses were able to access patients' electronic medical records to inform counseling and education based on relevant health factors. During the three-year demonstration of that program, the result was quite encouraging. First, there was a 2% reduction in readmission rates among the enrolled patients age 65 or older. Second, the lower readmission rate was sustained for over one year after the program was completed. Third, compared to about seven to thirteen percent participation rates in previous demonstrations, this three year demonstration had a whopping 77% participation rate among eligible Dartmouth-Hitchcock patients (Thorpe, 2011). The difference in participation rates between this and previous demonstrations was the fact that the nurses were integrated into the physician practice, rather than contacting patients as some external vendors (Johnson, 2010). The patients knew the nurses and trusted them with information. These strategies may prove very valuable for dual eligibles and other populations with complex needs to encourage more community-based care, which improves health and wellness for beneficiaries.

Another component of successful care coordination programs are medication adherence, management, and reconciliation (Thorpe, 2011). Appropriate use of prescription drugs is a key element of effective management of chronically ill patients. Medication reconciliation is especially very crucial after a patient is discharged from the hospital. During hospitalization, some medications may be stopped, and others may have their doses reduced or increased. It is important that a nurse or nurse practitioner follow up with the patient soon after discharge to conduct a medication reconciliation. In most cases, a patient can still follow up with their primary physician or specialist upon discharge and reconciliation should be done at that visit. The problem with the latter is getting timely appointment following hospitalization. The pharmacist becomes central in medication management as he/ she works with the healthcare team, the individual or caregiver. The goal is the same- achieve targeted health outcome through safe and effective use of medications. The pharmacist goes over drug dosing, drug-drug interactions, filling and refilling medications among other functions with the individual or their caregiver. Studies have shown that effective medication management is highly effective in reducing hospitalization and emergency room visits (Esposito, Bagchi, Verdier, Bencio, & Kim, 2009). Some of the studies point to a 23% lower healthcare spending among medically adherent Medicaid recipients when compared to non-adherent peers (Esposito et al., 2009).

A landmark CVS Caremark study on medication adherence among patients with existing chronic illnesses found that increased medication adherence resulted in lower aggregate healthcare spending and significant savings ranging from a moderate savings

of about \$1,860 per year for patients with hyperlipidemia to over \$8,880 for patients with congestive heart failure (Roebuck, Liberman, Gemmill-Toyama, & Brennan, 2011).

Studies show that increasing medication adherence through proven strategies including patient education, simplified dosing schedules, and improved communication between providers and patients can significantly improve clinical outcomes (Sokol, McGuigan, Verbrugge, & Epstein, 2005).

Another study found that improving medication adherence significantly reduced hospitalizations for four expensive chronic conditions – diabetes, hypertension, congestive heart failure, and dyslipidemia (Sokol et al., 2005). Not only are disease-related medical costs decreased but overall healthcare spending is positively impacted leading to substantial savings as individuals experience lower acute care utilization (Sokol et al., 2005). Another study analyzed Medicaid beneficiaries with heart failure and found over 23% lower overall healthcare spending in patients adherent to their medications and treatment plan compared to patients that were not (Esposito et al., 2009). Significant success have been documented by many large integrated group practices including Geisinger, Group Health, and Community Care of North Carolina who have implemented programs to improve medication adherence among patients with complex health needs (Cutler & Everett, 2010). Successful treatment of many conditions largely depends upon patients' adherence to provider prescribed medication regimens. Yet, for many reasons including low literacy level, costs, clarity of dosage, patient error, and side-effects, among others, medication adherence particularly among those suffering from chronic conditions is far too low, with adherence estimated between 50-65% (Cutler &

Everett, 2010). Coordinated care teams and programs such as D-SNP present opportunities for quality improvements through reduced hospitalizations and emergency room visits.

D-SNP programs may contribute to reducing health disparities in quality of care. Following Inovalon (2013) study that showed a widening gap between the quality of care for nondual and dual Medicare beneficiaries, Dobes & Bernstein (2016) looked at successful strategies for reducing disparities in quality of care among dual eligible. Their study attempted to identify factors that may contribute to higher quality performance in this population and, if broadly implemented, to reduce current levels of healthcare disparities. Their study focused on diabetes management and used glycohemoglobin test scores also known as Hemoglobin A1C (a test that provides information about a person's average levels of blood glucose in the preceding 90 days) as a measure of quality performance. They identified health risk assessments, medication dosing and reminder systems, use of interdisciplinary care teams, motivational interviewing, care managers and navigators, as major factors that contribute to improving the health of dual eligible beneficiaries (Dobes & Bernstein, 2016).

### **Gaps in Literature**

The poor coordination of Medicare and Medicaid benefits and services has been a longstanding problem in the care of the dual eligible population (Grabowski, 2009). The coordination of benefits refers to the bundling of Medicare and Medicaid coverage such that there is an incentive to deliver services efficiently. D-SNP as well as other special needs plans were born as a need to address this lack of coordination. Special needs plans



have seen a rapid growth since 2003 when these plans were first launched (Grabowski, 2009). During the early years of special needs plans, CMS funded three large-scale care coordination and disease management demonstrations with disappointing results (Grabowski, 2009). In the Medicare Health Support Program, high-risk fee-for-service beneficiaries with diabetes or congestive heart failure were randomly assigned to a disease management intervention. The researchers found no difference in health care quality or hospitalization rates compared with controls who did not receive the intervention (Cromwell, McCall, & Burton, 2008). The second demonstration was dubbed the Medicare Care Coordination. It was “a multi-site randomized trial of nurse-administered, telephone-based patient education about diet, exercise, self-management, and medication management in 15 different programs.” At the end of the demonstration, no difference was seen “on patient knowledge or behavior, preventive care, avoidable hospitalizations, Medicare expenditures, or mortality (Peikes, Chen, Schore, & Brown, 2009).” For this demonstration, about one-third of the programs recruited sufficient numbers of beneficiaries to detect a difference.

This third demonstration was the Life Masters Supported Self Care program which examined holistic nurse-led case management with Florida dual eligibles with congestive heart failure, coronary artery disease, or diabetes but had no impact “on the quality of care, preventive care, hospitalizations or emergency room visits, use of appropriate medications, Medicare expenditures, quality of life, or satisfaction with care (Esposito, Brown, Chen, Schore, & Shapiro, 2008).” Irrespective of the unsatisfactory results of these early demonstrations, lawmakers recognized that D-SNPs had a lot of

potential in providing care coordination to individuals with complex health needs. They also recognized that D-SNPs can be improved, and many parts of the program remained largely unstudied.

Grabowski in his study on Special Needs Plans and the coordination of benefits and services for Dual Eligibles, suggested that SNPs have the potential to add value by coordinating Medicare and Medicaid benefits and services for dual eligible beneficiaries (Grabowski, 2009). His study called for more evaluation of SNP performance in terms of beneficiary costs and outcomes. Yet few studies have examined the impact of D-SNPs on health care quality and costs, largely due to data limitations (Gold et al., 2012). Recent evidence shows that integrated managed care can provide beneficiaries with better care coordination and achieve better outcomes (Anderson, Feng, & Long, 2016). A 2016 report published by HHS studied the delivery of Medicare and Medicaid services to dually eligible beneficiaries over age 65 in Minnesota (Anderson et al., 2016). The study compared healthcare delivery between dually eligible beneficiaries in Minnesota Senior Care Plus (MSC+) and the Minnesota Senior Health Option (MSHO). MSC+ was a Medicaid-only program, and MSHO was a fully integrated Medicare-Medicaid program. The study found that the fully integrated managed care plans were more effective than fragmented delivery systems by delivering more service, lower emergency department utilization, and higher consumer satisfaction (Anderson et al., 2016). Zhang and Diana (2017) examined the effects of early Dual-Eligible Special Needs Plans on health expenditure, secondary state-level panel data was used from Medicare-Medicaid Linked Enrollee Analytic Data Source and Special Needs Plan comprehensive reports for the

years 2007 to 2011. Their findings show that D-SNPs through a competitive bidding system employed for the Medicare Advantage health plans, vigorous competition among D-SNP plans, care coordination deployed by health plans, and change in physician practice patterns due to spillover effects of Medicare managed care were associated with reduced Medicare spending for dual-eligible beneficiaries (Zhang & Diana, 2017).

Although these previous studies offer useful insights about the effects of D-SNPs on reduced Medicare spending, improved care coordination, and in some cases no change at all, no study has looked at the effect of the D-SNP model of care including nurse practitioner home visits, coordinated with telephonic case management by nurses on hospitalization and readmission rates. Secondly, other D-SNP studies have looked at claims data. This study will be the first to use beneficiary survey to determine effect of D-SNP on hospitalization and readmission rates. This study, therefore, will implement a cross sectional survey to examine hospitalization and readmission rates in urban Washington, D.C among dual eligibles. Specifically, the study will explore the impact of the D-SNP model of care on reduction in hospitalization and readmission rates.

### **Research Questions**

1. Does enrollment into a D-SNP reduce hospitalization and readmission rates among dual eligible beneficiaries in Washington, D.C?
2. Does support in execution of the post-hospitalization discharge plan offered through D-SNP lead to reduction in readmission rates?

### **Chapter 3: Methodology**

The population for this study is dual eligible beneficiaries who are directly impacted by D-SNP. This is a cross-sectional study using primary data. This study used a standardized questionnaire to conduct a telephone survey on dual eligible beneficiaries in Washington DC.

#### **Research Hypotheses**

This study has two main hypotheses:

1. Dual eligible beneficiaries in Washington DC enrolled into D-SNP will have lower hospitalization and readmission rates compared to duals not enrolled.
2. Support in execution of the post-hospitalization discharge plan offered through D-SNP leads to lower readmission rates.

#### **Study Design**

This study used a cross sectional survey to examine hospitalization and readmission rates in Washington, DC among dual eligibles where the D-SNP program was launched in 2014. A standardized questionnaire was administered via telephone over a two-month period (November 1st to December 31st, 2018) in Washington, DC.

#### **Study Population**

All dual eligible residents of all eight wards in Washington, DC were eligible for the study. All dual eligible beneficiaries who are enrolled in the United Healthcare dual complete (D-SNP) plan and those not yet enrolled into a D-SNP plan are eligible for the study.

**Exclusion criteria.** Any D-SNP or QMB member who did not consent to the survey, who was hospitalized throughout the entire study period, or who switched from QMB to D-SNP or vice versa within the two-month study period were excluded from the study.

### **Sample Size Determination**

The minimum sample size required to detect a significant difference in hospitalization rates for the two comparison groups was estimated using STATA. A 2012 study of Mercy Care Plan (a coordinated care plan) in Arizona found that enrolled dual eligible beneficiaries used 3% more preventive and outpatient services. The enrollees also had a 43% lower hospitalization rate, 19% shorter average length of stay in the hospital, 9% lower rate of emergency visits, and a 21% lower readmission rate than dual eligibles nationwide not enrolled in plans with care coordination (Crowe, 2014). Crowe (2014) showed that other coordinated care models have produced similar positive results. Researchers studying SCAN Health Plan's integrated care model for dual eligibles in California found that dual enrollees had 25% fewer hospitalizations and a 29% improvement in diabetes care among other impressive findings (Crowe, 2014). There is little doubt that coordinated and integrated care models keep enrolled dual eligible beneficiaries out of the hospital with fewer readmissions than beneficiaries not enrolled into coordinated plans. There is, therefore, an expectation that hospitalization rates among dual eligibles enrolled in D-SNP in Washington DC will be 30 to 50% lower than those not enrolled in a D-SNP program. Other assumptions using different estimated hospitalization rates for the two groups were applied in the sample size estimation.

Table 3.1

*Estimated Sample Size for Two-Sample Comparison of Proportions*

Assumptions	Estimated required sample sizes	
p1, p2	N1	N2
0.3, 0.5	200	100
0.3, 0.6	93	47
0.25, 0.75	34	17

*Note.* Test  $H_0: p_1 = p_2$ , where  $p_1$  is the proportion in population 1 and  $p_2$  is the proportion in population 2. Assumptions:  $\alpha = 0.0500$  (two-sided), power = 0.90,  $n_2/n_1 = 0.50$

**Participant Recruitment**

Email communication was first established with the Research Data Assistance Center (ResDAC) regarding research need on duals. ResDAC provides support to researchers requesting data on Medicare and Medicaid -the two large insurance programs administered by CMS. Unfortunately, at the time of the request, CMS has discontinued the beneficiary contact service and no longer accepts requests for beneficiary contacts or releases any data with contact information. Nevertheless, search engine links with list of non-CMS sources were provided. About four companies were contacted and information was sourced on how their lists are updated and verified. Information was also requested on what a typical percentage of bad numbers are, how vigorous the samples are scrutinized, how the names and numbers are obtained and how they use quotas to ensure representativeness of a demographic group.

In the end, a list comprising of 4000 dual eligible beneficiaries residing in Washington D.C was purchased from Exact Data- a marketing consulting firm based in Chicago, Illinois. From this list, an oversampled size of about 2000 candidates were randomly drawn for the survey using Stata. Individuals from the randomized list were

called via telephone and those consenting to the survey participated. Not all individuals who were contacted participated in the study. At the end, about 217 D-SNP beneficiaries enrolled with United Healthcare participated in the study and 112 non-enrolled D-SNP beneficiaries participated in the study. This number met our initial calculation of minimum sample estimate of 300.

### **Data Collection**

A questionnaire developed to capture information on demographics, enrollment in a D-SNP program, usual sources of care, hospitalization, health status, and medication adherence was used to capture data for this study. The questionnaire is a standardized tool adapted from multiple national surveys, particularly CMS surveys such as the Medicare Experience Survey, Medicare Health Outcomes Survey, Medicare Advantage Prescription Drug Survey, Nationwide Adult Medicaid CAHPS (Consumer Assessment of Healthcare Providers and Systems) Survey, the CAHPS Survey for Accountable Care Organizations, and the Morisky Eight-Item Medication Adherence Questionnaire (CMS, 2018).

CMS develops and administers diverse patient experience surveys. These surveys ask patients and in some cases their families about their personal experiences with healthcare providers, health plans, hospitals, and home health care agencies, among others. Patient experience surveys focus on how patients experienced or perceived key aspects of their care, not how satisfied they were with their care (CMS, 2015b). These surveys are in the CAHPS family of surveys. CAHPS surveys follow scientific principles in survey design and development (CMS, 2015b). The surveys are designed to reliably

assess the experiences of a large sample of patients. The surveys use standardized questions and data collection protocols to ensure that information can be compared across healthcare settings.

The questionnaire was administered over the telephone. An explanation of the study was read to each participant and verbal consent was obtained over the phone. No names or other patient identifiers were obtained.

### **Dependent Variable**

The main outcome variable for this study was number of hospitalizations and readmissions within the past four years captured as a continuous variable. For some part of this analysis, the main outcome variable was dichotomized as YES for “hospitalization” and NO for “no hospitalization,” or YES for “readmission” and No for “no readmission.”

### **Independent Variables**

**Enrollment in D-SNP.** The predictor variable for Research Question One (RQ-1) was enrollment in D-SNP. Participants were categorized as enrolled or not enrolled (See Appendix A).

**Post-Hospitalization support.** To answer Research Question Two (RQ-2), the predictor variable of post-hospitalization support was answered by three questions (See Appendix A). The first question asked if the patient was admitted to the hospital in the past four years, and if they got a phone call from a nurse after discharge. The second question asked if they got a follow-up visit from a nurse practitioner within seven days after discharge from the hospital. The third question asked whether the information they



gained from the nurse practitioner visits helped them decide against going to the ER in the last four years. All three questions were captured as yes/no.

### **Covariates**

The study questionnaire is comprised of 37 questions (see Appendix B). Five variables captured demographics such as age, gender, race, type of insurance and ward of residence in Washington D.C. Three variables captured the model of care including questions on home visits, frequency of visits and telephone calls (see Appendix A). The responses were discrete. Discrete variables are variables that that can only take on a finite number of values and are countable (Anthony, 2011). An example in the number of times an incident happened and can be 1,2,3,4, or 5 and so on. Continuous variables on the other hand are variables that can take on an infinite number of possible values (Anthony, 2011). Four variables captured usual source of care and the responses were categorical and discrete (see Appendix A). The variables for hospitalization and readmission were spread across seven questions (see Appendix A). Some of the questions captured ER visits and admissions and the responses were categorical and discrete. The variables for post hospitalization visits and support with post-discharge planning offered through the D-SNP model of care were captured with six questions and the responses were categorical (see Appendix A). Six questions assessed overall health status, chronic medical conditions, disability, and specialist physician visits (see Appendix A). Specialists are doctors such as surgeons, ophthalmologists, cardiologists, nephrologists, oncologists, rheumatologists, and other doctors who specialize in one area of medicine. The responses were discrete, categorical and on a Likert scale. The last set of six

variables were on medication adherence and the responses were categorical and on a Likert scale (see Appendix A).

### **Statistical Analysis**

Data collected from the questionnaire was entered into an Excel spreadsheet and exported to Stata Version 14 for cleaning and analysis. The statistical analysis for the study includes univariate, bivariate, and multivariate analyses.

**Univariate analysis.** The univariate analysis phase includes frequencies, including point and interval estimates to summarize demographic information from the study sample.

**Bivariate analysis.** The bivariate analysis phase includes comparison of baseline characteristics by D-SNP enrollment. This bivariate data analysis phase was also used to examine associations between potential predictor variables and hospitalization/readmission. In the bivariate analysis phase, a student's t-test compared continuous variables by enrollment status and an independent chi square test compared categorical variables by enrollment status.

**Multivariate Analysis.** For the dichotomous hospitalization and readmission variables captured as hospitalized (1) or not hospitalized (0), and readmitted (1) or not readmitted (0), a logistic regression was run to establish the relationships between the various predictor variables and hospitalizations/readmissions. For the discrete variables of hospitalizations and readmissions measured as the number of hospitalizations and readmissions, a Poisson Regression Model was used to establish the relationship between the various predictor variables and the number of hospitalizations/readmissions.

Variables adjusted for the multivariate models include demographics, D-SNP enrollment status, D-SNP support with post hospitalization discharge plan, usual source of care, ease of seeing health provider post hospitalization, frequency of doctor visits, disabilities, chronic medical and mental illness, and medication adherence.

### **Ethical Considerations**

Approval for the study was obtained from the Morgan State University Institutional Review Board. Following the approval, a disclosure form and an explanation of the study was read to each participant and verbal consent was obtained over the phone. No written consents were obtained. A one-time Walmart \$10 gift card was mailed to each study participant.

## **Chapter 4: Results**

This chapter details the results of the univariate, bivariate, and multivariate analyses that were conducted to test the study's hypotheses and conceptual framework. It includes descriptive characteristics of the study sample, a comparison of the study samples, enrollment into D-SNP and which aspects of the D-SNP model of care were found to have a significant association with the outcome variable of lower hospitalization and readmission rates.

### **Final Sample**

Sample size calculations indicated that a sample of 300 was needed to see significant differences between the two groups. During our outreach we surveyed about 350 dual eligible Medicare beneficiaries. We excluded 21 beneficiaries based on one of our exclusion criteria -switching from QMB to D-SNP or vice versa during the study period. Our final sample size was 329.

### **Demographics and Baseline Health Characteristics**

The sociodemographic and baseline characteristics of the study population are displayed in Table 4.1. A total of 329 subjects participated in the study with 34% (112) subjects being non-D-SNP (have Medicare and Medicaid) and 66% (217) subjects being D-SNP enrollees (have Medicare and Medicaid through United Healthcare Insurance). More females participated amongst the two groups with 54% (60) within the non-D-SNP members and 62% (134) within the D-SNP members with total participation of 59% (194). The number of non-D-SNP males were 46% (52) and 38% (83) for D-SNP members with total participation of 41% (135). There was no difference in the ages of the

two comparison groups. Age of subjects were similar with the mean age of the D-SNP participants being 70 years (standard deviation = 10.1 years) and non-D-SNP being 68 years (standard deviation = 9.6 years). Further, there was diversity in terms of subjects' sociodemographic characteristics. The study sample included at least subjects from all 8 wards of the District of Columbia. More than half of the subjects were African American 62% (204), Hispanic 18% (59), Caucasians 12% (39), and Asians 8% (27).

Participants were asked to report any history of depression, bipolar disorder, and schizophrenia, 15% (32) of D-SNP members reported some form of mood disorder or mental health illness while only 2% of non-D-SNP members reported mental health illness. Survey participants were asked about history of the most common chronic medical illnesses such as hypertension, heart disease, heart failure, kidney, disease, diabetes, stroke, cancer, COPD, rheumatoid arthritis, osteoarthritis, and mood disorders. Hypertension, heart disease, heart failure or kidney disease were reported by 81% (91) of non-D-SNP members similar to 78% (170) of D-SNP members. Diabetes was reported by 43% (48) of non-D-SNP members and 33% (72) of D-SNP members. Stroke was reported by 29% (32) of non-D-SNP members and 22% (48) of D-SNP members. Cancer was equally reported by 6% of members from both groups. COPD was reported by 17% (19) of non- D-SNP members and 19% (41) of D-SNP members. Rheumatoid arthritis and osteoarthritis were reported by 32% (36) of non-D-SNP members and 22% (48) of D-SNP members.

Table 4.1.

*Sociodemographic and Baseline Characteristics of D-SNP and non-D-SNP Study**Participants*

Variable	Non-DSNP (N=112) n (column %)	DSNP (N=217) n (column %)	All (N=329) n (column %)	P value
Gender				
Female	60 (53.6)	134 (61.8)	194 (59.0)	0.153
Male	52 (46.4)	83 (38.3)	135 (41.0)	
Age				
Mean (S.D.)	70 (10.2)	69 (9.6)	69 (9.8)	0.131
Race/ethnicity				
White	18 (16.1)	21 (9.3)	39 (11.9)	0.255
Black	66 (58.9)	138 (63.6)	204 (62.0)	
Asian	11 (9.8)	16 (7.4)	27 (8.2)	
Hispanic	17 (15.2)	42 (19.4)	59 (17.9)	
Overall health				
Excellent	2 (1.8)	15 (6.9)	17 (5.2)	0.010
Very good	12 (10.7)	46 (21.2)	58 (17.6)	
Good	37 (33.0)	71 (32.7)	108 (32.8)	
Fair	53 (47.3)	78 (36.0)	131 (40.0)	
Poor	8 (7.1)	7 (3.2)	15 (4.6)	
Disability/medical illness				
Cognitive/mental illness				
No	110 (98.2)	185 (85.3)	295 (89.7)	<0.001
Yes	2 (1.8)	32 (14.7)	34 (10.3)	
Neurological disability				
No	101 (90.2)	138 (82.0)	239 (84.8)	0.051
Yes	11 (9.8)	39 (18.0)	50 (15.2)	

(continued)

Table 4.1.

*Sociodemographic and Baseline Characteristics of D-SNP and non-D-SNP Study**Participants (continued)*

Variable	Non-DSNP (N=112) n (column %)	DSNP (N=217) n (column %)	All (N=329) n (column %)	P value
Disability/medical illness				
Physical disability				
No	104 (92.9)	189 (87.1)	293 (89.1)	0.113
Yes	8 (7.1)	28 (12.9)	36 (10.9)	
Other medical disability				
No	86 (76.8)	58 (76.7)	144 (43.8)	<0.001
Yes	26 (23.2)	159 (73.3)	185 (56.2)	
Chose not to answer				
No	105 (93.8)	182 (83.9)	287 (87.2)	0.011
Yes	7 (6.2)	35 (16.1)	42 (12.8)	
Chronic medical condition				
Hypertension/ heart disease/ heart failure/ kidney failure				
No	21 (18.8)	47 (21.7)	68 (20.7)	0.537
Yes	91 (81.2)	170 (78.3)	261 (79.3)	
Diabetes				
No	64 (57.1)	145 (66.8)	209 (63.5)	0.084
Yes	48 (42.9)	72 (33.2)	120 (36.5)	
Stroke				
No	80 (71.4)	169 (77.9)	249 (75.7)	0.196
Yes	32 (28.6)	48 (22.1)	80 (24.3)	
Cancer				
No	105 (93.8)	203 (93.6)	308 (93.6)	0.943
Yes	7 (6.2)	14 (6.4)	21 (6.4)	
COPD				
No	93 (83.0)	176 (81.1)	269 (81.8)	0.668
Yes	19 (17.0)	41 (18.9)	60 (18.2)	
Rheumatoid/osteoarthritis				
No	76 (67.9)	169 (77.9)	245 (74.5)	0.048
Yes	36 (32.1)	48 (22.1)	84 (25.5)	

(continued)

Table 4.1.

*Sociodemographic and Baseline Characteristics of D-SNP and non-D-SNP Study**Participants (continued)*

Variable	Non-DSNP (N=112) n (column %)	DSNP (N=217) n (column %)	All (N=329) n (column %)	P value
Chronic medical condition				
Depression/bipolar disorder/schizophrenia				
No	82 (76.2)	181(83.4)	263 (80.0)	0.029
Yes	30 (23.8)	36(16.6)	66 (20.0)	
Other				
No	63 (56.3)	51(23.5)	114 (34.7)	<0.001
Yes	49 (43.7)	166(76.5)	215 (65.3)	

*Note.* A chi-square test of independence was performed for categorical variables. n and column percentages presented. An independent-samples t-test was performed for continuous variables. Mean and standard deviation presented. Significance level = P-value < 0.05.

**Usual Source of Care**

Table 4.2 shows characteristics of the usual source of medical care for both groups. Among non-D-SNP members, 93% (104) reported having a place to go for care when they are sick or need advice about their health similar to 97% (210) of D-SNP members. Routine care at a health center or clinic was sought by 33% from both groups, 32% (36) of non-D-SNP members went to a doctor's office compared to 30% (64) of D-SNP members, and 24% (27) non- D-SNP members routinely obtained health services from a hospital outpatient clinic compared to 33% (70) of D-SNP members. Study participants were asked to report on the number of ER or urgent care visits using a scale of none, one to three, four to nine, or greater than ten in the past four years and 9% (10) of non- D-SNP members reported over 10 urgent care or ER visits compared to 5% (11) of D-SNP members (P<0.05). The scale of four to nine ER or urgent care visits in the



past four years was reported by 33% (37) of non-D-SNP members compared to 20% (46) of D-SNP members ( $P<0.05$ ). The scale of one to three ER or urgent care visits in the past four years was reported by 47% of the participants from both groups. A higher number of D-SNP members reported no ER or urgent care visits in the last four years, 11% (12) from the non-D-SNP members compared to 27% (58) among the D-SNP members ( $P<0.05$ ).

Study participants were further asked to choose their main reason for visiting the ER and 29% (32) of non- D-SNP members reported their main reason for ER visit being their close proximity to the ER compared to 9% (20) for D-SNP members ( $P<0.05$ ). Other reasons chosen by the participants include 7% (8) of non-D-SNP members who reported getting their routine care from the ER compared to just 2% (5) of D-SNP members ( $P<0.05$ ). Yet, 16% (18) of non-D-SNP members reported that their main reason for ER visit was that the health problem was too serious for the doctor's office or clinic compared to 38% (83) of D-SNP members. Over 70% from both groups reported receiving care from specialist physicians.

Table 4.2.

*Characteristics of the Usual Source of Care by Enrollment into D-SNP*

Variable	Non-DSNP (N=112) n (column %)	DSNP (N=217) n (column %)	All (N=329) n (column %)	P value
Do you have a place to go when sick?				
No	8 (7.1)	7 (3.2)	15 (4.6)	0.107
Yes	104 (92.8)	210 (96.8)	314 (95.4)	
What kind of place?				
Clinic	37 (33.0)	76 (33.2)	109 (33.1)	0.260
Doctor's office	36 (32.1)	64 (29.5)	100 (30.4)	
Emergency	5 (4.5)	4 (1.8)	9 (2.7)	
Hospital outpatient	27 (24.1)	70 (32.8)	97 (29.5)	
>1 place	7 (6.3)	7 (3.2)	14 (4.3)	
If not, why?				
No problems	2 (1.8)	1 (0.5)	3 (0.9)	
Not convenient	3 (2.7)	4 (1.8)	7 (2.1)	
ER is closer	5 (4.5)	2 (0.9)	7 (2.1)	
How often did you get an appointment for doctor's office?				
Sometimes/Never	14 (12.5)	12 (5.5)	26 (7.9)	0.012
Usually	31 (27.7)	43 (19.8)	74 (22.5)	
Always	67 (59.8)	162 (74.7)	229 (69.6)	
ER or Urgent Visits				
None	12 (10.7)	58 (26.7)	70 (21.3)	0.002
1-3	53 (47.3)	102 (46.7)	155 (47.1)	
4-9	37 (33.0)	46 (21.2)	83 (25.2)	
10 or more	10 (8.9)	11 (5.1)	21 (6.4)	
Main reason for E.R. visit				
ER is closer	32 (28.6)	20 (9.2)	52 (15.8)	
Clinic closed	17 (15.2)	22 (10.1)	39 (11.9)	
Serious problem	18 (16.1)	83 (38.3)	101 (30.7)	
Routine care from ER	8 (7.1)	5 (2.3)	13 (4.0)	

(continued)

Table 4.2.

*Characteristics of the Usual Source of Care by Enrollment into D-SNP (continued)*

Variable	Non-DSNP (N=112) n (column %)	DSNP (N=217) n (column %)	All (N=329) n (column %)	P value
Main reason for E.R. visit				
No appointment	20 (18.9)	17 (7.8)	37 (11.3)	
No PCP	6 (5.4)	12 (5.5)	18 (5.5)	
Specialist physician care				
No	32 (28.6)	57 (26.3)	89 (27.1)	
Yes	80 (71.4)	160 (73.7)	240 (72.9)	0.656
Made appointment w/ specialist as soon as needed?				
Never	33 (29.5)	57 (26.3)	90 (27.4)	
Sometimes	32 (28.6)	52 (24.0)	84 (25.5)	
Usually	37 (33.0)	89 (41.0)	126 (38.3)	
Always	10 (8.9)	19 (8.8)	29 (8.8)	0.548
Different specialists seen?				
None	31 (27.7)	57 (26.3)	88 (26.8)	
1	51 (45.5)	88 (40.6)	139 (42.3)	
2	21 (18.8)	47 (21.7)	68 (20.7)	
3+	9 (8.0)	25 (11.5)	34 (10.3)	0.646

*Note.* A chi-square test of independence was performed for categorical variables. n and column percentages presented. Significance level = P-value < 0.05.

**History of Hospitalizations and Readmissions**

Table 4.3 shows a significant relationship between D-SNP enrollment and decreased hospitalization rate ( $p < 0.001$ ). A significant association was also noted between D-SNP enrollment and lower readmission rates ( $p < 0.001$ ). Among D-SNP members, a much lower number 18% (40) reported readmission within 30 days of initial hospital discharge compared to 29% (44) of non-D-SNP members. Participants were asked how easy it would have been to see their doctor prior to going back to the ER post

hospitalization and 20% (43) of D-SNP members answered in the affirmative, compared to less than half 9% (10) non- D-SNP members. Over 60% of members from both groups reported receiving a nurse telephone call upon discharge from the hospital. However, 59% (127) of D-SNP members received a home visit by the NP following hospital discharge compared to 4% (4) of non-D-SNP members. Over 95% (210) of D-SNP members reported that during the home visit, the NP discussed specific things they could do to prevent hospitalization. Another 67% (145) of D-SNP members reported that the information gained from the NP home visit helped them decide against going to the ER. Among D-SNP members who were previously admitted into the hospital, 62% (134) reported that the visiting NP as well as the telephonic nurse either assisted or offered to assist in arranging follow-up visits including transportation to other doctors or specialists.

Table 4.3.

*Characteristics of Hospitalizations and Re-admissions by Enrollment into D-SNP*

Variable	Non-DSNP (N=112) n (column %)	DSNP (N=217) n (column %)	All (N=329) n (column %)	P value
How many times admitted into the hospital?				
Mean (S.D.)	3.3 (3.7)	1.8 (2.6)	2.3 (3.1)	<0.001
Readmitted within 30 days of initial discharge?				
No	54 (48.2)	98 (45.2)	152 (46.2)	
Yes	44 (29.3)	40 (18.4)	84 (25.5)	<0.012

(continued)

Table 4.3.

*Characteristics of Hospitalizations and Re-admissions by Enrollment into D-SNP**(continued)*

Variable	Non-DSNP (N=112) n (column %)	DSNP (N=217) n (column %)	All (N=329) n (column %)	P value
No. of times re-admitted?				
Mean (S.D.)	1.0 (1.8)	0.3 (1.1)	0.6 (1.4)	<0.001
Would it have been easy to see provider before E.R.?				
No	88 (78.6)	117 (53.9)	205 (62.3)	
Yes	10 (8.9)	43 (19.8)	53 (16.1)	
N/A	14 (12.5)	57 (26.3)	71 (21.6)	<0.001
How often did you visit doctor's office for personal healthcare?				
1-3 times	4 (3.6)	6 (2.8)	10 (3.0)	
4-9 times	24 (21.4)	33 (15.2)	57 (17.3)	
10 or more	84 (75.0)	178 (82.0)	262 (79.6)	0.322
Phone call from nurse after discharge?				
No	14 (12.5)	1 (0.5)	15 (4.6)	
Yes	72 (64.3)	136 (62.6)	208 (63.2)	
Follow up visit from NP?				
No	63 (56.3)	10 (4.6)	73 (22.2)	
Yes	4 (3.6)	127 (58.5)	131 (39.8)	
NP discussed ways to prevent hospitalization?				
No	0 (0.0)	2 (0.9)	2 (0.6)	
Yes	5 (4.5)	210 (96.8)	215 (65.4)	

*(continued)*

Table 4.3.

*Characteristics of Hospitalizations and Re-admissions by Enrollment into D-SNP**(continued)*

Variable	Non-DSNP (N=112) n (column %)	DSNP (N=217) n (column %)	All (N=329) n (column %)	P value
Information from NP helpful in deciding against E.R. visits?				
No	3 (2.7)	67 (30.9)	70 (21.3)	
Yes	1 (0.9)	145 (66.8)	146 (41.4)	
MOC assisted in deciding against E.R. visits?				
No	1 (0.9)	89 (41.0)	90 (27.4)	
Yes	0 (0.0)	123 (56.7)	123 (37.4)	
Did nurse or NP assist with post discharge plans?				
No	81 (72.3)	4 (1.8)	85 (25.8)	
Yes	7 (6.3)	134 (61.8)	141 (42.9)	

*Notes.* A chi-square test of independence was performed for categorical variables. n and column percentages presented. An independent-samples t-test was performed for continuous variables. Mean and standard deviation presented. Significance level = P-value < 0.05.

**Medication Adherence**

The characteristics of medication adherence for the D-SNP and non-D-SNP study participants are shown in Table 4.4. About six questions were adapted from the Morisky Eight-Item Medication Adherence Questionnaire to assess for medication adherence within the two groups. Among the non-D-SNP members, 48% (49) reported either cutting back or stopped taking their medicines without telling their doctor because they felt worse when they took it compared to 30% (64) of D-SNP members ( $P < 0.05$ ). Furthermore, 43% (48) of non-D-SNP members reported stopping their medications when they felt their symptoms were under control compared to 22% (48) of D-SNP

members ( $P<0.05$ ). The last question of the survey asked participants if they felt hassled about sticking to their treatment plans by their providers, and 33% (37) of non-D-SNP members reported feeling hassled about sticking to their treatment plan compared to about half 18% (40) of D-SNP members ( $P<0.05$ ).

Table 4.4.

*Characteristics of Medication Adherence by Enrollment into D-SNP*

Variable	Non-DSNP (N=112) n (column %)	DSNP (N=217) n (column %)	All (N=329) n (column %)	P value
Do you take prescribed medication?				
No	1 (0.9)	0 (0.0)	1 (0.3)	0.163
Yes	111 (99.1)	217 (100.0)	328 (99.7)	
Do you forget to take meds?				
No	12 (10.7)	76 (35.0)	88 (26.75)	<0.001
Yes	100 (89.3)	141 (65.0)	241 (73.3)	
How often is it difficult to remember meds?				
Never	40 (35.7)	115 (53.0)	155 (47.1)	
Sometimes	36 (32.1)	45 (20.7)	81 (24.6)	
Usually	22 (19.6)	46 (21.2)	68 (20.7)	
Always	12 (10.7)	10 (4.6)	22 (6.7)	
Stop meds that made you feel worse w/o telling prescriber?				
No	63 (56.3)	153 (70.5)	216 (65.6)	0.010
Yes	49 (47.7)	64 (29.5)	113 (34.4)	
Stop meds when symptoms are under control?				
No	64 (57.1)	169 (77.9)	233 (70.8)	<0.001
Yes	48 (42.9)	48 (22.1)	96 (29.2)	
Feel hassled to stick to treatment plan?				
No	75 (67.0)	177 (81.6)	252 (76.6)	0.003
Yes	37 (33.0)	40 (18.4)	77 (23.4)	

*Notes: A chi-square test of independence was performed for categorical variables. n and column percentages presented. Significance level = P-value < 0.05*

## Hospital Admissions in Last 4 Years

Table 4.5 is a bivariate analysis of the predictors of hospitalization in the last 4 years. Our results show that out of the 217 individuals that identified as D-SNP members, 64% (138) reported being hospitalized within the past four years compared to a significantly higher number of individuals not enrolled into D-SNP where 90 out of the 112 participants reported a hospitalization- an 80% rate ( $P<0.05$ ). The presence of hypertension, heart disease, heart failure, kidney disease, diabetes and mental health conditions such as depression, bipolar disorder or schizophrenia were significantly associated with hospitalization ( $P<0.05$ ).

Table 4.5.

### *Bivariate Analysis of Predictors of Hospital Admission in the Last 4 Years*

Variables	No admission (N=101) N (row %)	Hospital admission (N=228) N (row %)	P value
DSNP			
No	22 (19.6)	90 (80.4)	0.002
Yes	79 (36.4)	138 (63.6)	
Gender			
Female	65 (33.5)	129 (66.5)	0.186
Male	36 (26.7)	99 (73.3)	
Age			
Mean (SD)	67 (9.0)	70 (10.1)	0.994
Race			
White	11 (28.2)	28 (71.8)	0.107
Black	57 (27.9)	147 (72.1)	
Asian	7 (25.9)	20 (74.1)	
Hispanic	26 (44.1)	33 (55.9)	

(continued)



Table 4.5.

*Bivariate Analysis of Predictors of Hospital Admission in the Last 4 Years (continued)*

Variables	No admission (N=101) n (row %)	Hospital admission (N=228) n (row %)	P value
Is there a place to go when sick or need advice?			
No	8 (53.3)	7 (46.7)	0.052
Yes	93 (29.6)	221 (70.4)	
How often-appointment at Doctors office in the last 4 years?			
Never	2 (66.7)	1 (33.3)	0.506
Sometimes	8 (34.8)	15 (65.2)	
Usually	24 (32.4)	50 (67.6)	
Always	67 (29.3)	162 (70.7)	
How many times in last 4 year did you visit doctor for healthcare for self?			
1 time	7 (70.0)	3 (30.0)	<0.001
4-9 times	33 (57.9)	24 (42.1)	
10 or more	61 (23.3)	201 (76.7)	
Disabilities			
No	41 (36.6)	71 (63.4)	0.095
Yes	60 (27.7)	157 (72.3)	
Hypertension/ Heart Disease/ Heart failure/ Kidney Disease			
No	41 (60.3)	27 (39.7)	<0.001
Yes	60 (23.0)	201 (77.0)	
Diabetes			
No	88 (42.1)	121 (57.9)	<0.001
Yes	13 (10.8)	107 (89.2)	
Depression/Bipolar disorder/Schizophrenia			
No	90 (34.2)	173 (65.8)	0.006
Yes	11 (16.7)	55 (83.3)	

(continued)

Table 4.5.

*Bivariate Analysis of Predictors of Hospital Admission in the Last 4 Years (continued)*

Variables	No admission (N=101) n (row %)	Hospital admission (N=228) n (row %)	P value
Ever stopped taking meds without telling doctor because you felt worse after taking it?			
No	66 (30.6)	150 (69.4)	0.938
Yes	35 (31.0)	78 (69.0)	
Ever stopped taking meds because you felt the symptoms are under control?			
No	71 (30.5)	162 (69.5)	0.889
Yes	30 (31.3)	66 (68.7)	

*Note. n and row percentages presented for categorical variables. Mean and standard deviation presented for continuous variables.*

**30-Day All-Cause Hospital Readmission**

The 30-day all-cause hospital readmission measure is a risk-standardized readmission rate used by CMS to show beneficiaries who were hospitalized at a short-stay acute-care hospital and experienced an unplanned readmission for any cause to an acute care hospital within 30 days of discharge. The bivariate analysis of predictors of 30-day readmission is shown on Table 4.6. The results show that out of the 138 D-SNP members that were hospitalized in the past four years, 29% (40) were readmitted into the hospital within 30 days of discharge compared to 45% of persons not enrolled into D-SNP showing that enrollment into D-SNP is significantly associated with lower readmission rate ( $P<0.05$ ). Individuals who stopped taking their medications because they felt the symptoms were under control had a readmission rate of 46% and individuals who stopped taking their medications without telling their provider because they felt worse

after taking the medications also had a 46 % readmission rate showing a significant association between medication adherence and readmission ( $P<0.05$ ). Persons who reported difficulty scheduling follow up appointment with their provider after initial hospital discharge had a 41 % readmission rate whereas individuals that reported seeing their provider post discharge had an 81% lower readmission rate, indicating that not following up with healthcare provider post discharge is significantly associated with readmission ( $P<0.05$ ). Having a diagnosis of hypertension, heart disease, heart failure, kidney disease or diabetes is significantly associated with readmission ( $P<0.05$ ).

Table 4.6.

*Bivariate Analysis of predictors of 30-day readmission*

Variables	No re-admission (N=152) n (row %)	Re-admission (N=84) n (row %)	P value
DSNP			
No	54 (55.1)	44 (44.9)	0.012
Yes	98 (71.0)	40 (29.0)	
Gender			
Female	92 (68.2)	43 (31.8)	0.165
Male	60 (59.4)	41 (40.6)	
Age			
Mean (SD)	70 (9.0)	70 (11.6)	0.490
Race			
White	19 (63.3)	11 (36.7)	0.461
Black	94 (61.4)	59 (38.6)	
Asian	15 (75.0)	5 (25.0)	
Hispanic	24 (72.7)	9 (27.3)	
Was it easy to see your doctor before going to the ER?			
No	110 (59.1)	76 (40.9)	0.010
Yes	33 (80.5)	8 (19.5)	
Was it easy to see your doctor before going to the ER? Provider assist with arranging follow up?			
No	45 (53.6)	39 (46.4)	0.027
Yes (N=139)	95 (68.4)	44 (31.6)	

(continued)

Table 4.6.

*Bivariate Analysis of predictors of 30-day readmission (continued)*

Variables	No re-admission (N=152) n (row %)	Re-admission (N=84) n (row %)	P value
Disabilities			
No	47 (59.5)	32 (40.5)	0.263
Yes	105 (66.9)	52 (33.1)	
Hypertension/Heart Disease/Heart failure/ Kidney Disease			
No	29 (90.6)	3 (9.4)	0.001
Yes	123 (60.3)	81 (39.7)	
Diabetes			
No	99 (77.3)	29 (22.7)	<0.001
Yes	53 (49.1)	81 (50.9)	
Depression/Bipolar disorder/Schizophrenia			
No	118 (65.9)	61 (34.1)	0.389
Yes	34 (59.7)	23 (40.3)	
Ever stopped taking meds without telling doctor because you felt worse after taking it?			
No	109 (69.9)	47 (30.1)	0.014
Yes	43 (53.7)	37 (46.3)	
Ever stopped taking meds because you felt the symptoms are under control?			
No	114 (68.7)	52 (31.3)	0.035
Yes	38 (54.3)	32 (45.7)	

*Notes.* n and row percentages presented for categorical variables. Mean and standard deviation presented for continuous variables.

**Support in execution of the post-hospitalization plan offered through D-SNP leads to reduction in readmission rates.** Table 4.7 is showing the unadjusted odds of 30-day readmission for the predictors of post hospitalization support (part of D-SNP model of care). Since only one group (D-SNP members) received this service, there was collinearity in the final analysis. Collinearity occurs when a predictor variable expresses

a linear relationship in a regression model (Anthony, 2011). In other words, they explain some of the same variance in the dependent variable, which in turn reduces their statistical significance (Anthony, 2011).

Table 4.7.

*Post- Hospitalization Support Services Predicting 30-day Readmission*

Variables	No Re-admission (N=152) n (row %)	Re-admission (N=84) n (row %)	P value	Unadjusted OR (95% CI)
Did you get a phone call from the Nurse upon discharge?				
No	10 (76.9)	3 (23.1)		1.00
Yes	128 (61.8)	79 (38.2)	0.275	2.06 (0.55, 7.70)
Did you get a follow-up visit from an NP within 7 days of discharge?				
No	39 (54.9)	32 (45.1)		1.00
Yes	91 (69.5)	40 (30.5)	0.039	0.54 (0.29, 0.97)
Did the information provided help decide against going to the ER?				
No	18 (66.7)	9 (33.3)		1.00
Yes	80 (70.8)	33 (29.2)	0.674	0.83 (0.34, 2.02)

*Notes.* n and row percentages presented for categorical variables. Mean and standard deviation presented for continuous variables.

**Enrollment into D-SNP will reduce hospitalization rates among dual eligible beneficiaries in Washington D.C.** Table 4.8 is a multivariable logistic regression showing the odds of hospitalization for each predictor after controlling for covariates. In the unadjusted model, the odds of being hospitalized significantly reduced for those individuals enrolled into D-SNP with an OR (95% CI) of 0.4 (0.25, 0.73). After adjusting

for gender, age, race, usual source of care, frequency of doctor visits, disabilities, chronic medical and mental illness and medication adherence, the association between D-SNP enrollment and hospitalization rates remained statistically significant with an OR (95% CI) of 0.3 (0.12, 0.62). The presence of hypertension, heart disease, heart failure, or kidney disease were significantly associated with increased hospitalization after adjusting for covariates with an OR (95% CI) of 4.1 (1.83, 9.08). The presence of diabetes was also significantly associated with increased hospitalization after adjusting for covariates with an OR (95% CI) of 5.0 (2.38, 10.37). Having a mental illness such as depression, bipolar disorder or schizophrenia was also significantly associated with increased hospitalization after adjusting for covariates with an OR (95% CI) of 3.2 (1.29, 7.78).

Table 4.8.

*Multivariable Logistic Regression of predictors of hospital admission in the last 4 years*

Variables	Unadjusted OR	Unadjusted (95% CI)	Adjusted* OR	Adjusted (95% CI)
DSNP				
No (Ref)	1.00	-	1.00	-
Yes	0.43	(0.25, 0.73)	0.27	(0.12, 0.62)
Gender				
Female (Ref)	1.00	-	1.00	-
Male	1.38	(0.85, 2.25)	1.37	(0.72, 2.62)
Age	1.00	-	1.00	-
Mean (SD)	1.03	(1.01, 1.06)	1.00	(0.96, 1.03)
Race				
White (Ref)	1.00	-	1.00	-
Black	1.01	(0.47, 2.17)	1.00	(0.38, 2.65)
Asian	1.12	(0.37, 3.40)	1.94	(0.50, 7.56)
Hispanic	0.50	(0.21, 1.19)	0.54	(0.18, 1.63)
Is there a place to go when sick or need advice?				
No (Ref)	1.00	-	1.00	-
Yes	2.72	(0.95, 7.71)	8.42	(0.74, 96.02)

(continued)

Table 4.8.

*Multivariable Logistic Regression of predictors of hospital admission in the last 4 years**(continued)*

Variables	Unadjusted OR	Unadjusted (95% CI)	Adjusted* OR	Adjusted (95% CI)
How often-appointment at Doctors office in the last 4 years?				
Never (Ref)	1.00	-	1.00	-
Sometimes	3.75	(0.31, 47.99)	0.31	(0.01, 8.45)
Usually	4.17	(0.36, 48.25)	0.09	(0.00, 4.56)
Always	4.84	(0.43, 54.23)	0.07	(0.00, 3.31)
How many times in last 4 year did you visit doctor for healthcare for self?				
1 time (Ref)	1.00	-	1.00	-
4-9 times	1.70	(0.40, 7.24)	1.76	(0.26, 11.61)
10 or more	7.69	(1.93, 30.64)	6.24	(0.96, 40.43)
Disabilities				
No (Ref)	1.00	-	1.00	-
Yes	1.51	(0.93, 2.46)	2.27	(1.04, 4.97)
Hypertension/ Heart Disease/ Heart failure/ Kidney Disease				
No (Ref)	1.00	-	1.00	-
Yes	5.08	(2.89, 8.95)	4.07	(1.83, 9.08)
Diabetes				
No (Ref)	1.00	-	1.00	-
Yes	5.99	(3.16, 11.33)	4.97	(2.38, 10.37)
Depression/Bipolar disorder/Schizophrenia				
No (Ref)	1.00	-	1.00	-
Yes	2.60	(1.30, 5.21)	3.17	(1.29, 7.78)

*(continued)*

Table 4.8.

*Multivariable Logistic Regression of predictors of hospital admission in the last 4 years**(continued)*

Variables	Unadjusted OR	Unadjusted (95% CI)	Adjusted* OR	Adjusted (95% CI)
Ever stopped taking meds without telling doctor because you felt worse after taking it?				
No (Ref)	1.00	-	1.00	-
Yes	0.98	(0.60, 1.61)	1.00	(0.40, 2.47)
Ever stopped taking meds because you felt the symptoms are under control?				
No (Ref)	1.00	-	1.00	-
Yes	0.96	(0.58, 1.61)	0.95	(0.36, 2.51)

*Notes.* n and row percentages presented for categorical variables. Mean and standard deviation presented for continuous variables. OR= Odds Ratio

\*Adjusted for enrollment in D-SNP, gender, age, race, usual source of care, frequency of doctor visits, disabilities, chronic medical and mental illness, and medication adherence.

**Enrollment into D-SNP will reduce hospitalization rates among dual eligible beneficiaries in Washington D.C.** Table 4.9 is a multivariable Poisson regression showing the incidence rate ratio (IRR) of the estimated hospitalization by enrollment into D-SNP. The hospitalization IRR showed that beneficiaries enrolled into D-SNP had a 50% lower hospitalization incidence rate ratio compared to non-D-SNP [IRR (95% CI): 0.5 (0.46, 0.62)]. Given that other variables of gender, age, race, usual source of care, frequency of doctor visits, disabilities, chronic medical and mental illness and medication adherence are held constant in the model, D-SNP compared to non-D-SNP maintained a reduced hospitalization incidence rate 40% less [IRR (95% CI): 0.6 (0.49, 0.73)].



Table 4.9.

*Multivariable Poisson Regression of Predictors of Hospital Admission in the Last 4**Years*

Variables	Unadjusted IRR (95% CI)	Unadjusted (95% CI)	Adjusted* IRR (95% CI)	Adjusted* (95% CI)
DSNP				
No (Ref)	1.00	-	1.00	-
Yes	0.54	(0.46, 0.62)	0.60	(0.49, 0.73)
Gender				
Female	1.00	-	1.00	-
Male	1.42	(1.23, 1.63)	1.25	(1.07, 1.45)
Age				
Years	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Race				
White (Ref)	1.00	-	1.00	-
Black	1.10	(0.88, 1.37)	1.01	(0.80, 1.28)
Asian	0.79	(0.56, 1.11)	1.12	(0.78, 1.60)
Hispanic	0.66	(0.50, 0.88)	0.80	(0.59, 1.08)
Is there a place to go when sick or need advice?				
No (Ref)	1.00	-	1.00	-
Yes	0.74	(0.55, 1.00)	1.77	(1.15, 2.72)
How often-appointment at Doctors office in the last 4 years?				
Every time (Ref)	1.00	-	1.00	-
Sometimes	6.26	(1.54, 25.40)	1.58	(0.34, 7.31)
Usually	3.75	(0.93, 15.11)	0.78	(0.16, 3.78)
Always	3.14	(0.78, 12.58)	0.63	(0.13, 3.07)
How many times in last 4 year did you visit doctor for healthcare for self?				
1 time (Ref)	1.00	-	1.00	-
4-9 times	1.42	(0.71, 2.84)	1.25	(0.59, 2.63)
10 or more times	2.88	(1.49, 5.57)	2.39	(1.14, 4.97)

(continued)

Table 4.9.

*Multivariable Poisson Regression of Predictors of Hospital Admission in the Last 4**Years (continued)*

Variables	Unadjusted IRR (95% CI)	Unadjusted (95% CI)	Adjusted* IRR (95% CI)	Adjusted* (95% CI)
Disabilities				
No (Ref)	1.00	-	1.00	-
Yes	0.95	(0.82, 1.10)	1.31	(1.07, 1.61)
Hypertension/Heart Disease/Heart failure/ Kidney Disease				
No (Ref)	1.00	-	1.00	-
Yes	4.15	(3.07, 5.61)	2.93	(2.12, 4.04)
Diabetes				
No (Ref)	1.00	-	1.00	-
Yes	2.22	(1.92, 2.56)	1.64	(1.41, 1.92)
Depression/Bipolar disorder/Schizophrenia				
No (Ref)	1.00	-	1.00	-
Yes	1.98	(1.70, 2.30)	1.73	(1.47, 2.03)
Ever stopped taking meds without telling doctor because you felt worse after taking it?				
No (Ref)	1.00	-	1.00	-
Yes	1.85	(1.62, 2.15)	1.56	(1.24, 1.95)
Ever stopped taking meds because you felt the symptoms are under control?				
No (Ref)	1.00	-	1.00	-
Yes	1.75	(1.51, 2.02)	1.00	(0.78, 1.26)

*Notes.* IRR=Incidence Rate Ratio. \*Adjusted for enrollment in DSNP, gender, age, race, usual source of care, frequency of doctor visits, disabilities, chronic medical and mental illness, and medication adherence.

**Enrollment into D-SNP will reduce readmission rates among dual eligible beneficiaries in Washington D.C.** Table 4.10 is a multivariable logistic regression showing the odds of 30-day readmission for each predictor after controlling for covariates. In the unadjusted model, the odds of being readmitted within 30 days of initial discharge was significantly reduced for individuals enrolled into D-SNP compared to those not enrolled with an OR (95% CI) of 0.5 (0.29, 0.86). After adjusting for gender, age, race, ease of seeing health provider post hospitalization, D-SNP support, disabilities, chronic medical and mental conditions and medication adherence, the association between D-SNP enrollment and 30-day readmission rate was no longer significant.

Table 4.10.

*Multivariable Logistic Regression of Predictors of 30-day Readmission*

Variables	Unadjusted OR	Unadjusted (95% CI)	Adjusted* OR	Adjusted (95% CI)
DSNP				
No (Ref)	1.00	-	1.00	-
Yes	0.50	(0.29, 0.86)	0.37	(0.07, 1.86)
Gender				
Female (Ref)	1.00	-	1.00	-
Male	1.46	(0.97, 1.03)	1.44	(0.76, 2.75)
Age				
	1.00	-	1.00	-
Mean (SD)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Race				
White (Ref)	1.00	-	1.00	-
Black	1.08	(0.48, 2.44)	0.92	(0.34, 2.49)
Asian	0.58	(0.16, 2.02)	0.84	(0.20, 3.59)
Hispanic	0.65	(0.22, 1.88)	0.52	(0.15, 1.79)
Was it easy to see your doctor before going to the ER?				
No (Ref)	1.00	-	1.00	-
Yes	0.35	(0.15, 0.80)	0.43	(0.18, 1.07)

(continued)

Table 4.10.

*Multivariable Logistic Regression of Predictors of 30-day Readmission (continued)*

Variables	Unadjusted OR	Unadjusted (95% CI)	Adjusted* OR	Adjusted (95% CI)
Provider assist with arranging follow up?				
No (Ref)	1.00	-	1.00	-
Yes	0.53	(0.31, 0.93)	1.51	(0.31, 7.33)
Disabilities				
No (Ref)	1.00	-	1.00	-
Yes	0.73	(0.42, 1.27)	0.78	(0.32, 1.96)
Hypertension/Heart Disease/Heart failure/Kidney Disease				
No (Ref)	1.00	-	1.00	-
Yes	6.37	(1.88, 21.59)	5.93	(1.41, 24.87)
Diabetes				
No (Ref)	1.00	-	1.00	-
Yes	3.54	(2.02, 6.20)	2.76	(1.46, 5.22)
Depression/Bipolar disorder/Schizophrenia				
No (Ref)	1.00	-	1.00	-
Yes	1.31	(0.71, 2.42)	1.43	(0.66, 3.09)
Ever stopped taking meds without telling doctor because you felt worse after taking it?				
No (Ref)	1.00	-	1.00	-
Yes	2.00	(1.14, 3.48)	2.05	(0.76, 5.46)
Ever stopped taking meds because you felt the symptoms are under control?				
No (Ref)	1.00	-	1.00	-
Yes	1.85	(1.04, 3.28)	0.85	(0.29, 2.46)

*Note.* OR= Odds Ratio. \*Adjusted for enrollment in D-SNP, gender, age, race, ease of seeing health provider post hospitalization, D-SNP support, disabilities, chronic medical and mental conditions, and medication adherence.

### Enrollment into D-SNP will reduce readmission rates among dual eligible

**beneficiaries in Washington D.C.** Table 4.11 is a multivariable Poisson regression showing the incidence rate ratio (IRR) of the estimated 30-day readmission by enrollment into D-SNP. The 30-day readmission IRR showed that beneficiaries enrolled into D-SNP had a 70% lower 30-day readmission incidence rate ratio compared to non-D-SNP [IRR (95% CI): 0.3 (0.23, 0.42)]. Given that other variables of gender, age, race, ease of seeing health provider post hospitalization, D-SNP support, disabilities, chronic medical and mental conditions and medication adherence are held constant in the model, D-SNP beneficiaries remained steady at 70% lower 30-day readmission IRR compared to non-D-SNP beneficiaries [IRR (95% CI): 0.3 (0.18, 0.56)].

Table 4.11.

*Multivariable Poisson Regression of Predictors of 30-day Readmission*

Variables	Unadjusted IRR	Unadjusted (95% CI)	Adjusted* IRR	Adjusted* (95% CI)
DSNP				
No	1.00	-	1.00	-
Yes	0.31	(0.23, 0.42)	0.32	(0.18, 0.56)
Gender				
Female	1.00	-	1.00	-
Male	1.57	(1.17, 2.08)	1.22	(0.89, 1.67)
Age	1.00			
Years	1.00	(1.00, 1.00)	0.99	(1.00, 1.00)
Race				
White (Ref)	1.00	-	1.00	-
Black	1.34	(0.84, 2.14)	1.15	(0.68, 1.92)
Asian	0.58	(0.25, 1.31)	0.96	(0.41, 2.26)
Hispanic	0.59	(0.31, 1.12)	0.83	(0.42, 1.65)

(continued)

Table 4.11.

*Multivariable Poisson Regression of Predictors of 30-day Readmission (continued)*

Variables	Unadjusted IRR	Unadjusted (95% CI)	Adjusted* IRR	Adjusted* (95% CI)
Was it easy to see your doctor before going to the ER?				
No (Ref)	1.00	-	1.00	-
Yes	0.28	(0.19, 0.40)	0.91	(0.56, 1.47)
Provider assist with arranging follow up?				
No (Ref)	1.00	-	1.00	-
Yes	0.36	(0.29, 0.45)	1.79	(1.08, 3.00)
Disabilities				
No (Ref)	1.00	-	1.00	-
Yes	0.63	(0.47, 0.84)	0.95	(0.63, 1.43)
Hypertension/Heart Disease/Heart failure/ Kidney Disease				
No (Ref)	1.00	-	1.00	-
Yes	11.85	(4.40, 31.93)	5.98	(2.14, 16.72)
Diabetes				
No (Ref)	1.00	-	1.00	-
Yes	3.66	(2.69, 4.97)	1.69	(1.21, 2.38)
Depression/Bipolar disorder/Schizophrenia				
No (Ref)	1.00	-	1.00	-
Yes	2.52	(1.87, 3.38)	1.69	(1.21, 2.34)
Ever stopped taking meds without telling doctor because you felt worse after taking it?				
No (Ref)	1.00	-	1.00	-
Yes	3.09	(2.30, 4.16)	2.26	(1.42, 3.59)

(continued)

Table 4.11.

*Multivariable Poisson Regression of Predictors of 30-day Readmission (continued)*

Variables	Unadjusted IRR	Unadjusted (95% CI)	Adjusted* IRR	Adjusted* (95% CI)
Ever stopped taking meds because you felt the symptoms are under control?				
No (Ref)	1.00	-	1.00	-
Yes	2.95	(2.21, 3.93)	0.99	(0.60, 1.61)

*Notes.* IRR=Incidence Rate Ratio. \*Adjusted for enrollment in DSNP, gender, age, race, ease of seeing health provider post hospitalization, D-SNP support, disabilities, chronic medical and mental conditions, and medication adherence.

## **Chapter 5: Discussion and Conclusion**

The purpose of this study was to evaluate the impact of Dual Special Needs Plan (D-SNP) on hospitalization and readmission rates in Washington D.C where the D-SNP program was launched in 2014. The previous chapter presented the results of the univariate, bivariate and multivariate analyses. This chapter summarizes those results, provides the conceptual framework support, discusses the study limitations and strengths that were encountered, provides recommendations for future research and describes policy implications of the study.

### **Summary of the Findings**

The presence of a diverse study sample was anticipated since our inclusion criteria comprised of dual eligible beneficiaries from all wards in the District of Columbia. Prior to data collection, it was known that this population experienced higher than normal hospitalization since they tend to be older or younger with disabilities, generally poorer, have worse health status, and use more health care services (Segal, 2011). Also given the disproportionate costs associated with potentially avoidable hospitalizations (PAHs), it therefore presents an opportunity to improve both the quality of care for these beneficiaries and reduce overall Medicare spending (Segal, 2011). The need for this type of study was also heightened by the limited number of studies involving dual eligible beneficiaries and none involving beneficiary survey (Grabowski, 2009).

There were concerns regarding the operationalization of this study including how a single survey would answer the research questions, and how to recruit the D-SNP and



non-D-SNP population. There were also concerns that many of these beneficiaries may not recall when they were hospitalized not to talk of the number of times they were hospitalized, due to the high prevalence of hospitalization within this population. There were challenges encountered while recruiting participants for the study. Many of the listed phone numbers were not working, thus, decreasing the pool of potential subjects. However, these concerns did not override the commitment to use a standardized survey instrument, as well as representative study participants.

Ultimately, the study sample was sufficient to produce definitive and significant findings related to some of the study's hypothesis and conceptual framework. The final study sample was also sufficiently diverse in terms of age, gender, race, Washington D.C ward of residence, and relatively in line with the census tract demographic proportions. This similarity of both study groups allowed for valid analysis. Overall, the study sample represented a sociodemographic sub-population of dual eligible beneficiaries in Washington D.C that in comparison with the characteristics of the broader resident population of Washington D.C, had a higher rate of hospitalization, was likely to be poor, and had multiple comorbidities (Grabowski, 2009).

The sociodemographic data revealed that subjects' ages were similar with the mean age of the D-SNP participants being 70 years (standard deviation = 10.1 years) and non-D-SNP being 68 years (standard deviation = 9.6 years). There was diversity in terms of subjects' sociodemographic characteristics with participants drawn from all eight wards of the District of Columbia. More than half of the subjects were African American at 62% above the US 2018 Census Bureau data, that reported the population of African

Americans in Washington, D.C. as 47.1% (U.S. Census Bureau, 2018). Chronic medical illnesses such as heart disease, kidney disease, arthritis, diabetes, mental illness, and physical disability were reported similarly by research subjects from both groups. This burden of chronic illnesses among duals is supported in the literature by Bennett and Probst (2016) in their study that looked at 30-day readmission rates among duals.

Research subjects from both groups reported having usual source of care obtained from private doctor offices, clinics including federally qualified health centers (FQHCs), hospital outpatient centers, urgent care centers and emergency rooms (ERs). Non-D-SNP members reported a higher utilization of urgent and ER care ( $P<0.05$ ). An interesting finding was that a higher number of non- D-SNP members 29% reported their main reason for ER visit was their close proximity to the ER compared to 9% of D-SNP members ( $P<0.05$ ). Another interesting finding was that 7% of non-D-SNP members reported getting their routine care from the ER compared to just 2% of D-SNP members ( $P<0.05$ ). This is similar to findings by Shi in 2000 in her study on the type of insurance and quality of primary care experience (Shi, 2000). Her study examined several attributes of primary care such as accessibility, comprehensiveness, coordination, continuity, and accountability as listed by the Institute of Medicine (IOM). The 1994 definition of primary care by the IOM is “the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and the community (IOM, 1994).” Her study suggested that access to health insurance does truly make a difference in achieving the cardinal features of primary care.

Individuals who have private insurance are more likely to experience good primary care in terms of coordination and comprehensiveness compared to individuals who are publicly insured (Shi, 2000). It is worth noting at this juncture that D-SNPs are a type of Medicare Advantage plan and thus are private insurance plans.

My initial results clearly showed two things- a significant association between D-SNP enrollment and decreased hospitalization ( $p < 0.001$ ) and a lower readmission rate 18% for D-SNP members compared to 29% of non-D-SNP members ( $p < 0.001$ ). This outcome is similar to findings by JEN Associates (2008) that showed dual eligibles enrolled into the state of Massachusetts health plans had lower rates of institutionalization. Similarly, a Texas state study that found that duals enrolled in Medicaid health plans experienced lower rates of emergency room and inpatient admissions (Texas Health and Human Services Commission, 2005). This lower readmission rate may be attributed to a higher number of D-SNP members 20% who reported that they saw their provider post discharge compared to less than half 9% of non- D-SNP members. To mitigate against 30-day readmission, most hospitals routinely call patients post discharge and that could explain the 60% of members from both groups who reported receiving a nurse telephone call upon discharge from the hospital (Harrison, Hara, Pope, Young, & Rula, 2011). Hospital readmission usually within 30 days of discharge is a common and costly phenomenon, particularly within the dual population with many chronic illnesses (Harrison et al., 2011). Most of these readmissions occur as a result of chronic disease progression, in addition to insufficient post discharge care plan

which is known as a major contributor to preventable readmissions (Harrison et al., 2011).

My hypothesis that support in execution of the post-hospitalization plan offered through D-SNP leads to reduction in re-admission rates did not hold up during the analysis. Using the logistic regression model, there was no statistical significance between enrollment into D-SNP and lower 30-day readmission rates. Post hospitalization support service is offered only to D-SNP enrollees and thus the analysis showed collinearity. However, one variable that assessed whether the beneficiaries got a follow-up visit from an NP within seven days of discharge was associated with 50% reduction in readmission rates with unadjusted OR (95% CI) of 0.54 (0.29, 0.97) and P value <0.05 similar to predictions by Sommers and Cunningham (2011).

My findings show that D-SNP members may receive a telephone call from the discharging hospital as well as from the D-SNP nurse case manager. An additional NP home visit is scheduled for consenting members and about 59% of D-SNP members received a home visit by the NP following the hospital discharge. During the telephone calls and home visits, members are assisted with setting up prompt follow up physician appointment, receive additional discharge education on acute and chronic illnesses including reasons for hospitalization and treatment adherence. All these additional steps may explain the lower rates of hospitalization and readmission. My results also showed that 67% of D-SNP members reported that the information gained from the NP home visit helped them decide against going to the ER. This coordinated visits post discharge previously discussed under the D-SNP model of care goals is similar in objectives to

transitional care planning which aims to improve patient care transitions from hospital to home thereby reducing hospital readmissions among chronically ill patients (Rennke & Ranji, 2015).

A large number of dual eligible beneficiaries bear a significant chronic disease burden compared to the general population (Bennett & Probst, 2016). Therefore, medication and treatment adherence are crucial not only in maintaining wellness, but in reducing hospitalization (Thorpe, 2011). It is therefore no surprise that medication adherence is an important predictor of hospitalization and readmission. The questions for medication adherence were adapted from the eight-item Morisky Medication Adherence Scale (MMAS). Overall, D-SNP members had a better score on this scale as well. While 48% of non-D-SNP members, reported either cutting back or stopped taking their medicines without telling their doctor because they felt worse when they took it, about 30% of D-SNP members reported same ( $P<0.05$ ). Another 43% of non-D-SNP members reported stopping their medications when they felt their symptoms were under control compared to about half 22% of D-SNP members who reported same ( $P<0.05$ ). Additionally, 33% of non-D-SNP members reported feeling hassled about sticking to their treatment plan by their providers compared to about half 18% of D-SNP members ( $P<0.05$ ). As discussed in the literature, proper medication management and adherence to treatment plan has been shown to effectively reduce hospitalization and emergency room visits (Esposito et al., 2009).

Multivariate regression analyses were conducted to test the hypotheses that there are associations between our predictor variables and the outcome variables (lower

hospitalization and readmission rates). My results revealed that enrollment into D-SNP was significantly associated with decreased hospitalization and readmission rates. This finding is similar to findings by Anderson et al. (2016) which showed that fully integrated managed care plans were more effective than fragmented delivery systems in delivering lower emergency department utilization. Studies by Backus, Moron, Bacchetti, Baker, and Bindman (2002) also showed that managed care organizations in California significantly reduced the number of avoidable hospitalizations. Other evaluations of managed care programs in other states have also shown a similar trend, where enrollees have a lower rate of potentially avoidable hospitalizations (Basu, Friedman, & Burstin, 2004; Edwards, Tucker, Klutz, & Flowers, 2009). It is worth mentioning again that D-SNPs are a type of Medicare Advantage plan and thus, are considered managed care plans.

Among predictor variables, diagnosis of chronic medical illnesses such as hypertension, heart disease, heart failure, kidney disease, diabetes and mental health conditions were significantly associated with hospitalization ( $P < 0.05$ ) similar to findings in (2016) by Bennett and Probst. Having a usual source of care where one goes for routine care as well as increased frequency of routine provider follow up were significantly associated with decreased hospitalization and readmission rates (Sommers & Cunningham, 2011). Other predictors of hospitalization and readmission such as medication adherence and follow up appointment with provider after initial hospital discharge were significantly associated with hospitalization and readmission rates ( $P < 0.05$ ).

My study revealed that enrollment into D-SNP is significantly associated with 70% lower hospitalization rate OR (95% CI) of 0.3 (0.1-0.6). This significant finding echoes the findings reported in Crowe (2014), where they found a 43% lower hospitalization rate, 19% shorter average length of stay in the hospital, 9% lower rate of emergency visits, and a 21% lower readmission rate among enrollees in the Mercy Care Plan in Arizona. My study also revealed that chronic medical and mental illnesses such as diabetes, hypertension, heart disease, heart failure, kidney disease, depression, bipolar disorder, or schizophrenia were also significantly associated with increased hospitalization rate.

For readmission, the model when unadjusted show that the odds of being readmitted was significantly reduced for individuals enrolled into D-SNP by as much as 50% OR (95% CI) of 0.5 (0.3-0.9). However, after adjusting for covariates, the significance was lost. Study by Jung et al. (2015) also found no significance in readmission rates after adjusting for covariates. Although the outcome from our study, and the 2015 study are similar, their study examined a Massachusetts Managed Care program that was only financially integrated.

The Poisson regression revealed that the hospitalization incidence rate ratio (IRR) for D-SNP members was 40% less for each episode of hospitalization holding all other covariates constant [IRR (95%): 0.6 (0.5,0.7)]. For readmission, the Poisson regression showed that the 30-day readmission incidence rate ratio (IRR) for D-SNP members holding all other covariates constant in the model is 70% less compared to individuals not enrolled into D-SNP [IRR (95%): 0.3 (0.2-0.6)].

The 21st Century Cures Act requires CMS to assess penalties based on a hospital's performance relative to other hospitals with a similar proportion of patients who are dually eligible for Medicare and full-benefit Medicaid beginning in fiscal year 2019 (CMS, 2019). CMS terms the program Hospital Readmissions Reduction Program (HRRP) as it reduces CMS payments up to 3% to hospitals with excess readmission rates (CMS, 2019). Hospitals in an attempt to avoid being assessed this payment reduction penalty and to improve healthcare, task social workers or discharge planners as they are known in some hospitals with interviewing admitted patients to determine degree of medical and social needs including home living arrangements post discharge. The social workers or discharge planners then coordinate with home health agencies for registered nurses to conduct follow up home visits to appropriate patients recently discharged with qualifying diagnoses of acute myocardial infarction (AMI), chronic obstructive pulmonary disease (COPD), heart failure (HF), pneumonia, coronary artery bypass graft (CABG) surgery, and elective primary total hip arthroplasty and/ or total knee arthroplasty, (CMS, 2019). CMS assesses hospitals using performance measures in each of these six conditions or procedures. This service is offered to all discharges from these categories. This service is separate from a nurse practitioner home visit offered to D-SNP members.

Our bivariate analysis also tested the hypothesis that there are associations between enrollment into D-SNP and reductions in hospitalization and readmission rates. Once again, our hypothesis held showing a significant association between D-SNP enrollment and lower hospitalization and readmission rates ( $p < 0.001$ ). Given the cross-



sectional nature of this study within a three-month period, it could not be fully established whether enrollment into D-SNP was the only contributing factor to the lower hospitalization and readmission rates or other factors. These findings however, suggest that the beneficiaries' relationships with their NP played a huge role in these findings as well the NP having access to the discharge summary during the home visit (Sommers & Cunningham, 2011). Two questions in the survey asked the subjects how often the nurse practitioner explained healthcare information in a way that was easy to understand and whether information gained from the NP helped them decide against going to the ER. An overwhelming 95% answered always or usually to the first question and another 96% answered yes that the information gained from the NP home visits helped them decide against going to the ER.

### **Conceptual Framework Support**

Our findings support the core of the study's conceptual framework which was based on the social ecological model (SEM). The core concept of the model predicted that hospitalizations can be influenced at multiple levels (individual, interpersonal, organizational, and policy). Our statistical analysis supported this theory with evidence of D-SNP model of care's overall influence on lower hospitalization and readmission rates. This supports the theory that D-SNP MOC influences hospitalization and readmission rates.

The first level of the conceptual framework was further expanded to predict that the D-SNP model of care aimed to increase the individual's knowledge and beliefs regarding knowledge about chronic illnesses, self-efficacy to make changes in diet,

physical activity, and medication and treatment adherence as well as risks and benefits of poor chronic disease management will influence hospitalization. Our statistical analysis supported this theory.

The conceptual framework predicted that the second level of the SEM which includes activities at the interpersonal level intended to facilitate individual behavior change by affecting social and cultural norms and overcoming individual-level barriers can influence hospitalization. These activities include engagement with healthcare providers, patient navigators, NCM telephonic outreach, NP home visits, among others. Our statistical analysis supported this theory and showed it is influence on lower hospitalization rates.

The conceptual framework predicted that the third level of the SEM which include activities at the organizational level will influence hospitalization. The assistance beneficiaries got with appointment scheduling, transportation, among others helped lower hospitalization and readmission rates. This was also supported by our statistical analysis.

The conceptual framework predicted that the fourth level of the SEM which defines activities implemented at the community level will influence hospitalization. These activities were intended to facilitate individual behavior change by leveraging resources and participation of community-level institutions such as hospital outpatient clinics, specialty clinics, doctor's offices and FQHCs. The D-SNP MOC also establishes relationships and networks within the local market so that collaboration is enhanced especially by relaying real time patient information obtained from home visits to other medical providers. While overall, the D-SNP model of care was supported by our

analysis, the community level impact described in the SEM was not accounted for specifically in our statistical analysis.

The conceptual framework also predicted that the fifth and outermost level of the SEM which includes public policies and laws at the local, state and federal levels influence hospitalization. Our analysis resoundingly show that chronic disease management through care coordination and individualized care plans has significant association with lower hospitalization and readmission rates.

The second key concept of the SEM is reciprocal causation which suggests that people both influence and are influenced by those around them (NCI & DHHS, 2012). Our results show that D-SNP members were influenced by the phone calls and home visits as well as all the provider engagements they received. Included in the engagements were some of our predictor variables for hospitalization such as having usual source of medical care, medication adherence, and provider follow ups. Our statistical analysis also supported this theory.

When the conceptual framework was tested by placing all variables in the bivariate analysis, our first hypothesis held. When our measures in the conceptual framework were tested using the Logistic and Poisson regression models, our predictor variables once again remained significant upholding our first hypothesis. Overall, the theoretical constructs from the study's conceptual framework held up in the analysis, and the conceptual framework as a whole did hold up for the study population.

## **Strengths and Limitations of the Study**

**Strengths.** This study possesses a number of strengths. First, the study's subjects represent a legitimate sampling of a dual eligible population. Generally, the study population is representative of urban dual eligible population across the US, that is vital in understanding how duals utilize health care services. Further, the research subjects were given the opportunity to participate or not to participate in the survey, which resulted in a more trusting and open interview experience. The age and gender distribution in the study population mirrored that of the larger dual population and allowed for better analysis and comparison.

The survey instrument that was used to collect the data for this study is a standardized questionnaire adopted from multiple national surveys particularly CMS CAHPS family of surveys and was adapted to fit this study. The use of telephone interviews most likely contributed to a heightened trust between subject and interviewer and greater comfort on the part of the subject, thereby increasing the likelihood that subjects did indeed share honest and truthful responses.

This is one of the first studies to actually survey duals on acute inpatient utilization using quantitative analysis. The data analysis comprising many t-tests and regression analyses provide strength in ensuring that the results are valid, and the right inference can be made with minimal error.

This study further demonstrated that even though duals have high prevalence of hospitalizations, the use of MOC and ICP within D-SNP can have significant impact on hospitalization and readmission rates. This study is also the first to explore the

relationship between the theoretical framework of the socioecological model (SEM) and Dual Special Needs Plans (D-SNP).

**Limitations.** The study has several limitations. First, as a cross-sectional study, we could not establish causal relationship, for example, whether enrollment into D-SNP actually caused reduction in hospitalization and readmission rates, thereby, leaving unanswered questions about causation. Second, there was design bias since the survey did not ask the subjects when they first enrolled into D-SNP meaning some of the hospitalizations could have occurred before the individual joined the plan. Another limitation of the study includes the biases and inaccuracies inherent in self-reported data. Responses were dependent on subjects' ability to recall details about past hospitalizations, readmissions, doctor visits, medication adherence, and other behaviors that may have occurred months and years before, and on subjects' willingness to be forthcoming and fully honest. Subjects may also have been uncomfortable with questions about their personal medical history, despite our assurances that their responses would be kept strictly confidential.

This quantitative study did not allow for follow-up or exploratory questions that might have revealed greater details, complexities, and nuances about our study population. This is especially important considering the high prevalence of hospitalization within this population. Cost and time are important factors that influence extensive and more rigorous studies upon which associations and effectiveness may be established. A larger sample size would have facilitated more extensive sub-analysis and perhaps more associations to be made. Time and funding constraints did not allow for

additional data collection. Another limitation of the research analysis is the use of Poisson regression which assumes that provisional on a given set of covariate values, the variance of the distribution of the number of events is equal to the mean. Therefore, Poisson regression may not perform well in situations where there is overdispersion- a situation where the conditional variance is greater than the conditional mean. In hindsight, I should have categorized number of admissions and readmissions using Logistic regression. These limitations, nonetheless, did not undermine the value of the work in this study, but instead point the way for additional research and implications for public health policy.

### **Recommendations for Future Research**

With the finding in this dissertation study that enrollment into D-SNP lowers hospitalization and readmission rates, another important future research direction will be to embark on a more rigorous study in order to assess the effectiveness of the model of care. In addition, a more robust qualitative study using focus groups will be important to assess the beneficiaries' perceptions on the benefits of enrollment into a Medicare Advantage D-SNP, access to timely care, and acute inpatient utilization. This will provide the relevant template to guide program evaluation and continued program review to ensure improvements and enhance effectiveness.

Furthermore, this dissertation results also provide support for the replication of this study in other urban, suburban and rural areas. Replicating this research in rural areas with high percentage of duals will be beneficial, especially in areas with limited access to acute inpatient care settings. Also, the fact this study was conducted in urban

Washington D.C where access to specialized care is considered more accessible, demonstrates that improvement is still needed particularly in access to care post hospitalization.

Additionally, while important details were asked about the subject's usual source of care, it would have been interesting to explore relationships between where beneficiaries received care such as doctor's office, hospital outpatient center, or FQHCs and hospitalization and readmission rates.

Of great interest is a recent 2019 cardiology news publication which added to mounting evidence on the unintended consequences of readmission penalty where hospitals with too many 30-day readmissions of HF patients are penalized (Zoler, 2019). The article suggested that HF patient mortality has increased as an unintended consequence of this Medicare program prompting discussions among physicians, Medicare administrators, and other interest groups (Zoler, 2019). Although, it has been documented that CMS's HRRP has led to significantly reduced readmission rates in patients with HF, it has also come at a cost of a significant increase in mortality among HF patients (Gupta et al., 2018). A 2018 study analyzed over 115,000 Medicare beneficiaries during 2006-2014, and showed that beginning in 2012, when the HRRP penalty was phased in, HF readmissions fell after adjustment by a relative 8%, but adjusted HF mortality rose by a relative 10%, when compared to the period prior to HRRP penalty (Gupta et al., 2018). Another major study of more than 3 million Medicare beneficiaries with HF, acute MI and pneumonia, during 2005-2015 also showed similar findings – a significantly increased mortality after the penalty phase for readmissions

began (Wadhera et al., 2018). Given these findings, it will be interesting to see how duals who are largely represented within these population are affected.

### **Implications for Public Policy**

Since the time that this study's hypotheses were first formulated, there have been major changes in policy impacting dual eligibles. The Bi-Partisan Budget Act of February 2018 gave "permanent authorization of Medicare Advantage Special Needs Plans including D-SNPs." Prior to this legislation, D-SNPs were subject to annual reauthorization by Congress. Additionally, on July 31, 2018, "CMS issued guidance for default enrollment of dually eligible beneficiaries who are enrolled in a Medicaid Managed Care Plan, and are newly eligible for Medicare, into an integrated D-SNP offered by the same organization."

The results from this study should strengthen CMS's efforts in continuing with the recently adopted default enrollment (previously called "seamless conversion") - an automatic enrollment of a dually-eligible beneficiary in a Medicaid Managed Care Organization into a D-SNP offered under the same MA organization, when the beneficiary is first eligible for Medicare.

Components of the D-SNP model of care including ICP, NP visits, NCM telephonic outreach, transportation, and coordinated care with other care providers remain vital for the overall improvements in health outcomes for duals. Additionally, these results validate the benefits of evidence-based interventions through policy and regulations as well as emphasizes the values of theory driven and research guided behavioral interventions in the care of vulnerable populations.



The model of care within D-SNP aims to establish partnerships within the local community that can form the foundation for future collaborations with other programs, community organizations and agencies. These partnerships can serve as a platform to support future relationships. The D-SNP model can be further advanced and deciphered to address other prevailing health policy areas within the U.S. and around the world.

Finally, the motivation for this dissertation comes from a clinician's experience working with the dual population. Hence, lending credence for effective collaboration between organizations in the community and the academia. This relationship is essential in translating research to practice as well as fostering growth and development in preventive health policies.

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## APPENDICES

### Appendix A: Crosswalk of survey questions with dependent and independent variables described in the methodology

Survey Question	Variable	Type
How would you describe your gender? a. Female b. Male	Gender A&B	Categorical
How old are you? _____	Age_____	Continuous
What is your race? Please mark one or more. a. White b. Black or African-American c. Asian d. Native Hawaiian or other Pacific Islander e. American Indian or Alaska Native	Race A, B, C, D, & E	Discrete
Which ward do you live in Washington D.C? _____	D.C. Ward_____	Discrete
Please mark the box below for each type of health insurance that you have. a. Medigap, which may be identified on the front of your policy as “Medicare Supplemental Insurance” b. Employer, Union, or Retiree Health Coverage (insurance) c. Veteran’s Benefits, also known as VA benefits d. Military Retiree Benefits, also known as Tricare e. Medicaid, also known as State medical assistance, which is for some persons with limited income and resources f. Dual Complete (Please select one from list below) g. United Healthcare h. Cigna i. Medstar j. Medicare	Health Insurance Type A, B, C, D, E, F, & G	Discrete

(continued)

**Appendix A: Crosswalk of survey questions with dependent and independent variables described in the methodology (continued)**

<b>Survey Question</b>	<b>Variable</b>	<b>Type</b>
If you have Dual Complete plan, how many times in the past four years have you been visited at home by a nurse practitioner? a. Never b. 1 to 3 times c. 4 to 9 times d. 10 or more times e. N/A	Module of Care Home Visits A, B, C, D, E.	Discrete
How often did the visiting nurse practitioner explain things in a way that was easy to understand? a. Never b. Sometimes c. Usually d. N/A	Module of Care Home Visits A, B, C, D	Continuous
If you had a visit in the past year, how often did you get a visit? a. Monthly b. Quarterly c. Annually d. N/A	Frequency of Home Visits A, B, C, D	Discrete
How often did the visiting nurse practitioner explain things in a way that was easy to understand? a. Never b. Sometimes c. Usually d. N/A	Frequency of Home Visits A, B, C, D	Discrete
Is there a place that you usually go to when you are sick or need advice about your health? a. Yes b. No	Usual Source of Care A & B	Categorical

(continued)

**Appendix A: Crosswalk of survey questions with dependent and independent variables described in the methodology (continued)**

<b>Survey Question</b>	<b>Variable</b>	<b>Type</b>
What kind of place do you go to most often for your medical care? a. Clinic or health center b. Doctor's office or HMO c. Hospital emergency room d. Hospital outpatient department e. Don't go to one place most often	Usual Source of Care A, B, C, D, E	Discrete
If you chose E, why don't you have a usual source of medical care? Is it because...? a. You haven't had any problems b. No doctors take your insurance c. The doctor's office is too far away or not convenient d. I prefer the ER because it is closer e. It is too expensive f. Not applicable	Usual Source of Care A, B, C, D, E, F	Discrete
In the last four years, how often did you get an appointment for a check-up or routine care at a doctor's office or clinic as soon as you needed? a. Never b. Sometimes c. Usually d. Always	Usual Source of Care A, B, C, D	Continuous
During the past four years, how many times did you have an illness, injury, or condition that needed care right away in a clinic, emergency room, or doctor's office? a. None b. 1 to 3 times c. 4 to 9 times d. 10 or more times	ER Visits A, B, C, D	Continuous

(continued)



**Appendix A: Crosswalk of survey questions with dependent and independent variables described in the methodology (continued)**

<b>Survey Question</b>	<b>Variable</b>	<b>Type</b>
What was the main reason for your emergency room visit? a. ER is closer to me. b. Doctor's office or clinic was not open c. The problem was too serious for the doctor's office or clinic d. Get most of your care at the emergency room e. Doctor's office was open but could not get an appointment f. Didn't have a doctor. g. N/A	ER Visits A, B, C, D, E, F, G	Discrete
During the past four years, how many times have you been admitted into the hospital----- ---?	Admissions No. of hospitalizations- _____	Discrete
If you were admitted into the hospital, did you get readmitted into the hospital within 30 days of initial discharge? a. Yes b. No c. N/A	Readmissions A, B, C	Categorical
How many times have you been readmitted into the hospital within 30 days of being discharged from the hospital-----?	Readmissions No. of readmissions__	Discrete
If you wanted to see your doctor prior to going to the ER, would it have been easy for you? a. Yes b. No c. N/A	Hospitalization A, B, C	Categorical

(continued)

**Appendix A: Crosswalk of survey questions with dependent and independent variables described in the methodology (continued)**

<b>Survey Question</b>	<b>Variable</b>	<b>Type</b>
In the last four years, not counting the times you went to an emergency room, how many times did you go to a doctor's office or clinic to get healthcare for yourself? a. None b. 1 to 3 times c. 4 to 9 times d. D. 10 or more times	Hospitalizations A, B, C, D	Discrete
If you were admitted to the hospital in the past four years, did you get a phone call from a nurse upon discharge? a. Yes b. No c. Not applicable	Post Discharge Visits A, B, C	Categorical
If you were admitted into the hospital in the last four years, did you get a follow up visit from a nurse practitioner upon discharge within seven days? a. Yes b. No c. Not applicable	Post Discharge Visits A, B, C	Categorical
During the nurse practitioner home visits and telephone calls, did you and the provider talk about specific things you could do to prevent hospitalization? a. Yes b. No c. N/A	Post Discharge Visits A, B, C	Categorical
Did the information you gained from the nurse practitioner following the visits help you decide against going to the ER in the last 4 years? a. Yes b. No c. C. N/A	Post Discharge Visits A, B, C	Categorical

(continued)

**Appendix A: Crosswalk of survey questions with dependent and independent variables described in the methodology (continued)**

<b>Survey Question</b>	<b>Variable</b>	<b>Type</b>
Did being enrolled into a health plan where you got home visits, telephone calls from nurses and assistance with doctor appointments and transportation help you decide against going to the ER in the last 4 years? a. Yes b. No c. C. N/A	Post Discharge Visits A, B, C	Categorical
If you were admitted into the hospital in the last four years, did the providers assist or offer to assist you in arranging follow-up visits including transportation to other doctors or specialists? a. Yes b. No c. C. N/A	Post Discharge Visits A, B, C	Categorical
How would you describe your overall health? a. Excellent b. Very good c. Good d. Fair e. E. Poor	Health Status A, B, C, D, E	Likert scale
Specialists are doctors like surgeons, heart doctors, skin doctors, and other doctors who specialize in one area of healthcare. In the last four years, did you make any appointments to see a specialist? a. Yes b. B. No	Specialists Visits A&B	Categorical
In the last four years, how often did you get an appointment to see a specialist as soon as you needed? a. Never b. Sometimes c. Usually d. D. Always	Specialists Visits A, B, C, D	Continuous

(continued)

**Appendix A: Crosswalk of survey questions with dependent and independent variables described in the methodology (continued)**

<b>Survey Question</b>	<b>Variable</b>	<b>Type</b>
How many specialists have you seen in the last four years? a. None b. 1 specialist c. 2 specialists d. D. 3 or more specialists	Specialists Visits A, B, C, D	Discrete
Do you have any disabilities or conditions? a. Cognitive/mental illness b. Neurological disability c. Physical disability d. Other medical disability e. E. Choose not to answer.	Disabilities A, B, C, D, E	Discrete
Which chronic medical conditions do you have? a. Hypertension/Heart Disease/Heart failure/ Kidney Disease b. Diabetes c. Stroke d. Cancer e. COPD f. Rheumatoid/Osteoarthritis g. Depression/Bipolar disorder/Schizophrenia h. H. Other	Chronic Conditions A, B, C, D, E, F, G, H	Discrete
Do you take prescribed medications including insulin, inhalers, or eye drops? a. Yes b. B. No	Medication Adherence A&B	Categorical
Do you sometimes forget to take your medicine? a. Yes b. No	Medication Adherence A&B	Categorical

(continued)

**Appendix A: Crosswalk of survey questions with dependent and independent variables described in the methodology (continued)**

<b>Survey Question</b>	<b>Variable</b>	<b>Type</b>
How often do you have difficulty remembering to take all your medicines? a. Never/rarely b. Once in a while c. Sometimes d. Usually e. All the time	Medication Adherence A, B, C, D, E	Likert scale
Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it? a. Yes b. No	Medication Adherence A&B	Categorical
When you feel like your symptoms are under control, do you sometimes stop taking your medicine? a. Yes b. No	Medication Adherence A&B	Categorical
Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan? a. Yes b. No	Medication Adherence A&B	Categorical

## Appendix B: Survey

### Evaluating the Impact of Dual Eligible Special Needs Plans (D-SNP) on the Rates of Hospitalization and Readmission Among the Beneficiaries in Washington, D.C.

1. How would you describe your gender?
  - a. Female
  - b. Male
2. How old are you? \_\_\_\_\_
3. What is your race? Please mark one or more.
  - a. White
  - b. Black or African-American
  - c. Asian
  - d. Native Hawaiian or other Pacific Islander
  - e. American Indian or Alaska Native
  - f. Hispanic
4. Which ward do you live in DC? \_\_\_\_\_
5. Please mark the box below for each type of health insurance that you have.
  - a. Medigap, which may be identified on the front of your policy as “Medicare Supplemental Insurance”
  - b. Employer, Union, or Retiree Health Coverage (insurance)
  - c. Veteran’s Benefits, also known as VA benefits
  - d. Military Retiree Benefits, also known as Tricare
  - e. Medicaid, also known as State medical assistance, which is for some persons with limited income and resources
  - f. Dual Complete (Please select one from list below)
6. United Healthcare 2. Cigna 3. Medstar
  - a. Medicare.
7. If you have Dual Complete plan, how many times in the past four years have you been visited at home by a nurse practitioner?
  - a. Never
  - b. 1 to 3 times
  - c. 4 to 9 times
  - d. 10 or more times
  - e. N/A
8. If you had a visit in the past year, how often did you get a visit?
  - a. Monthly
  - b. Quarterly
  - c. Annually

- d. N/A
- 9. How often did the visiting nurse practitioner explain things in a way that was easy to understand?
  - a. Never
  - b. Sometimes
  - c. Usually
  - d. Always
  - e. N/A
- 10. Is there a place that you usually go to when you are sick or need advice about your health?
  - a. Yes
  - b. No
- 11. What kind of place do you go to most often for your medical care?
  - a. Clinic or health center
  - b. Doctor's office or HMO
  - c. Hospital emergency room
  - d. Hospital outpatient department
  - e. Don't go to one place most often
- 12. If you chose E, why don't you have a usual source of medical care? Is it because...?
  - a. You haven't had any problems.
  - b. No doctors take your insurance.
  - c. The doctor's office is too far away or not convenient.
  - d. I prefer the ER because it is closer.
  - e. It is too expensive
  - f. Not applicable.
- 13. In the last four years, how often did you get an appointment for a check-up or routine care at a doctor's office or clinic as soon as you needed?
  - a. Never
  - b. Sometimes
  - c. Usually
  - d. Always
- 14. During the past four years, how many times did you have an illness, injury, or condition that needed care right away in a clinic, emergency room, or doctor's office?
  - a. None
  - b. 1 to 3 times
  - c. 4 to 9 times
  - d. 10 or more times

15. What was the main reason for your emergency room visit?
- a. ER is closer to me.
  - b. Doctor's office or clinic was not open
  - c. The problem was too serious for the doctor's office or clinic
  - d. Get most of your care at the emergency room
  - e. Doctor's office was open but could not get an appointment
  - f. Didn't have a doctor.
  - g. N/A
16. During the past four years, how many times have you been admitted into the hospital?
- a. -----
17. If you were admitted into the hospital, did you get readmitted into the hospital within
- a. 30 days of initial discharge?
  - b. Yes
  - c. No
  - d. N/A
18. How many times have you been readmitted into the hospital within 30 days of being discharged from the hospital?
- a. ....
19. If you wanted to see your doctor prior to going to the ER, would it have been easy for you?
- a. Yes
  - b. No
  - c. N/A
20. In the last four years, not counting the times you went to an emergency room, how many times did you go to a doctor's office or clinic to get healthcare for yourself?
- a. None
  - b. 1 to 3 times
  - c. 4 to 9 times
  - d. 10 or more times
21. If you were admitted to the hospital in the past four years, did you get a phone call from a nurse upon discharge?
- a. Yes
  - b. No
  - c. Not applicable



22. If you were admitted into the hospital in the last four years, did you get a follow up visit from a nurse practitioner upon discharge within seven days?
- a. Yes
  - b. No
  - c. Not applicable
23. During the nurse practitioner home visits and telephone calls, did you and the provider talk about specific things you could do to prevent hospitalization?
- a. Yes
  - b. No
  - c. N/A
24. Did the information you gained from the nurse practitioner following the visits help you decide against going to the ER in the last 4 years?
- a. Yes
  - b. No
  - c. N/A
25. Did being enrolled into a health plan where you got home visits, telephone calls from nurses and assistance with doctor appointments and transportation help you decide against going to the ER in the last 4 years?
- a. Yes
  - b. No
  - c. N/A
26. If you were admitted into the hospital in the last four years, did the providers assist or offer to assist you in arranging follow-up visits including transportation to other doctors or specialists?
- a. Yes
  - b. No
  - c. N/A
27. How would you describe your overall health?
- a. Excellent
  - b. Very good
  - c. Good
  - d. Fair
  - e. Poor
28. Specialists are doctors like surgeons, heart doctors, skin doctors, and other doctors who specialize in one area of healthcare. In the last four years, did you make any appointments to see a specialist?
- a. Yes
  - b. No

29. In the last four years, how often did you get an appointment to see a specialist as soon as you needed?
- a. Never
  - b. Sometimes
  - c. Usually
  - d. Always
30. How many specialists have you seen in the last four years?
- a. None
  - b. 1 specialist
  - c. 2 specialists
  - d. 3 or more specialists
31. Do you have any disabilities or conditions?
- a. Cognitive/mental illness
  - b. Neurological disability
  - c. Physical disability
  - d. Other medical disability
  - e. Choose not to answer.
32. Which chronic medical conditions do you have?
- a. Hypertension/Heart Disease/Heart failure/ Kidney Disease
  - b. Diabetes
  - c. Stroke/ Epilepsy/ MS
  - d. Cancer
  - e. COPD
  - f. Rheumatoid/Osteoarthritis
  - g. Depression/Bipolar disorder/Schizophrenia
  - h. Other
33. Do you take prescribed medications including insulin, inhalers, or eye drops?
- a. Yes
  - b. No
34. Do you sometimes forget to take your medicine?
- a. Yes
  - b. No
35. How often do you have difficulty remembering to take all your medicines?
- a. Never/rarely
  - b. Once in a while
  - c. Sometimes
  - d. Usually
  - e. All the time

36. Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it?
- a. Yes
  - b. No
37. When you feel like your symptoms are under control, do you sometimes stop taking your medicine?
- a. Yes
  - b. No
38. Taking medicine every day is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan?
- a. Yes
  - b. No

**This is the end of the survey**