COMPARING PRESCRIPTION DRUG COVERAGE BETWEEN MEDICARE PART D AND THE FEDERAL EMPLOYEES HEALTH BENEFITS PROGRAM

By

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A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY
UNIVERSITY OF FLORIDA

2010

To the memory of my mother, Brenda White, whose encouragement went far beyond what the eye could see and to my husband, John, whose love and support provided me the strength and perseverance I needed to press forward and to all who nurtured my intellectual curiosity, academic interests, and sense of scholarship throughout my lifetime, making this milestone possible

ACKNOWLEDGMENTS

Thanks go out to the chair and members of my supervisory committee for their expertise and time. A special thanks goes to Dr. McKay for her countless hours of reflecting, reading, and patience. Thanks go out to Dr. Ward for the many times that you explained econometric equations in detail. Thanks go out to Dr. Harman and Dr. McCarty for agreeing to serve on my committee. Special thanks are extended to the Agency for Health Care Administration. Anne Wells, Ray Aldridge, and Vern Hamilton assisted me in overcoming one of the largest obstacles in the completion of my dissertation. Acknowledgements go out to the Pharmaceutical Research and Manufacturers of America Foundation for believing that this research was important. I appreciate the generous monetary support.

A special feeling of gratitude is extended to my husband, John Lovett III, who has shared the many uncertainties, challenges and sacrifices for completing this dissertation. Thanks go out to my father, Henry White, whose words gave me an extra push to accomplish my dreams. Thanks go out to my sister, Tammy White, whose smile and laughter motivated me to complete my study. Additional thanks are extended to my many family and friends, who have been my emotional anchors through not only the vagaries of graduate school, but my entire life. Thanks also go out to Uncle Mark, who emphasized the importance of education and directed me toward this journey back in 1995. Thanks go out to my mentor, Dr. Odedina, whose life example has spoken to me far louder than words ever could. Thanks are extended to the faculty at Florida A&M University College of Pharmacy who answered my numerous phone calls for assistance. Thanks go out to my church family for prayer support each day. Finally, thanks go out to all the staff and faculty in the Health Services Research Department.

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LIST OF ABBREVIATIONS

FEHBP	Federal Employees Health Benefits Program
USP	United States Pharmacopeia
GDP	Gross Domestic Product
HMO	Health Maintenance Organizations
PPO	Preferred Provider Organizations
MMA	Medicare Prescription Drug, Improvement, and Modernization Act
PDP	Prescription Drug Plans
MA	Medicare Advantage
IMS	Intercontinental Marketing Services
HDHP	High Deductible Health Plan
FFS	Fee-for-Service
RUPRI	Rural Policy Research Institute
GAO	Government Accountability Office
VA	Veterans Administration
OPM	Office of Personnel Management
PBM	Pharmacy Benefit Manager
P&T	Pharmacy and Therapeutics
CMS	Centers for Medicare and Medicaid Services
NDC	National Drug Code
ADHD	Attention Deficit Hyperactivity Disorder
FDA	Food and Drug Administration
SPSS	Statistical Package for the Social Sciences Software Package
STATA	Statistics and Data Software Package

TSP	Time Series Processor Software Package
US	United States
ED	Erectile Dysfunction
NIDDK	National Institute of Diabetes and Digestive and Kidney Diseases

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy

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December 2010

Chair: Niccie L. McKay
Major: Health Services Research

This study provides an in-depth empirical comparison of Medicare Part D and the Federal Employees Health Benefits Program (FEHBP) with respect to prescription drug plans. A major difference between these two programs is found in Medicare's required adherence to the United States Pharmacopeia (USP) guidelines. Results revealed that, depending on the method used for analysis, both programs provided broad coverage of top drugs dispensed and sold in the United States. Using the independent samples t-test for the 19 Medicare Part D formularies analyzed, formulary coverage of the top drugs dispensed and sold in the United States ranged from 72-94% (average 84%), while the range was 85-99% (average 94%) for the 5 FEHBP formularies examined ($p<.01$). Overall, the independent sample t-test findings indicated that the FEHBP plans provided broader drug coverage as compared to Medicare Part D plans. On the other hand, the regression results indicated that, once other factors and interaction effects were taken into account, the programs were shown to be about the same in terms of coverage.

In regard to cost sharing, both Medicare Part D plans and the FEHBP plans utilize fixed-dollar copayments more often than coinsurance percentages for generic drugs, but for brand name drugs Medicare Part D plans were more likely to utilize copays while the FEHBP plans were more likely to utilize coinsurance. Furthermore, for the Medicare Part D plans that utilized copayments, the mean copayment for generic drugs was $4.53 (range was $0 - $8) as compared to the FEHBP plans mean copayment of $7.67 (range $5 - $10). Therefore, the Medicare Part D plans provided lower mean copays for generic drugs as compared to the FEHBP plans ($p<.05$). On the other hand, the finding for brand name drugs was non-significant. For the Medicare Part D plans that utilized coinsurance for generic drugs, mean rates were 17% as compared to the FEHBP plan mean rates of 20% ($p<.05$). For the Medicare Part D plans that utilized coinsurance for brand name drugs, mean rates were 26% as compared to the FEHBP plan mean rates of 34%. These findings benefit policymakers, health care professionals, and consumers by suggesting lessons that can be learned from both the FEHBP and the Medicare Part D program.

CHAPTER 1
INTRODUCTION

The Medicare program was created in 1965 to provide health care for people age 65 and older. Over time, costs associated with the Medicare program have increased steadily and have contributed to the growth in national health expenditures. For example, health care expenditures in the United States were $253 billion in 1980, $714 billion in 1990, and rose to $2 trillion in 2006 (Centers for Medicare and Medicaid Services 2008). In 2006, health care spending was about $7,026 per resident for the United States and accounted for 16% of the nation's Gross Domestic Product (GDP) (Catlin, Cowan, Hartman, et al 2008). For Medicare alone, total expenditures in 2006 were approximately 3.1% of GDP or $408 billion (Annual Report of the Boards of Trustees 2007).

Although the original Medicare program provided access to numerous health services, prescription drugs were not covered. To address rising drug costs and to provide more comprehensive health care coverage, the Medicare Prescription Drug, Improvement, and Modernization Act, which created Medicare Part D, was implemented in 2006. Medicare Part D is a voluntary drug benefit offered by private health plans that covers a wide range of prescription medications listed on the Medicare Part D formulary. Anyone who is eligible for Medicare is eligible for Medicare Part D. Upon its inception, over 20 million seniors enrolled to receive prescription drug coverage (Henry J. Kaiser Family Foundation 2007).

The purpose of Medicare Part D was to provide seniors with access to prescription drugs. Yet many questions surrounding coverage for prescription drugs have emerged. There are questions among state policy makers as to the projected cost savings in

switching enrollees from other plans to Medicare Part D plans. Enrollees question whether Medicare Part D plans provide an expansion in prescription drug coverage compared to other plans. In addition, concerns about Medicare funding persist as costs continue to rise at alarming rates. Will funding for Medicare eventually run out? What are plans to address rising prescription costs?

It has been proposed to reform Medicare to make it similar to the Federal Employees Health Benefits Program (National Bipartisan Commission 1999). The Federal Employees Health Benefits Program (FEHBP) was created by Congress in 1959 (Butler and Moffit 1995). The program provides health care coverage to active and retired federal and postal workers and their families, in addition to active and retired members of Congress and congressional staff. Over 400 private plans compete to provide coverage to more than 9 million people. Some have cited the program's cost saving techniques and provision of quality services as markers of a truly successful program (Heritage Foundation 2003; Francis 2003).

Specific advantages include optional enrollment and broad eligibility requirements. In addition, the FEHBP uses community ratings as a disincentive for plans to determine coverage on the basis of beneficiary risk. Furthermore, the program offers more provider choice and access, greater rural access, greater achievements in cost control, and better health benefits by covering preventive services, dental services and health care costs incurred abroad (Hoff 1998; Medicare Payment Advisory Commission 2002; McBride 2003; Peck 2003; and Francis 1993). For these reasons, the FEHB program has been cited as superior compared to the Medicare program (Butler and Moffit 1995). On the other hand, some reports reveal opposing views on Medicare's adoption of an

FEHBP type model. Several studies dispute the claim that adopting a FEHBP model would offer an improvement to the Medicare program (Moon 2002; Oberlander 2000).

Prior to the implementation of Medicare Part D, the lack of coverage for prescription drugs made the FEHBP particularly attractive in comparison to Medicare. Now that Medicare Part D has been implemented, however, there is renewed debate on the desirability of switching enrollees from Medicare to an FEHB-type plan. An unanswered question central to the debate is how Medicare Part D and the FEHB prescription drug plans compare.

To answer this question, this dissertation will compare Medicare Part D and the Federal Employees Health Benefits program with respect to prescription drug plans. The analysis will focus on the consumer perspective by examining differences in drug coverage and cost sharing. The following research questions will be addressed:

1. How do Medicare Part D stand-alone plans compare to Federal Employees Health Benefits plans with respect to coverage of prescription drugs?
   Ho: There is no difference in drug coverage among FEHB prescription drug plans as compared to Medicare Part D plans.

2. How do Medicare Part D stand-alone plans compare to Federal Employees Health Benefits plans with respect to cost sharing on prescription drugs?
   Ho: There is no difference in cost sharing among FEHB prescription drug plans as compared to Medicare Part D plans.

By the year 2030, the United States will be comprised of 71 million persons over the age of 65 (Centers for Disease Control 2007). For the first time in history, the United States may have more elderly individuals than working individuals. Many projections indicate that Medicare will not be able to deliver promised benefits to the next generation of retirees without making changes to the program (Butler and Moffit 1995). The policymakers and healthcare professionals are interested in

recommendations to address the anticipated needs of older persons. To avoid extreme increases in payroll taxes and other revenues or major cutbacks in services Medicare must explore ways to change the health care system to achieve better value for money. The experience of the FEHBP suggests a possible means of accomplishing this objective. Yet, little empirical research has been done to confirm this viewpoint.

This dissertation will contribute to the literature on Medicare reform by providing an assessment of an alternative form of prescription drug coverage. It will provide information for third-party payers to aid in their discussions surrounding Medicare reform. Furthermore, results of this study may help older persons who are interested in receiving help with a complex network of prescription drug services, but need more information about the potential benefits of services.

CHAPTER 2
REVIEW OF LITERATURE

This dissertation compares the Medicare Part D and the Federal Employee Health Benefits plans with respect to prescription drug coverage. This chapter first provides a general overview of Medicare and the Federal Employee Health Benefits Program. Next, background information is presented on the prescription drug component of the two programs, followed by a review of the research on Medicare Part D and the FEHB prescription drug plans. Lastly, the chapter discusses how this research addresses gaps in the literature.

Overview of Medicare

Medicare was created under Title XVIII of the Social Security Act in 1965, providing Medicare Part A and Medicare Part B for those age 65 and older. In 1972 Medicare coverage was extended to those that were disabled and to individuals with end stage renal disease. Medicare is administered under the Department of Health and Human Services. Coverage under Part A, with automatic enrollment for eligible individuals, includes care rendered in a hospital, skilled nursing facility care and home health care. Part A is financed through payroll taxes. Coverage under Part B is voluntary and includes outpatient services such as physician services, outpatient hospital care, laboratory tests, speech therapy, ambulance services and medical equipment. Part B is financed through federal appropriations and premiums paid by enrollees.

On August 5, 1997, the Balanced Budget Act, which contained a number of Medicare reforms, was signed into law. Specifically, Medicare+Choice or Medicare Part C was created. Up until that time beneficiaries enrolled in Part A and/or B. Now

beneficiaries had the option of enrolling in a private health insurance plan, a Medicare Advantage Plan. Medicare Advantage plans combine Part A and Part B (Medicare Consumer Guide 2008). Medicare Advantage plans include Health Maintenance Organizations (HMOs), Preferred Provider Organizations (PPOs), private fee-for-service plans and Medicare special needs plans.

Medicare is financed through a combination of payroll taxes, general tax revenues, and premiums paid by beneficiaries. The Medicare Hospital Insurance trust fund currently is operating under a deficit and is projected to be depleted by 2019 (Annual Report of the Boards of Trustees 2007). Medicare reform is needed to address this problem.

Prescription Drug Coverage under Medicare

Public debate led to the creation of Medicare Part D through the Medicare Prescription Drug, Improvement, and Modernization Act (MMA), which became effective on January 1, 2006. Medicare Part D is provided exclusively through private insurers, with coverage provided either by stand-alone prescription drug plans (PDPs) or comprehensive managed care plans called Medicare Advantage (MA) plans (National Health Policy Forum 2004). Enrollees in Medicare Part A or B are eligible for Part D. Beneficiaries enrolled in MA plans receive drug benefits as a part of their Medicare Advantage plan, while those enrolled in fee-for-service coverage may enroll in a stand-alone prescription drug plan (National Health Policy Forum 2004).

In 2006, about 22 million seniors enrolled in Medicare Part D (Henry J. Kaiser Family Foundation 2007). Enrollment is voluntary and for those with no coverage it means new access to thousands of prescription drugs. Additionally, other Medicare beneficiaries have the option to replace their existing drug coverage (e.g. Medigap or

Medicaid) or keep it (e.g. Veterans Administration) as long as it meets the same standards as Medicare Part D coverage (i.e. creditable coverage). As shown in Figure 2-1, by 2008 enrollment in Medicare Part D was 25.4 million, or approximately 57% of all Medicare beneficiaries.

Drug coverage under Part D varies by plan. Formularies must meet criteria established by the United States Pharmacopeia (United States Pharmacopeial Convention 2008). For example, plans are required to include drugs within a pre-established list of therapeutic categories and classes (National Health Policy Forum 2004). The process by which drugs are selected for coverage is discussed in more detail in Chapter 3.

Figure 2-2 shows the standard Medicare drug benefit as of 2010. The Part D monthly premium was about $39 a month (Kaiser Family Foundation 2009). Cost sharing included a $310 deductible, coverage of 75% of drug costs between $310 and $2,830, and no coverage for drug costs $2,830 to $6,440 (this is the so-called "doughnut hole"). After reaching $6,440 enrollees reach a "catastrophic coverage" level and are required to only pay the greater of a co-payment or coinsurance of 5% (Kaiser Family Foundation 2009).

The "doughnut hole" was created in an attempt to contain costs of the new prescription drug benefit. Policymakers wanted to provide extensive drug coverage, but they did not want to give seniors a blank check for utilization. As shown in Figure 2-2, under the Medicare Part D program seniors receive drug coverage until their costs reach an amount of $2,830. At that time coverage stops and then resumes again when they reach $6,440. During the coverage gap seniors must pay out of pocket.

Oberlander (2007) termed this gap as “one of the least sensible innovations in the history of federal health policy.” Others felt it was a pragmatic way to constrain the Medicare budget.

A study by the Kaiser Family Foundation (2008) examined the number of beneficiaries reaching the gap in coverage. Data was extracted from the Intercontinental Marketing Services (IMS) Health Longitudinal Prescription Drug Database. The final sample consisted of 1.9 million Medicare Part D enrollees. Findings revealed that 26% of enrollees reached the coverage gap. Furthermore, older beneficiaries reached the gap sooner. A finding that is particularly important from a policy perspective is that many who reached the coverage gap changed medications or stopped taking their medicine altogether. This is problematic because research has shown that when patients stop taking prescribed medication, especially those with chronic conditions, the result is worse health outcomes and an increase in health care costs (Hoadley, Hargrave, Cubanski, and Neuman 2008).

Medicare Part D has been in operation since 2006 and enrollment has grown to nearly 25 million people. Although many are satisfied with their increased drug coverage, enrollees still have concerns. As mentioned previously, the “doughnut hole” poses a unique problem. Other areas of concern are enrollment, dual eligibility, the impact on health professionals, and beneficiary choice of plan. And of particular concerns is the adequacy of financing for the program in the future.

Overview of the Federal Employees Health Benefits Program

Created in 1959, the Federal Employees Health Benefits Program is the largest employer-sponsored voluntary health plan in the world (Ruddock 1966). All federal employees who elect FEHBP coverage register during an open enrollment period

(November to December of each year). Once a plan is selected changes are allowed only in the occurrence of a major life event or during the annual open enrollment period. There are five types of plans to choose from: Fee-For-Service non-Preferred Provider Organization (PPO) plans, Fee-for-Service PPO plans, Health Maintenance Organization (HMO) plans, HMO Plans Offering a Point of Service Product, and Consumer-Driven Health Plans. Furthermore, enrollees have the option of selecting a Health Reimbursement Arrangement, Health Savings Account, or a High Deductible Health Plan (HDHP) (FEHBP Home Page 2008).

Enrollees in the Fee-for-Service (FFS) non-PPO plans may obtain health services and then upon filing be reimbursed or allow the plan to pay the medical provider directly. The choice of physician is unlimited. Beneficiaries usually pay more for these plans compared to other plans. Fee-for-Service PPO plans give the beneficiary access to physicians who reduce their charges to the plan (a network of physicians) resulting in decreased out-of-pocket spending when using a PPO provider. Furthermore, individuals do not have to file claims or paperwork (FEHBP Home Page 2008).

On the other hand, Health Maintenance Organizations are somewhat more restrictive. Providers must be selected from a network of physicians and hospitals in certain geographic areas. Enrollees are charged a copay for physician visits, but there are no deductibles or coinsurance for hospital visits. The advantages of these plans are that there is no paperwork or billing involved, which results in low out-of-pocket costs (FEHBP Home Page 2008). Another option, the HMO Plans offering a Point of Service Product, is an alternative for individuals looking for an HMO that allows use of non-network providers. These plans are more costly as shown by higher deductibles and

coinsurances. Beneficiaries must also file claims for reimbursement (FEHBP Home Page 2008).

Finally, for individuals who desire to have more control over their health care costs, the FEHBP offers Consumer-Driven Health Plans and Health Savings Accounts. Under Consumer-Driven Health Plans a maximum amount is designated to spend on health care and full coverage is provided for preventive care. These plans require higher cost sharing once a beneficiary exceeds the designated amount. Following the same concept, Health Savings Accounts utilize pre-tax funds and require beneficiaries to save for future health care services. Once deposited into an account, the money is not taxed and is used to pay for current health care services (FEHBP Home Page 2008). The FEHBP beneficiaries have many options. Health plans offered are varied not only in their provisions, but also in the associated premiums.

Under the FEHBP, the government makes a biweekly contribution, an amount fixed by law at one-half the cost of the least expensive option offered by either one of the two government-wide plans (Ruddock 1966). Although considered a generous amount to some, there is a 75% cap on the government's contribution to premiums. Individuals can select from a high option or a basic option enrollment based on information obtained from the Office of Personnel Management. This information includes a list of services provided by the plan (e.g. a list of covered drugs, copays, coinsurance, premiums and deductibles). The majority of enrollees (86%) choose the high option (Ruddock 1966). Each plan offers a range of prescription drug benefits and enrollees can choose from 12-20 plans, depending on geographical region.

Three plans (Blue Cross Blue Shield, Government Employees Hospital Association, and PacifiCare of California) cover more than half of all FEHBP enrollees (over 4 million) and those plans paid about $3.3 billion for about 65 million prescriptions in 2001 (Dicken, Agarwal, Dirosa et al 2003). Currently, 2008 data for the standard FEHBP Blue Cross/Blue Shield Plan shows that the employee pays $1,616 per year for an individual plan and $3,774 per year for a family plan (Blue Cross Blue Shield Service Benefit Plan Brochure 2008). Furthermore, the FEHB plan premiums rose an average of 7% in 2009 (Office of Personnel Management 2008).

A GAO study (2007) was conducted in response to the rising premiums seen in FEHBP plans. Data obtained from the Office of Personnel Management were examined for all FEHBP plans and compared to data from the California Public Employees' Retirement System (the second largest public purchaser of employee health benefits). Additional survey data was obtained from the Kaiser Family Foundation/Health Research and Educational Trust (Dicken, Dirosa, D'Souza et al 2007). Results revealed that premium growth slowed down from 12.9% in 2002 to 1.8% in 2007. The top ten FEHBP plans had a range of 0-15.5% in regard to premium growth in 2007. Those plans that did increase their premiums reported increases in utilization, cost of health services, and a high proportion of elderly enrollees as the cause, while other plans saw decreased premiums due to the provision of less generous coverage.

A study by Mueller and colleagues (2005) examined the availability of choices for federal employees in rural areas. Data was derived from the Health Benefit Data File, the Office of Personnel Management Web site, the plan's Web site and the Rural Policy Research Institute (RUPRI) Medicare Capitation Files. A multivariate analysis was

conducted to explore whether characteristics of rural areas influence enrollment. Results revealed that Blue Cross Blue Shield represented 60% of rural enrollment. Furthermore, enrollment in regional plans was higher in urban areas as compared to rural areas. A positive correlation was found between enrollment and the location of the county (i.e. plans were more likely to be found in central urban counties and rural adjacent counties as compared to rural nonadjacent counties). Therefore, highly populated areas attract more plans. The authors concluded that in some rural counties, available choices are few because not all plans are experiencing enrollment (Mueller, McBride, Andrews et al 2005).

Prescription Drug Coverage under the Federal Employees Health Benefits Program

Under FEHBP, private plans compete to provide health insurance to enrollees. The plans must meet certain criteria to be able to compete. For example, plans must agree to offer medical services, including doctor's office visits, hospitalization, emergency care, treatment of mental conditions and prescription drug coverage. Once plans contract with the FEHBP (through the Office of Personnel Management) benefits and premiums are negotiated. Service provided by plans may vary in location, including local, regional, or national markets. Furthermore, plans may service particular groups such as postal carriers.

Each FEHB health plan has its own formulary. The formulary includes a list of generic and brand name drugs that are covered by the health plan. The formulary is developed by a team of pharmacists and physicians that review and update the list periodically (FEHBP Home Page 2008). The process by which drugs are selected for coverage is discussed in more detail in Chapter 3.

Review of Research Literature

Medicare Part D

The research literature on Medicare Part D is extensive and continues to grow. This section reviews the research on Medicare Part D related to enrollment, dual eligibility, health professionals, beneficiary choices, expenditures and the effects of drug coverage.

Enrollment

Medicare Part D enrollment is increasing. By early 2007 approximately 17 million seniors had enrolled in stand-alone prescription drug plans (Henry J. Kaiser Family Foundation 2008), although target populations such as low-income seniors only enrolled in small numbers. However, policymakers expected over 29 million seniors to enroll during the first year of the program (Henry J. Kaiser Family Foundation 2006), in order to ensure fair competition among plan providers.

Cubanski and Neuman (2006) analyzed the enrollment of seniors in Medicare Part D. Data for the year 2006 were derived from the Centers for Medicare and Medicaid Services and included information on prescription drug plans (premiums, deductibles, co-payments and gap coverage). Researchers determined which firms increased market share within Medicare and examined trends by plan type (PDP vs. MA-PD) and benefit design (standard vs. enhanced). The final study sample included 20.4 million enrollees and 2,811 Part D plans (1,446 PDPs and 1,365 MA-PD plans).

Results revealed that 10 companies covered 72% of enrollees. Although numerous plans were offered, enrollees were concentrated in a small number of plans. This concentration of enrollees may be explained by the MA patterns found prior to Medicare Part D implementation. Many of the same MA organizations saw increased

enrollment as Medicare Part D beneficiaries were added. Additionally, some organizations merged, such as United and PacifiCare, resulting in a higher concentration of enrollees. On the other hand, the organizations with low enrollment faced concerns about risk aversion, decreased ability to negotiate low drug prices and warnings from Medicare related to cancellation of contracts. For example, the Center for Medicare and Medicaid Services discussed non-renewal of those contracts representing less than 5,000 enrollees, a total of 13 organizations (Cubanski and Neuman 2006).

Of the top 15 plans, 11 were stand-alone plans. United AARP Medicare Rx and Humana Standard Plan used highly effective methods such as using the AARP "brand" and emphasizing low premiums to attract enrollees. Thus, more enrollees took advantage of provisions through stand-alone PDPs as compared to MA-PD plans (Cubanski and Neuman 2006).

The majority of Part D plans did not offer the standard 2006 benefit (i.e. $250 deductible, 25% coinsurance, $2,850 coverage gap and catastrophic coverage once beneficiaries exceed $3,600) and only 17% of enrollees chose the plans that did offer this standard benefit. Fifty-two percent of enrollees chose plans that had no deductible and a tiered co-payment structure. Furthermore, 30% of enrollees were in plans with low or no deductible, providing coverage of some excluded drugs and offering gap coverage. Lastly, results showed that in regard to the coverage gap, 95% of plans included a coverage gap and 94% enrollees were in plans that include a gap. It is projected that 48% of enrollees will be affected by the gap due to dual eligibility and low income subsidies (9.3 million enrollees).

The authors concluded that Medicare did meet its goals for enrollment of beneficiaries in Medicare Part D (Cubanski and Neuman 2006). The authors further noted that the relatively small number of plans dominating the market may change as other plans reassess themselves to become more competitive. Name recognition and low premiums seemed to be the most effective way to attract enrollees, while gap coverage proved to be not as important as expected. This study reflects the many concerns regarding Medicare Part D enrollment. While many of the goals for enrollment have been met, policymakers must continue to monitor the enrollment process to best meet the needs of beneficiaries in the future. Another important policy issue is dual eligibility.

Dual Eligibility

Dual eligible individuals are Medicare beneficiaries who are also eligible for Medicaid. In a report by the Kaiser Family Foundation (2005), dual eligibles were cited as the most costly, sickest, and poorest group within the Medicare population (Nemore 2005). Under Medicaid, beneficiaries had wider access to drugs included on the formulary. Then, when Medicare Part D was enacted, dually eligible individuals were instructed to choose a Medicare prescription drug plan for drug coverage. As a way to meet the growing needs of this group, a low-income subsidy was provided under Medicare Part D, which covered premiums, deductibles and the coverage gap.

Many dually eligible seniors have complained of decreased access to medications and higher co-pays after the switch. For example, under Medicaid if an individual cannot afford a copay for a prescription he/she will not be denied that medication. On the other hand, under Medicare Part D the individual plans determine which drugs will be included on the formulary. Those drugs may or may not be the drugs that are

needed. If a drug is not listed on the Medicare Part D plan formulary the individual must pay out of pocket.

A GAO report (2007) assessed the process for enrolling dual eligible individuals and also examined access to drugs by dually eligible individuals after enrolling in the program. Results showed that the process for enrolling dual eligible individuals was complicated and time-consuming (King et al 2007). Administrative burden and the many individuals involved in the process were noted as limitations for some seniors. Furthermore, enrollment for many dual eligible individuals may result in time delays for medications. For example, if an individual switches from Medicaid to Medicare Part D, there may be a delay in the time that the pharmacy receives their up to date information. During this time delay individuals may be denied access to medications or forced to pay for them out of pocket. GAO concluded that CMS should notify seniors of reimbursement rules and monitor progress (King et al 2007).

An article by Basu et al (2008) also examined the effects of Medicare Part D on dual eligible individuals and came to different conclusions. Prescription claims data on over 10,000 dual eligible individuals were obtained from a national pharmacy chain. The authors used regression models to compare treatment and control groups in terms of drug usage, out-of-pocket spending, and total drug expenditures. Results revealed that in terms of drug usage there was not a statistically significant difference in treatment and control groups for the probability of continuing, discontinuing, or initiating a new medication. Additionally, there was no significant difference in out-of-pocket spending for treatment and control groups. Lastly, total drug expenditures decreased for both the treatment and control group after Medicare Part D was implemented. The

authors concluded that the implementation of Medicare Part D did not adversely affect dual eligible individuals (Basu, Yin and Alexander 2008).

However, studies on Medicare Part D beneficiaries with mental illnesses have shown that issues of dual eligibility have resulted in interrupted treatment, relapses, and increased hospitalizations (Huskamp, Stevenson, Donohue, Newhouse and Keating 2007; Daly and Moran 2007) . The healthcare infrastructure is wide and vast. Responding to the need of transitioning over 6 million dual eligible individuals has been challenging. CMS must not only meet the needs of beneficiaries, but there is also the often daunting task of addressing the concerns of health professionals.

Health Professionals

There are extensive reports in the literature on the views of physicians, pharmacists, and other health professionals in regard to Medicare Part D. Increased administrative burden and decreased patient access to drugs are often mentioned as issues of concern (Epstein, Rathore, Alexander, Ketcham 2008; National Survey of Pharmacists 2006). A study by Epstein and colleagues (2008) examined physicians' attitudes about Medicare Part D. Over 700 primary care physicians completed surveys in North Carolina, Florida, Massachusetts, and Texas. Results revealed that although many physicians (48%) had a favorable view of Medicare Part D overall, 44% reported that access declined for individuals with prior drug coverage. Furthermore, more than half of the physicians (64%) were dissatisfied with Medicare Part D formularies stating that the formularies did not meet patients' needs. Finally, 63% reported higher administrative burden after Medicare Part D was implemented.

Similarly, in a study by the Kaiser Family Foundation (2006), 802 pharmacists were surveyed. Findings revealed that 91% of pharmacists felt the Medicare Part D

program was too complicated. This was supported by the fact that 97% of the pharmacists' customers requested help or advice in regard to Medicare Part D concerns (National Survey of Pharmacists 2006). The American Society of Health-System Pharmacists issued a statement to the Senate Special Committee on Aging Hearing on Medicare Part D. Pharmacists expressed difficulty in corresponding with plans to answer questions, in filling prescriptions for seniors who switched plans toward the end of the month, in verifying enrollment status, and in reimbursement for emergency prescriptions. Furthermore, pharmacists were concerned that the majority of plans do not allow a 31 day supply of prescriptions or partial fills of controlled substances, which are common preferences among seniors (ASHP 2006).

In addition to the issues of physicians and pharmacists, various other professionals have presented concerns to be addressed by policymakers. For example, a study by Summer and colleagues (2008) summarized the responses of counselors, attorneys, program managers, health professionals, and others. These individuals were identified as those who had direct knowledge of Part D beneficiaries' experiences. Their major concerns involved the accuracy of information as well as the ease of use of information related to Medicare Part D plans. Survey respondents recommended that CMS improve communication among organizations, develop a system that incorporates beneficiary drug needs in the selection of a drug plan, and develop a more rigorous monitoring process. Respondents also noted that there were too many drug plan choices, a common criticism of the Medicare Part D program.

Beneficiary Choices

A growing body of literature focuses on the choices beneficiaries face in selecting plans. Enrollees typically have 45 to 57 plans to choose from, with the plans varying by

premium, copayment and formulary. The guides that were created to facilitate these choices have been criticized as being too complex and not comprehensive enough (Hoadley 2006). A recent article by the Commonwealth Fund (2008) highlighted views for and against standardization of the program. Ideas for standardization include requiring plans to use universal terms to describe benefits, requiring plans to have the same rules for cost sharing, and creating universal rules for formulary design (Hoadley 2008). Those in opposition to standardization claim that as the market adjusts itself over time standardization will not be needed. They feel that the program will become less complex and standardization may occur naturally as plans respond to the market (Hoadley 2008). The authors note that beneficiaries support the idea of standardization. Although they enjoy choices many stated that there are simply too many plan options. These concerns reflect the complexity of the Medicare Part D program.

Expenditures

Medicare Part D expenditures have been a concern since its inception and continue to challenge policymakers. The challenge stems from an attempt to maintain a program that provides high quality services while containing healthcare costs. Projections from the Congressional Budget Office estimate that the Medicare Part D program will cost about $811 billion over the years 2007-2016 (Congressional Budget Office 2007).

An article by Stuart and colleagues (2005) assessed out-of-pocket spending by Medicare Part D beneficiaries. The authors used a simulation model to project out-of-pocket spending for those who enrolled during the first 3 years of the Medicare Part D program. Data were derived from the 1998-2000 Medicare Current Beneficiary Survey. The study sample was comprised of 1,333 enrollees per capita drug spending. The

sample was projected using the National Health Accounts representing expectations had the Medicare Part D program not been implemented. Three groups were selected for the study: a “potential Part D enrollee” cohort defined as those who were ineligible for subsidized coverage (having incomes above 150% of the federal poverty level) and with characteristics that would make Part D a reasonable option, a “high spender” cohort of potential Part D enrollees with projected 2006 prescription spending above $2,250, and a “catastrophic spender” cohort of high spenders with projected 2006 drug spending above $5,100. Coverage thresholds were established and out–of-pocket spending for those expected to enroll was tracked quarterly for two years. Results revealed that average spending estimates for the entire community-dwelling Medicare population was $3,081 in 2006 and $3,891 in 2008, while the potential Part D enrollee population spent on average $2,608 in 2006 and $3,230 in 2008. Furthermore, the high spenders mean drug spending was $5,534 in 2006 and 2008, while catastrophic spenders were expected to spend on average $9,106 in 2006 and $7,328 in 2008.

Overall, over 3 years potential Part D enrollees were expected to pay for about 44% of total drug spending out-of-pocket. Furthermore, about 40% of potential Part D enrollees were expected to spend in the doughnut hole, while 15% will reach the catastrophic threshold. Additionally, in what the authors call the “benefit rollercoaster,” they estimated that quarterly out-of-pocket payments for enrollees with average prescription drug spending would range from $163 in 2006 to $590 in 2007, while the high spender cohort prescription drug spending would range from $401 in 2006 to $1,391 in 2007. The authors concluded that beneficiaries with high or catastrophic drug spending would be affected the most by the Part D benefit structure. High spenders

could pay more than $10,000 out-of-pocket from 2006-2008. Considering that the median income for those age 65 and older is about $23,000 this could pose serious concerns related to beneficiary health outcomes. The authors recommended that future research in this area address these concerns and explore the importance of costly off formulary medicines and their ability to further increase beneficiary out-of-pocket spending.

On the other hand, some studies report decreases in spending since the implementation of Medicare Part D. One study found that higher plan participation and lower premiums than anticipated resulted in less spending (Goldman and Joyce 2008). Vogt and colleagues analyzed the effects of Medicare Part D on out-of-pocket spending using 2006 claims data, and found that Medicare Part D decreased out-of-pocket spending by 16%, while increasing the number of prescriptions filled by 6.5% (Vogt, Joyce, and Goldman 2008).

Effect on Outcomes

Recent articles have begun to examine the effects of prescription drug coverage (or lack of) on health outcomes. Hsu and colleagues examined the consequences of caps on Medicare drug benefits. The authors used a prospective cohort design to compare over 150,000 Medicare+Choice beneficiaries on the basis of economic and clinical outcomes that occurred in 2003. The data were obtained from Kaiser Permanente. Logistic regression was employed to examine costs. Results revealed that about 79% of beneficiaries had a $1,000 cap on their drug benefits and gaps in coverage resulted in negative effects on health outcomes (Hsu, Price, Huang, Brand, et al 2006). Specifically, beneficiaries with no cap on their drug coverage had lower odds of non-adherence to their medications. Beneficiaries with the $1,000 cap had higher

odds of high blood pressure, high cholesterol, and high blood glucose levels. Furthermore, beneficiaries with capped benefits had more emergency room visits and hospitalizations (Hsu, Price, Huang, Brand, et al 2006).

Similarly, a study by Rosenberg (2007) reviewed the literature on drug coverage provided by Medicare Part D in relation to the outcomes of patients with psychotic disorders. Study findings revealed that for patients with mental illness Medicare Part D coverage was inadequate. This represents about 17% of the total Medicare Part D population. The authors cite lack of continuity of care and insufficient drug coverage as areas for improvement. A similar study found that when drug coverage was inadequate in the psychiatric population the result was increased emergency room visits, increased hospitalizations and worse health outcomes (Soumerai 1994). In fact, it has been suggested that some Medicare Part D participating plans developed a strategy to discourage the enrollment of high cost individuals, such as those with mental illnesses. Psychiatric drugs are very costly, which creates a potential for adverse selection with respect to these individuals.

Review of Research Literature

Federal Employees Health Benefits Program

Little research has been published about the Federal Employees Health Benefits program. Although a search of the literature found no empirical studies, there is a growing body of conceptual papers that focus on the success of the Federal Employees Health Benefits program. Discussion of these papers helps to provide background on why this program has been cited as exemplary. Unique features of the program, such as cost saving techniques, are highlighted.

The adoption of the Federal Employees Health Benefits program has been recommended as the way to provide insurance coverage in the future (Enthoven 2003; Richmond and Fein 2005). Enthoven (1989) described managed competition as the idea that purchasers could create incentives for consumers and providers to make better choices given scarce resources. He cited the FEHBP as an example of this type of reformed healthcare system, in which organized units are responsible for care resulting in more cost-effective choices, improved patient satisfaction and better health outcomes.

Another example is a book by Richmond and colleagues that discussed current views on universal health insurance (Richmond and Fein 2005). The book cites the FEHBP program as an ideal model for healthcare reform that would allow for an incremental approach to coverage, financing, and enrollment. Similarly, Palmisano and colleagues (2004) cited the Federal Employees Health Benefits program as a good example for health insurance reform. In their article representatives of the American Medical Association discussed proposals to expand healthcare. They noted the FEHB program's publication of health plan ratings, the fact that only 5% of enrollees switch in any year, and the program's cost containment measures as exemplary.

Comparison of Medicare Part D and the Federal Employees Health Benefits Program Prescription Drug Coverage

Given that the FEHBP has been proposed as a substitute for Medicare, it is important to compare the programs. Only two studies were found in the research literature that directly compared the two programs, indicating the need for additional research in this area.

The National Bipartisan Commission on the Future of Medicare was created in 1997 as a part of the Balanced Budget Act. It was composed of 17 members, Democrats and Republicans, who were responsible for examining the Medicare program and making recommendations for improvement. All recommendations required 11 votes (not a majority vote) to ensure fairness. In 1999, the Commission proposed to reform Medicare into a FEHBP-type model. The proposal did not receive enough votes to be officially submitted to Congress, but advocates continued to promote the proposal (National Bipartisan Commission 1999 and Oberlander 2007).

A paper by Cain (1999) discussed the similarities and differences between Medicare and the FEHBP. Both programs were created in the 1960s and are federally legislated programs that override states' related laws. Both programs prohibit medical underwriting, age rating, and waiting periods for preexisting conditions. Furthermore, both programs utilize pharmacy benefit managers in the provision of drug coverage.

In regard to differences, Medicare originated from health policy debates that occurred over a long period of time to address unmet health care needs, while the FEHBP originated from a large employer's need to offer better benefits to its employees. Additionally, Medicare has payment policies with an excessive amount of detail (e.g. the volume of laws and regulations exceeds 800 pages per million beneficiaries), stemming from the large number of associated interest groups, while the FEHBP mitigated interest group politics (e.g. laws are about twenty pages per million beneficiaries, a ratio of forty to one compared to Medicare). Another important difference between the two programs is that Medicare uses its negotiating power to set prices, while the FEHBP attempts to regulate the market by setting boundaries.

Specifically, Medicare sets criteria that plans must meet in order to get paid, whereas the FEHBP negotiates premiums and benefits with the health plans individually. Other differences are Medicare's high rate of fraud and abuse and the FEHBP's superior cost containment measures and customer satisfaction ratings. For Medicare, the federal government holds the financial risk compared to the FEHBP, where the government is involved only as an employer (Cain 1999). For example, the governmental finance committee for the FEHBP is the Post Office and Civil Service Committee of Congress, while the Ways and Means and Finance Committees govern Medicare. The Civil Service committees are not focused on health policy because the government can control employees' benefit costs, the health plans hold the financial risk, and consumers have multiple choices (Cain 1999). This study highlighted many of the advantages of the FEHBP as compared to the Medicare Part D program.

Other studies have come to similar conclusions even when including in the comparison additional large employer health providers. A 2008 study by Yamamoto and colleagues examined the benefits provided by Medicare and FEHBP as compared to large employer plans. Hewitt Associates provided data on the original fee-for-service Medicare program, the FEHBP-Blue Cross/Blue Shield standard nationwide PPO option, and a typical provider organization (PPO) plan. A benefit value was calculated based on an expected value for participants eligible for Medicare. The comparison involved the value of benefits for Medicare beneficiaries with three health care utilization states: healthy beneficiaries, moderately healthy beneficiaries, and beneficiaries with poor health (Yamamoto, Neuman and Strollo 2008).

The data were derived from the year 2007. Results revealed that the average benefit value of Medicare ($10,610) was lower than that of the typical large employer PPO ($12,160) and the FEHBP standard option ($11,780). Furthermore, Medicare was shown to be less generous due to higher cost-sharing and lack of an out-of-pocket limit on services provided under Part B (Yamamoto, Neuman and Strollo 2008). Medicare also provided less drug coverage when compared to the typical large employer PPO and the FEHBP standard option.

In regard to total benefit costs, Medicare paid a smaller share (74%) as compared to the typical large employer PPO (85%) and the FEHBP standard option (83%). Similarly, Medicare's contribution to total drug costs was on average lower (51%) as compared to the typical large employer PPO (73%) and the FEHBP standard option (80%). When comparing individuals based on utilization, study results revealed that Medicare is less generous for low, moderate, and high users as compared to the typical large employer PPO and the FEHBP standard option (Yamamoto, Neuman and Strollo 2008).

For example, for low cost Medicare beneficiaries the benefit value was $1,470 on average, while it was $1,650 for the typical large employer PPO and $1,690 for the FEHBP standard option. Similarly, for high cost Medicare beneficiaries the benefit value was $42,440 on average, while it was $47,600 for the typical large employer PPO and $44,860 for the FEHBP standard option (2007 data). The authors concluded that the Medicare Part D program was less generous than either the typical large employer plan or the FEHBP standard plan option (Yamamoto, Neuman and Strollo 2008).

Support for these findings came from a study by researchers of the Lewin Group. They compared the drugs listed on the formularies of two Medicare Part D plans, the Veterans Administration Program and the Federal Employees Health Benefits Program (Lewin Group 2007). Data were derived for the year 2006 from Verispan's Vector One Data (VONA) and included the top 300 drugs (i.e. highest script volumes) used by those age 65 and older. Other data were collected from the Veteran's Administration (VA) pharmacy website, the Centers for Medicare and Medicaid Services, and the Blue Cross Blue Shield Federal Employee Program website.

Results revealed that, of the 300 drugs, the FEHBP covered the most (284 or 95%), followed by Medicare Part D plans (282 or 94%) and the VA formulary (194 or 65%). Specifically, the Medicare Part D plans covered more of the 132 brand name drugs (128 or 97%) compared to the FEHBP (125 or 95%) and the VA formulary (56 or 42%). The authors concluded that the FEHBP and Medicare Part D formularies provide broader drug coverage than the VA formulary. However, concerns persist about the adequacy of drug coverage through Medicare Part D formularies. Additional research is needed to provide a comprehensive comparison of drug coverage between Medicare Part D and the FEHBP.

The two studies mentioned above involve a comparison of one FEHBP plan (i.e. BCBS) and one Medicare Part D plan. Although the analyses were helpful, these studies are limited in that the FEHBP program is comprised of about 222 plans, while the Medicare Part D program is comprised of over 1,500 plans. This dissertation proposes to address this gap in the literature by comparing plans/formularies that represent 63-70% of total program enrollment (i.e. 5 FEHBP formularies and 19

Medicare Part D formularies). Furthermore, this dissertation proposes to analyze over 250 drugs by therapeutic class, another limitation that has not been addressed in the literature.

Summary

Review of the literature revealed that additional research is needed to compare Medicare Part D prescription drug plans and the FEHB prescription drug plans. Researchers have described the Medicare Part D program as experimental, thus requiring continual evaluation and revision (Berndt 2004). This dissertation will focus on the following areas: assessment of prescription drug plan formularies and examination of cost sharing. This section explains gaps in the research literature in these areas and how this dissertation will fill the gaps in the literature.

The three key areas that legislators had to address in the passing of Medicare Part D legislation were financing, delivery, and regulation. Research to date has found that delivery of services has been successful thus far, while some beneficiaries remain concerned with the comprehensiveness of those services. Regulation has been adequate, with the exception of a lack of guidelines to monitor progress and enforce recommendations for improvement. Financing, however, poses one of the biggest challenges. As the Medicare program faces large increases in cost incurred by beneficiaries in the coming years, possible reforms must be considered.

Suggestions to increase the effectiveness and efficiency of Medicare Part D will be helpful. Studies have shown that cost sharing may be used as a cost containment measure to redirect enrollee use of health services. Insurers may increase cost sharing on certain drugs (e.g. brand vs. generic) to limit their use. Encouraging the use of generic drugs whenever clinically appropriate will result in cost savings. The use of

generic drugs is encouraged through lower or waived co-payments and formulary compliance programs such as step therapy. Generic drugs cost on average, 71% less than brand drugs. For each percentage point increase in the generic utilization rate, Part D drug spending falls by an estimated $12 billion (Price Waterhouse Coopers 2007). This dissertation will include an analysis of generic and brand name drug coverage.

Previous research also has revealed a need to examine the inclusion or exclusion of certain drugs on the formulary. Medicare Part D and the FEHBP formularies have not been studied in detail. Examining formularies is difficult because of the large number of drugs offered (over 1,400) and the lack of a consensus across plans. Drugs vary by dose, strength, and route of administration. Furthermore, prescription drug plan formularies change once a year. While additions and deletions usually do not exceed 15-20 drugs, the fact remains that one of the deleted drugs may be viewed as a life saving drug by a consumer. Some have asked what makes a good formulary. The Centers for Medicare and Medicaid Services attempted to answer this question by employing the United States Pharmacopeia to determine whether a plan should target the most commonly prescribed drugs or offer a broad and comprehensive list of drugs. To date, researchers have not been in agreement in their conclusions, but they do agree that there is room for improvement.

Co-payments are another area of concern. Studies show that 91% of Medicare Part D plans have tiered cost sharing (Medicare 2006). A prescription drug plan may have several tiers, and the co-payment amount depends on in which tier the drug is listed. Studies have shown that Medicare Part D plan tiers range from 1-4 (Bowman,

Rousseau, Silk, and Harrison 2006), while the FEHBP plan tiers range from 1-6 (Heritage Foundation 2003). Examination of the drug co-payments and tiers is important when considering beneficiary access. This dissertation will compare co-payments among Medicare Part D and the FEHBP prescription drug plans.

In conclusion, this dissertation will directly compare the Federal Employees Health Benefits prescription drug plans to Medicare Part D stand-alone plans representing the top 63-70% of plan enrollees. Results will be useful in considerations of future reform of Medicare Part D. Furthermore, this dissertation will use 2009 data, which offers an opportunity for an up-to-date and timely study. Finally, this research will provide help to older persons who are interested in understanding complex benefit structures to assist in their management of medication costs.

The research questions utilized to address the above mentioned gaps in the literature will reflect the perspective of the consumer. Studies have shown that health policy analyses are sensitive to perspective. For example, assessing drug coverage from a plan perspective versus a consumer perspective would lead to very different conclusions. This research utilizes the consumer perspective. Research questions are:

1. How do Medicare stand-alone plans compare to Federal Employees Health Benefits plans with respect to coverage of prescription drugs?
2. How do Medicare stand-alone plans compare to FEHBP plans with respect to cost sharing on prescription drugs?

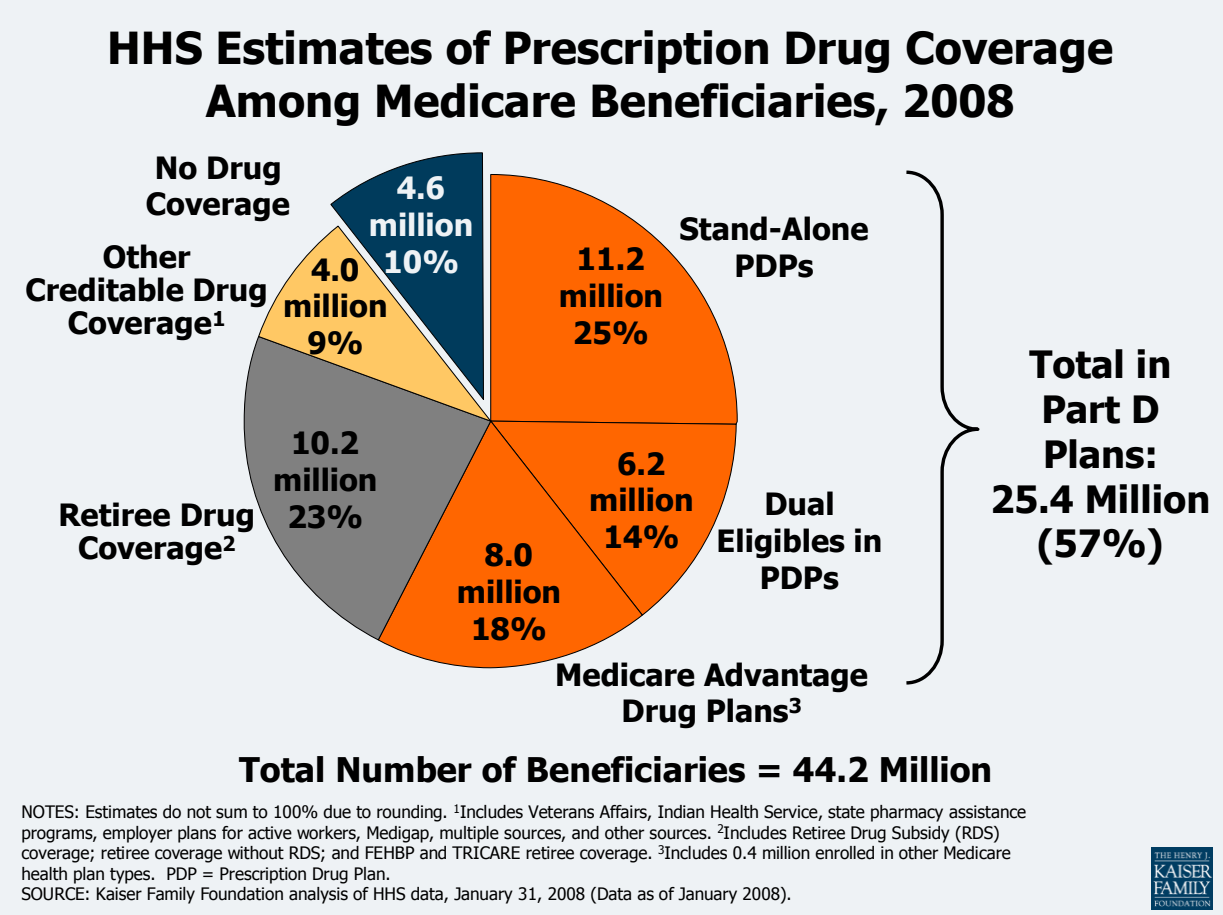

Figure 2-1. Estimates of Prescription Drug Coverage among Medicare Beneficiaries, 2008

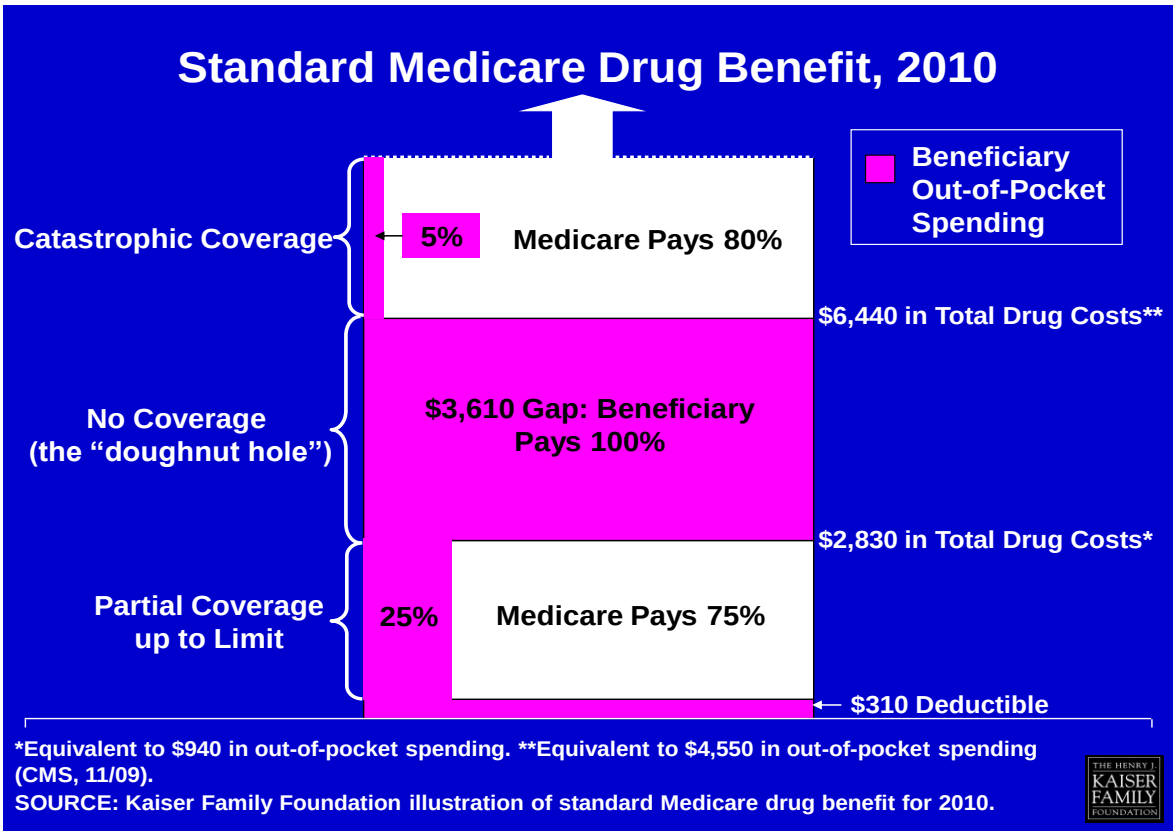

Figure 2-2. Standard Medicare Drug Benefit, 2010

CHAPTER 3
CONCEPTUAL FRAMEWORK

Competition and Regulation in Health Care Markets

Although various theories have been proposed to explain the complex decision making process that Medicare Part D and the FEHB prescription drug plans utilize, there is no consensus on one particular theory. However, review of the literature suggests that differences between the two programs may be reflected in differing degrees of regulation (Moran 2000; Paul 2003; Enthoven 1989; Cain 1999; Merlis 2003; Atherly 2009).

Advocates of competition, such as Adam Smith, date back to the early 1700s. In the economic literature, a market is defined as an arrangement where buyers meet sellers to exchange goods, services, or information with no government intervention. Prices are set by the laws of supply and demand (Friedman and Friedman 1980). The law of demand states that there is a negative relationship between quantity demanded and price, where quantity demanded is the amount people are willing to buy at a certain price. As price decreases the quantity demanded increases. For this research, the market is prescription drugs and beneficiaries are the demanders of those drugs. Furthermore, cost sharing and inclusion of drugs on the formulary are used as a proxy for price. Thus, as shown in Figure 3-1, the demand curve slopes downward.

On the other hand, the law of supply states that there is a relationship between quantity supplied and price that is based on how much sellers can offer to the market (Stigler 1966). For this research, prescription drug plans are the suppliers of goods. Although prescription drug plans are the direct suppliers of drugs to beneficiaries, there are many indirect suppliers (e.g. pharmaceutical manufacturers and pharmacy benefit

managers) that are involved in this process. For example, pharmaceutical manufacturers create new drugs, introduce them to the market and then negotiate the price for those drugs with pharmacy benefit managers. Pharmacy benefit managers are employed by prescription drug plans to negotiate on their behalf. In Figure 3-2, the supply curve is shown by the upward sloping curve—that is, the quantity supplied increases as the price increases.

In a competitive market with no government regulation, equilibrium occurs at the point where the demand and supply curves intersect (see Figure 3-3). In this case, the supply of drugs from a pharmaceutical manufacturer would meet the demand of drugs by beneficiaries. Demand would be expressed through prescription drug plan cost sharing requirements and inclusion of drugs on the formulary. As mentioned, prescription drug plans hire pharmacy benefit managers to negotiate price discounts for drugs with manufactures. The negotiations involve the receipt of rebates by pharmacy benefit managers on the drugs selected for the formulary. Manufacturers give rebates based on the inclusion of their drugs on a plan's formulary which increases their market share. The rebates that are negotiated by the pharmacy benefit manager result in savings that are passed on to the prescription drug plans, which are then passed on to the beneficiaries (Henry J. Kaiser Family Foundation 2005).

In Figure 3-3, at the equilibrium price (P*), quantity demanded by beneficiaries is the same as quantity supplied by prescription drug plans (Q*). For this research, cost sharing and inclusion of drugs on the formulary are used as a proxy for price. When prescription drug plans freely enter and exit the market, deviations from equilibrium set in motion forces that drive price (i.e. cost sharing and formulary drug inclusion) back to

equilibrium. For example, as shown in Figure 3-4, if price is above equilibrium, the quantity supplied by prescription drug plans (Q3) exceeds the quantity demanded by beneficiaries (Q1), resulting in a surplus (Q3-Q1). In such a situation, prescription drug plans will lower the price to eliminate the surplus, inducing beneficiaries to increase quantity demanded. The process continues until price reaches the equilibrium level.

Competitive markets with no or little government regulation have certain benefits for consumers. In particular, competition forces sellers to supply the goods and services that are most desired by consumers because otherwise new firms will enter to better meet consumer preferences. In addition, a relatively more competitive market will have lower equilibrium prices and higher equilibrium quantities than comparable markets that are relatively less competitive. In some cases, however, markets with no government intervention are not optimal, particularly from a social perspective. When there is what is called “market failure,” there may be a role for government. In examination of the two programs in this research, one of the major differences between the two programs is government regulation. Specifically, the Medicare Part D program utilizes the United States Pharmacopeia (USP) Guidelines, which specify that certain drugs should be covered, to regulate their program, while the FEHB program does not. The question arises as to whether the use of USP guidelines stemmed from some type of market failure.

There are four types of market failure: market power, externalities, public goods, and asymmetric information. First, in some markets, sellers have substantial market power, which means that they can keep prices higher and quantities lower than would be the case in a more competitive market. This type of market failure is the rationale for

antitrust policy. That is, the government intervenes to prohibit business practices that restrict competition and harm consumers.

The USP guidelines requiring certain drugs to be included on a formulary may or may not affect market power. A 2005 report by the Henry J. Kaiser Family Foundation noted that pharmaceutical manufacturers give rebates based on the inclusion of their drugs on a plan's formulary in order to increase their market share. Prior to the implementation of the Medicare Part D program, policymakers assured beneficiaries that the Medicare prescription drug plans had sufficient market power to negotiate low drug prices (Frank and Newhouse 2008; Outterson and Kesselheim 2009). However, a Families USA report in 2007 compared the drug prices of Medicare Part D plans and VA plans and found that the VA plans provided lower drug prices, presumably due to the greater buying power of VA plans. Furthermore, a survey by Ayres, McHenry & Associates found that seniors had concerns about drug manufacturers helping to determine which of their drugs Medicare should and should not cover, but the preferred method to address these concerns was not to create the USP guidelines. Rather, seven out of ten seniors preferred a plan similar to the FEHBP plans (Senior Journal 2004).

A second type of market failure is externalities, which occur when private consumption or production has external benefits or costs. An example of a positive externality is vaccination against contagious disease. When one person is vaccinated, that individual receives a benefit, but so do all the others that might have been infected. An example, of a negative externality is pollution. When one firm pollutes, the effects extend well beyond the firm itself. Externalities are the rationale for government

regulation in the form of taxes, subsidies, or by using property rights to force firms and individuals to take the spill-over impacts of their economic activity into account. If the USP Guidelines benefit society as a whole as well as individuals, externalities could explain the use of these regulations by Medicare.

For example, Medicare Part D included a low income subsidy to supplement the income of those beneficiaries who could not afford drugs provided by this program. However, a 2007 report by the Commonwealth Fund noted that many of those eligible for the subsidy were not enrolled in Part D and not receiving the subsidy (Summer, Nemore, and Finberg 2007). Furthermore, in 2008, GAO reported that the majority of denials for the low income subsidy (i.e. >50%) were asset and income related (Steinwald, Thorburn, Garvey et al 2008).

Additionally, an article by Stuart and colleagues, which assessed out-of-pocket spending by Medicare Part D beneficiaries, found that over 3 years potential Part D enrollees were expected to pay for about 44% of total drug spending out-of-pocket (Stuart, Briesacher, Shea, et al 2005). Some studies have found that hospitalizations among beneficiaries with mental illness have actually gone up (Huskamp, Stevenson, Donohue, Newhouse and Keating 2007; Daly and Moran 2007). On the other hand, Basu and colleagues examined the effects of Medicare Part D on dual eligible individuals and concluded that the implementation of Medicare Part D did not adversely affect dual eligible individuals (Basu, Yin and Alexander 2008).

Public goods are a third type of market failure. Public goods are non-excludable—that is, it is not possible to provide a good or service to one person without it thereby being available to others and non-rivalrous, meaning that the consumption of a good or

service by one person will not prevent others from enjoying it. A classic example is a lighthouse, others cannot be excluded from using it and many persons can use it simultaneously. Due to this “free rider” problem, individuals are reluctant to invest in public goods, thus they are often provided by the government. This type of market failure does not seem to be related to Medicare Part D as this program is offered exclusively to Medicare beneficiaries.

Finally, asymmetric information may lead to market failure. This situation occurs when one party to a transaction has more or better information than the other party. If the information problem is severe the government may intervene either by providing information publicly or by mandating the provision of information by market participants. Medicare policymakers may have required the use of USP Guidelines to correct for this problem.

As noted, market failure provides a rationale for government intervention, with the type of preferred intervention depending on the type of market failure. Medicare policymakers may have utilized the USP Guidelines as a solution to market failure expecting prices to be lower and quality to be higher. Or, the purpose of USP guidelines may have been to prevent adverse selection. Adverse selection, the tendency for people with higher risk to seek health insurance coverage more than those with less risk, is usually a concern whenever people are allowed to choose among plans for health insurance. The idea is that since asymmetry of information exists the potential for adverse selection exists.

Unfortunately, there is no research that examines the relationship of market failure and Medicare Part D. Therefore, the effect of the difference in regulation between Medicare Part D or the FEHBP on coverage or cost sharing is an empirical question. If the increased regulation represents an effective response to market failure then the expectation is that Medicare Part D would have more extensive coverage and lower cost sharing than the FEHBP. If, on the other hand, the increased regulation was not due to market failure, the expectation is that FEHBP would have more extensive coverage and lower cost sharing than Medicare Part D.

Decision Making Process: Medicare Part D vs. FEHBP

The next step is to compare Medicare Part D and the FEHBP plans with respect to the process by which health plans decide on the formulary and the level of cost sharing (see Figure 3-5). Medicare Part D plans are governed by Congress via the Ways and Means and Finance Committees, while the FEHBP is governed by the Post Office and Civil Service Committee. An article by Cain 1999 noted that the FEHBP outscored the Medicare program in the areas of cost containment, innovation, customer satisfaction, and regulatory requirements. The area of regulatory requirements is of particular concern for purposes of this dissertation.

For Medicare Part D, the United States Pharmacopeia (USP) Guidelines play an important role. Specifically, in section 1860D-4(b)(3)(C)(ii), the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA) states: “The Secretary shall request the United States Pharmacopeia to develop, in consultation with pharmaceutical benefit managers and other interested parties, a list of categories and classes that may be used by prescription drug plans under this paragraph and to revise such classification from time to time to reflect changes in therapeutic uses of covered part D

drugs and additions of new covered part D drugs" (Medicare Prescription Drug Benefit 2008). For example, the guidelines specify that "all or substantially all" drugs should be covered in certain drug classes (Public Law 2006).

The USP is a not-for-profit organization that receives funding through the sale of products and services. The goal of the USP is to ensure quality pharmaceutical care. The USP standards are well known around the world and provide the official public standards for prescription and over the counter medications in the United States (Medicare Prescription Drug Benefit 2008).

In the case of the FEHBP, Figure 3-5 shows that the Office of Personnel Management (OPM) is the primary oversight agency, with each prescription drug plan choosing its own formulary. However, about 80% of plans employ a pharmacy benefit manager (PBM), which is a third party administrator hired to help manage prescription drug benefits. Specifically, PBMs process and pay prescription drug claims, develop and maintain the formulary, perform drug utilization reviews, contract with pharmacies, and negotiate discounts and rebates with drug manufacturers (Dicken, Agarwal, Dirosa, Kirksey, Rivera-Lowitt and White 2003). For the FEHBP, the Office of Personnel Management monitors the PBMs by negotiating plan benefits, monitoring drug benefit delivery, reviewing customer service reports, and conducting on-site visits. Each PBM has a Pharmacy and Therapeutics (P&T) Committee, made up of physicians, pharmacists, and individuals with specialized clinical expertise that reviews and updates the list of drugs on the formulary for a given plan (FEHBP Home Page 2008). The formulary is designed by the PBM and the plan, but must be submitted to and approved

by the Office of Personnel Management before the final list of covered drugs is offered to FEHBP beneficiaries.

It is important to note that, although some Medicare Part D plans also utilize pharmacy benefit managers, a major difference can be found in the decision making process. Unlike the FEHBP, PBMs that serve Medicare must work with the plan to comply with Medicare's regulations, in particular the USP Guidelines. This requires a delicate balance among cost, quality, and access. Specifically, PBM negotiations with pharmaceutical manufacturers have a great impact on selection of drugs for the formulary. PBMs design the formulary to maximize cost savings for the plan and the consumer. Once the final formulary is complete, it is submitted to the Centers for Medicare and Medicaid Services (CMS) for review. Once approved, the final list of covered drugs is offered to Medicare Part D beneficiaries.

Hypotheses

The use of USP Guidelines by Medicare Part D may represent a response to potential market failure. If so and if the increased regulation compared to the FEHBP is an effective response to market failure, then the expectation is that Medicare Part D would have more extensive coverage and lower cost sharing than the FEHBP. If, on the other hand, the increased regulation was not due to market failure, the expectation is that the FEHBP would have more extensive coverage and lower cost sharing than Medicare Part D. The objective of this dissertation is to provide empirical evidence that bears on this question. In particular, the dissertation will compare drug coverage and cost sharing between Medicare Part D and the FEHBP.

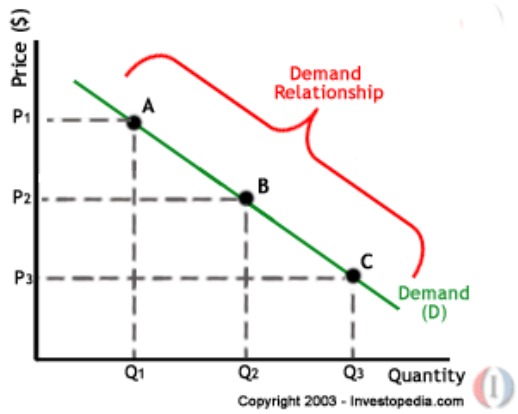

Figure 3-1. The Demand Curve

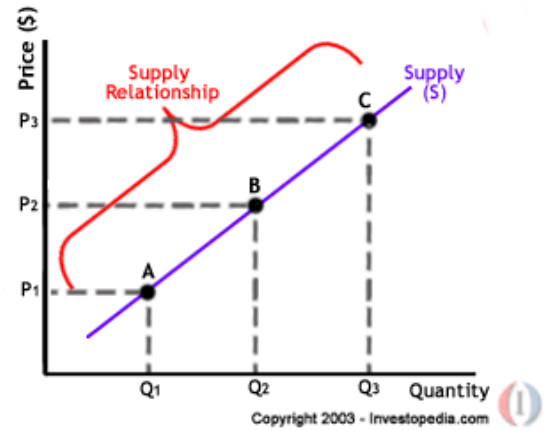

Figure 3-2. The Supply Curve

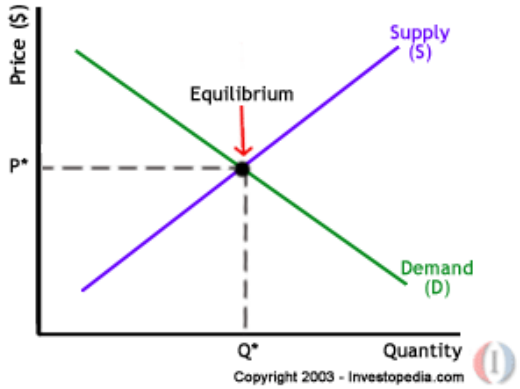

Figure 3-3. Equilibrium

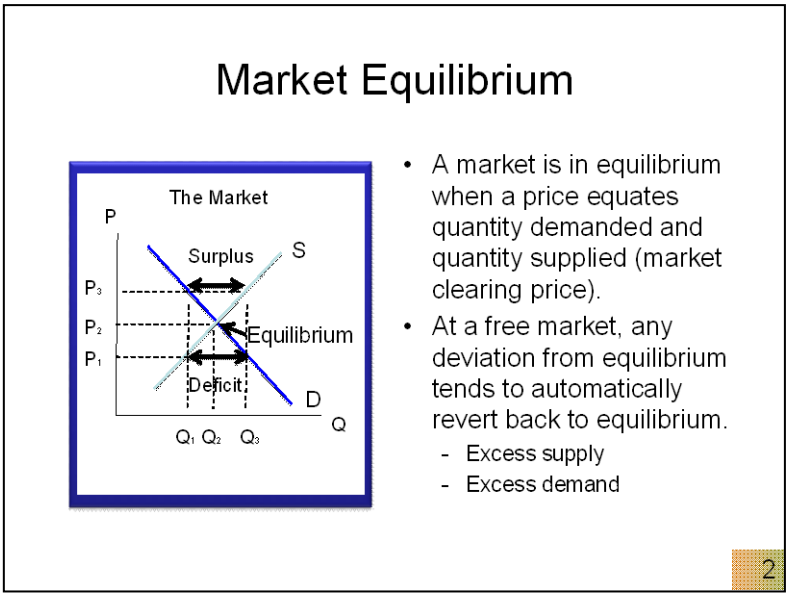

Figure 3-4. Market Equilibrium

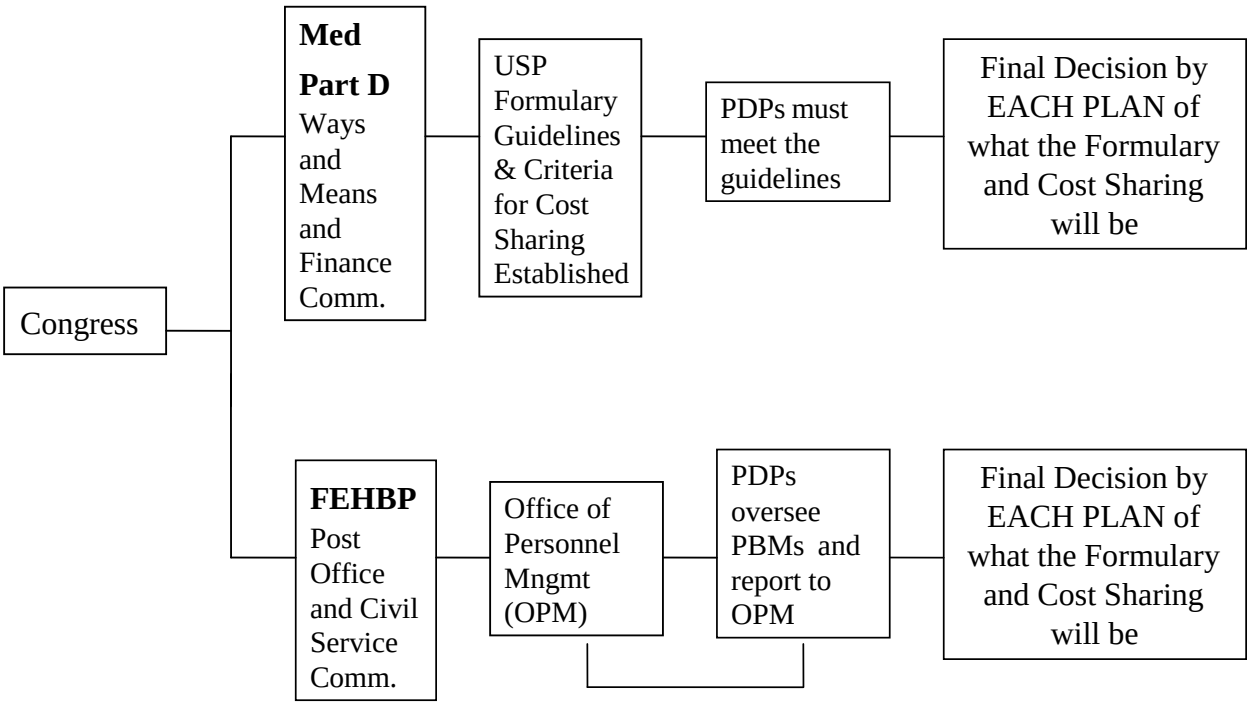

Figure 3-5. Diagram of the Medicare Part D & FEHBP Decision-Making Processes

CHAPTER 4
DATA AND METHODS

The objective of this research is to compare Medicare and the Federal Employees Health Benefits Program with respect to prescription drug plans. Secondary data for study were obtained from the Centers for Medicare and Medicaid Services and the Office of Personnel Management. In addition, primary data were collected from various health plan websites. The unit of analysis was the drug or the plan, depending on the particular research question being addressed. This chapter describes the data collection process, provides details on construction of the analytic dataset, defines study variables, and discusses methods used in the empirical analysis. Prior to commencing the study, approval was obtained from the University of Florida Institutional Review Board.

Data Collection

Medicare Part D Prescription Drug Plans

Data were obtained from the Centers for Medicare and Medicaid Services (CMS). The initial sample of Medicare Part D prescription drug plans consisted of approximately 2,500 prescription drug plans. Medicare Advantage plans were excluded because separate data about prescription drug coverage were not available. After this exclusion, there remained approximately 1,893 stand-alone prescription drug plans. The percent and cumulative percent of enrollees within each plan were calculated, then the plans were ranked in terms of total enrollment. Beginning with the largest enrollment, the plans representing 75% of total enrollment were selected for further consideration, resulting in a total of 287 stand-alone prescription drug plans.

Examination of the Medicare Part D prescription drug data revealed that there were multiple plans that had the same formulary. Therefore, the plans were collapsed by formulary and ranked in order of total enrollment. Formularies were included in the sample if enrollment was greater than or equal to .5% of total enrollment. This yielded a final study sample of 19 formularies, covering 63% of total enrollment, as shown in Table 4-1. These 19 formularies represented 232 prescription drug plans.

The range of enrollment for the excluded plans/formularies was 16,697-82,585 enrollees. Once enrollment was less than .5% of total enrollment the enrollment numbers became very small and it was more likely that the characteristics of those smaller plans were not the norm. For example, the Center for Medicare and Medicaid Services discussed non-renewal of those contracts representing a small number of enrollees (Cubanski and Neuman 2006). The organizations with low enrollment faced adverse selection concerns and decreased ability to negotiate low drug prices. It is important to note that, although there are over 1,000 prescription drug plans, enrollees typically choose among 45-57 plans, depending on the state in which they live.

The CMS data included Prescription Drug Plan Formulary and Pharmacy Network Files, with formulary and pharmacy network data for all Medicare Prescription Drug Plans as of January 2009. The file contained six subfiles. The Geographic Locator File included the Medicare Advantage and Prescription Drug Plan Region codes and county codes. The Plan Information File included information for each plan (i.e. name, contract ID, plan ID, service area, and plan type). The Formulary File included formulary details for each plan including National Drug Codes (NDCs), tier level, indicators for step therapy, quantity limits, and prior authorization. The Beneficiary Cost File included plan

level cost sharing details for preferred, non-preferred and mail order network pharmacies. The Pharmacy Network File included the National Association of Boards of Pharmacy numbers for each network pharmacy including preferred, retail, and mail order indicators. Lastly, the Record Layout File included a diagram of file linkages, in addition to separate data dictionaries for each of the files listed above.

The data provided by CMS did not include drug names, generic or brand name status of drugs, or therapeutic classes. The Agency for Health Care Administration in Tallahassee, FL provided information on the drug names and generic or brand name status of drugs. Agency staff used the National Drugs Codes (approximately 3,000 per formulary) to look up the requested information. The therapeutic class (defined as groups of drugs that are similar in chemistry, method of action, and purpose of use) was determined and entered manually using the United States Pharmacopeia Drug Classification System (United States Pharmacopeial Convention 2008).

Federal Employees Health Benefits Program Prescription Drug Plans

A list of all plans serving beneficiaries of the Federal Employees Health Benefits Program was obtained from the Office of Personnel Management. The list included the plan name, plan type, and number of enrollees. Additional information on plans' formularies was obtained from the respective plans' websites (Blue Cross Blue Shield Formulary 2009; GEHA Benefit Plan Formulary 2009; and NALC Health Benefit Plan Formulary 2009).

The initial sample of the Federal Employees Health Benefits Program prescription drug plans consisted of 222 prescription drug plans. The plans were ranked in terms of total enrollment, then the percent and cumulative percent of enrollees within each plan were calculated. Beginning with the largest enrollment, the plans representing 70% of

total enrollment were selected for the study, resulting in a total of 5 prescription drug plans/formularies, as shown in Table 4-2. The range of enrollment for the excluded plans/formularies was 1-63,346 enrollees. Similarly to the case for Medicare Part D, although there are over 200 prescription drug plans, enrollees typically choose from among 12-20 plans depending on the state in which they live. It should be noted that for both Medicare Part D and the FEHBP, enrollment ranged from 80,000 to 2 million enrollees.

Construction of Analytic Datasets

Prior to the development of datasets, comparison of Medicare and the Federal Employees Health Benefits programs revealed the need for an appropriate benchmark to compare the programs. After reviewing the literature, IMS Health Data was chosen to obtain a list of the top 200 drugs most commonly used by dispensed prescriptions and the top 200 most commonly used drugs by sales in the United States (IMS Health Data 2009). For instances where the drug name was found on both lists (i.e. by dispensed prescriptions and by sales) the drug name was only listed once.

Additionally, brand name drugs with generic equivalents were added to the list. This means that if a brand name drug was not listed on the formulary, but its generic equivalent was, that drug was considered to be listed on the formulary. Categorization in this way refers to therapeutic equivalence. Two drugs are referred to as therapeutically equivalent if, regardless of product name, packaging or price difference, they contain the same amount of the relevant active ingredients and may be used interchangeably.

This process yielded a final list of 266 drugs (i.e. 134 duplicate drugs were deleted), representing a total of 23 therapeutic classes. This list was further verified

through literature review to ensure that these drugs represented at least 75% of all Medicare expenditures (Soni 2009; Stevenson, Huskamp, Keating and Newhouse 2007; Simoni-Wastila, Shaffer and Stuart 2007; Families USA 2001).

The data were merged to comprise three datasets. Table 4-3 lists the variables in each dataset; a later section presents the justification for the variables included. Dataset 1, which was used to make comparisons based on the number/percentage of drugs covered, brand/generic status of drugs, and therapeutic class included the following variables: drug name, generic name, drug type, therapeutic class, and then all 24 formulary names were listed. For this dataset the unit of observation was the drug. The first variable, drug name, was an alphabetic variable (i.e. each of the 266 drugs was listed on the rows). The next variable, generic name was also alphabetic and included the generic name of each drug. The third variable, drug type, was numeric (recoded as 0 if it was a generic drug and 1 if it was a brand name drug). Next, therapeutic class was an alphabetic variable which included the therapeutic class name that each drug was classified under. Lastly, the 24 formularies were listed (19 Medicare Part D and 5 FEHBP formularies). Each corresponding row consisted of a 0 or 1 for each formulary depending on whether each drug was listed on the formulary or not (i.e. 0 if not listed on the formulary and 1 if listed on the formulary).

Dataset 2 was used to perform the regression analysis and included the following variables: plan name, type of plan, premium, enrollment, copay, coinsurance, tier, and then all top 15 therapeutic classes were listed (i.e. ADHD agents, analgesics, anti-cancer agents, antibacterials, anticonvulsants, antidepressants, antipsychotics, anxiolytics, arthritis agents, blood glucose regulators, blood products/ modifiers/volume

expanders, cardiovascular agents, gastrointestinal agents, hormonal agents, and respiratory tract agents). For this dataset the unit of observation was the plan. The first variable, plan name, was an alphabetic variable (i.e. each of the 227 plans included for this analysis were listed on the rows). The second variable was type of plan. This variable represented whether the plan was a Medicare Part D or FEHBP plan. In each corresponding row the type of plan was noted (i.e. recoded as 1 for Medicare Part D and 0 for the FEHBP). The next variable was premium, which was a continuous number that reflected the amount enrollees pay to the plan each month to receive benefits. The enrollment variable followed as a continuous variable that represented the number of beneficiaries per plan. Copay was listed as the fifth variable. For each of the 227 plans, the copay or dollar amount that enrollees pay for prescription drugs was noted. The next variable, coinsurance rate, indicated by the percentage that enrollees pay for drugs was listed on the corresponding rows.

For comparability, the analysis examined coverage only for tiers 1 and 2. For Medicare Part D plans, tier 3 represents non-formulary drugs and tier 4 represents specialty drugs, while none of the FEHBP plans have a tier 4 and the definition for tier 3 varies among the FEHBP plans (see Table 4-4). For example, for some of the FEHBP plans, tier 3 represents multi-source brand-name drugs (i.e. drugs available from more than one manufacturer and that have at least one generic equivalent alternative available), whereas other FEHBP plans have no tier 3. Additionally, non-formulary drugs and specialty drugs require higher out-of-pocket costs for beneficiaries as compared to tier 1 and 2 (generic/brand) formulary drugs. Therefore, for this research

the comparison between Medicare Part D and the FEHBP cost sharing is limited to tiers 1 (generic drugs) and 2 (brand name drugs).

The tier variable was indicated by a number that distinguished tier 1 generic drugs from tier 2 brand name drugs and the copay and coinsurance listed was for tier 1 generic drugs. To account for the change in copay and coinsurance for tier 2 brand name drugs, the dataset above was copied and pasted below itself. Then the variables copay and coinsurance were updated with new correct entries for each row/plan. That is, the copay and coinsurance changed because tier 2 brand name drugs are different than tier 1 generic drugs. This means that the total number of plans in the first column/row increased to 454 (i.e. 227 plans for tier 1 and 227 plans for tier 2). Finally, the last 15 variables consisted of the top 15 therapeutic classes. Each row listed the number of drugs within each class that was included in each plan.

The third and final dataset 3 used to conduct the analysis of cost sharing included the variables: plan name, tier, cost type (copay or coinsurance), and cost amount. It is important to note that in the construction of the dataset for the analysis of cost sharing there was a change in sample size. Initially, there were 19 Medicare Part D formularies and 5 FEHBP formularies. These formularies represented 232 Medicare Part D plans and 5 FEHBP plans, respectively, for a total of 237 plans. Data on cost sharing was missing for the following 14 Medicare Part D plans: Community CCRx Basic (1 plan), Prescription Pathway Bronze (11 plans), BravoRx (1 plan), and Medco Medicare Prescription (1 plan). The deletion of these plans yielded a final total of 218 Medicare Part D plans for the cost sharing analysis. For the FEHBP plans there was no missing data, but examination of cost sharing revealed that there was variation among plans

depending on whether a plan was for a single person (self) or for a family (self+family). Therefore, a total of 10 FEHBP plans were included in the cost sharing analysis. That is, self and self+family for each of the original 5 plans. This resulted in a final sample of 228 plans for the cost sharing analysis.

For this dataset the unit of observation was the plan. The first variable, plan name, was an alphabetic variable (i.e. each of the 227 plans included for this analysis were listed on the rows). The second variable tier was indicated as 1 for tier 1 generic drugs and 2 for tier 2 brand name drugs. The third variable, cost type was indicated for each plan as 1 if copay and 2 if coinsurance. Lastly, the amount or percentage for each plan was listed on each row, which depended on the tier and whether the plan required a copay or coinsurance.

Definition of Study Variables

This section provides a brief review of the literature for each of the variables included in this study. Specifically, for the regression analysis, the relationship between the dependent and independent variables is described in detail. Some variables were re-coded to facilitate analysis. The variables were classified into two main groups by unit of observation. For comparisons involving the number/percentage of drugs covered, generic/brand name status of drugs, and therapeutic class, the unit of observation was the drug. For the regression and cost sharing analyses, the unit of observation was the plan. Tables 4-3 and 4-4 provide additional information.

Current standards require prescription drugs to be offered under a health plan policy or contract. For the Medicare program a total of 1,893 stand-alone prescription drug plans were offered, while the FEHBP offered 222 plans. The variables in which the unit of observation was the drug were drug name, generic name, drug type,

therapeutic class, and formulary name. The variable drug name is used to identify drugs within formularies. The drug name refers to an owned, proprietary, brand or generic drug. There were 266 total drugs used for analysis in this research, as discussed in a previous section.

The next two variables, generic name and drug type, refer to a drug's brand or generic status on a formulary. Factors such as whether a drug is generic or brand may affect whether the drug is included on a formulary. A brand name drug is defined as a trade name and is protected by a patent. A generic drug is defined as a prescription drug that has the same active-ingredient formula as a brand name drug. An active ingredient is any component that provides pharmacological activity or other direct effect in the diagnosis, cure, mitigation, treatment, or prevention of disease, or to affect the structure or any function of the body of man or animals. Generic drugs usually cost less than brand name drugs and are rated by the Food and Drug Administration (FDA) to be as safe and effective as brand name drugs.

Drugs that are listed on a formulary are classified into therapeutic class. A therapeutic class is defined as a group of drugs that are similar in chemistry, method of action, and purpose of use. Most prescription drug plans offer approximately 40 therapeutic classes on their formularies (United States Pharmacopeia 2008). The number of drugs per therapeutic class is important to beneficiaries because it can be a measure of access or extent of drug coverage (Elam et al 2005; Hoadley et al 2006; Ketcham and Ngai 2008).

The variable formulary name was selected as a key factor in the comparison of Medicare Part D and the FEHBP. Although plans vary by program, similar formularies

may exist among plans. For example, multiple Medicare Part D plans have the same formulary. A formulary is defined as the list of prescription drugs covered (paid for) by a given health plan.

To define the variables listed in the regression analysis, the unit of observation was the plan. The variables included were: plan name, type of plan, premium, enrollment, copayment, coinsurance, tier, and therapeutic classes. The plan name was used as an identifier and referred to the official name given to the plan. The variable type of plan (i.e. FEHBP or Medicare Part D) was also selected as a key descriptor of these plans since studies and reports point to differences in regulation between the two programs (Paul 2003; Cain 1999; Merlis 2003; Atherly 2009). For example, in a 1999 study by Cain it was noted that Medicare uses its negotiating power to set prices, while the FEHBP attempts to regulate the market by setting boundaries. Other research suggests that differences in regulation may affect the number of drugs offered to beneficiaries (Kipp and Ko 2008). To date, there are no studies that show an empirical examination of whether the number of drugs offered will increase or decrease depending on the type of plan.

Other studies highlight the importance of plan premiums and enrollment as related to number of drugs in a therapeutic class. Plans with higher enrollment increased the number of drugs included on their formularies over time. Hoadley and colleagues (2008) analyzed tends among Medicare Part D plans and found that the formularies with the highest enrollment increased the number of drugs offered on their formularies as enrollment increased (Hoadley, Hargrave, Merrell et al 2008). Additionally, premiums have been shown to be associated with the number of drugs included on plan

formularies. For many plans, the amount of the premium that is charged to beneficiaries is related to the amount of drug coverage. A recent study showed that plans with higher premiums provided more extensive drug coverage as compared to plans with lower premiums (Hoadley, Hargrave, Cubanski et al 2006).

Additionally, studies show that copayment and coinsurance will also affect the number of drugs as they are modified by plans to contain costs. Results in an article by Gellad et al (2007) showed that plans that offered higher copayments and higher coinsurance also offered more drugs. When Part D plans were compared to plans offered prior to the enactment of Part D, results showed that the greater provision of drugs under Part D resulted in higher copayments.

After reviewing the literature several covariates were identified as factors expected to influence the number of drugs per therapeutic class: tier, copayment, coinsurance, enrollment, and premium. Tier was used as a control variable and defined as either tier 1 (preferred generic drugs) or tier 2 (preferred brand name drugs). Preferred drug refers to drugs selected for inclusion on a plan formulary because of their effectiveness and cost. To discourage use, non-preferred drugs are offered at higher co-pay and coinsurance rates meaning consumers must pay a substantial out-of-pocket amount if they want to purchase a non-preferred drug. For comparability, this research focuses on preferred drugs only (see Table 4-4). The preferred or non-preferred status of a drug is defined by its tier number. Tier 1 refers to preferred generic drugs and tier 2 refers to preferred brand name drugs. Tier was controlled for because it could increase the likelihood of including drugs within a certain therapeutic class. Specifically, plans

usually provide more tier 1 (generic drugs) as compared to tier 2 (brand name drugs) to curtail cost (Ku 2003; Gorman, Gorman, and Newell 2010).

Finally, variables were created to represent the top 15 therapeutic classes. The classes included: ADHD agents, analgesics, anti-cancer agents, antibacterials, anticonvulsants, antidepressants, antipsychotics, anxiolytics, arthritis agents, blood glucose regulators, blood products/ modifiers/volume expanders, cardiovascular agents, gastrointestinal agents, hormonal agents, and respiratory tract agents. Examination of the number of drugs included by each plan for each of these classes allows for a more in-depth look at drug coverage between Medicare Part D and the FEHBP plans. Table 4-5 lists the therapeutic classes and the drugs in each therapeutic class included in the analysis.

It should be noted that there are other variables that may affect the dependent variable, the number of drugs per therapeutic class. Although data was not available from both programs on variables such as sex, race, and employment status, these factors may explain differences in the formularies. For example, a study by Smetana and colleagues examined factors that influenced patient willingness to accept a medication change to a unified, restrictive formulary (Smetana, Davis, and Phillips 2004). The sample consisted of managed care plan members who had received a prescription for a non-formulary medication in the previous 4 months and whose primary care physician approved a conversion to a formulary medication. Results revealed that patient age (OR, 1.03; CI, 1.01 to 1.05) and male gender (OR, 2.00; CI, 1.09 to 3.67) were each significant correlates of conversion (Smetana, Davis, and Phillips 2004). Furthermore, formulary conversion reduced costs beginning 3 months after the

conversion date. In determining the number of drugs per therapeutic class one must consider that males may have a stronger preference for formulary drugs as compared to non-formulary drugs. Therefore, the number of drugs per therapeutic class may be greater for males. On the other hand, in a NCHS Data Brief it was noted that women were more likely to use prescription drugs than men. This may be the case, but one must consider whether women prefer formulary drugs more often or non-formulary drugs (Gu, Dillon, and Burt 2010).

Furthermore, race has been shown in many studies to have an effect on the kinds and number of drugs on formularies. White patients have the highest prescription drug use so one may speculate that white patients require a higher number of drugs per therapeutic class. Additionally, studies show that medication adherence is lower among other races. A recent longitudinal retrospective cohort study revealed that for the therapeutic class blood glucose agents, black patients were as likely as whites to initiate oral therapy and fill their first prescription, but experienced higher rates of medication discontinuation (HR: 1.8, 95% CI: 1.2, 2.7) and were less adherent over time (Trinacty, Adams, Soumerai, et al 2009). The authors concluded that racial differences in adherence to blood glucose agents persist even with equal access to medication. Therefore, if black and white patients have the same drugs listed on their formularies, black patients may still be less adherent to medication.

Employment is another factor that may affect the number of drugs per therapeutic class. The Medicare Part D program consists of mostly retired beneficiaries, while the FEHBP is mostly working age adults. Retired beneficiaries may have less of an ability to pay for non-formulary medications or higher cost sharing medications. Therefore,

retirees (i.e. Medicare Part D beneficiaries) may have more drugs on their formularies. Huskamp and colleagues examined the effect of three-tier formulary adoption on medication continuation and spending among elderly retirees (Huskamp, Deverka, Landrum, et al 2007). Data were derived from four retiree plans that moved from a two tier formulary to a three tier formulary meaning the number and cost of drugs changed for the formularies. Results revealed that there was only a small effect on medication continuation. A few of the retired patients had gaps in use and discontinued use (Huskamp, Deverka, Landrum, et al 2007). Retirement status of beneficiaries may impact the number of drugs per therapeutic class.

Research Questions

To compare Medicare Part D and the FEHBP, the following questions and hypotheses were addressed in regard to prescription drugs:

Research Question 1. How do Medicare Part D stand-alone plans compare to Federal Employees Health Benefits plans with respect to coverage of prescription drugs?

1A. Does the percent of the 266 drugs on the formulary differ between Medicare Part D and the FEHBP?

Ho1A: There is no difference in percentage of drugs on the formulary among FEHB prescription drug plans as compared to Medicare Part D plans.

1B. Does the percent of the 266 drugs on formulary differ by therapeutic class between Medicare Part D and the FEHBP?

Ho1B: There is no difference in percentage of drugs covered in the top therapeutic classes on the formulary among FEHB prescription drug plans as compared to Medicare Part D plans.

1C. For each of the 266 drugs, how does coverage differ between Medicare Part D and the FEHBP?

Ho1C: There is no difference in drug coverage among FEHB prescription drug plans as compared to Medicare Part D plans.

1D. For each of the 266 drugs that are covered by formulary, does percent brand differ between Medicare Part D and the FEHBP?

Ho1D: There is no difference in the percentage of brand name drugs on the formulary among FEHB prescription drug plans as compared to Medicare Part D plans.

1E. Does the number of the top 266 drugs on formulary differ between Medicare Part D and the FEHBP, after controlling for other factors affecting formulary coverage?

Ho1E: There is no difference in the number of the top 266 drugs on formulary among FEHB prescription drug plans as compared to Medicare Part D plans, after controlling for other factors affecting formulary coverage.

Research Question 2. How do Medicare Part D stand-alone plans compare to Federal Employees Health Benefits plans with respect to cost sharing on prescription drugs?

2A. Among plans with a copay, how does the percentage of plans with generic drugs differ between Medicare Part D and the FEHBP?

Ho2A: Among plans with a copay, there is no difference in the percentage of plans with generic drugs among FEHB prescription drug plans as compared to Medicare Part D plans.

2B. Among plans with a copay, does the percentage of plans with brand name drugs differ between Medicare Part D and the FEHBP?

Ho2B: Among plans with a copay, there is no difference in the percentage of plans with brand name drugs among FEHB prescription drug plans as compared to Medicare Part D plans.

2C. Among plans with a copay, does the mean copay differ between Medicare Part D and the FEHBP?

Ho2C: Among plans with a copay, there is no difference in mean copay among FEHB prescription drug plans as compared to Medicare Part D plans.

2D. Among plans with a coinsurance, does the percentage of plans with generic drugs differ between Medicare Part D and the FEHBP?

Ho2D: Among plans with a coinsurance, there is no difference in the percentage of plans with generic drugs among FEHB prescription drug plans as compared to Medicare Part D plans.

2E. Among plans with a coinsurance, does the percentage of plans with brand name drugs differ between Medicare Part D and the FEHBP?

Ho2E: Among plans with a coinsurance, there is no difference in the percentage of plans with brand named drugs among FEHB prescription drug plans as compared to Medicare Part D plans.

2F. Among plans with a coinsurance, does the mean coinsurance rate differ between Medicare Part D and the FEHBP?

Ho2F: Among plans with a coinsurance, there is no difference in mean coinsurance among FEHB prescription drug plans as compared to Medicare Part D plans.

Data Analysis

Descriptive Analysis

Data examination began with the benchmark list of 266 drugs previously identified. Each of the 24 formularies (i.e. Medicare Part D and the FEHBP) was compared to the list of 266 drugs. The average number and percentage of drugs included in the formulary were compared across plans. That is, formulary coverage was compared across plans by drug. Then, the percentage of drugs that were brand name and generic was compared between Medicare Part D and the FEHBP plans. Next, the percentage of drugs on the formulary was calculated within each therapeutic class and compared between Medicare Part D and the FEHBP prescription drug plans. Table 4-5 lists the therapeutic classes and all drugs used in the analysis. If there were less than three drugs in a therapeutic class that class was excluded from the analysis. This was necessary because an accurate comparison of Medicare Part D and the FEHBP could not be completed through the examination of a small number of drugs. For example, the therapeutic class anti-migraine agents included only one drug. Comparing Medicare Part D and the FEHBP based on coverage of one drug would not be an appropriate comparison. Frequencies, mean values, and standard deviations were used to describe the sample. For comparisons involving the number/percentage of drugs covered, generic/brand name status of drugs and therapeutic class the unit of observation was the drug. For the regression and cost sharing analyses, the unit of observation was the plan.

Independent Samples t-test

In addition to descriptive analyses, a bivariate method of analysis was utilized in which the independent variable x was a binary variable that defined the two groups

compared and the dependent variable *y* was quantitative. The data was entered into SPSS 17.0 and an independent samples t-test was utilized to determine whether there were statistically significant differences between Medicare Part D and the FEHBP prescription drug plans with respect to percent of drugs covered, percent brand/generic, therapeutic class, and copay.

The t-test was chosen because the data represented a sample of the larger population of prescription drug plans. As a result, it was not possible to determine the true standard deviation and calculate a z score. An assumption of the t-test is that the observations are normally distributed.

To examine the distribution of variables the data were plotted on a histogram and the mean and median were determined. The mean and the median were approximately equal revealing that the distribution of observations was symmetric. Furthermore, the skewness and kurtosis indicated that the data was normally distributed.

Another assumption of the t-test is that the variances of the populations to be compared are equal. The equality or non-equality of variances was determined for each independent samples t-test using the Levene Statistic for the Test of Homogeneity of Variances (NIST/SEMATECH e-Handbook of Statistical Methods, 2010). When the test statistic was non-significant ($p<.05$), equal variances was assumed. When the test statistic was significant ($p>.05$), the t-test was performed using a calculation that does not assume equal variances. The procedure for use of the independent samples t test was:

y = average percent of drugs covered (or percent brand/generic or therapeutic class or copay)

x = plan (i.e. 0 = FEHBP, 1 = Medicare Part D)

In this case, small sample inference was used for comparing means because of the small sample sizes used, that is, at least one of the samples ($n1$ or $n2$) was less than 20 (Agresti and Finlay 1997). It is assumed that the population distributions were normal. This approach is the same as for large samples sizes, but the normal distribution is substituted with the *t* distribution.

The confidence interval has the form of: $(\text{mean}Y2 - \text{mean}Y1) \pm t \sqrt{\frac{s1^2}{n1} + \frac{s2^2}{n2}}$

It was assumed that the two groups had the same variability. Values for σ were estimated by: $\sigma\text{hat} = \sqrt{\frac{\Sigma (Y1i - \text{mean}Y1)^2 + \Sigma (Y2i - \text{mean}Y2)^2}{n1 + n2 - 2}} = \sqrt{\frac{(n1 - 1)\, s1^2 + (n2 - 1)\, s2^2}{n1 + n2 - 2}}$

The term $\Sigma (Y1i - \text{mean}Y1)^2$ is the sum of squared distances of measurements in the first sample from their mean$Y1$, and the sum of squares $\Sigma (Y2i - \text{mean}Y2)^2$ refers to distances of measurements in the second sample from their mean. The estimate σ pools information from the two samples to provide a single estimate of variability. The degrees of freedom for this estimate equal $df = n1 + n2 - 2$. This equals the total number of observations ($n1 + n2$) minus the number of parameters estimated in order to calculate σhat. Using σhat to estimate σ1 and σ2, the estimated standard error of mean$Y2$ - mean$Y1$ simplifies to:

$$\sigma\text{hat}_{\text{mean}Y2 - \text{mean}Y1} = \sqrt{\frac{\sigma\text{hat}^2}{n1} + \frac{\sigma\text{hat}^2}{n2}} = \sqrt{\frac{1}{n1} + \frac{1}{n2}}$$

The confidence interval for $\mu 2 - \mu 1$ has the form $(\text{mean}Y2 - \text{mean}Y1) \pm t\, \sigma\text{hat}_{\text{mean}Y2 - \text{mean}Y1}$. The *t*-score comes from the *t* table with $df = n1 + n2 - 2$, for the desired

confidence level (Agresti and Finlay 1997).

Negative Binomial Regression

While results of this bivariate analysis provides a direct comparison of drug coverage between Medicare and the Federal Health Employees Benefit programs, the possibility remains that there are other variables that may affect the difference in means. To address this concern, a negative binomial regression analysis was performed. Analyses included a total of 16 regressions. The first regression was an overall model in which the dependent variable was number of drugs per therapeutic class and therapeutic class is a control variable. The next 15 regressions were separate models for each of the top 15 therapeutic classes in which the dependent variable was the number of drugs per therapeutic class. For example, ADHD agents represented therapeutic class 1 and analgesics represented therapeutic class 2. The independent variables represent factors that may affect the number of drugs per therapeutic class and included type of plan (i.e. FEHBP or Medicare Part D), premium, copayment, coinsurance, tier, enrollment, and therapeutic class.

Number of drugs per therapeutic class = f [Part D/FEHBP; Premium; Copay; Coinsurance; Tier; Enrollment; Therapeutic Class]

$$ND = \alpha_0 + \alpha_1 F + \alpha_2 P + \alpha_3 CP + \alpha_4 CI + \alpha_5 T + \alpha_6 E + \beta_1 CL_1 + \ldots + \beta_{15} CL_{15} + \pi_1 CL_1 * F + \ldots + \pi_{15} CL_{15} * F + \mu$$

where (ND) is the number of drugs per therapeutic class, (F) is the type of plan, (P) is the premium, (CP) is the copay, (CI) is the coinsurance, (T) is the tier, (E) is the enrollment, (CL) is the therapeutic class, (CL*F) is an interaction term and (μ) is the error term.

STATA version 11.0 and TSP version 5.0 software was used to perform the analysis (StataCorp 2009; TSP 2007). Negative binomial regression was chosen as an appropriate method because the dependent variable is a count of the number of incidents occurring in a given period of time. Traditional linear regression (OLS) assumes a normally distributed outcome variable with equal variances over the range of predictor variables, and may not be optimal for modeling count outcomes. Furthermore, when trying to estimate using OLS, the homoskedasticity assumption may be violated and results may provide negative predictions with biased coefficients (Wooldridge 2002). A negative binomial distribution assumes a mixture of Poisson variables which follow a gamma distribution. In this model the likelihood of observing Yi is:

$$f(yi) = \frac{\Gamma(1/\phi + yi)}{\Gamma(yi+1)\,\Gamma(1/\phi)} \cdot \left(\frac{1}{1+\phi\lambda i}\right)^{1/\phi} \cdot \left(1 - \frac{1}{1+\phi\lambda i}\right)^{yi}$$

Where Γ is the gamma function and λi is the same as a Poisson → $\lambda i = e^{\sum X\beta}$

This procedure uses a maximum likelihood estimation providing an odds measure, which shows the odds that a particular outcome will occur for each independent variable. Differences with p-value of less than .05 were considered statistically significant. Categorical variables included the type of plan (i.e. FEHBP or Medicare Part D) and tier. Continuous variables included the number of drugs covered in a therapeutic class, plan premium, plan enrollment, therapeutic class, copay and coinsurance.

As noted previously, results of this research may conclude in three ways. It may be shown that more regulation is associated with a less competitive market. In that case, FEHB prescription drug plans would be expected to provide broader drug coverage as compared to Medicare Part D plans. On the other hand, results may show

that Medicare Part D plans provide broader drug coverage as compared to the FEHB prescription drug plans because of regulation that addresses market failures. Lastly, results may show that there is no difference in prescription drug coverage offered between the two programs.

Table 4-1. Medicare Part D Plans Selected for Analysis

Formulary Name	Total Enrollment (as of Jan 2009)	Percent of Total Enrollment*	Cumulative Percent	Number of Plans per Formulary
AARP MedicareRx Preferred	2,716,518	15.6	15.6	31
Advantage Star Plan by RxAmerica	299,956	1.6	17.2	9
Blue Medicare Rx	285,869	1.6	18.8	7
BlueRx	99,729	0.6	19.4	3
BravoRx	82,585	0.5	19.9	3
CIGNA Medicare Rx Plan One	134,285	0.8	20.7	5
Community CCRx Basic	1,041,610	6.2	26.9	26
First Health Part D-Premier	277,085	1.6	28.5	8
Health Net Orange	343,495	1.9	30.4	7
HealthSpring Prescription Drug Plan	171,719	0.9	31.3	5
Humana PDP Enhanced or Complete	1,432,200	8.2	39.5	30
Humana PDP Standard	1,445,988	8.1	47.6	27
Medco Medicare Prescription Plan	211,477	1.2	48.8	2
MedicareBlue Rx Option 3	298,839	1.7	50.5	3
Prescription Pathway Bronze Plan	314,664	1.7	52.2	12
SilverScript Value	353,491	2.1	54.3	12
AARP MedicareRx Saver or UnitedHealth Rx Basic	831,943	4.9	59.2	20
WellCare Classic or Signature	476,022	2.6	61.8	20
WellCare Classic or Signature	200,462	1.2	63	2

*Total enrollment across all plans was 17,313,409

Table 4-2. FEHBP Prescription Drug Plans Selected for Analysis

Plan Name	Total Enrollment (as of 2009)	Percent of Total Enrollment*	Cumulative Percent
Blue Cross and Blue Shield Standard Service Benefit Plan	2,020,621	50.2	50.2
Blue Cross and Blue Shield Basic Service Benefit Plan	391,541	9.7	59.9
GEHA Benefit Plan	215,833	5.4	65.3
NALC Health Benefit Plan	95,481	2.4	67.7
American Postal Workers Union Health Plan (CDHP)	81,626	2.0	69.7

*Total enrollment across all plans was 4,026,575

Table 4-3. Datasets 1, 2, and 3 - Definition of Study Variables

Variable	Definition	Label in Dataset	Variable Type	Unit of Observation
Dataset 1				
Drug Name	Refers to an owned, proprietary, brand or generic drug.	DN	Alphabetic	Drug
Generic Name	A generic drug is a prescription drug that has the same active-ingredient formula as a brand name drug. An active ingredient is any component that provides pharmacological activity or other direct effect in the diagnosis, cure, mitigation, treatment, or prevention of disease, or to affect the structure or any function of the body of man or animals.	GN	Alphabetic	Drug
Drug Type	A brand name drug has a trade name and is protected by a patent (i.e. can be produced and sold only by the company holding the patent); A generic drug is a prescription drug that has the same active-ingredient formula as a brand name drug. This variable indicates whether a drug is brand or generic.	Br	0=Generic, 1=Brand	Drug

Table 4-3. Continued

Variable	Definition	Label in Dataset	Variable Type	Unit of Observation
Therapeutic Class	Groups of drugs that are similar in chemistry, method of action, and purpose of use	CL	Alphabetic	Drug
Formulary name	A formulary is the list of prescription drugs covered (paid for) by a given health plan. This variable indicates whether or not a particular drug is in the formulary for a given plan.	Form	0=No, 1=Yes	Drug
Dataset 2				
Plan Name	Used as an identifier and refers to the name of the plan	PN	Alphabetic	Plan
Type of Plan	This variable indicates whether a plan is either a Medicare Part D plan or a Federal Employees Health Benefits Plan.	TP	0=FEHBP, 1=Med Part D	Plan
Premium	The amount a beneficiary pays each month for their health plan coverage. This amount varies depending on the health plan or drug formulary.	P	Continuous	Plan
Enrollment	Refers to the number of enrolled individuals in a prescription drug plan.	E	Continuous	Plan
Copayment	A copayment is a fixed amount of money paid by a beneficiary when receiving covered services (e.g. prescriptions).	CP	Continuous	Plan
Coinsurance	In health insurance, the insured person and the insurer share the covered procedures under a policy in a specified ratio. For example, the insurer may pay 80% of a drug's cost and the insured must pay the remaining 20%.	CI	Continuous	Plan
Tier	A tier indicates the level of copayment for a given drug. Plans have multiple tiers, and the copayment/coinsurance amount depends on the tier level.	T	1=First Tier, 2=Second Tier	Plan

Table 4-3. Continued

Variable	Definition	Label in Dataset	Variable Type	Unit of Observation
Top 15 Therapeutic Class Names	Refers to the number of drugs per therapeutic class (i.e. ADHD agents, analgesics, anti-cancer agents, antibacterials, anticonvulsants, antidepressants, antipsychotics, anxiolytics, arthritis agents, blood glucose regulators, blood products/ modifiers/volume expanders, cardiovascular agents, gastrointestinal agents, hormonal agents, and respiratory tract agents).	ND	Continuous	Plan
Dataset 3				
Plan Name	Used as an identifier and refers to the name of the plan	PN	Alphabetic	Plan
Tier	A tier indicates the level of copayment for a given drug. Plans have multiple tiers, and the copayment/coinsurance amount depends on the tier level.	T	1=First Tier, 2=Second Tier	Plan
Cost Type	Refers to the type of cost sharing applied for drug coverage	CT	1=Copay, 2=Coinsurance	Plan
Cost Amount	This number represents either a copay dollar value or a coinsurance percentage. A copayment is a fixed amount of money paid by a beneficiary when receiving covered services (e.g. prescriptions). Coinsurance is a percentage the insured person and the insurer share to cover the cost of drugs.	CA	Continuous	Plan

Table 4-4. Datasets Tier Comparison: Medicare Part D and the FEHBP

Plan	Tier 1	Tier 2	Tier 3	Tier 4
All Medicare Part D Plans	Generic drugs	Preferred brand-name drugs	Non-preferred Brands and Generics	Tier 4=Specialty Drugs "Specialty Drugs" means those covered drugs that typically cost $500 or more per dose or $6,000 or more per year and have one or more of the following characteristics: (1) complex therapy for complex disease (2)specialized patient training and coordination of care (services, supplies, or devices) required prior to therapy initiation and/or during therapy; (3) unique patient compliance and safety monitoring requirements; (4)unique requirements for handling, shipping and storage; and (5) potential for significant waste due to the high cost of the drug
FEHBP BCBS Basic Formulary-Self Only Non Postal	Generic drugs	Preferred brand-name drugs	Non-formulary or non-preferred brand-name drug	N/A
FEHBP BCBS Basic Formulary-Self+Family Non Postal	Generic drugs	Preferred brand-name drugs	Non-formulary or non-preferred brand-name drug	N/A
FEHBP BCBS Standard Formulary-Self Only Non Postal	Generic drugs	Preferred brand-name drugs	Non-formulary or non-preferred brand-name drug	N/A

Table 4-4. Continued

Plan	Tier 1	Tier 2	Tier 3	Tier 4
FEHBP BCBS Standard Formulary-Self+Family Non Postal	Generic drugs	Preferred brand-name drugs	Non-formulary or non-preferred brand-name drug	N/A
FEHBP American Postal Workers Union Health Plan Formulary (CDHP)-Self Only-Non Postal	Generic drugs	Preferred brand-name drugs (all drugs are covered)	N/A	N/A
FEHBP American Postal Workers Union Health Plan Formulary (CDHP)-Self+Family-Non Postal	Generic drugs	Preferred brand-name drugs (all drugs are covered)	N/A	N/A
NALC Health Benefit Plan-Self Only-Non Postal	Generic drugs	Preferred brand-name drugs (all drugs are covered)	N/A	N/A
NALC Health Benefit Plan Self+Family-Non Postal	Generic drugs	Preferred brand-name drugs (all drugs are covered)	N/A	N/A
FEHBP GEHA Benefit Plan Formulary Standard-Self Only-Non Postal	Generic drugs	Preferred brand-name drugs	N/A	N/A

Table 4-4. Continued

Plan	Tier 1	Tier 2	Tier 3	Tier 4
FEHBP GEHA Benefit Plan Formulary Standard-Self+Family -Non Postal	Generic drugs	Preferred brand-name drugs	N/A	N/A
FEHBP GEHA Benefit Plan Formulary High Option-Self Only-Non Postal	Generic drugs	Single-source preferred brand-name drugs (Single-source brand-name drugs are available from only one manufacturer and are patent protected. No generic equivalent is available)	Multi-source brand (Multi-source brand-name drugs are available from more than one manufacturer and have at least one generic equivalent alternative available)	N/A
FEHBP GEHA Benefit Plan Formulary High Option-Self +Family Non Postal	Generic drugs	Single-source preferred brand-name drugs	Multi-source brand	N/A

Table 4-5. Top Therapeutic Classes and List of All Drugs

Drug Name	Therapeutic Class
Concerta	ADHD Agents
Focalin XR	ADHD Agents
Strattera	ADHD Agents
Vyvanse	ADHD Agents
Adderall XR	ADHD Agents
Acetaminophen and codeine	Analgesics
Fentanyl	Analgesics
Hydrocodone/Acetaminophen	Analgesics
Lidoderm	Analgesics
Naproxen	Analgesics
Oxycontin	Analgesics
Oxycodone and Acetaminophen	Analgesics
Oxycodone hydrochloride ER	Analgesics
Propoxyphene napsylate and acetaminophen	Analgesics
Suboxone	Analgesics
Tramadol hydrochloride	Analgesics
Celebrex	Analgesics
Ibuprofen	Analgesics
Abraxane	Anti Cancer Agents
Aldara	Anti Cancer Agents
Alimta	Anti Cancer Agents
Allopurinol	Anti Cancer Agents
Aloxi	Anti Cancer Agents
Arimidex	Anti Cancer Agents
Avastin	Anti Cancer Agents
Casodex	Anti Cancer Agents
Eloxatin	Anti Cancer Agents
Erbitux	Anti Cancer Agents
Femara	Anti Cancer Agents
Gemzar	Anti Cancer Agents
Herceptin	Anti Cancer Agents
Neulasta	Anti Cancer Agents
Neupogen	Anti Cancer Agents
Pegasys convenience pack	Anti Cancer Agents
Rituxan	Anti Cancer Agents
Sandostatin LAR	Anti Cancer Agents
Tarceva	Anti Cancer Agents
Taxotere	Anti Cancer Agents
Temodar	Anti Cancer Agents
Thalomid	Anti Cancer Agents
Velcade	Anti Cancer Agents

Table 4-5. Continued

Drug Name	Therapeutic Class
Xeloda	Anti Cancer Agents
Zometa	Anti Cancer Agents
Amoxicillin	Antibacterials
Amoxicillin TR and clavulanate potassium	Antibacterials
Avelox	Antibacterials
Azithromycin	Antibacterials
Cephalexin	Antibacterials
Ciprofloxacin hydrochloride	Antibacterials
Cubicin	Antibacterials
Doxycycline hyclate	Antibacterials
Fluconazole	Antibacterials
Levaquin	Antibacterials
Penicillin VK	Antibacterials
Solodyn	Antibacterials
Sulfamethoxazole and trimethoprim	Antibacterials
Synagis	Antibacterials
Zosyn	Antibacterials
Zyvox	Antibacterials
Depakote	Anticonvulsants
Depakote ER	Anticonvulsants
Gabapentin	Anticonvulsants
Keppra	Anticonvulsants
Lamictal	Anticonvulsants
Lamotrigine	Anticonvulsants
Lyrica	Anticonvulsants
Topamax	Anticonvulsants
Aricept	Antidementia Agents
Exelon	Antidementia Agents
Namenda	Antidementia Agents
Amitriptyline hydrochloride	Antidepressant Agents
Budeprion XL	Antidepressant Agents
Citalopram hydrobromide	Antidepressant Agents
Cymbalta	Antidepressant Agents
Effexor XR	Antidepressant Agents
Fluoxetine hydrochloride	Antidepressant Agents
Lexapro	Antidepressant Agents
Paroxetine hydrochloride	Antidepressant Agents
Sertraline hydrochloride	Antidepressant Agents
Trazodone hydrochloride	Antidepressant Agents
Geodon	Antipsychotic Agents
Invega	Antipsychotic Agents

Table 4-5. Continued

Drug Name	Therapeutic Class
Risperdal	Antipsychotic Agents
Risperdal consta	Antipsychotic Agents
Risperidone	Antipsychotic Agents
Seroquel	Antipsychotic Agents
Zyprexa	Antipsychotic Agents
Zyprexa Zydis	Antipsychotic Agents
Abilify	Antipsychotic Agents
Atripla	Antiretroviral/Antiviral Agents
Combivir	Antiretroviral/Antiviral Agents
Epzicom	Antiretroviral/Antiviral Agents
Kaletra	Antiretroviral/Antiviral Agents
Norvir	Antiretroviral/Antiviral Agents
Reyataz	Antiretroviral/Antiviral Agents
Tamiflu	Antiretroviral/Antiviral Agents
Truvada	Antiretroviral/Antiviral Agents
Valtrex	Antiretroviral/Antiviral Agents
Viread	Antiretroviral/Antiviral Agents
Alprazolam	Anxiolytics
Clonazepam	Anxiolytics
Diazepam	Anxiolytics
Lorazepam	Anxiolytics
Enbrel	Arthritis Agents
Humira	Arthritis Agents
Meloxicam	Arthritis Agents
Orencia	Arthritis Agents
Remicade	Arthritis Agents
ACTOplus met	Blood Glucose Regulators
Actos	Blood Glucose Regulators
Avandia	Blood Glucose Regulators
Byetta	Blood Glucose Regulators
Gleevec	Blood Glucose Regulators
Glyburide	Blood Glucose Regulators
Humalog	Blood Glucose Regulators
Janumet	Blood Glucose Regulators
Januvia	Blood Glucose Regulators
Lantus	Blood Glucose Regulators
Lantus Solostar	Blood Glucose Regulators
Levemir	Blood Glucose Regulators
Metformin hydrochloride	Blood Glucose Regulators
NovoLog	Blood Glucose Regulators
NovoLog FlexPen	Blood Glucose Regulators

Table 4-5. Continued

Drug Name	Therapeutic Class
Aggrenox	Blood Products/Modifiers/Volume Expanders
Angiomax	Blood Products/Modifiers/Volume Expanders
Aranesp	Blood Products/Modifiers/Volume Expanders
Carimune NF	Blood Products/Modifiers/Volume Expanders
Epogen	Blood Products/Modifiers/Volume Expanders
Gammagard Liquid	Blood Products/Modifiers/Volume Expanders
Gamunex	Blood Products/Modifiers/Volume Expanders
Lovenox	Blood Products/Modifiers/Volume Expanders
Plavix	Blood Products/Modifiers/Volume Expanders
Procrit	Blood Products/Modifiers/Volume Expanders
Venofer	Blood Products/Modifiers/Volume Expanders
Warfarin sodium	Blood Products/Modifiers/Volume Expanders
Amlodipine besylate	Cardiovascular Agents
Amlodipine besylate and benazepril	Cardiovascular Agents
Atenolol	Cardiovascular Agents
Avalide	Cardiovascular Agents
Avapro	Cardiovascular Agents
Benicar	Cardiovascular Agents
Benicar HCT	Cardiovascular Agents
Caduet	Cardiovascular Agents
Cartia XT	Cardiovascular Agents
Catapres TTS	Cardiovascular Agents
Clonidine	Cardiovascular Agents
Coreg CR	Cardiovascular Agents
Cozaar	Cardiovascular Agents
Crestor	Cardiovascular Agents
Digoxin	Cardiovascular Agents
Diovan	Cardiovascular Agents
Diovan HCT	Cardiovascular Agents
Enalapril maleate	Cardiovascular Agents
Furosemide	Cardiovascular Agents

Table 4-5. Continued

Drug Name	Therapeutic Class
Hydrochlorthiazide	Cardiovascular Agents
Hyzaar	Cardiovascular Agents
Intergrilin	Cardiovascular Agents
Isosorbide mononitrate	Cardiovascular Agents
Klor-Con M20	Cardiovascular Agents
Lipitor	Cardiovascular Agents
Lisinopril	Cardiovascular Agents
Lisinopril and hydrochlorthiazide	Cardiovascular Agents
Lotrel	Cardiovascular Agents
Lovaza	Cardiovascular Agents
Metoprolol succinate	Cardiovascular Agents
Metoprolol tartrate	Cardiovascular Agents
Niaspan	Cardiovascular Agents
Potassium chloride	Cardiovascular Agents
Pravastatin sodium	Cardiovascular Agents
Ramipril	Cardiovascular Agents
Simvastatin	Cardiovascular Agents
Toprol-XL	Cardiovascular Agents
Triamterene and hydrochlorizide	Cardiovascular Agents
Tricor	Cardiovascular Agents
Verapamil SR	Cardiovascular Agents
Vytorin	Cardiovascular Agents
Zetia	Cardiovascular Agents
Aciphex	Gastointestinal Agents
Asacol	Gastointestinal Agents
Nexium	Gastointestinal Agents
Omeprazole	Gastointestinal Agents
Pantoprazole sodium	Gastointestinal Agents
Prevacid	Gastointestinal Agents
Prevacid Solutab	Gastointestinal Agents
Protonix	Gastointestinal Agents
Ranitidine hydrochloride	Gastointestinal Agents
Androgel 1%	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)

Table 4-5. Continued

Drug Name	Therapeutic Class
Avodart	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)
Levothyroxine sodium	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)
Levoxyl	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)
Mirena	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)
NuvaRing	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)
Ortho Tri-Cyclen Lo	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)
Prednisone	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)

Table 4-5. Continued

Drug Name	Therapeutic Class
Premarin	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)
Sensipar	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)
Synthroid	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)
Trinessa-28	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)
Yasmin 28	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)
Yaz-28	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)
Zemplar	Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)
Actonel	Metabolic Bone Disease Agents
Alendronate sodium	Metabolic Bone Disease Agents

Table 4-5. Continued

Drug Name	Therapeutic Class
Boniva	Metabolic Bone Disease Agents
Evista	Metabolic Bone Disease Agents
Forteo	Metabolic Bone Disease Agents
Fosamax	Metabolic Bone Disease Agents
Fosamax Plus D	Metabolic Bone Disease Agents
Avonex	Multiple Sclerosis Agents
Betaseron	Multiple Sclerosis Agents
Copaxone	Multiple Sclerosis Agents
Rebif	Multiple Sclerosis Agents
Carisoprodol	Muscle Relaxants
Cyclobenzaprine hydrochloride	Muscle Relaxants
Skelaxin	Muscle Relaxants
Cosopt	Ophthalmic Agents
Lucentis	Ophthalmic Agents
Lumigan	Ophthalmic Agents
Restasis	Ophthalmic Agents
Xalatan	Ophthalmic Agents
Advair Diskus	Respiratory Tract Agents
Albuterol	Respiratory Tract Agents
Allegra-D 12-Hour	Respiratory Tract Agents
Astelin	Respiratory Tract Agents
Clarinex	Respiratory Tract Agents
Combivent	Respiratory Tract Agents
Fexofenadine hydrochloride	Respiratory Tract Agents
Flomax	Respiratory Tract Agents
Flovent HFA	Respiratory Tract Agents
Fluticasone propionate	Respiratory Tract Agents
Nasacort AQ	Respiratory Tract Agents
Nasonex	Respiratory Tract Agents
ProAir HFA	Respiratory Tract Agents
Promethazine hydrochloride	Respiratory Tract Agents
Proventil HFA	Respiratory Tract Agents
Pulmicort respules	Respiratory Tract Agents
Singulair	Respiratory Tract Agents
Spiriva HandiHaler	Respiratory Tract Agents
Symbicort	Respiratory Tract Agents
Xolair	Respiratory Tract Agents
Xopenex	Respiratory Tract Agents
Ambien CR	Sedatives/Hypnotics
Lunesta	Sedatives/Hypnotics
Zolpidem tartrate	Sedatives/Hypnotics

Table 4-5. Continued

Drug Name	Therapeutic Class
Gardasil	Vaccines
Prevnar	Vaccines
RotaTeq	Vaccines
Varivax	Vaccines
Zostavax	Vaccines

CHAPTER 5
RESULTS

This dissertation compares Medicare Part D and the Federal Employee Health Benefits plans with respect to prescription drug coverage. This chapter is divided into three sections. The first section describes the results of the examination of formulary coverage among plans. The second section provides results of the regression analysis, which examined the relationship between type of plan and the number of drugs per therapeutic class, holding constant therapeutic class, premium, copayment, coinsurance, tier, and enrollment. Lastly, section three describes results of the analysis on cost sharing.

Tables 5-1 and 5-2 give a brief description of the data. It is important to emphasize that, while in the Federal Employees Health Benefits Program each formulary is associated with only one plan, such is not the case for Medicare Part D. As shown in Table 5-1, nineteen Medicare Part D formularies and five Federal Employees Health Benefits Program prescription drug formularies/plans were examined, resulting in a total of 24 formularies. However, there were multiple Medicare Part D plans with the same formulary. For example, the formulary AARP MedicareRx Preferred was utilized by 31 Medicare Part D plans (Table 5-2). Overall, the 19 Medicare Part D formularies identified in this analysis were used by a total of 232 plans.

The formulary for each plan was compared to the list of 266 top drugs dispensed and sold in the United States. Of the 266 top drugs utilized in the U.S., 197 were brand-name drugs and 69 were generic drugs. The 266 drugs were categorized into 23 therapeutic classes for further inquiry.

Formulary Coverage

The first research question was (1) How do Medicare Part D stand-alone plans compare to Federal Employees Health Benefits plans with respect to coverage of prescription drugs? To answer this question, first the number and percentage of the top 266 drugs dispensed and sold in the U.S. was calculated for each formulary. The results of the analysis are reported in Table 5-3.

Results revealed, that for the AARP MedicareRx Preferred Prescription Drug formulary, which represents the Medicare Part D formulary with the highest enrollment, 249 out of 266 (94%) top drugs were covered, while for the Blue Cross and Blue Shield Standard Service Benefit Plan (the FEHBP formulary with the highest enrollment) 252 out of 266 (95%) drugs were on the formulary. On the other hand, for those formularies representing the least amount of enrollees (about 80,000 beneficiaries each), Medicare Part D's Bravo Rx formulary and the FEHBP's American Postal Workers Union formulary, the percentage of drugs covered was 80% and 99%, respectively.

Overall, for the 19 Medicare Part D formularies analyzed, formulary coverage of the top drugs dispensed and sold in the United States ranged from 72-94%, while the range was 85-99% for the 5 FEHBP formularies examined. On average, Medicare Part D plans covered 84% of the top drugs dispensed and sold in the United States compared to FEHBP plans which covered about 94% on average.

To determine whether these differences were statistically significant an independent samples t-test was performed. Results revealed that there was a statistically significant difference in drug coverage for the FEHBP prescription drug plans as compared to Medicare Part D plans. As shown in Table 5-4, the FEHBP prescription drug plans yielded a higher average percentage of covered drugs as

compared to Medicare Part D plans ($p<.01$). Considering these independent t test results one may conclude that the FEHBP prescription drug plans provided broader coverage of top drugs dispensed and sold in the United States as compared to Medicare Part D plans, but, as reported later, further analysis using regression methods yielded different results.

Examination by therapeutic class is shown in Table 5-5. These are the therapeutic classes associated with the top 266 drugs sold and dispensed in the United States. For the 23 therapeutic classes examined, the number of drugs in the therapeutic class ranged from three to forty-two drugs. The top three therapeutic classes in regard to top drugs sold and dispensed in the U.S. were cardiovascular agents (42 of 266 top drugs), anti-cancer agents (25 of 266 top drugs), and respiratory tract agents (21 of 266 top drugs).

The average percentage of drugs covered per therapeutic class ranged from 0 to 100% for Medicare Part D formularies and from 52 to 100% for the FEHBP formularies. The therapeutic class anxiolytics showed the greatest difference in drug coverage between formularies; among Medicare Part D formularies, none of the drugs were covered in this class, while the FEHBP formularies covered on average 95%. In contrast, for some therapeutic classes the average percentage of drugs covered was the same for Medicare Part D and the FEHBP. For example, drugs in the therapeutic class anticonvulsants and antiretroviral/antiviral agents were completely covered by both Medicare Part D plans and the FEHBP plans. Of the 23 therapeutic classes analyzed, both Medicare Part D plans and the FEHBP plans covered at least one drug in each class with the exception of the class anxiolytics.

Analyses using the independent samples t-test revealed that there were statistically significant differences in drug coverage for the following 12 of the 23 therapeutic classes: ADHD agents, anxiolytics, arthritis agents, blood glucose agents, blood products/modifiers/volume expanders, cardiovascular agents, gastrointestinal agents, hormonal agents, metabolic bone disease agents, multiple sclerosis agents, ophthalmic agents, and respiratory tract agents (Table 5-5). Specifically, in all these therapeutic classes the FEHBP was shown to provide broader drug coverage ($p<.05$).

For example, Medicare Part D formularies on average covered 87% of drugs in the class cardiovascular agents as compared to the FEHBP formularies, which on average covered 97% ($p<.01$). Furthermore, on average 95% blood glucose regulators were covered on Part D formularies, while on average 100% were covered by the FEHBP formularies ($p<.01$).

To further examine formulary coverage Medicare Part D and the Federal Employee Health Benefits programs were compared drug by drug. Table 5-6 shows the top 266 drugs dispensed and sold in the U.S. and the mean percentage of formularies covering each drug. Of the 266 drugs that were examined, 149 were covered by all Medicare Part D formularies compared to 211 covered by all the FEHBP formularies. The mean percentage comparison between formularies varied drug by drug. For example, the mean percentage of Medicare Part D formularies covering the drug Lipitor, a cardiovascular agent, was 79% compared to a mean percentage of 100% for FEHBP formularies. On the other hand, the mean percentage of Medicare Part D formularies covering the drug Zostavax, a vaccine, was 100% compared to a mean percentage of 40% for FEHBP formularies. Drug coverage within classes also varied. For Medicare

Part D formularies in the therapeutic class Smoking Cessation Agents, coverage was 79% for Chantix and 95% for Wellbutrin XL compared to the FEHBP formularies which provided coverage of 100% for Chantix and 80% for Wellbutrin XL.

Tables 7 - 9 examine how drug coverage differed by brand versus generic status. There were two types of comparisons: (1) within formulary: distribution of total drugs covered between brand and generic; and (2) as % of total brand and total generic among top drugs. For example, Table 5-7 shows that the first Medicare Part D formulary, AARP Medicare Rx, covered a total of 249 of the top drugs—63 (25%) being generic and 186 (75%) being brand. Moreover, AARP Medicare Rx covered 63 of the total 69 generic drugs (91%) and 186 of the total 197 brand drugs (94%).

Focusing first on the distribution of total drugs between generic and brand, for the Medicare Part D formularies, the number of generic drugs covered ranged from 60 to 63 compared to 67 to 68 for the FEHBP formularies, but when calculated as a percentage of total drugs in the formulary, generic drug coverage was about the same for Medicare Part D (25-32%) and the FEHBP (25-30%). Similarly, for brand name drugs, Medicare Part D formularies covered 134 to 185 (68-75%), while the FEHBP formularies covered 159 to 197 (70-75%). Further analysis using the independent samples t-test showed that study groups did not significantly differ with respect to coverage of generic and brand name drugs as a percent of total drugs covered (Table 5-8).

For the second comparison, the data was analyzed in an alternative way to shed additional light on differences in generic and brand name status of drug coverage. Independent samples t- tests were performed to compare generic drug coverage among generic drugs only and to compare brand name drug coverage among brand name

drugs only. As noted above, for the Medicare Part D formulary AARP MedicareRx Preferred, 63 generic drugs were covered out of a possible 69 generic drugs and 186 brand drugs were covered out of a possible 197 brand drugs (Table 5-7). Results of this analysis revealed statistically significant differences between Medicare Part D and the FEHBP formularies ($p<.05$). On average, the FEHBP plans covered about 98% of all generic drugs (among generic drugs only) versus about 90% for Medicare Part D plans (Table 5-9). Similarly, a significant difference was shown for the 197 brand name drugs that were listed. Medicare Part D plans covered on average 82% brand name drugs (among brand name drugs only) as compared to the FEHBP plans that covered on average 93% ($p<.05$).

To determine whether there were other variables that may have affected the difference in means between the number of drugs on the Medicare Part D and the FEHBP formularies a negative binomial regression analysis was performed. The first regression was an overall model in which the dependent variable was number of drugs per therapeutic class (results are shown in Table 5-10). In addition, fifteen regression models were conducted in which the number of drugs in a given therapeutic class was the dependent variable (results are shown in Tables 5-11 through 5-25). For example, ADHD agents represented therapeutic class 1 and analgesics represented therapeutic class 2, etc. The independent variables included type of plan (i.e. FEHBP or Medicare Part D), premium, copayment, coinsurance, tier, enrollment, and therapeutic class. The regression equation was:

$$ND = \alpha_0 + \alpha_1 F + \alpha_2 P + \alpha_3 CP + \alpha_4 CI + \alpha_5 T + \alpha_6 E + \beta_1 CL_1 + \ldots + \beta_{15} CL_{15} + \pi_1 CL_1 * F + \ldots + \pi_{15} CL_{15} * F + \mu$$

where (ND) was the number of drugs per therapeutic class, (F) was the type of plan, (P) was the premium, (CP) was the copay, (CI) was the coinsurance, (T) was the tier, (E) was the enrollment, (CL) was the therapeutic class, (CL*F) was an interaction term and (μ) was the error term.

Table 5-10 shows the results of the negative binomial regressions for the overall model. It should be noted that coefficients in a negative binomial regression must be adjusted for interpretation. The coefficients represented by Beta (β) were interpreted as the difference between the log of expected counts. Consider $\beta = \log(\mu_{x0+1}) - \log(\mu_{x0})$, where β is the regression coefficient, μ is the expected count and the subscripts represent where x, the predictor variable, is evaluated at x_0 and x_0+1 (UCLA Academic Technology Services 2010). The difference of two logs is equal to the log of their quotient, $\log(\mu_{x0+1}) - \log(\mu_{x0}) = \log(\mu_{x0+1} / \mu_{x0})$, meaning, the parameter estimate is the log of the 'ratio' of expected counts (UCLA Academic Technology Services 2010). Incidence rates are shown as the irr values in tables 5-10-5-25.

Type of plan was positively associated with the number of drugs per therapeutic class while tier was negatively associated. Specifically, Medicare Part D plans provided a greater number of drugs per therapeutic class as compared to the FEHBP plans, holding other factors constant. However, the significant interaction terms for all classes except for the class anxiolytics, showed that, on average, the number of drugs for those therapeutic classes was greater for the FEHBP plans as compared to Medicare Part D plans. For example, for the class analgesics the interaction term indicates that, on average, the number of drugs is expected to have a rate .695 times greater for the FEHBP plans as compared to Medicare Part D plans (in reference to the class ADHD

agents). Similarly, for the class gastrointestinal agents the interaction terms indicates that, on average, the number of drugs is expected to have a rate .678 times greater for the FEHBP plans (see Table 5-10).

Thus, in the overall model Medicare Part D plans provided broader coverage, while the interaction of type of plan and therapeutic class showed that the FEHBP plans provided broader coverage. The explanation for this seeming contradiction lies in the difference between main and interaction effects. A main effect in the model shows whether there is an overall effect of a variable, after accounting for other variables in the model. An interaction term is added with the understanding that the coefficients of the lower order terms are conditional effects instead of main effects. In other words, the effect of one predictor is conditional on the value of the other (Grace-Martin 2009). The coefficient of the lower order term is the effect only when the other term in the interaction equals 0 (Grace-Martin 2009). A significant interaction term means that the effect of one predictor variable on the dependent variable is different at different values of the other predictor variable (Grace-Martin 2000). Adding an interaction term results in the multiplication of the two predictor variables, which changes the interpretation of all coefficients (Grace-Martin 2000). For example, consider the equation derived from results shown in Table 5-10:

$$ND = \alpha_0 + \alpha_1 F + \alpha_2 P + \alpha_3 CP + \alpha_4 CI + \alpha_5 T + \alpha_6 E + \beta_1 CL_1 + \ldots + \beta_{15} CL_{15} + \pi_1 CL_1 * F + \ldots + \pi_{15} CL_{15} * F + \mu$$

If there were no interaction term, α1 would be interpreted as the unique effect of type of plan on the number of drugs per therapeutic class. Since the interaction indicates that the effect of type of plan on the number of drugs per therapeutic class is

different for different values of therapeutic class, the unique effect of type of plan on the number of drugs per therapeutic class is not limited to α1, but also depends on the values of π1 and therapeutic class (Grace-Martin 2000). The unique effect of type of plan is represented by everything that is multiplied by type of plan in the model: α1 + π1*therapeutic class. α1 can now be interpreted as the unique effect of type of plan on the number of drugs per therapeutic class only when therapeutic class = 0.

Because of the interaction, the predicted number of drugs varies depending on the therapeutic class. Another way of saying this is that the slopes of the regression lines between type of plan and the number of drugs per therapeutic class are different for the different categories of therapeutic class (Grace-Martin 2000). π1 indicates how different those slopes are.

Interpreting β1 is more difficult (Grace-Martin 2000). β1 is the effect of therapeutic class when type of plan = 0. The effect of therapeutic class is β1 + π1*type of plan, which is different at each of the two values of type of plan. For that reason, the best way to explore the effect of therapeutic class is to plug various values of type of plan into the equation to see how the number of drugs per therapeutic class, the dependent variable, changes. Consider, for example in Table 5-10, the therapeutic class analgesics and the associated irr coefficients. If we write the equation for the FEHBP's coverage of the therapeutic class analgesics, we find:

$$ND = \alpha_0 + \alpha_1 F + \alpha_2 P + \alpha_3 CP + \alpha_4 CI + \alpha_5 T + \alpha_6 E + \beta_1 CL_1 + \pi_1 CL_1 * F + \mu$$

where (ND) is the number of drugs per therapeutic class, (F) is the type of plan, (P) is the premium, (CP) is the copay, (CI) is the coinsurance, (T) is the tier, (E) is the

enrollment, (CL) is the therapeutic class, (CL*F) is an interaction term and (μ) is the error term.

In reference to the irr values found in Table 5-10, we would write the equation as:

ND= 1.20 + 1.40*type of plan + .99 *premium + 1.00*copay + .93*coinsurance + .98*tier + 1.02*enrollment + 3.10*therapeutic class analgesics + .70* type of plan * therapeutic class analgesics

The irr or incidence rate ratio of [1.40*type of plan + .70* type of plan*therapeutic class analgesics] represents the effect of type of plan on the number of drugs per therapeutic class (Grace-Martin 2000). For the interaction of therapeutic class analgesics and type of plan, FEHBP type of plan = 0 and therapeutic class analgesics = 1, so the effect of type of plan is 1.40*0 + .70*0*1 = 0. So for therapeutic class analgesics, FEHBP plans as compared to Medicare Part D plans would be expected to provide the same rate for drugs.

The fact that all interaction terms in this model were statistically significant (except class anxiolytics) supports the non-significant findings for the classes in the 15 separate regressions. Specifically, the differences between α and π are very small (e.g. between α1 and π1 or α1 and π2), so there is only a small difference shown between the FEHBP and Medicare Part D plans, with respect to drug coverage and most times this difference is non-significant when controlling for other factors. For example, consider the equation:

$$ND = \alpha 0 + \alpha 1F + \alpha 2P + \alpha 3CP + \alpha 4CI + \alpha 5T + \alpha 6E + \beta 1CL1 + \pi 1CL1*F + \mu$$

Next, consider the β coefficients in Table 5-10 for the variables α1Type of Plan (.34) and π1Interaction Analgesics (-.36). The difference is .34 + - .36 = -.02. For the

variables α2Type of Plan (.34) and π2Interaction Anti Cancer Agents (-.34), the difference is .34 + - .34 = 0 and so on.

In regard to the other factors in the model, enrollment was the single strongest predictor of the number of drugs per therapeutic class. As enrollment increased, the number of drugs per therapeutic class increased. Furthermore, the number of drugs per therapeutic class was greater for tier 2 brand name drugs as compared to tier 1 generic drugs. The coefficients of copayment, coinsurance, and premium were not statistically significant.

Results of the alternative specification, using each number of drugs in each therapeutic class separately as the dependent variable, indicated that for only one therapeutic class did Medicare Part D plans differ from the FEHBP plans after controlling for enrollment, premium, tier, coinsurance and copayment (Tables 5-11 through 5-25). Analysis of the therapeutic class anxiolytics (Table 5-18) showed that the FEHBP plans provided more drugs, other factors held constant. Additionally, the therapeutic class respiratory tract agents was borderline significant (p=.067) in favor of the FEHBP providing greater coverage. The remaining therapeutic classes (i.e. ADHD agents, analgesics, antibacterial agents, anti-cancer agents, anticonvulsants, antidepressants, antipsychotics, arthritis agents, blood glucose regulators, cardiovascular agents, gastrointestinal agents, and hormonal agents) showed no difference in drug coverage among plans when controlling for enrollment, premium, tier, coinsurance and copayment, which is consistent with the results from the overall model with interaction effects.

In regard to specific therapeutic classes, results revealed varying relationships between the dependent and independent variables, as shown in Tables 5-11 through 5-25 and summarized in Table 5-26. In summary, type of plan did not have a statistically significant effect on the number of drugs in a therapeutic class with the exception of the class anxiolytics. On the other hand, the variable enrollment was positively associated with the number of drugs per therapeutic class for the classes: anti-cancer agents, blood products, cardiovascular agents, gastrointestinal agents, and respiratory tract agents. Coinsurance was a positive and significant predictor of the number of drugs per therapeutic class for three classes: ADHD agents, anti-cancer agents and respiratory tract agents. Interestingly, copay was only positive and significant for the classes ADHD agents and anti-cancer agents. Similarly, tier was only significant (but negative) for the classes ADHD agents and anti-cancer agents. Perhaps the most striking result was that the variable premium was not statistically significant for any of the classes. Thus, increasing the premium had no significant effect on the number of drugs per therapeutic class.

Cost Sharing

The second research question was (2) How do Medicare Part D stand-alone plans compare to Federal Employees Health Benefits plans with respect to cost sharing on prescription drugs? To address this question copay and tier levels were analyzed among formularies. Analysis of plan formularies showed that the number of tiers varied depending on the plan. Tier 1 refers to preferred generic drugs, tier 2 refers to preferred brand-name drugs, tier 3 refers to non-preferred generic and brand name drugs, and tier 4 refers to specialty drugs (i.e. those covered drugs that meet specific criteria and typically cost $500 or more per dose or $6,000 or more per year). Furthermore, as

shown in Table 5-27, there was wide variation in copay and coinsurance depending on the tier. As the tier number increases usually the drug out-of-pocket cost increases. For example, the copay is $7 for drugs offered on tier 1 for the Medicare Part D formulary Humana PDP Enhanced as compared to $40 for drugs offered on tier 2. Similarly, for the FEHBP's Blue Cross Blue Shield Basic formulary the copay is $10 for drugs offered on tier 1 compared to $35 for drugs offered on tier 2. Many formularies switch to applying coinsurance rates for tier 3 drugs. All formularies utilize coinsurance rates for tier 4 drugs. To discourage use, tier 3 and 4 drugs are offered at higher co-pay and coinsurance rates (i.e. consumers must pay a substantial out-of-pocket amount if they want to purchase these drugs).

When comparing plans based on whether they provide cost sharing through copayments versus coinsurance, results showed that both Medicare Part D plans and the FEHBP plans utilize fixed-dollar copayments more often than coinsurance for tier 1 generic drugs (Table 5-28). On the other hand, for tier 2 brand name drugs Medicare Part D plans were more likely to utilize copays while the FEHBP plans were more likely to utilize coinsurance.

For the plans that were shown to utilize copayments, there was a statistically significant difference between Medicare Part D plans and the FEHBP plans (Table 5-29). For the Medicare Part D plans that utilized copayments, the mean copayment for tier 1 generic drugs was $4.53 (range was $0 - $8) as compared to the FEHBP plans mean copayment of $7.67 (range $5 - $10). Therefore, the Medicare Part D plans provided lower mean copays for tier 1 generic drugs as compared to the FEHBP plans ($p<.05$). On the other hand, the finding for tier 2 brand name drugs was non-significant,

meaning there was no difference between the two programs with respect to copay for tier 2 brand name drugs (Table 5-29).

For the Medicare Part D plans that utilized coinsurance for tier 1 generic drugs, mean rates were 17% as compared to the FEHBP plan mean rates of 20% ($p<.05$). For the Medicare Part D plans that utilized coinsurance for tier 2 brand name drugs, mean rates were 26% as compared to the FEHBP plan mean rates of 34% (Table 5-30). Furthermore, the FEHB prescription drug plans provided higher mean coinsurance rates as compared to Medicare Part D plans (Table 5-30).

Table 5-1. Overview of Data

	Total
Medicare Part D Plans	232
Medicare Part D Formularies	19
FEHBP Formularies/Plans	5
Total Number of Drugs Examined	266
Total Number of Brand Name Drugs Examined	197
Total Number of Generic Drugs Examined	69
Total Number of Therapeutic Classes Examined	23

Table 5-2. Plans vs. Formularies

Formulary Name	Number of Plans per Formulary
Medicare Part D Formularies	
AARP MedicareRx Preferred	31
AARP MedicareRx Saver/UnitedHealth Rx Basic	20
Advantage Star Plan by RxAmerica	9
Blue Medicare Rx	7
BlueRx	3
BravoRx	3
CIGNA Medicare Rx Plan One	5
Community CCRx Basic	26
First Health Part D Premier	8
Health Net Orange	7
HealthSpring Prescription Drug Plan	5
Humana PDP Enhanced/Complete	30
Humana PDP Standard	27
Medco Medicare Prescription Plan	2
MedicareBlue Rx Option 3	3
Prescription Pathway Bronze Plan	12
SilverScript Value	12
WellCare Classic/Signature Option 1	20
WellCare Classic/Signature Option 2	2
FEHBP Formularies/Plans	
American Postal Workers Union Health Plan	1
Blue Cross Blue Shield Basic	1
Blue Cross Blue Shield Standard	1
GEHA Benefit Plan	1
NALC Health Benefit Plan	1

Table 5-3. Formulary Coverage of 266 Top Drugs in the U.S.

Formulary	TOTAL NUMBER OF DRUGS COVERED (n)	PERCENT OF DRUGS COVERED (n/266)
Medicare Part D Formularies (N=19)		
AARP MedicareRx Preferred	249	94%
AARP MedicareRx Saver/UnitedHealth Rx Basic	248	93%
Advantage Star Plan by RxAmerica	210	79%
Blue Medicare Rx - Standard	219	82%
BlueRx Value	240	90%
BravoRx	212	80%
CIGNA Medicare Rx Plan One	230	86%
Community CCRx Basic Formulary	219	82%
First Health Part D-Premier	232	87%
Health Net Orange	226	85%
Health Spring Prescription Drug Plan	219	82%
Humana PDP Enhanced or Complete	232	87%
Humana PDP Standard	232	87%
Medco Medicare Prescription Plan	214	80%
MedicareBlue Rx	220	83%
Prescription Pathway Bronze Plan	209	79%
SilverScript Value	248	93%
WellCare Classic/Signature Option 1	192	72%
WellCare Classic/Signature Option 2	196	74%
FEHBP Formularies (N=5)		
Blue Cross Blue Shield Basic	243	91%
Blue Cross Blue Shield Standard	252	95%
American Postal Workers Union Health Plan	264	99%
GEHA Benefit Plan	227	85%
NALC Health Benefit Plan	264	99%

Table 5-4. Independent Samples t–Test: Formulary Coverage of 266 Top Drugs in the U.S.

	MED PART D N=19 (Mean ± SD)	FEHBP N=5 (Mean ± SD)	P -Value
Percent Drug Coverage	84 ± 6.10	94 ± 5.93	.004

Table 5-5. Independent Samples t-Test: Formulary Coverage by Therapeutic Class

Therapeutic Class	Total Number of Drugs in Class	Medicare Part D Formulary Coverage (Mean Percent Covered ± SD)	FEHBP Formulary Coverage (Mean Percent Covered ± SD)	P -Value
ADHD Agents**	5	65 ± 27.36	96 ± 8.94	.001
Analgesics	13	98 ± 3.62	98 ± 3.58	.783
Anti Cancer Agents	25	77 ± 15.50	85 ± 17.07	.353
Antibacterials	16	93 ± 7.18	96 ± 8.50	.432
Anticonvulsants	8	100 ± 0	100 ± 0	N/A
Antidementia Agents	3	100 ± 0	93 ± 14.76	.374
Antidepressant Agents	10	98 ± 4.19	98 ± 4.47	.961
Antipsychotic Agents	9	98 ± 4.12	93 ± 14.76	.505
Antiretroviral/Antiviral Agents	10	100 ± 0	100 ± 0	N/A
Anxiolytic Agents**	4	0 ± 0	95 ± 11.18	.000
Arthritis Agents**	5	93 ± 9.91	100 ± 0	.005
Blood Glucose Regulators**	15	95 ± 6.62	100 ± 0	.004
Blood Products/Modifiers/Volume Expanders*	12	72 ± 12.93	90 ± 18.22	.019
Cardiovascular Agents**	42	87 ± 8.62	97 ± 4.22	.003
Gastrointestinal Agents**	9	74 ± 19.25	96 ± 9.84	.005
Hormonal Agents*	15	82 ± 9.36	93 ± 8.17	.019
Metabolic Bone Disease Agents**	7	85 ± 11.33	100 ± 0	.000
Multiple Sclerosis Agents*	4	93 ± 11.31	100 ± 0	.021
Muscle Relaxants	3	77 ± 15.76	80 ± 29.91	.860
Opthalmic Agents**	5	72 ± 10.15	100 ± 0	.000
Respiratory Tract Agents*	21	86 ± 9.63	98 ± 4.47	.017
Sedative /Hypnotic Agents	3	84 ± 20.33	93 ± 14.76	.292
Vaccines	5	83 ± 7.49	52 ± 46.04	.205

Table 5-5. Continued

*Difference between group means significant at .05 confidence level
** Difference between group means significant at .01 confidence level

Table 5-6. Independent Samples t-Test: Formulary Coverage for each of the 266 Top Drugs in the U.S.

Therapeutic Class	Drug Name	Mean Percent of Medicare Part D Formularies including this Drug on Formulary (N=19)	Mean Percent of FEHBP Plans including this Drug on Formulary (N=5)
ADHD Agents	Concerta	100	100
	Focalin XR	74	80
	Strattera	68	100
	Vyvanse	16	100
Analgesics	Acetaminophen and codeine	100	100
	Fentanyl	100	100
	Hydrocodone/Acetaminophen	100	100
	Lidoderm	100	100
	Naproxen	100	100
	Oxycontin	84	100
	Oxycodone and Acetaminophen	100	100
	Oxycodone hydrochloride ER	100	100
	Propoxyphene napsylate and acetaminophen	100	80
	Suboxone	100	100
	Tramadol hydrochloride	100	100
Anti Cancer Agents	Abraxane	68	60
	Aldara	100	100
	Alimta	68	60
	Allopurinol	100	100
	Aloxi	26	80
	Arimidex	100	100
	Avastin	63	80
	Casodex	100	100
	Eloxatin	74	60
	Erbitux	58	80

Table 5-6. Continued

Therapeutic Class	Drug Name	Mean Percent of Medicare Part D Formularies including this Drug on Formulary (N=19)	Mean Percent of FEHBP Plans including this Drug on Formulary (N=5)
Anti Cancer Agents	Femara	100	100
	Gemzar	79	60
	Herceptin	68	80
	Neulasta	89	100
	Neupogen	100	100
	Pegasys convenience pack	100	100
	Rituxan	100	60
	Sandostatin LAR	100	100
	Tarceva	100	100
	Taxotere	74	60
	Temodar	0	100
	Thalomid	100	100
	Velcade	100	60
	Xeloda	0	100
	Zometa	63	80
Antibacterials	Amoxicillin	100	100
	Amoxicillin TR and clavulanate potassium	100	100
	Avelox	89	80
	Azithromycin	100	100
	Cephalexin	100	100
	Ciprofloxacin hydrochloride	100	100
	Cubicin	89	80
	Doxycycline hyclate	100	100
	Fluconazole	100	100
	Levaquin	100	100
	Penicillin VK	100	100
	Solodyn	63	100
	Sulfamethoxazole and trimethoprim	100	100
	Synagis	53	100

Table 5-6. Continued

Therapeutic Class	Drug Name	Mean Percent of Medicare Part D Formularies including this Drug on Formulary (N=19)	Mean Percent of FEHBP Plans including this Drug on Formulary (N=5)
	Zosyn	95	80
	Zyvox	100	100
Anticonvulsants	Depakote	100	100
	Depakote ER	100	100
	Gabapentin	100	100
	Keppra	100	100
	Lamictal	100	100
	Lamotrigine	100	100
	Lyrica	100	100
	Topamax	100	100
Antidementia Agents	Aricept	100	100
	Exelon	100	100
	Namenda	100	80
Antidepressant	Amitriptyline hydrochloride	95	100
Agents	Budeprion XL	100	100
	Citalopram hydrobromide	100	100
	Cymbalta	100	100
	Effexor XR	100	100
	Fluoxetine hydrochloride	100	100
	Lexapro	84	80
	Paroxetine hydrochloride	100	100
	Sertraline hydrochloride	100	100
	Trazodone hydrochloride	100	100
Anti-inflammatory Agents	Celebrex	89	100
	Ibuprofen	100	100
Antimigraine Agents	Imitrex	100	100
Antiparkinson Agents	Mirapex	89	100

Table 5-6. Continued

Therapeutic Class	Drug Name	Mean Percent of Medicare Part D Formularies including this Drug on Formulary (N=19)	Mean Percent of FEHBP Plans including this Drug on Formulary (N=5)
Antipsychotic Agents	Geodon	100	100
	Invega	100	80
	Risperdal	100	100
	Risperdal consta	100	80
	Risperidone	84	100
	Seroquel	100	100
	Zyprexa	100	100
	Zyprexa Zydis	100	100
Antiretroviral/Antiviral Agents	Atripla	100	100
	Combivir	100	100
	Epzicom	100	100
	Kaletra	100	100
	Norvir	100	100
	Reyataz	100	100
	Tamiflu	100	100
	Truvada	100	100
	Valtrex	100	100
	Viread	100	100
Anxiolytics	Alprazolam	0	80
	Clonazepam	0	100
	Diazepam	0	100
	Lorazepam	0	100
Arthritis Agents	Enbrel	100	100
	Humira	100	100
	Meloxicam	95	100
	Orencia	68	100
	Remicade	100	100

Table 5-6. Continued

Therapeutic Class	Drug Name	Mean Percent of Medicare Part D Formularies including this Drug on Formulary (N=19)	Mean Percent of FEHBP Plans including this Drug on Formulary (N=5)
Bipolar Agents	Abilify	100	80
Blood Glucose Regulators	ACTOplus met	95	100
	Actos	100	100
	Avandia	89	100
	Byetta	100	100
	Gleevec	100	100
	Glyburide	100	100
	Humalog	84	100
	Janumet	95	100
	Januvia	100	100
	Lantus	100	100
	Lantus Solostar	100	100
	Levemir	84	100
	Metformin hydrochloride	100	100
	NovoLog	89	100
	NovoLog FlexPen	89	100
Blood Products/Modifiers/Volume Expanders	Aggrenox	100	100
	Angiomax	0	60
	Aranesp	89	100
	Carimune NF	58	80
	Epogen	74	80
	Gammagard Liquid	74	100
	Gamunex	74	80
	Lovenox	100	100
	Plavix	100	100
	Procrit	100	100
	Venofer	0	80
	Warfarin sodium	100	100

Table 5-6. Continued

Therapeutic Class	Drug Name	Mean Percent of Medicare Part D Formularies including this Drug on Formulary (N=19)	Mean Percent of FEHBP Plans including this Drug on Formulary (N=5)
Cardiovascular Agents	Amlodipine besylate	84	100
	Amlodipine besylate and benazepril	84	100
	Atenolol	100	100
	Avalide	42	80
	Avapro	47	80
	Benicar	79	100
	Benicar HCT	79	100
	Caduet	37	80
	Cartia XT	100	100
	Catapres TTS	95	100
	Clonidine	100	100
	Coreg CR	100	100
	Cozaar	84	100
	Crestor	79	80
	Digoxin	100	100
	Diovan	79	100
	Diovan HCT	79	100
	Enalapril maleate	100	100
	Furosemide	100	100
	Hydrochlorthiazide	100	100
	Hyzaar	84	100
	Intergrilin	0	40
	Isosorbide mononitrate	100	100
	Klor-Con M20	100	100
	Lipitor	79	100
	Lisinopril	100	100
	Lisinopril and hydrochlorthiazide	100	100
	Lotrel	95	100
	Lovaza	95	100

Table 5-6. Continued

Therapeutic Class	Drug Name	Mean Percent of Medicare Part D Formularies including this Drug on Formulary (N=19)	Mean Percent of FEHBP Plans including this Drug on Formulary (N=5)
	Metoprolol succinate	100	100
	Metoprolol tartrate	100	100
	Niaspan	89	100
	Potassium chloride	100	100
	Pravastatin sodium	100	100
	Ramipril	89	100
	Simvastatin	100	100
	Toprol-XL	89	100
	Triamterene and hydrochlorizide	100	100
	Tricor	100	100
	Verapamil SR	100	100
	Vytorin	53	100
	Zetia	100	100
Central Nervous System Agents	Adderall XR	68	100
	Provigil	100	100
Cystic Fibrosis Agents	Pulmozyme	95	100
Erectile Dysfunction Agents	Cialis	0	100
	Viagra	0	80
Gastrointestinal Agents	Aciphex	42	80
	Asacol	100	100
	Nexium	79	100
	Omeprazole	100	100
	Pantoprazole sodium	68	100
	Prevacid	53	100
	Prevacid Solutab	53	80
	Protonix	74	100
	Ranitidine hydrochloride	100	100

Table 5-6. Continued

Therapeutic Class	Drug Name	Mean Percent of Medicare Part D Formularies including this Drug on Formulary (N=19)	Mean Percent of FEHBP Plans including this Drug on Formulary (N=5)
Hormonal Agents, Stimulant/Replacement/Modifying (Sex Hormones/Modifiers) AND Hormonal Agents, Stimulant/Replacement/Modifying (Thyroid)	Androgel 1%	84	100
	Avodart	100	100
	Levothyroxine sodium	100	100
	Levoxyl	100	100
	Mirena	0	80
	NuvaRing	68	100
	Ortho Tri-Cyclen Lo	58	100
	Prednisone	100	100
	Premarin	100	100
	Sensipar	100	100
	Synthroid	100	100
	Trinessa-28	100	60
	Yasmin 28	58	80
	Yaz-28	68	80
	Zemplar	89	100
Metabolic Bone Disease Agents	Actonel	79	100
	Alendronate sodium	100	100
	Boniva	74	100
	Evista	100	100
	Forteo	100	100
	Fosamax	100	100
	Fosamax Plus D	42	100
Multiple Sclerosis Agents	Avonex	89	100
	Betaseron	100	100
	Copaxone	100	100
	Rebif	84	100
Muscle Relaxants	Carisoprodol	100	80
	Cyclobenzaprine hydrochloride	100	100
	Skelaxin	32	60
Ophthalmic Agents	Cosopt	95	100
	Lucentis	0	100

Table 5-6. Continued

Therapeutic Class	Drug Name	Mean Percent of Medicare Part D Formularies including this Drug on Formulary (N=19)	Mean Percent of FEHBP Plans including this Drug on Formulary (N=5)
	Lumigan	79	100
	Restasis	100	100
	Xalatan	84	100
Phosphate Binders	Renagel	89	100
Radiography Agents	Omnipaque	0	40
	Visipaque	0	40
Respiratory Tract Agents	Advair Diskus	100	100
	Albuterol	100	100
	Allegra-D 12-Hour	58	80
	Astelin	100	100
	Clarinex	37	100
	Combivent	100	100
	Fexofenadine hydrochloride	100	100
	Flomax	100	100
	Flovent HFA	100	100
	Fluticasone propionate	100	100
	Nasacort AQ	47	100
	Nasonex	89	100
	ProAir HFA	89	100
	Promethazine hydrochloride	100	100
	Proventil HFA	100	100
	Pulmicort respules	79	100
	Singulair	100	100
	Spiriva HandiHaler	89	100
	Symbicort	89	100
	Xolair	79	80
	Xopenex	58	100
Sedatives/Hypnotics	Ambien CR	68	100
	Lunesta	84	80
	Zolpidem tartrate	100	100

Table 5-6. Continued

Therapeutic Class	Drug Name	Mean Percent of Medicare Part D Formularies including this Drug on Formulary (N=19)	Mean Percent of FEHBP Plans including this Drug on Formulary (N=5)
Smoking Cessation Agents	Chantix	79	100
	Wellbutrin XL	95	80
Transplant Agents	CellCept	100	100
	Prograf	100	100
Urinary Tract Antispasmodics	Detrol LA	89	100
	Vesicare	95	100
Vaccines	Gardasil	100	60
	Prevnar	16	60
	RotaTeq	100	40
	Varivax	100	60
	Zostavax	100	40
Vitamins	Folic Acid	0	60
	Vitamin D	0	60

Table 5-7. Formulary Coverage of Prescription Drugs: Brand versus Generic by Formulary

Formulary	Total Number of Generic Drugs Covered (ng)	Total Number of Brand Name Drugs Covered (nb)	Total Number of Drugs Covered (n)	Generic Drugs as Percent of Total Drugs Covered (ng/n)	Brand Drugs as Percent of Total Drugs Covered (nb/n)	Generic Drugs Covered by this Formulary as a Percent of All Generic Drugs (ng/69)	Brand Drugs Covered by this Formulary as a Percent of All Brand Drugs (nb/197)
Medicare Part D Formularies (N=19)							
AARP MedicareRx Preferred	63	186	249	25%	75%	91%	94%
AARP MedicareRx Saver/UnitedHealth Rx Basic	63	185	248	25%	75%	91%	94%

Table 5-7. Continued

Formulary	Total Number of Generic Drugs Covered (ng)	Total Number of Brand Name Drugs Covered (nb)	Total Number of Drugs Covered (n)	Generic Drugs as Percent of Total Drugs Covered (ng/n)	Brand Drugs as Percent of Total Drugs Covered (nb/n)	Generic Drugs Covered by this Formulary as a Percent of All Generic Drugs (ng/69)	Brand Drugs Covered by this Formulary as a Percent of All Brand Drugs (nb/197)
Advantage Star Plan by RxAmerica	62	148	210	30%	70%	90%	75%
Blue Medicare Rx - Standard	62	157	219	28%	72%	90%	80%
BlueRx Value	63	177	240	26%	74%	91%	90%
BravoRx	63	149	212	30%	70%	91%	76%
CIGNA Medicare Rx Plan One	60	170	230	26%	74%	87%	86%
Community CCRx Basic	62	157	219	28%	72%	90%	80%
First Health Part D-Premier	62	170	232	27%	73%	90%	86%
Health Net Orange	62	164	226	27%	73%	90%	83%
HealthSpring Prescription Drug Plan	60	159	219	27%	73%	87%	81%

Formulary	Total Number of Generic Drugs Covered (ng)	Total Number of Brand Name Drugs Covered (nb)	Total Number of Drugs Covered (n)	Generic Drugs as Percent of Total Drugs Covered (ng/n)	Brand Drugs as Percent of Total Drugs Covered (nb/n)	Generic Drugs Covered by this Formulary as a Percent of All Generic Drugs (ng/69)	Brand Drugs Covered by this Formulary as a Percent of All Brand Drugs (nb/197)

Table 5-7. Continued

Formulary	Total Number of Generic Drugs Covered (ng)	Total Number of Brand Name Drugs Covered (nb)	Total Number of Drugs Covered (n)	Generic Drugs as Percent of Total Drugs Covered (ng/n)	Brand Drugs as Percent of Total Drugs Covered (nb/n)	Generic Drugs Covered by this Formulary as a Percent of All Generic Drugs (ng/69)	Brand Drugs Covered by this Formulary as a Percent of All Brand Drugs (nb/197)
Humana PDP Enhanced/Complete	62	170	232	27%	73%	90%	86%
Humana PDP Standard	62	170	232	27%	73%	90%	86%
Medco Medicare Prescription Plan	63	151	214	29%	71%	91%	77%
MedicareBlue Rx Option	62	158	220	28%	72%	90%	80%
Prescription Pathway Bronze Plan	62	147	209	30%	70%	90%	75%
SilverScript Value	63	185	248	25%	75%	91%	94%
WellCare Classic/Signature Option1	60	132	192	31%	69%	87%	67%

Table 5-7. Continued

Formulary	Total Number of Generic Drugs Covered (ng)	Total Number of Brand Name Drugs Covered (nb)	Total Number of Drugs Covered (n)	Generic Drugs as Percent of Total Drugs Covered (ng/n)	Brand Drugs as Percent of Total Drugs Covered (nb/n)	Generic Drugs Covered by this Formulary as a Percent of All Generic Drugs (ng/69)	Brand Drugs Covered by this Formulary as a Percent of All Brand Drugs (nb/197)
WellCare Classic/Signature Option 2	62	134	196	32%	68%	90%	68%
FEHBP Formularies (N=5)							
American Postal Workers Union Health Plan	67	197	264	25%	75%	97%	100%

Formulary	Total Number of Generic Drugs Covered (ng)	Total Number of Brand Name Drugs Covered (nb)	Total Number of Drugs Covered (n)	Generic Drugs as Percent of Total Drugs Covered (ng/n)	Brand Drugs as Percent of Total Drugs Covered (nb/n)	Generic Drugs Covered by this Formulary as a Percent of All Generic Drugs (ng/69)	Brand Drugs Covered by this Formulary as a Percent of All Brand Drugs (nb/197)
Blue Cross Blue Shield Basic	68	175	243	28%	72%	99%	89%
Blue Cross Blue Shield Standard	68	184	252	27%	73%	99%	93%
GEHA Benefit Plan	68	159	227	30%	70%	99%	81%
NALC Health Benefit Plan	67	197	264	25%	75%	97%	100%

Table 5-8. Independent Samples t-Test: Formulary Coverage Brand versus Generic of Total Drugs Covered

	MED PART D n=19 (Mean ± SD)	FEHBP n=5 (Mean ± SD)	P –Value
Percent Brand Name Drugs Covered out of total drugs covered	72 ± 2.07	73 ± 2.12	.458
Percent Generic Drugs Covered out of total drugs covered	28 ± 2.07	27 ± 2.12	.458

Table 5-9. Independent Samples t–Test: Formulary Coverage - Brand versus Generic as % of All Brand and Generic Drugs

	MED PART D n=19 (Mean ± SD)	FEHBP n=5 (Mean ± SD)	P –Value
Percent Brand Name Drugs Covered	82 ± 8.00	93 ± 8.02	.015
Percent Generic Drugs Covered	90 ± 1.34	98 ± 1.10	.000

Table 5-10. Negative Binomial Regression Predicting Number of Drugs per Therapeutic Class among Medicare Part D and the FEHBP

Variable	β	irr	SE	z	p-value
Intercept	1.20128	1.20128	.129187	9.29877	.000
Type of Plan***	.340841	1.40612	.090507	3.76592	.000
Premium	-.357216E-03	.999642	.996970E-03	-.358302	.720
Copay	.662928E-03	1.00066	.544193E-03	1.21819	.223
Coinsurance	-.069158	.933179	.066941	-1.03312	.302
Tier*	-.017108	.983037	.784080E-02	-2.18187	.029
Enrollment***	.021756	1.02199	.510407E-02	4.26242	.000
Analgesics***	1.13318	3.10551	.130873	8.65858	.000
Anti Cancer Agents***	1.53474	4.64011	.125799	12.2000	.000
Antibacterials***	1.24873	3.48591	.128903	9.68736	.000
Anticonvulsants***	.647861	1.91144	.138627	4.67340	.000
Antidepressants***	.850632	2.34112	.134918	6.30483	.000
Antipsychotic Agents***	.693394	2.00049	.137720	5.03481	.000
Anxiolytics	-7.55466	5.24E-04	19.6139	-.385168	.700
Arthritis Agents	.068611	1.07101	.151928	.451601	.652
Blood Glucose Regulators***	1.23424	3.43577	.129136	9.55768	.000
Blood Products/Modifiers/Volume Expanders***	.789408	2.20209	.134114	5.88611	.000
Cardiovascular Agents***	2.22288	9.23388	.121593	18.2813	.000
Gastrointestinal Agents***	.625634	1.86943	.137715	4.54296	.000
Hormonal Agents***	1.13528	3.11204	.130055	8.72921	.000
Respiratory Tract Agents***	1.54368	4.68179	.125922	12.2590	.000

Table 5-10. Continued

Variable	β	irr	SE	z	p-value
Interaction Analgesics ***	-.363843	.695000	.100933	-3.60480	.000
Interaction Anti Cancer Agents ***	-.340175	.711645	.097236	-3.49846	.000
Interaction Antibacterials **	-.308413	.734611	.099618	-3.09596	.002
Interaction Anticonvulsants***	-.340163	.711654	.106880	-3.18266	.001
Interaction Antidepressants**	-.330022	.718907	.104092	-3.17049	.002
Interaction Antipsychotic Agents**	-.307468	.735306	.106286	-2.89282	.004
Interaction Anxiolytics	-7.64641	4.78E-04	19.6136	-.389851	.697
Interaction Arthritis Agents**	-.348412	.708843	.117163	-2.97373	.003
Interaction Blood Glucose Regulators***	-.345687	.707734	.099725	-3.46642	.001
Interaction Blood Products/Modifiers/Volume Expanders***	-.367880	.692200	.103651	-3.54921	.000
Interaction Cardiovascular Agents**	-.358287	.698872	.093990	-3.81198	.000
Interaction Gastrointestinal Agents**	-.388108	.678339	.106250	-3.65276	.000
Interaction Hormonal Agents	-.373899	.688046	.100414	-3.72356	.000
Interaction Respiratory Tract Agents***	-.399111	.670916	.097227	-4.10494	.000

β, unstandardized regression coefficient; p-value, factor change in the dependent variable given a one-unit increase in the predictor. Categorical variables were dummy coded: type of plan (1, Medicare Part D; 2, FEHBP), tier (1,preferred generic drugs; 2, preferred brand drugs), and therapeutic class. R^2 = .96, p< .001.
*p< .05
**p< .01
***p< .001

Table 5-11. Negative Binomial Regression Predicting Number of Drugs for ADHD Agents

Variable	β	irr	SE	z	p-value
Intercept	-1.23792	-1.23792	.579085	-2.13771	.033
Type of Plan	-.077802	.925148	.110629	-.703273	.482
Premium	-.449939E-03	.999550	.126559E-02	-.355518	.722
Copay*	.030958	1.03144	.928376E-02	3.33468	.001
Coinsurance*	1.70386	5.49511	.592478	2.87582	.004
Tier*	-1.84892	.157407	.142749	-12.9523	.000
Enrollment	.049508	1.05075	.051446	.962328	.336

*Variable is significant at .05 confidence level

Table 5-12. Negative Binomial Regression Predicting Number of Drugs for Analgesics

Variable	β	irr	SE	z	p-value
Intercept	2.57037	2.57037	.218586	11.7591	.000
Type of Plan	-.025352	.974966	.045741	-.554255	.579
Premium	-.242869E-03	.999757	.519303E-03	-.467682	.640
Copay	-.109139E-02	.998909	.208861E-02	-.522544	.601
Coinsurance	-.139494	.869798	.257390	-.541955	.588
Tier	.014674	1.01478	.030071	.487989	.626
Enrollment	.195950E-02	1.00196	.019752	.099205	.921
	*Variable is significant at .05 confidence level				

Table 5-13. Negative Binomial Regression Predicting Number of Drugs for Anticancer Agents

Variable	β	irr	SE	z	p-value
Intercept	2.36938	2.36938	.172053	13.7712	.000
Type of Plan	.821828E-02	1.00825	.036474	.225318	.822
Premium	.202492E-03	1.00020	.394189E-03	.513693	.607
Copay*	.722754E-02	1.00725	.164767E-02	4.38652	.000
Coinsurance*	.512864	1.67006	.202123	2.53739	.011
Tier*	-.085236	.918296	.023811	-3.57970	.000
Enrollment*	.044644	1.04566	.015483	2.88352	.004
	*Variable is significant at .05 confidence level				

Table 5-14. Negative Binomial Regression Predicting Number of Drugs for Antibacterials

Variable	β	irr	SE	z	p-value
Intercept	2.49227	2.49227	.197514	12.6182	.000
Type of Plan	.033287	1.03385	.042582	.781712	.434
Premium	.413186E-03	1.00041	.459103E-03	.899985	.368
Copay	.128296E-02	1.00128	.188903E-02	.679162	.497
Coinsurance	.041466	1.04234	.233062	.177919	.859
Tier	-.013611	.986481	.027222	-.500002	.617
Enrollment	.016341	1.01648	.017791	.918490	.358
	*Variable is significant at .05 confidence level				

Table 5-15. Negative Binomial Regression Predicting Number of Drugs for Anticonvulsants

Variable	β	irr	SE	z	p-value
Intercept	2.07944	2.07944	.274730	7.56905	.000
Type of Plan	-.152065E-28	1	.058193	-.261313E-27	.999
Premium	.162636E-31	1	.648816E-03	.250666E-28	.999
Copay	-.371930E-30	1	.261608E-02	-.142171E-27	.999
Coinsurance	-.336054E-28	1	.322232	-.104289E-27	.999
Tier	.456440E-29	1	.037649	.121236E-27	.999
Enrollment	-.260431E-28	1	.024797	-.105025E-26	.999
	*Variable is significant at .05 confidence level				

Table 5-16. Negative Binomial Regression Predicting Number of Drugs for Antidepressants

Variable	β	irr	SE	z	p-value
Intercept	2.26997	2.26997	.246992	9.19045	.000
Type of Plan	.011072	1.011134	.052659	.210254	.833
Premium	.644786E-04	1.000064	.584028E-03	.110403	.912
Copay	-.371952E-03	0.999628	.235272E-02	-.158095	.874
Coinsurance	-.028856	0.971556	.289978	-.099513	.921
Tier	.443259E-02	1.004442	.033852	.130942	.896
Enrollment	.171901E-02	1.00172	.022282	.077149	.939
	*Variable is significant at .05 confidence level				

Table 5-17. Negative Binomial Regression Predicting Number of Drugs for Antipsychotic

Variable	β	irr	SE	Z	p-value
Intercept	2.22265	2.22265	.263842	8.42419	.000
Type of Plan	.020014	1.020216	.057006	.351083	.726
Premium	.313291E-03	1.000313	.626068E-03	.500410	.617
Copay	-.272798E-02	0.997276	.253748E-02	-1.07508	.282
Coinsurance	-.470700	0.624565	.314871	-1.49490	.135
Tier	.040382	1.041208	.036623	1.10264	.270
Enrollment	-.237244E-02	0.99763	.023797	-.099695	.921
	*Variable is significant at .05 confidence level				

Table 5-18. Negative Binomial Regression Predicting Number of Drugs for Anxiolytics

Variable	β	irr	SE	Z	p-value
Intercept	-.447114	-.447114	1.02663	-.435518	.663
Type of Plan*	-2.05698	0.127839	.122602	-16.7778	.000
Premium	.386747E-03	1.000387	.103258E-02	.374545	.708
Copay	-.104781E-02	0.998953	.013676	-.076614	.939
Coinsurance	-.173947	0.840341	1.24582	-.139625	.889
Tier	.015653	1.015776	.162323	.096435	.923
Enrollment	-.421970E-02	0.995789	.096363	-.043790	.965
	*Variable is significant at .05 confidence level				

Table 5-19. Negative Binomial Regression Predicting Number of Drugs for Arthritis Agents

Variable	β	irr	SE	Z	p-value
Intercept	1.26990	1.26990	.354064	3.58664	.000
Type of Plan	-.763167E-02	0.992397	.074596	-.102307	.919
Premium	.187646E-03	1.000188	.816594E-03	.229791	.818
Copay	.342083E-02	1.003427	.339484E-02	1.00765	.314
Coinsurance	.153342	1.165724	.417966	.366876	.714
Tier	-.037654	0.963046	.049021	-.768121	.442
Enrollment	.021555	1.021789	.031935	.674965	.500
	*Variable is significant at .05 confidence level				

Table 5-20. Negative Binomial Regression Predicting Number of Drugs for Blood Glucose Regulators

Variable	β	irr	SE	Z	p-value
Intercept	2.43298	2.43298	.203258	11.9700	.000
Type of Plan	.564821E-02	1.005664	.042890	.131690	.895
Premium	.941978E-04	1.000094	.471124E-03	.199943	.842
Copay	.122969E-02	1.00123	.193690E-02	.634877	.526
Coinsurance	.193206	1.213133	.237932	.812022	.417
Tier	-.017576	0.982578	.027835	-.631441	.528
Enrollment	.019012	1.019194	.018337	1.03680	.300

*Variable is significant at .05 confidence level

Table 5-21. Negative Binomial Regression Predicting Number of Drugs for Blood Products/Modifiers/Volume Expanders

Variable	β	irr	SE	Z	p-value
Intercept	1.79314	1.79314	.250631	7.15450	.000
Type of Plan	-.019804	0.980391	.051836	-.382052	.702
Premium	.625153E-03	1.000625	.549474E-03	1.13773	.255
Copay	-.109515E-02	0.998905	.243907E-02	-.449001	.653
Coinsurance	-.214497	0.806947	.300938	-.712763	.476
Tier	.016951	1.017095	.035100	.482938	.629
Enrollment*	.042820	1.04375	.022666	1.88916	.059

*Variable is significant at .05 confidence level

Table 5-22. Negative Binomial Regression Predicting Number of Drugs for Cardiovascular Agents

Variable	β	irr	SE	Z	p-value
Intercept	3.43159	3.43159	.124658	27.5281	.000
Type of Plan	-.018014	0.982147	.026110	-.689940	.490
Premium	.125224E-03	1.000125	.287702E-03	.435256	.663
Copay	-.342248E-03	0.999658	.120154E-02	-.284841	.776
Coinsurance	-.170040	0.843631	.148279	-1.14676	.251
Tier	.838469E-02	1.00842	.017322	.484039	.628
Enrollment*	.022490	1.022745	.011259	1.99740	.046

*Variable is significant at .05 confidence level

Table 5-23. Negative Binomial Regression Predicting Number of Drugs for Gastrointestinal Agents

Variable	β	irr	SE	Z	p-value
Intercept	1.66373	1.66373	.277372	5.99819	.000
Type of Plan	-.051670	0.949642	.057120	-.904597	.366
Premium	.167734E-03	1.000168	.627876E-03	.267146	.789
Copay	-.192391E-02	0.998078	.271797E-02	-.707848	.479
Coinsurance	-.544265	0.580268	.336764	-1.61616	.106
Tier	.034763	1.035374	.039293	.884717	.376
Enrollment	.043489	1.044449	.025091	1.73327	.083

*Variable is significant at .05 confidence level

Table 5-24. Negative Binomial Regression Predicting Number of Drugs for Hormonal Agents

Variable	β	irr	SE	Z	p-value
Intercept	2.33629	2.33629	.214833	10.8749	.000
Type of Plan	-.040644	0.960171	.044537	-.912584	.361
Premium	.142946E-03	1.000143	.491782E-03	.290669	.771
Copay	-.174050E-03	0.999826	.208432E-02	-.083504	.933
Coinsurance	-.305238	0.736948	.257694	-1.18450	.236
Tier	.010715	1.010773	.030122	.355731	.722
Enrollment	.024813	1.025123	.019424	1.27745	.201
	*Variable is significant at .05 confidence level				

Table 5-25. Negative Binomial Regression Predicting Number of Drugs for Respiratory Tract Agents

Variable	β	irr	SE	Z	p-value
Intercept	2.74634	2.74634	.178137	15.4170	.000
Type of Plan	-.067012	0.935184	.036483	-1.83677	.066
Premium	-.107815E-03	0.999892	.410563E-03	-.262602	.793
Copay	-.167628E-02	0.998325	.173596E-02	-.965621	.334
Coinsurance*	-.497231	0.608212	.214851	-2.31431	.021
Tier	.031025	1.031511	.025099	1.23608	.216
Enrollment	.027526	1.027908	.016125	1.70707	.088
	*Variable is significant at .05 confidence level				

Table 5-26. Summary of Negative Binomial Regressions Predicting Number of Drugs for Top 15 Therapeutic Classes

	Type of Plan	Premium	Copay	Coinsurance	Tier	Enrollment
ADHD Agents	-.078	-.450E-03	.031*	1.704*	-1.849*	.050
Analgesics	-.025	-.243E-03	-.109E-02	.139	.015	.196E-02
Anti-cancer	.822E-02	.202E-03	.723E-02*	.513*	-.085*	.045*
Antibacterials	.033	.413E-03	.128E-02	.041	-.014	.016
Anticonvulsants	-.152E-28	.162E-31	-.372E-30	-.336E-28	.456E-29	-.26E-02
Antidepressants	.011	.645E-04	.372E-03	-.029	.443E-02	.172E-02
Antipsychotics	.020	.313E-03	-.273E-02	-.471	.040	-.24E-02
Anxiolytics	-2.06*	.387E-03	-.105E-02	-.174	.016	.422E-02
Arthritis Agents	-.763E-02	.188E-03	.342E-02	.153	-.038	.022
Blood Glucose	.564E-02	.942E-04	.123E-02	.193	-.018	.019
Blood Products	-.020	.625E-03	-.110E-02	-.214	.017	.043*
Cardiovascular	-.018	.125E-03	-.342E-03	-.170	.838E-02	.022*
Gastrointestinal	-.052	.168E-03	-.192E-02	-.544	.035	.043*
Hormonal Ag.	-.041	.143-03	-.174E-03	-.305	.011	.025
Respiratory Ag.	-.067 *	-.108E-03	-.168E-02	-.497*	.031	.028*
*Variable is significant at .05 confidence level						

Table 5-27. Cost Sharing Analysis among Medicare Part D (N=19) and FEHBP (N=5) Formularies

Formulary	Tiers	Cost Sharing
Medicare Part D Formularies		
AARP MedicareRx Preferred	4	$7 $38 $66.25-98 .33
AARP MedicareRx Saver	4	$5 $22 $49.45-98 .25
Advantage Star Plan by RxAmerica	4	$4.75-5.50 .25 .25 .45
Blue Medicare	4	$2-9 $33-45 $60-75 .25-.30
BlueRx	4	$4-5 $25-$35 $55-65.25-.33 .25-.33
CIGNA Medicare Rx Plan One	4	$2-2.50 $25-33 $72.50-81 .25
First Health Part D-Premier	4	$7 $27-30 $51-64 .33
Health Net Orange	5	$2-5 $30-44 90 .25-.33 .25-.33
HealthSpring Prescription Drug Plan	2	.25 .25
Humana PDP Enhanced	4	$7 $40 $70 .33
Humana PDP Standard	3	.10-.15 .25 .40-.48
MedicareBlue Rx	4	$8 $43 $73 .30

Table 5-27. Continued

Formulary	Tiers	Cost Sharing
SilverScript Value	4	$8 $32.50-39.25 $98 .25
WellCare Classic/Signature Option 1	4	$0 $30-41 $67-92 .25-.33
WellCare Classic/Signature Option 2	4	$0 $36-39 $79-85 .25-.33
FEHBP Formularies		
American Postal Workers Union Health Plan	2	$8 .25
Blue Cross Blue Shield Basic	3	$10 $35 .50
Blue Cross Blue Shield Standard	3	.20 .30 .30
GEHA Benefit Plan	2	$5 .5
NALC	2	.20 .30

Table 5-28. Cost Sharing among Top Drugs in the U.S.

Tier	Medicare Part D -Total number of plans with copay (n=218)	FEHBP -Total number of plans with copay (n=10)
Tier 1 Generic Drugs	181 or 83%	6 or 60%
Tier 2 Brand Name Drugs	147 or 67%	2 or 20%

Table 5-29. Independent Samples t Test - Comparison of Mean Copay among Plans with Copay by Plan Type

	Copay Medicare Part D Plans (Mean ± SD)	Copay FEHBP Plans (Mean ± SD)	P – Value
Tier 1 Generic Drugs (Medicare Part D Plans n=181 and FEHBP Plans n=6)	$4.53 ± 3.05	$7.67 ± 2.25	.014
Tier 2 Brand Name Drugs (Medicare Part D Plans n=147 and FEHBP Plans n=2)	$35.06 ± 6.32	$35.00 ± 0	.901

Table 5-30. Independent Samples t Test - Comparison of Mean Coinsurance among Plans with Coinsurance by Plan Type

	Coinsurance Medicare Part D Plans (Mean ± SD)	Coinsurance FEHBP Plans (Mean ± SD)	P –Value
Tier 1 Generic Drugs (Medicare Part D Plans n=37 and FEHBP Plans n=4)	17% ± .046	20% ± 0	.000
Tier 2 Brand Name Drugs (Medicare Part D Plans n=71 and FEHBP Plans n=8)	26% ± .020	34% ± .103	.066

CHAPTER 6
SUMMARY, DISCUSSION, AND CONCLUSION

Medicare Part D and the Federal Employees Health Benefits Program both provide services to millions of enrollees, yet their methods of operations differ. Specifically, Medicare Part D is run through extensive government regulations (approximately 2,400 pages), while the FEHBP runs by laws that comprise about twenty pages (Cain 1999). The Medicare program has been criticized for its lack of provision of services. For example, nine out of ten Medicare enrollees purchase supplemental coverage (Francis 2009). Some advocate for reforming Medicare to look more like the FEHBP program, citing the FEHBP's exemplary benefits, service, catastrophic limits, cost control, lack of fraud/abuse, and protection against interest group politics (National Bipartisan Commission 1999; Francis 2003; and Oberlander 2007).

On the other hand, the Medicare Part D program has exceeded the expectations of many. Premiums and costs are one third below initial predictions (Francis 2009). Additionally, Medicare does not require prior plan approval for nonemergency hospitalization while the FEHBP does. Furthermore, Medicare offers greater access to non-preferred providers. Currently, controversy exists as to which program is preferable particularly, given the challenges faced by a growing elderly population in the United States. This research aims to compare the two programs with respect to prescription drug coverage and cost sharing.

Formulary Coverage

Before discussing the findings on formulary coverage it is important to briefly discuss the two different methods that were used for analysis. This discussion is particularly important given the independent t-tests, which found that the FEHBP plans

provided broader drug coverage, whereas findings of the regression analysis showed that there was only a small difference between the two programs and that difference was only statistically significant for the classes anxiolytics and respiratory agents, for which the FEHBP provided broader drug coverage.

The independent t-test was used for testing hypotheses related to a single factor, while the regression analysis was used for testing hypotheses related to multiple factors. The question arises as to which method is preferable; the answer depends on the research objectives and questions. Multiple regression provides an advantage because it takes into account the effect of multiple predictor variables simultaneously. That is, the effect of a single predictor variable is estimated assuming that all other predictor variables are held constant. On the other hand, the independent t-tests answer the bottom line question of which program provides broader drug coverage when all factors affecting coverage are allowed to vary. The first research question addressed in this study was how do Medicare Part D stand-alone plans compare to Federal Employees Health Benefits plans with respect to coverage of prescription drugs? The null hypothesis was that there would be no difference between the plans. Using the independent samples t-test for the 19 Medicare Part D formularies analyzed, formulary coverage of the top drugs dispensed and sold in the United States ranged from 72-94% (average 84%), while the range was 85-99% (average 94%) for the 5 FEHBP formularies examined ($p<.01$). Overall, the independent sample t-test findings indicate that the FEHBP plans provided broader drug coverage as compared to Medicare Part D plans.

On the other hand, the regression results indicate that, once other factors and interaction effects were taken into account, the programs were shown to be about the same in terms of coverage. In other words, the bivariate analysis results disappeared in multivariate analysis. This difference in findings using the two different analytical methods may be useful to different groups. For example, consumers may be interested in the actual number and kind of drugs on their formulary so they may find the independent sample t-test results useful. Other consumers may find the factors copay and coinsurance to be important so they may focus on regression results. Additionally, health plan providers may be more interested in how factors like premium, copay, coinsurance, tier and enrollment affect drug coverage. As health plan providers make complex decisions on which drugs to include on their formulary, they may need to take the multiple factors used in the regression analysis into consideration.

When examined by therapeutic class, independent samples t-tests revealed that the FEHBP provided broader drug coverage in 12 of the 23 therapeutic classes: ADHD agents, anxiolytics, arthritis agents, blood glucose agents, blood products/modifiers/ volume expanders, cardiovascular agents, gastrointestinal agents, hormonal agents, metabolic bone disease agents, multiple sclerosis agents, ophthalmic agents, and respiratory tract agents ($p<.05$). Additionally, results of the t-tests revealed that for one of the top three therapeutic classes in terms of drugs sold and dispensed in the U.S., anti-cancer agents, there was no difference found between the two programs in regard to drug coverage. Yet, for the other top classes, cardiovascular agents and respiratory agents, the FEHBP was shown to provide broader coverage.

Moreover, the therapeutic class anxiolytics, which was composed entirely of benzodiazepine drugs (i.e. alprazolam, clonazepam, diazepam, and lorazepam), showed the greatest difference in drug coverage between formularies. Results of the independent samples t-test revealed that, among Medicare Part D formularies, none of the drugs were covered in this class, while the FEHBP formularies covered on average 95% ($p<.05$). This finding may be explained by the difference in enrollee population characteristics of the two programs (i.e. the majority of Medicare beneficiaries are older vs. the FEHBP which includes working age adults and those 65 and older). For example, some studies show that anxiolytics are not recommended for use in the elderly (Pontillo, Lang, and Stein 2002), while other studies recommend their use, but only with caution (Merck Manual of Geriatrics 2010). Specifically, short/intermediate acting anxiolytics like alprazolam, lorazepam, and oxazepam are recommended for use, while longer acting anxiolytics like diazepam or clonazepam are not recommended for use in the elderly. Additionally, the dosage is usually lower for elderly patients as compared to younger patients. Anxiolytics are classified as short or long acting based on their onset and duration of action. The decision to prescribe or not prescribe them is also based on the associated side effects and addictive properties of the drugs. Possible side effects include sedation and disorientation. For this reason some have attributed these drugs to the cause of falls and fractures in the elderly. In fact, Medicare decision makers have cited these factors as reason to exclude these drugs from their formularies (Bambauer, Sabin, and Soumerai 2005; United States Pharmacopeial Convention 2008). On the other hand, recent studies revealed that exclusion of anxiolytics from formularies may decrease use, but may not result in decreased fracture

risk (Briesacher et al 2010; Wagner et al 2007). Considering the lack of consensus on the use of anxiolytics, it could be possible that the difference between programs for this class is reflected by Medicare Part D decision maker's use of various studies to decide not to include anxiolytics on their formularies. Yang and colleagues suggest that future studies that examine anxiolytic use in Medicare beneficiaries should focus on age, sex, and racial-ethnic differences among beneficiaries (Yang et al 2008).

To provide more explanation regarding the therapeutic classes in which differences between programs were found, it is helpful to examine certain drugs. Specifically, the drugs that some FEHBP plans offer that none of the Medicare Part D plans offer were: folic acid, mirena, venofer, lucentis, omnipaque, visipaque, angiomax, integrilin, cialis, viagra, temodar, xeloda and vitamin D. Review of the literature suggests that Medicare Part D plans' decision not to cover these drugs may not mean that they provide less coverage, but that provision of these drugs was not necessary for the Medicare (mostly over 65 years of age) population. For example, folic acid may not be included on Medicare Part D formularies because it is primarily found in many foods and usually prescribed to pregnant women (Office on Women's Health 2010). Specifically, it is a water-soluble B vitamin and is added to many cold cereals, flour, breads, pasta, bakery items, cookies, and crackers. It is also found in many vegetables and is used for preventing and treating folic acid deficiency, as well as anemia (Office on Women's Health 2010). Pregnant women take folic acid to prevent miscarriage and birth defects (Office on Women's Health 2010). With this in mind, it is understandable why folic acid was not included on Medicare Part D formularies.

Similarly, it is recommended that the drug venofer, which replenishes depleted stores of iron, be used with caution in the elderly. The elderly may be more sensitive to its side effects of hypotension and nausea (Rx List the Internet Drug Index Venofer 2010).

It is also recommended that the drug mirena, a birth control agent, be used with caution in the elderly due to their increased sensitivity to its effects. Common side effects include acne, back pain, breast pain or tenderness, changes in menstrual bleeding , changes in sex drive, dizziness, lightheadedness, bleeding, headache, nausea, vomiting and weight gain (Drugs.com Mirena 2010). Review of this side effect profile or the low, if any, number of Medicare beneficiaries taking the drug to prevent pregnancy may have been the reason why Medicare decision-makers decided not to include this drug.

Next, the exclusion of the drug lucentis may have been due to 2007 reports that the drug is linked to stroke in elderly patients. Results of the safety study, (SAILOR) showed that the risk for stroke was significantly higher in patients receiving the recommended dose of lucentis (0.5 mg) compared with a 0.3 mg dose (1.2% vs 0.3%; *P* = .02) at an average follow-up of 230 days (Waknine 2007). Furthermore, those with a history of stroke appeared to be at increased risk for subsequent stroke. Lucentis, which treats (wet) age-related macular degeneration is still widely used among elderly patients, but there is reason to be cautious with its use (The Eye Digest 2009).

Both drugsomnipaque and visipaque are used as radiographic contrast mediums administered by intravascular injection to allow radiographic visualization of internal structures. Since these drugs are highly excreted by the kidney it is recommended that

they be used with caution in the elderly (Drugs.com Omnipaque 2010; Drugs.com Visipaque 2010). Those with impaired renal function are at greater risk and elderly patients are more likely to have decreased renal function.

On the other hand, literature review shows that there is no clear explanation why the other excluded drugs were left out. For example, angiomax is used as a blood thinner for patients who aim to block the formation of clots in their bloodstream. It is recommended that the drug be used with caution in the elderly because they may be more sensitive to its effects, such as bleeding (Rx List the Internet Drug Index Angiomax 2010). Similarly, integrilin keeps the platelets in the bloodstream from coagulating (clotting) to prevent unwanted clots that can occur with certain heart or blood vessel conditions (Rx List the Internet Drug Index Integrilin 2010). Caution is advised with this drug for the same reasons as described for angiomax. Although it is advised that these drugs be used with caution in the elderly, that advice holds true for the other drugs in the same class (e.g. plavix, warfarin) that are covered by Medicare Part D plans (Rx List the Internet Drug Index Plavix 2010; Rx List the Internet Drug Index Warfarin 2010). Therefore, it is unclear why these drugs were excluded from Medicare Part D plans.

Additionally, some have questioned why cialis and viagra were excluded. These drugs are used for erectile dysfunction (ED), which primarily plagues senior men. According to the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) in older men, ED usually has a physical cause, such as disease, injury, or side effects of drugs (NIDDK 2010). Furthermore, the American Urological Association has stated that "By far, the most important cause of the development of ED is the presence

of illnesses like high blood pressure, diabetes mellitus, high cholesterol levels and cardiovascular disease" (American Urological Association Education and Research 2010). Incidence has been shown to increase with age (i.e. about 5% of 40-year-old men and between 15 and 25% of 65-year-old men experience ED). Various senior advocate groups have expressed concern related to the exclusion of cialis and viagra from Medicare Part D formularies (Senior Journal 2006). They claim that many senior men find relief through these drugs, yet the drugs still remain excluded.

Furthermore, for the drugs temodar and xeloda, which are used to treat brain tumors, it is interesting that they are covered by Medicare Part B, but not Medicare Part D (Mahay 2009; Nelson 2010). Part B covers drugs administered in a physician's office, hospital or clinic and some self-administered prescription drugs. Temodar and xeloda are self-administered drugs. Also, due to the fact that these drugs are included in the protected class of anticancer (antineoplastic) agents one may speculate that they would be included on the Medicare Part D formularies. It is unclear why Part D plans excluded these two drugs from their formularies.

Lastly, findings revealed that none of the Medicare Part D plans covered vitamin D. It is unclear why the plans decided not to cover vitamin D. A study by Mosekilde 2005 provided a review that summarized knowledge on vitamin D status in the elderly (Mosekilde 2005). The author concluded that studies suggest fortification of food cannot provide sufficient vitamin D to the elderly. Furthermore, vitamin D insufficiency was noted to be related to a number of other disorders frequently observed among the elderly, such as breast, prostate and colon cancers, type 2 diabetes, and cardiovascular disorders, yet causality has not been established (Mosekilde 2005). In regard to

treatment, it was suggested that 800 IU (20 µg) vitamin D per day in combination with calcium be used for high blood pressure in elderly women (Mosekilde 2005). In summary, some of the drugs excluded by all Medicare Part D plans can be justified by supporting literature cautioning use of the drugs in the elderly. During the final decision-making process plans reserve the right to choose which drugs to include on their formularies. This review has shown clinical reasons may account for some of the differences in coverage between Medicare Part D and FEHBP plans.

There are few studies that compare the FEHBP and Medicare Part D with respect to coverage within therapeutic classes. But what can be found in the literature is information on how well these programs individually cover specific therapeutic classes. For example, in a study by Bowman et al 2006, formulary drug coverage among Medicare Part D plans was examined within the therapeutic class anti-cancer agents. The authors found that the majority of cancer drugs were covered by almost all Medicare Part D plans. Furthermore, Gellad et al 2007, examined Medicare Part D plan coverage of angiotensin receptor blockers which are categorized under the class cardiovascular agents. Results showed that all Medicare Part D prescription drug plan formularies included at least one angiotensin receptor blocker, while 35% of plans covered all seven listed in the study. Consistent with previous research this study also found that Medicare Part D plans covered a large number of anti-cancer and cardiovascular drugs.

Moreover, a recent JAMA article reported results of a study on Medicare Part D plan coverage of drugs in the classes gastrointestinal agents, cardiovascular agents, respiratory agents, antidepressants, blood glucose regulators, and analgesics (Tseng et

al 2007). Results revealed that the greatest coverage was found for cardiovascular agents (85-90% of plans). On the other hand, the authors concluded that less than half of the drugs examined (34 out of 75) were widely covered by Medicare Part D plans.

Broad coverage of formulary drugs has also been shown within therapeutic classes in the FEHBP. For example, a 2003 GAO report found that FEHBP enrollees generally had unrestricted access to prescription drugs. Furthermore, formularies were not considered to be overly restrictive, which was determined by the finding that they included drugs in most major therapeutic categories (Dicken et al 2003).

With respect to coverage of brand vs. generic drugs, results of the independent samples t-test revealed that the FEHBP plans covered about 98% of generic drugs (among generic drugs only) versus about 90% for Medicare Part D plans. Additionally, FEHBP plans covered on average 93% brand name drugs (among brand name drugs only) as compared to Medicare Part D plans which covered on average 82% brand name drugs ($p<.05$). On the other hand, further examination using the t-test comparison showed that generic and brand name drug coverage (i.e. generic/brand coverage out of total drug coverage) was about the same for Medicare Part D and the FEHBP.

In contrast, a study by the Lewin Group 2007 revealed Medicare Part D plans covered more of the 132 brand name drugs (128 or 97%) compared to the FEHBP (125 or 95%), although no statistical tests were performed and thus one is unable to determine if there was a statistically significant difference between the two groups. Another study, by Tseng 2007, showed that Medicare Part D plans covered 90% of generic drugs. This discrepancy in findings in the literature and the results of this study

may be due to the cross-sectional nature of the study design. More accurate measures of generic and brand name drug coverage may be shown in longitudinal studies (Jung 2010).

The final set of analyses, to address formulary coverage differences between the two programs used negative binomial regression analysis. In the overall regression model, which included all therapeutic classes, results indicated, that, after controlling for premium, tier, enrollment, copay, coinsurance and therapeutic class, Medicare Part D plans provided greater drug coverage while the interaction of type of plan and therapeutic class showed that the FEHBP plans provided broader coverage; when both main and interaction effects were considered, the effects "cancelled out" resulting in similar number of drugs being covered by Medicare Part D and FEHBP.

To shed further light on this finding, separate regression analyses were conducted with the dependent variable defined as number of drugs in a given therapeutic class. The only two classes that showed a statistically significant difference with respect to type of plan were the classes anxiolytics and respiratory agents, both of which revealed the FEHBP provided broader drug coverage. Thus the results in the separate regressions by therapeutic class are consistent with the results from the overall regression—in general, no difference in formulary coverage between the two plans.

A 2010 GAO study of specialty drugs for FEHBP/Medicare Part D beneficiaries examined reasons why some drugs were included on the formulary and why others were not included. Results revealed that Medicare Part D plans considered limited ability to negotiate price concessions with manufacturers, low utilization for some drugs, and CMS USP guided formulary requirements as barriers to inclusion of drugs on

formulary (GAO 2010). Plan sponsors noted that they are limited in the leverage they have when negotiating prices for drugs. Normally, when negotiating a drug price, plan sponsors have the ability to exclude a drug from a plan's formulary in favor of a therapeutic alternative. However, many specialty drugs belong to one of the six classes of clinical concern for which the USP guidelines state Part D plan sponsors must include all or substantially all drugs on their formularies. Therefore, that normal negotiating leverage is removed (GAO 2010). As mentioned previously in the conceptual framework, regulation could possibly affect the inclusion of drugs on a formulary.

As for other control variables premium did not have a statistically significant effect on the number of drugs. Review of the literature revealed that premiums are heavily dependent on the degree of cost sharing, with deductibles having the greatest impact on premiums. Perhaps including deductibles in the regression analyses would have resulted in significant effects for the variable premium (Gorman, Gorman, and Newell 2010). A recent examination of New York health plans showed that changes in deductibles and cost sharing resulted in premium changes of as much as 50% (Gorman, Gorman, and Newell 2010). Other studies have shown that while copay and coinsurance are used to deter enrollees from seeking services, premiums do not directly affect the number of services utilized. Instead, premiums affect the amount and type of services utilized (Brook et al 1984; Manning et al 1988). Future research which considers deductibles may yield more significant premium related results.

The regression analysis did find a positive association between the number of drugs per therapeutic class and copay for the classes ADHD agents and anti-cancer agents. An increase in copay resulted in an increase in the number of drugs in these

classes. Additionally, coinsurance was a significant predictor of the number of drugs per therapeutic class for the classes: ADHD agents, anti-cancer agents and respiratory tract agents. The number of ADHD and anti-cancer drugs increased as coinsurance increased, while the number of respiratory drugs decreased as coinsurance increased. This study has shown the importance of taking individual therapeutic classes into consideration in the interpretation of findings on cost sharing. A study by Avalere Health that examined Medicare Part D plan cost sharing for cancer drugs noted that most Medicare plans place cancer drugs on higher tiers and that the coinsurance maximum is 33% (Murphy et al 2008). Earlier results of the regression analysis revealed that an increase in copay resulted in an increase in the number of anti-cancer agents. Therefore, both enrollees and plans can benefit from this type of benefit structure. Beneficiaries pay more through higher copays and coinsurance, yet they receive more drugs as a result. Similarly, plans provide more drugs, yet beneficiaries use less (Huskamp 2003). A more extensive discussion on copay and coinsurance can be found later in the section labeled cost sharing.

For the next independent variable, tier, a significant difference was found for the classes ADHD agents and anti-cancer agents. For both classes, the number of drugs per therapeutic class was greater for tier 2 brand name drugs as compared to tier 1 generic drugs. It is interesting that there were more brand name drugs listed on the formularies vs. generic drugs considering that generic drug promotion is often used as a cost containment measure (Tseng 2007).

Lastly, in the overall model enrollment was the single strongest predictor of the number of drugs per therapeutic class. As enrollment increased, the number of drugs

per therapeutic class increased. Specifically, an increase was shown in the classes: anti-cancer agents, blood products/modifiers/volume expanders, cardiovascular agents, gastrointestinal agents, and respiratory tract agents.

Cost Sharing

Plans utilize cost sharing as a way to control costs. The goal is to decrease utilization by promoting the use of more cost-effective therapies and to discourage use of unnecessary services (Office of Technology Assessment 1993). Out–of-pocket costs among health plan beneficiaries have been increasing in recent years. In relation to prescription drug coverage, beneficiaries may incur out-of pocket costs in the form of fees that exceed the amount of reimbursement allowed by the health plan or payment for drugs received during the waiting period of eligibility for coverage, experimental treatments, or drugs purchased that are not listed on plan formularies (Office of Technology Assessment 1993). The most common out-of-pocket costs among beneficiaries are deductibles, copays (a fixed amount of money paid by a beneficiary when receiving covered services) or coinsurance (a percentage of covered procedures). This research focused on copay and coinsurance.

Out-of-pocket costs vary depending on whether a health plan charges a copay or coinsurance. The second aim of this research was to address the question of how Medicare Part D stand-alone plans compare to Federal Employees Health Benefits plans with respect to cost sharing on prescription drugs. Results of this research were consistent with the literature in that there was wide variation in copay and coinsurance depending on the tier. Cost sharing usually increased by tier from lowest to highest starting with generic then brand then non-formulary drugs.

Furthermore, results revealed that both Medicare Part D plans and the FEHBP plans utilize fixed-dollar copayments more often than coinsurance for tier 1 generic drugs. But for tier 2 brand name drugs, the FEHBP plans utilized coinsurance more often. Studies have shown that coinsurance is more effective in controlling cost for brand name drugs.

Findings from the independent samples t-test revealed that, for the Medicare Part D plans that utilized copayments, the mean copayment for tier 1 generic drugs was $4.53 as compared to the FEHBP plans mean copayment of $7.67, a difference of $3.14 ($p<.05$). Furthermore, there was a small, but significant difference related to coinsurance. For tier 1 generic drugs, Medicare Part D plans coinsurance mean rates were 17% as compared to the FEHBP plan mean rates of 20% ($p<.01$). Additionally, for tier 2 brand name drugs, mean rates were 26% as compared to the FEHBP plan mean rates of 34% ($p=.06$).

Considering that there were statistically significant differences found, the question arises, from the consumer perspective, what is a 'good' copay amount or coinsurance rate. From a consumer perspective lower cost sharing is better. Furthermore, studies have shown that when copay increases, utilization decreases and negative outcomes may result. Gaynor et al found that raising the amount of cost sharing was not a very effective method for controlling cost (Gaynor, Li, and Vogt 2007). The authors commented that increased cost sharing resulted in decreased utilization of health services, but the resulting savings were offset by an increase in outpatient service use. On the other hand, a study by Gruber found that increasing coinsurance rates resulted in decreased health care utilization without a negative effect on health outcomes

(Gruber 2006). Other studies clearly show that as cost sharing increases prescription drug utilization decreases (Joyce et al 2002; Goldman et al 2004; Huskamp et al 2003; Soumerai, Ross-Degnan, and Gortmaker 1987; Harris, Stergachis, and Ried 1990; Johnson et al 1997; Tamblyn et al 2001; Motheral and Fairman 2001).

Studies also have shown that the effect of cost sharing is greatly impacted by income. For example, the Kaiser Commission conducted a study on Medicaid and the uninsured to examine the effects of increasing cost sharing to curtail costs (Ku 2003). This study was interesting considering the fact that concern exists as to whether those with low incomes will be negatively affected by increased cost sharing. The Commission concluded that as copayments increased utilization of prescription drugs decreased among low-income Medicaid beneficiaries, and there was concern about resulting negative health outcomes.

With respect to employer-based health insurance beneficiaries, a study of the New York health insurance market found that typical generic drugs had a $10 copay, while brand name drugs carried a $30 copay (Gorman, Gorman, and Newell 2010). These numbers were a bit higher, but comparable to findings in this research of $4-$8 for generic drugs and $35 for brand name drugs. Gorman et al also reported that within the New York health care market a cost sharing benefit of $10 for generic drugs and $50 for brand name drugs resulted in a savings of 12% (Gorman, Gorman, and Newell 2010). This is interesting considering that these amounts are larger than the average copay amounts revealed in this research. Correspondingly, a Kaiser Family Foundation report yielded findings of average employer-sponsored copays of $11 per prescription in 2006 (Kaiser Family Foundation and the Health Research and Educational Trust 2006).

In terms of coinsurance, the most common employer based coinsurance rate is 20 percent.

This research has shown that there is no one size fits all in the determination of appropriate cost sharing levels. The goal for plan providers is to encourage beneficiaries to purchase less expensive yet effective drugs. Since different approaches to financing and health care delivery exist, it is a challenge to compare cost sharing coverage options. Some have suggested that standardization may be a solution for easier comparison of plans. For example, standardizing out-of-pocket maximums may be a good start. There are lessons to be gleaned here for both Medicare Part D and the FEHBP.

Limitations

Several limitations should be considered in interpreting the findings of this research. First, data was not available on the demographics of enrollees within each plan. Factors such as age, income, sex, race, and employment status may affect results.

Age was not controlled for in this study. The FEHBP population likely consists of younger enrollees as compared to the Medicare population, and those age 65 and older have been found to enroll in different plans as compared to younger enrollees (Francis 2009). However, younger FEHBP enrollees are found in mostly HMO plans, while many of those age 65 and older enroll in PPO plans (e.g. the Blue Cross Standard Plan) (Francis 2009).

Demographics may also affect cost sharing, without–of-pocket costs varying with income, type of service, or patient characteristics (Brook et al 1984; Manning et al 1988). These factors also may affect administrative costs, and health costs tend to rise

with age. In particular, enrollee income may have an impact on prescription drug coverage. For example, recent changes in Medicare Part D charge those with higher incomes a higher premium. Currently, the FEHBP charges all enrollees the same dollar amount regardless of income. Therefore, income is likely to be an important predictor in the difference between the two programs. Although data was not available from both programs on sex, race, and employment status one can speculate that these factors may also explain many of the differences in the formularies.

Secondly, caution should be used in the interpretation of results due to the cross-sectional nature of the data. Plans are subject to change over time. The data used in this research represents the year 2009. Therefore, this data set might not capture the full impact of drug coverage today, although it is unlikely that prescribing trends have changed dramatically in a one-year period.

Thirdly, not all Medicare Part D and FEHBP plans were included in the study. Analyses included the top 63-70% of prescription drug plans among the FEHBP and Medicare Part D programs. However, previous studies only compared a maximum of 3 Medicare Part D/FEHBP prescription drug plans (Lewin 2007; Yamamoto 2008; Bowman 2006). Lastly, caution in the interpretation of these results stems from the fact that these two programs may be overlapping in their effect on one another. For example, Americans who work pay for Medicare as wages are deducted from each paycheck. Therefore, federal employees, or FEHBP beneficiaries contribute to the cost of Medicare through payroll deductions. On the other hand, when an enrollee has both FEHBP and Medicare coverage, Medicare is the primary payer. Over 1 million of the FEHBP enrollees are Medicare Part D enrollees meaning Medicare is contributing to the

finance of the FEHBP. Specifically, a total of one third of the FEHBP are age 65 and older and make up about one half of the FEHBP spending (Francis 2009). The possibility exists that changes in Medicare Part D could result in corresponding changes in the FEHBP.

Conclusion

In conclusion, there are differences in prescription drug coverage and cost sharing among plans within and between the Medicare Part D and FEHB program. The nature of these differences depends on the method of analysis, perspective, and therapeutic class examined. Analysis using independent t tests revealed that the FEHBP plans provided broader prescription drug coverage as compared to Medicare Part D plans. However, further regression analysis taking into account the effect of various factors affecting coverage showed that there was no difference between the two programs with respect to drug coverage. Consumers, policymakers, and health insurance providers may be interested in reviewing all results to determine appropriate conclusions in the examination of plans. In regard to cost sharing, benefit structures among both programs were wide and varied. Average copays for generic drugs were $4.53 for Medicare Part D plans and $7.67 for the FEHBP plans. Additionally, generic drug coinsurance rates were 17% for Medicare Part D plans and 20% for the FEHBP plans. Both Medicare Part D and the FEHBP provide prescription drug coverage in a variety of the top therapeutic classes of drugs dispensed and sold in the United States. Lessons in formulary decision making and cost sharing are derived through comparison of the two programs.

Policy Implications

Health care reform is one of the nation's top concerns at this time. Among the topics of interest, the scope and depth of health insurance benefits are of particular importance. Specifically, the provision of prescription drugs can affect access and quality among beneficiaries.

Considering the projected depletion of funds to support Medicare in the coming years, Medicare policymakers can use this research to make more informed decisions related to reform. Similarly, the FEHB program will need to make adjustments in the coming years to keep up with the growing elderly population. Comparisons to Medicare and other employer-based health insurance programs will help to identify best practices among plans in the provision of the top drugs dispensed and sold in the U.S. Policymakers can take a closer look at the benefit structure of those plans providing the greatest number of top drugs in addition to plans with the lowest and highest cost sharing levels.

Clinicians can also benefit from results of this research. A 2007 study by Tseng and colleagues addressed clinician concerns about variations in Medicare plan formularies (Tseng 2007) and concluded that future research that identified, within a class, which drugs were widely covered would greatly aid clinicians in the reduction of their administrative burden. Furthermore, the authors stated that such information would lower the risk that Medicare beneficiaries are prescribed non-formulary drugs. Moreover, special attention would be given to those classes with no widely covered drugs, in this case the anxiolytics. Tseng and colleagues suggested that this information be provided to clinicians in the form of a Web site, personal digital

assistant–based tool, or e-prescribing software to aid in decision making in the selection of medications (Tseng 2007).

In summary, the importance of learning from the lessons of the FEHBP and the Medicare Part D programs should be emphasized. Ignoring these lessons can result in wasteful spending throughout the health care system. It has been stated that Medicare is financed primarily by persons who do not directly benefit from it until in their future. This becomes important when we consider the ratio of our growing elderly population to the working population. Comparing the coverage and cost sharing between these two programs involves many issues that warrant further exploration.

Future Research

This research has opened the door to many areas for future research. Important areas for future research are the role of demographic factors in prescription drug coverage, the market behavior of prescription drug plans, and health outcomes associated with drug coverage.

Specifically, future comparison of the two programs should include an analysis of the relationship of drug coverage/cost sharing and demographic factors such as income and geographic location. Studies show that the cost of medical care varies by area and physician practice patterns vary by area. This may result in drug coverage that varies by area. Furthermore, many studies suggest that lower income people may be affected negatively by cost-sharing (Hudman and O'Malley 2003; Ku and Wachino 2005; Artiga and O'Malley 2005).

In regard to market behavior, it would be interesting to explore the role of market share in drug coverage. In short, prescription drug plans hire pharmacy benefit managers to negotiate price discounts for drugs with manufactures. The negotiations

involve the receipt of rebates by pharmacy benefit managers on the drugs selected for the formulary. Manufacturers give rebates based on the inclusion of their drugs on a plan's formulary which increases their market share. The rebates that are negotiated by the pharmacy benefit manager result in savings that are passed on to the prescription drug plans, which are then passed on to the beneficiaries (Henry J. Kaiser Family Foundation 2005). Exploring how market share affects access and quality of drugs provided to beneficiaries would be beneficial to consumers.

Lastly, while this research provided an examination of drug coverage and cost sharing, it did not explore whether broader drug coverage led to better health outcomes or whether harm resulted from the provision of less drug coverage. Studies show that substantial cost sharing will lead to adverse outcomes for some patients resulting from forgone care (Khan, Kaestner, and Lin 2008). The question remains as to how prescription drug coverage and cost sharing affect health outcomes. In the future, research that examines the link between Medicare Part D and the FEHBP drug coverage and common health outcomes (e.g. blood pressure level, cholesterol level, glucose/hemoglobin A1C) may be beneficial to consumers and plans.

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BIOGRAPHICAL SKETCH

Annesha White Lovett graduated magna cum laude from Florida A & M University with a Doctor of Pharmacy Degree in April 2001. Realizing her passion for outcomes research after taking a related course, she decided to pursue a Master of Science degree with a focus in pharmacoeconomics, which she obtained in July 2003. She received her Doctor of Philosophy degree from the University of Florida in the fall of 2010. She has worked on various projects with the Florida Medicaid program including her thesis entitled, The Economic Burden of Hyperphosphatemia-Related End Stage Renal Disease in Florida Medicaid Patients. She has also interned at the Government Accountability Office, which resulted in a publication entitled Federal Employees' Health Benefits: Effects of Using Pharmacy Benefit Managers on Health Plans, Enrollees, and Pharmacies.

Dr. Lovett is a recipient of the South Florida Society of Health-System Pharmacists Student Achievement Award, the Association of Black Health-System Pharmacists Student Achievement Award, the Florida Society of Health-System Pharmacists Student Scholarship Award, the International Society of Pharmacoeconomics and Outcomes Research Distinguished Service Award and the Pharmaceutical Research and Manufacturers of America Foundation Fellowship. She is also an active member of the American Society of Health-Systems Pharmacists, the American Pharmacists Association, and the International Society of Pharmacoeconomics and Outcomes Research. Dr. Lovett prides herself in believing that she can truly make a difference in today's society through contributions in outcomes research.