Evaluation of Vermont's Pharmacy Assistance Programs For Low Income Medicare Beneficiaries

First Round Evaluation

Final Report

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Executive Summary

Introduction

In 1996, Vermont Medicaid implemented an 1115 waiver entitled The Vermont Health Access Plan or VHAP. The waiver consisted of a five-year demonstration that introduced a statewide mandatory Medicaid managed care program. One unique component of the demonstration was a program to provide Medicaid prescription drug benefits to the State's lower income Medicare beneficiaries.[1] Medicare beneficiaries living in households with incomes up to 175 percent of the federal poverty level (FPL) are currently eligible for the full Medicaid outpatient pharmacy benefit. As part of the 1115 waiver, costs incurred under the VHAP Pharmacy program are eligible for federal matching dollars. The VHAP Pharmacy program represented an expansion of a pre-existing fee-for-service pharmacy benefit, called VScript, which covers only maintenance drugs and is based on state-only dollars. VScript was subsequently extended to Medicare beneficiaries with incomes up to 225 percent of FPL.

The Vermont pharmacy programs, like most state-administered drug assistance programs, were intended to help those most vulnerable to the absence of a Medicare drug benefit. This particularly applies to low-income Medicare beneficiaries who are not

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[1] Low-income seniors who are not entitled to Medicare benefits are also eligible for Vermont's pharmacy assistance programs. The small number of non-Medicare eligible enrollees in the state pharmacy assistance programs have been excluded from this analysis.

eligible for, cannot afford, or choose not to purchase employer-sponsored retirement plans or Medicare supplemental (Medigap) plans, but who are not poor enough to qualify for Medicaid. The explicit objectives of VScript and VHAP Pharmacy are to help defray the rising cost of prescription drugs to low-income elderly and disabled residents, to improve access to drugs that maintain their health, and to prevent unnecessary health problems due to inadequate access to prescription drugs. Prescription drug benefits for the low-income elderly and disabled may also lower Medicare expenditures by reducing the need for outpatient and inpatient medical services for people suffering from chronic prescription drug sensitive conditions. Moreover, by preventing the low-income elderly and disabled with high and expensive prescription drug needs from exhausting all of their financial resources on medications, drug assistance programs may reduce the number of people who spend-down to full Medicaid eligibility.

Goals of the Study

Vermont's pharmacy assistance programs provide a useful opportunity for assessing the impact of outpatient prescription drug benefits on the cost and use of drug and non-drug medical services among the elderly and disabled population. This study should also help inform the current national debate over outpatient prescription drug coverage for low-income Medicare beneficiaries at the federal or state levels. The principal research questions motivating this study were:

- what types of beneficiaries choose to participate in the state pharmacy assistance programs and for how long;
- to what extent does participation in state pharmacy assistance programs lead to a reduction in the Medicaid spend-down rate;

- what types of drugs do participants most commonly purchase and for what conditions;

- how much do these drugs cost;

- to what extent are program expenditures driven by prescription use levels, number of users, or costliness of individual drugs;

- what impact does an outpatient prescription drug benefit have on the use of inpatient, outpatient, and physician services; and

- what impact do state pharmacy assistance programs have on Medicare spending for inpatient, outpatient, and physician services among covered individuals.

Major Findings

The following are key findings from the report on enrollment, Medicaid spend-down, drug use and costs, medical service use, and Medicare expenditures. Not all research questions were answerable using administrative data. Remaining research questions will be addressed in subsequent analyses under the contract using data collected from a survey of enrolled and eligible but unenrolled beneficiaries in Vermont.

Enrollment in Vermont Pharmacy Assistance Programs

- Nearly 16 percent of the 93,332 Medicare beneficiaries who resided in Vermont in 2000 received some form of outpatient prescription drug coverage through the state's pharmacy assistance programs.

- Of the 14,659 enrollees in 2000, 66 percent received full drug coverage under the 1115 waiver's VHAP Pharmacy program for individuals with incomes up to 150 percent of federal poverty level (FPL). An additional 20 percent received coverage for maintenance prescriptions only under the 1115 waiver portion of the VScript program for individuals with incomes between 151 and 175 percent of FP. The remaining 14 percent received maintenance drug coverage through the VScript Expanded program for individuals with incomes between 176 and 225 percent of FPL with state-only dollars.

- An additional 17 percent of Vermont's Medicare beneficiaries received outpatient drug coverage through Medicaid.

- Over 80 percent of the 21,730 unique individuals who participated in the Vermont pharmacy assistance programs between 1993 and 2000 were enrolled for a single episode only. The majority of these participants were enrolled for more than one year.

Medicaid Spend-Down Rate

- The proportion of Medicare beneficiaries who were dually eligible for full benefits under Medicaid fell from nearly one quarter in 1994 to less than 20 percent in 2000.

- During the same period, the number of newly enrolled dual eligibles was reduced by half, from 2,501 to 1,268.

- The proportion of Medicare beneficiaries who spent down to full Medicaid benefits during the study period fell from 2.9 percent to 1.4 percent.

- During the same period, the number of state pharmacy assistance recipients increased from 3,894 to 14,659, while the proportion of beneficiaries enrolled in the pharmacy assistance programs increased from 4.6 percent 15.7 percent.

- Although they are not sufficient to establish a causal relationship, these trends in dual eligibility lend support to the contention that VHAP Pharmacy and VScript have helped to lower the rate at which Medicare beneficiaries in Vermont spend down to full Medicaid benefits.

Prescription Drug Use and Cost among Enrollees

- The total cost of the Vermont pharmacy assistance programs, including both state and federal dollars, was $13.3 million in 1999. Of that amount, 82 percent was incurred by the VHAP Pharmacy program ($10.9 million) and 18 percent by the VScript program ($2.4 million).

- An additional $33.5 million was spent on outpatient drugs for dually eligible Medicare beneficiaries under Medicaid.

- Over 83 percent of the 9,598 VHAP Pharmacy enrollees in 1999 submitted an outpatient drug claim, resulting in average payments of $1,131 per enrollee and $1,358 per user. A total of 79 percent of the 3,001 VScript enrollees in 1999 submitted a claim, with an average payment of $809 per enrollee and $1,024 per user. In comparison, 89 percent of the 16,809 dual eligible beneficiaries in 1999 submitted a

drug claim, with an average cost of $1,935 per dual eligible and $2,176 per user.

- VHAP Pharmacy claimants submitted an average of 35 claims in 1999. Claimants in VScript, which covers only longer-term prescriptions for chronic diseases, submitted an average of 18 claims. In comparison, dual eligible beneficiaries who purchased drugs submitted on average 50 claims.

- The types of drugs most commonly purchased under both VHAP Pharmacy and VScript were used to treat chronic conditions such as stomach acids or ulcers, cholesterol, heart disease, diabetes and mental disorders. In contrast, Medicaid prescriptions were dominated by treatments for mental health and related disorders.

- Three drugs used for treating stomach acids and ulcers (Prilosec, Prevacid and Pepcid) accounted for over 10 percent of total expenditures in 1999. Another 7 percent of spending was for two cholesterol drugs (Lipitor and Zocor), 4 percent for two heart disease drugs (Norvasc and Vasotec), 3 percent for two mental disorder drugs (Zoloft and Prozac), and 2 percent for one diabetes drug (Glucophage). Total expenditure on these drugs is driven by both high numbers of users and high costs per pill.

- The drug with the highest number of users was Furosemide, a diuretic that is essential for treating congestive heart failure and kidney and liver disease. Despite its high use, it ranked 48th in terms of total VHAP Pharmacy expenditures because of its low cost per pill.

Impact on Medicare Expenditures

- After controlling for confounding factors, including differences in health status, average Medicare spending for hospital inpatient, hospital outpatient and physician services increased by nearly $1,000 during the initial year of enrollment in VHAP Pharmacy or VScript compared to the spending trend amount non-enrolled beneficiaries Inpatient expenditures increased by $850, outpatient expenditures by $72, and physician payments by $62 for VHAP Pharmacy enrollees and by comparable amounts for VScript enrollees. These differences were statistically significant at the one-percent level and suggest that beneficiaries apply for state outpatient drug benefits following an acute illness.

- Following the initial spike in expenditures, average spending amounts among participants returned to their pre-enrollment levels in subsequent VHAP Pharmacy and VScript enrollment years. This

pattern holds true for both programs and all service categories. The relative changes in spending during subsequent years of participation were largely not statistically significantly different from zero, suggesting a regression to the mean.

- The results failed to show any evidence of a substitution of drug for non-drug care among the study population and, hence, a reduction in Medicare program spending in the presence of an outpatient prescription drug benefit. Nor did the study reveal any complementarities between drug and non-drug care.

Study Limitations

The report attempted to assess the impact of outpatient drug coverage on the cost and use of Medicare covered services using eligibility and claims data. Our findings, however, are inconclusive because we were unable to isolate fully the effect of outpatient drug coverage on medical service use from other factors that may have affected trends in the utilization of care and, hence, Medicare expenditures. The study's main limitations can be divided into three broad categories: selective enrollment in pharmacy assistance programs, the absence of a good comparison group, and lack of information on prior drug coverage among enrollees and non-enrollees.

- Adverse selection into pharmacy assistance programs leads to higher medical care expenditures during the post-enrollment period. As a result, the model may be measuring the effect of poor health status, rather than substitution of care, on Medicare spending. Selective enrollment on the basis of poor health makes it look as if access to outpatient drug benefits results in the use of more medical services, not fewer, even when substitution of care may have occurred. In contrast, a regression to the mean following the high costs associated with a precipitating acute care episode during the initial year of enrollment may falsely suggest a longer-term substitution of drug for non-drug medical services. Of course, if access to outpatient drugs leads to better health, health status will be endogenously determined by program enrollment. Fully controlling for differences in health status over time between participants and non-participants would undermine our ability to assess the impact of drug coverage on

medical service use and costs. The challenge is to control only for differences in health status that are not the result of outpatient drug coverage.

- Differences in the health status of enrollees and non-enrollees, independent of selection, that cause their respective expenditures to deviate over time will also bias the results. Pharmacy assistance participants are, by definition, poorer than regular Medicare beneficiaries. They have also been shown to have more (and more intensive) medical encounters than non-participating non-dually eligible beneficiaries. As a result, it is possible that the expenditure growth rates for these two groups will not be same. While the time variant risk scores control for some of the between-group differences that may change over time, the model does not control for unobservable differences in expenditure growth rates that are unrelated to the pharmacy assistance program. The information necessary to identify the most appropriate comparison group, namely, low-income beneficiaries who suffer from similar chronic conditions as enrollees, experienced a precipitating event, and did not have outpatient drug coverage, was not available.

- We were unable to control for prior outpatient drug coverage among both program participants and non-participants. Substitution of care is most likely to occur (and savings on other non-drug medical services realized) only if individuals lack outpatient drug coverage prior to enrollment in the state-sponsored programs. If a significant number of enrollees had such coverage prior to enrollment and dropped it to take advantage of the state subsidy, the experience of state pharmacy assistance enrollees does not accurately represent the change from no drug coverage to drug coverage. Similarly, changes in the proportion of comparison group members with access to outpatient pharmaceuticals could also affect the use of Medicare covered services and bias the results.

Further Studies

Additional research remains to be done to better understand the impact of outpatient prescription drug coverage on health status, medical service use and expenditures among Medicare beneficiaries. Several areas for future work have been suggested by this study.

- Enrollment decision models are needed to better understand the extent and form of adverse selection into state pharmacy assistance programs. Factors that predict enrollment independent of health status and expenditures would be helpful for controlling for selection bias in expenditure models.

- Future studies should focus on specific diseases, such as individual chronic conditions, for which access to outpatient pharmacy benefits would be most effective and substitution of drug for non-drug care most likely to occur. The chronic conditions identified in this report with the most commonly prescribed drugs would be good candidates for a more targeted study. The results of a more targeted study would be less generalizable, but more likely to reveal opportunities for Medicare savings.

- Information should be collected on prior coverage among program enrollees and incorporated in future studies, so that the effect of shifting from no drug coverage to drug coverage can be isolated.

- Information on both the use of and compliance with prescription medications would further help control for factors that mitigate the potential effect of drug coverage on medical service use and costs. Access to outpatient drugs *per se* does not lower the use of non-drug medical services. To the extent that cost savings occur, they will only do so through the use of and compliance with prescription medication.

- Information on health status, drug coverage, service use, and expenditures among eligible but unenrolled beneficiaries in Vermont (or low-income beneficiaries in states without a pharmacy assistance program) would help identify and characterize a better comparison group. A better matched comparison group based on beneficiaries with similar conditions and a precipitating event without prior drug coverage would further help isolate the impact of drug benefit on service use and costs.

- Further work needs to be done to measure potential savings to states from a pharmacy assistance program through a reduction in the Medicaid spend-down rate among elderly and disabled Medicare beneficiaries.

A survey of both program participants and eligible but unenrolled beneficiaries in Vermont is scheduled to be conducted under the next phase of this contract. Information on reasons for enrollment, health status, medical service use, outpatient drug coverage, and drug use and compliance among both enrollees and eligible but unenrolled

beneficiaries, together with additional years of eligibility and claims data, should go a long way toward addressing many of these research questions.

1   Introduction

1.1   Introduction

In 1996, Vermont Medicaid implemented an 1115 waiver entitled the Vermont Health Access Plan or VHAP. The waiver consisted of a five-year demonstration that introduced a statewide mandatory Medicaid managed care program. One unique component of the demonstration was a program to provide Medicaid prescription drug benefits to the state's lower income Medicare beneficiaries. Medicare beneficiaries living in households with incomes up to 175 percent of the federal poverty level (FPL) are currently eligible for the outpatient pharmacy benefit. As part of the 1115 waiver, costs incurred under the VHAP Pharmacy program are eligible for federal matching dollars. The VHAP Pharmacy program represented an expansion of a pre-existing fee-for-service pharmacy benefit, called VScript, based on state-only dollars. VScript was subsequently extended to Medicare beneficiaries with incomes up to 225 percent of FPL. Nearly 15,000 individuals, or 16 percent of the state's Medicare residents, currently receive outpatient prescription drug benefits under VScript or VHAP Pharmacy.[1]

Vermont's pharmacy assistance programs provide a unique opportunity to assess the impact of outpatient drug benefits on the cost and use of medical services among the

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[1] The small percentage of program participants who are not eligible for Medicare either because of employment or citizenship requirements have been excluded from this analysis. The primary focus of this evaluation is on the program's impact on Medicare service utilization and costs.

elderly and disabled population. This study is designed to help inform the policy debate over a national outpatient prescription drug benefit for low-income elderly and disabled individuals administered at the federal or state level. The study provides one of the first comprehensive empirical assessments of the cost of such a benefit, as well as the potential for program savings through either a reduction in other forms of provider-based care or a decline in the Medicaid spend-down rate. The principal research questions motivating this study are:

- what types of beneficiaries choose to participate in state-sponsored pharmacy assistance programs and for how long;
- what types of drugs do they most commonly use;
- how much do these drugs cost and how are the costs allocated between state and federal governments;
- what impact does an outpatient drug benefit program have on beneficiary eligibility for full Medicaid benefits;
- what impact does an outpatient prescription drug benefit have on the use of provider-based medical services administered in inpatient, outpatient, physician office and home health settings; and
- what is the impact of the pharmacy assistance programs on Medicare Part A and B spending for covered individuals.

One of the main arguments in favor of adding a prescription drug benefit to Medicare is that timely and reliable access to outpatient prescription drugs may reduce the number of preventable hospitalizations for certain acute and chronic diseases such as hypertension and diabetes. In addition to improving beneficiary outcomes, an outpatient prescription drug benefit may thus result in lower Medicare expenditures for other types of provider-based care. On the other hand, an outpatient prescription drug benefit may lead to higher Part A and B expenditures if drug and non-drug medical services (e.g., physician office visits for prescription refills) are complementary or if drug use leads to

greater adverse events or complications. This report represents one of the first studies to provide an empirical assessment of the substitution of pharmaceutical care for other forms of medical care among Medicare beneficiaries. The report also gives preliminary findings in the areas of program administration, patterns of enrollment and pharmaceutical use by enrolled beneficiaries, and the impact of the pharmacy benefit programs on Medicare utilization and costs. These and other questions listed above will be addressed further in future research under this contract.[2]

1.2 Prescription Drug Spending and Coverage among Medicare Beneficiaries

According to estimates provided by the CMS Medicare Current Beneficiary Survey (MCBS), average total prescription drug expenditures among all non-institutionalized Medicare beneficiaries in 1998 were $877.[3] Prescription drug spending represented nearly ten percent of beneficiaries' total health care expenditures. Average annual prescription drug spending was even higher among the disabled ($1,253), among those who described their health status as fair or poor ($1,264), and among those suffering from multiple chronic conditions ($1,231). Moreover, spending for prescription medications has grown by over 15 percent annually in recent years, nearly five times the rate of growth in hospital spending and three times the rate of growth in physician

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[2] This study represents only the first phase of a larger evaluation of the Vermont pharmacy assistance programs. Subsequent analysis will include a survey of enrollees, as well as individuals who are eligible but unenrolled. Future work will also include a more detailed assessment of program outreach and enrollment procedures based on interviews with program administrators. In addition, the authors intend to further develop and refine the empirical models used to assess the impact of the outpatient prescription drug benefit on cost, medical service use, and health care outcomes.

[3] The Medicare beneficiary prescription drug spending and coverage figures presented in this section were derived from the MCBS as reported in Poisal and Chulis (1999); Poisal and Murray (2000); Davis and Poisal, *et al*. (1999); Poisal and Murray, *et al*., (1999); and Murray and Eppig (1999).

spending.[4] Nationwide, prescription drug spending is expected to increase by more than 12 percent per year on average over the next decade, ultimately reaching 16 percent of all health care expenditures in 2010.

Despite the growing reliance on pharmaceuticals for treating illness and maintaining health, prescription medications are the least insured medical good or service for the non-institutionalized elderly and disabled population. Nearly 30 percent of all non-institutionalized Medicare beneficiaries had no outpatient prescription drug coverage in 1998. The rate of uninsurance for pharmaceuticals was highest among individuals with incomes between 100 and 200 percent of poverty. (See Figure 1-1.) People in this income category are typically too poor to purchase commercial drug policies, but not poor enough to qualify for drug benefits under Medicaid. Since Medicare does not offer an outpatient prescription benefit, 45 percent of those beneficiaries with drug coverage obtained insurance through an employer-sponsored plan, 21 percent through a Medicare risk HMO, 16 percent through Medicaid, 14 percent through a private supplemental plan, 2 percent through a state pharmacy assistance program, and 2 percent through some other type of plan. (See Figure 1-2.) However, these plans often impose high enrollee cost sharing (via deductibles, co-payments, co-insurance and spending caps) and restrictive

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[4] Estimates of the growth in national prescription drug expenditures are based on the CMS Office of the Actuary National Health Accounts data as reported in Heffler and Levit, *et al*., (2001).

Figure 1-1
Percent of Medicare Beneficiaries Without Prescription Drug Coverage by Poverty Level,
1996 and 1998
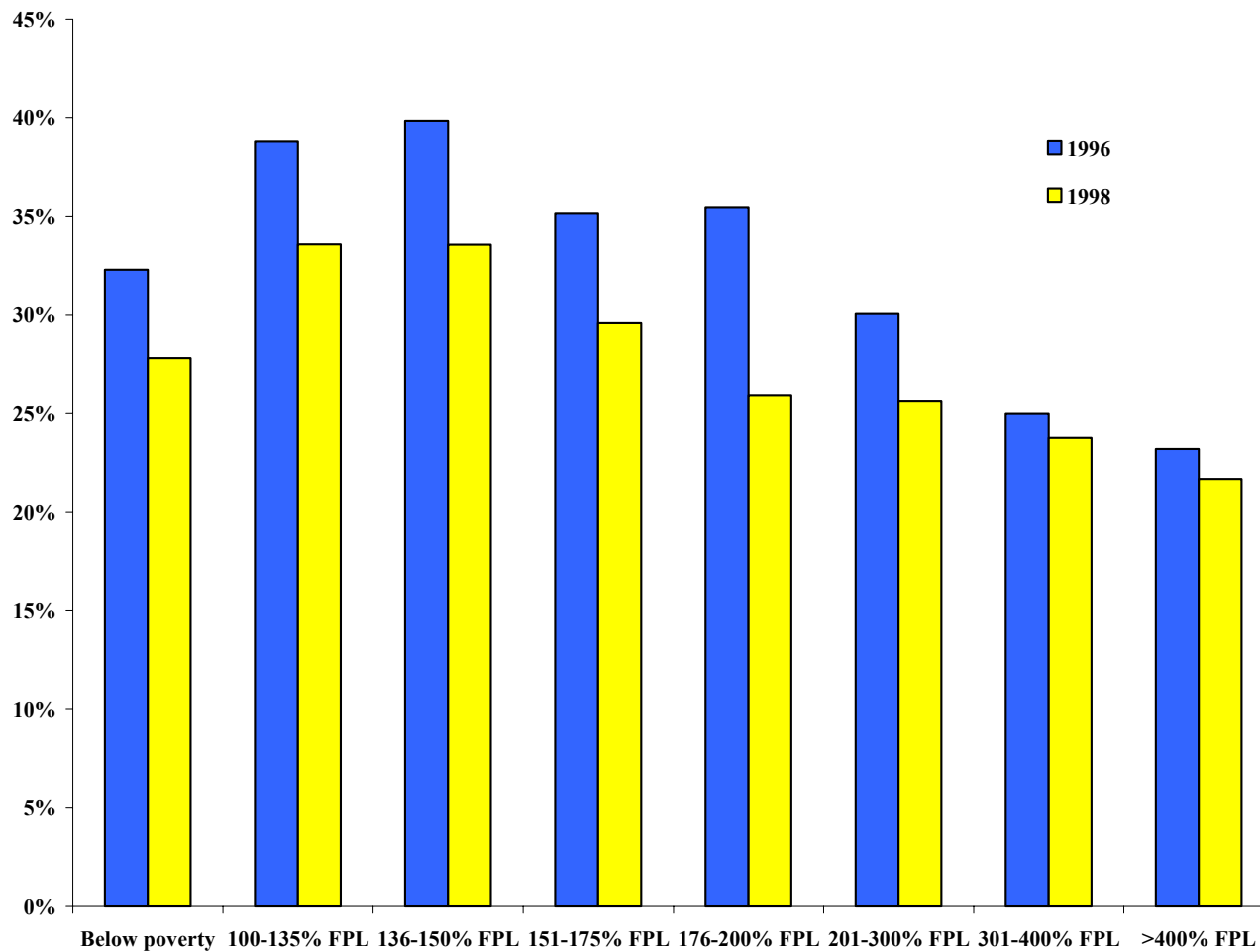
**Figure 1-2
Source of Prescription Drug Coverage for Medicare Beneficiaries, 1998**
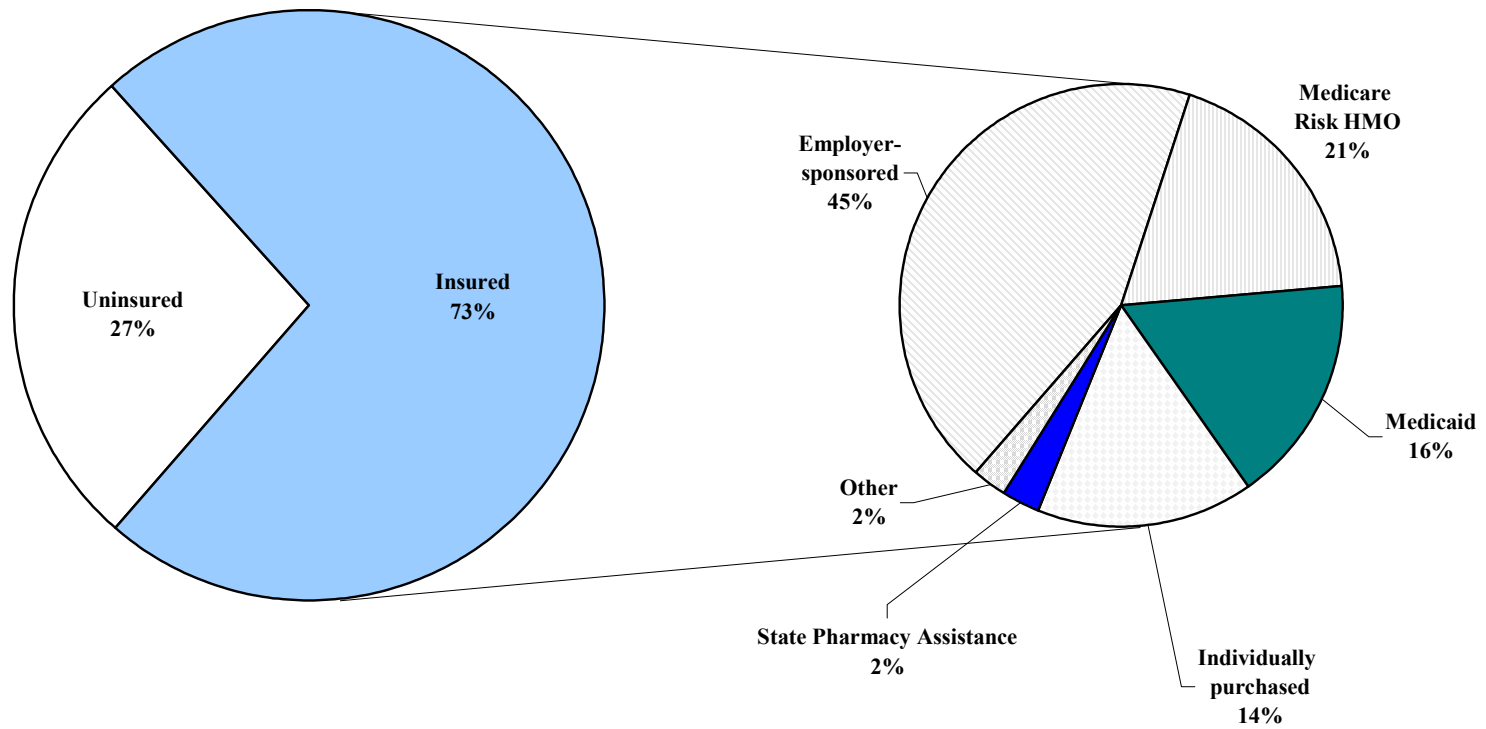
SOURCE: 1998 MCBS Cost and Use File, as reported in Poisal and Murray (2001).

drug formularies.[5] Meanwhile, many of the plans that previously offered prescription benefits, such as Medicare risk HMOs, have begun to drop their outpatient drug coverage and those that still do are raising their premiums or further restricting benefits.

The absence of a Medicare outpatient prescription drug benefit, together with high co-insurance and limited coverage for those who are covered, mean that nearly half of all prescription drug costs are paid for directly by the beneficiary. Average out-of-pocket spending on prescription drugs in 1998 totaled $385, accounting for 44 percent of all drug expenditures, including medications administered in an inpatient setting. Out-of-pocket spending on prescription drugs, measured as a share of total drug expenditures, was highest among individuals with incomes between 100 and 200 percent of the federal poverty level, those least likely to be insured. (See Figure 1-3.) In addition, recent evidence reveals that individuals without prescription drug coverage use fewer drugs than those with drug coverage. (See Figure 1-4.) Moreover, the gap in drug use between those with versus those without drug benefits has been widening over time. These competing forces – increasing reliance on newer and better drugs to maintain health and uneven access to such medications – have made outpatient drug benefits one of the most pressing issues facing Medicare today.

1.3   State Pharmacy Assistance Programs for Medicare Beneficiaries

In the absence of a nationwide Medicare outpatient drug benefit, many states have taken the initiative and implemented programs to fill the gap in prescription

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[5] For example, the three Medigap options that include a prescription drug benefit (out of the 10 plans approved by CMS) require beneficiaries to satisfy a $250 deductible and then cover only 50 percent of the cost of the prescription drug. The maximum annual benefit for two of these plans is capped at $1,250 and, for the third option, at $3,000.

Figure 1-3
Out-of-Pocket Prescription Drug Spending as Share of Total Drug Spending for Medicare Beneficiaries by Poverty Level, 1996 and 1998
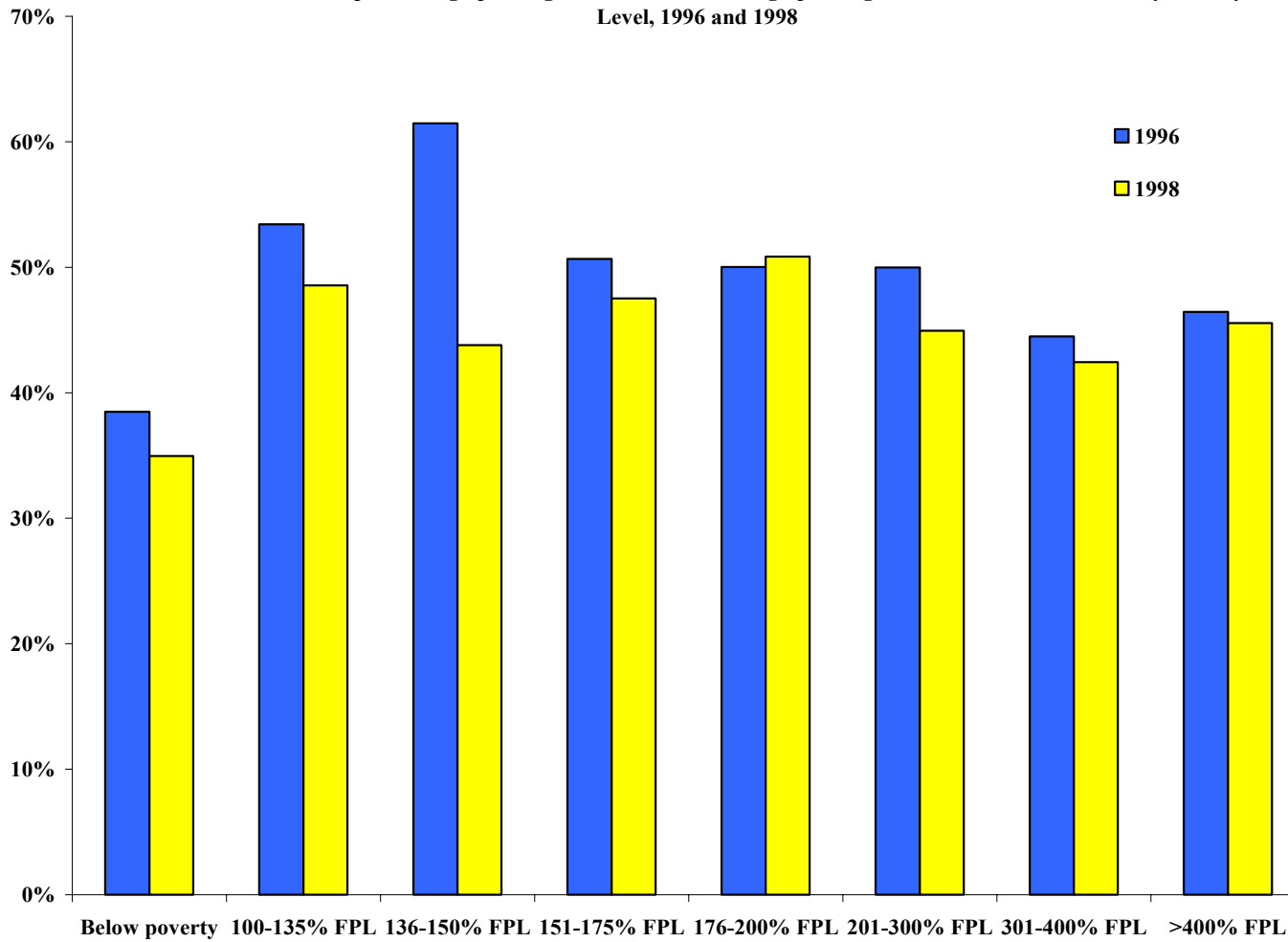
SOURCE: 1996 and 1998 MCBS Cost and Use File, as reportedin Poisal and Chulis (2000) and Poisal and Murray (2001).

Figure 1-4
Average Prescription Drug Spending for Medicare Beneficiaries
by Poverty Level, 1998

SOURCE: 1998 MCBS Cost and Use File, as reported in Poisal and Murry (2001).
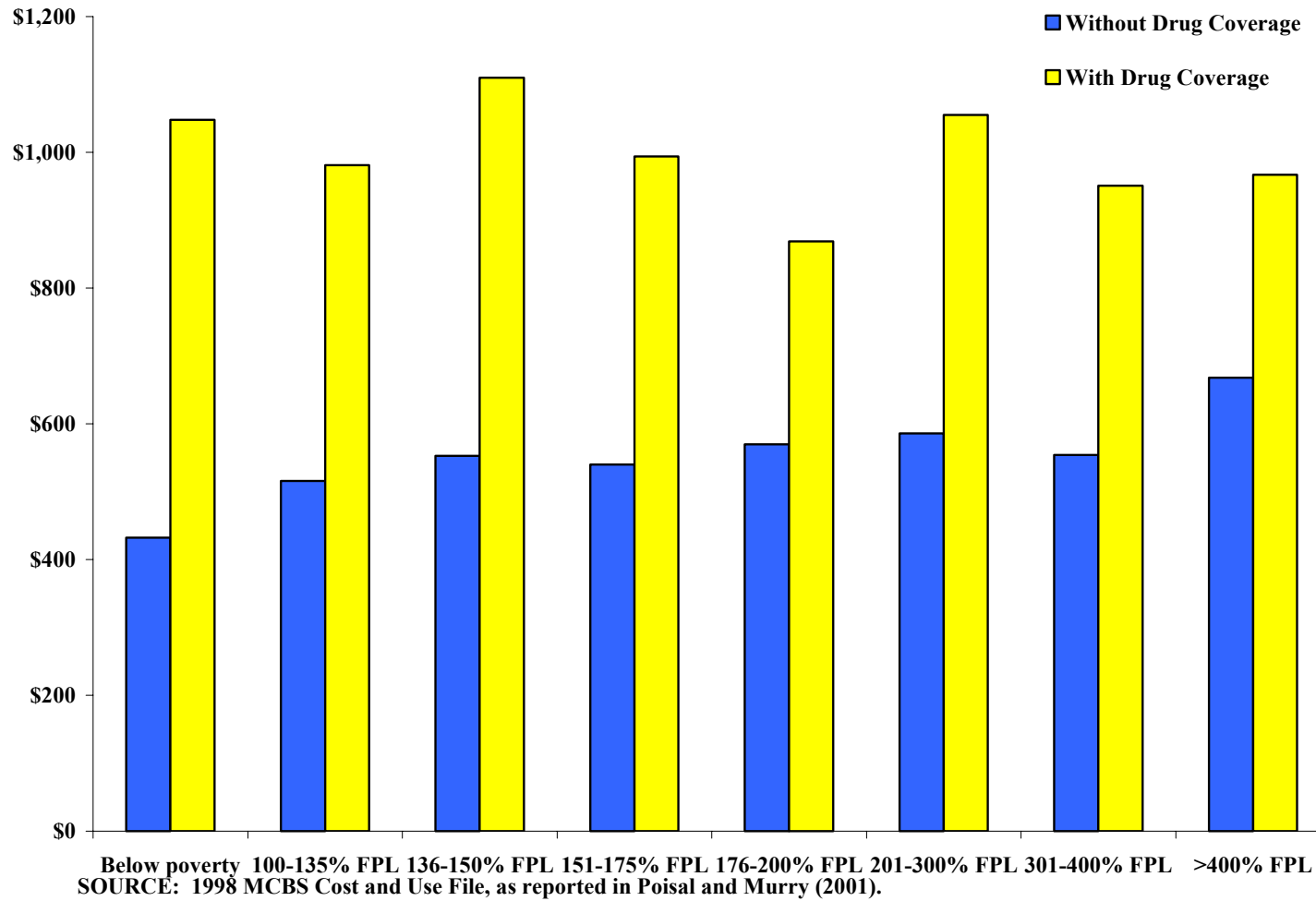
drug coverage for their low-income elderly and disabled residents. By August 2001, 20 states had implemented some type of an outpatient drug subsidy program for Medicare beneficiaries.[6] (See Table 1-1.) Eight of these states have passed new legislation expanding their senior pharmacy assistance programs over the past few years. Five additional states have passed legislation authorizing the creation of such programs that have not yet become operational.[7] These state subsidy programs currently provide outpatient drug benefits to nearly one and a half million low-income elderly and disabled individuals.

While these state-based pharmacy assistance programs vary in detail, they share many common goals and features. All programs cover the over 65 population, yet almost two-thirds extend coverage to other groups with special drug needs such as people with disabilities or those suffering from specific chronic illnesses.[8] All states impose some type of income requirement. In 2001, state income requirements ranged from 100 to 400 percent of FPL, although the level of subsidy generally diminishes as income rises. One state requires that beneficiaries' prescription drug costs exceed a fixed proportion of their monthly income prior to enrollment. Two other states waive their income requirements if prescription drug costs exceeded 40 percent of a person's income. Very few states have asset restrictions. All states have residency requirements and generally allow individuals with private drug coverage to enroll, although specific rules vary.

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[6] Four states (California, New Hampshire, Maine and West Virginia) have implemented a pharmacy discount program for which no subsidy is provided. Two other states had a pharmacy discount only program that has either not yet been implemented (Iowa) or was closed after a court ruling (Washington).

[7] These include Arizona, Arkansas, Kansas, Oregon and Texas.

[8] Only state pharmacy assistance programs in Maryland and Wyoming do not impose a minimum age requirement on enrollees.

Table 1-1

State Pharmacy Assistance Programs, 2001

	Year Enacted	Year Impl.	Elderly/ Disabled Covered	Income (% FPL)	Enroll.	Rx. Coverage	Funding Source
Connecticut	1985	1986	Yes/Yes	175	31,666	All	State
Delaware	1999	2000	Yes/Yes	200	29,577	All	State
Florida	2000	2001	Yes/Yes	120	20,500	All	State
Illinois	1985	1985	Yes/Yes	250	145,089	Dx Specific	State
Indiana	2000	2000	Yes/Yes	135	10,000	All	State
Maine*	1975	1975	Yes/Yes	225	41,000	All	State
Maryland*	1978	1979	Yes/Yes	100	34,000	Maintenance	State
Massachusetts*	1996	1997	Yes/Yes	188	91,000	All	State
Michigan*	1988	1990	Yes/No	200	44,000	All	State
Minnesota	1997	1999	Yes/No	120	6,322	All	State
Missouri	1999	1999	Yes/No	175	262,000	All	State
Nevada	1999	2001	Yes/Yes	200	1,167	All	State
New Jersey*	1975	1975	Yes/Yes	220	188,000	All	State
New York	1986	1987	Yes/No	400	200,000	All	State
North Carolina	1999	2000	Yes/Yes	150	2,076	Dx Specific	State
Pennsylvania*	1983	1983	Yes/No	185	234,711	All	State
Rhode Island*	1985	1985	Yes/No	400	33,000	Dx Specific	State
South Carolina	2000	2001	Yes/No	175	34,000	All	State
Vermont*	1989	1989	Yes/Yes	225	9,428	All	State/Federal
Wyoming	1988	1988	Yes/Yes	100	550	All	State

NOTES: States with an '*' have implemented additional expansion programs since the first initiative was enacted. Eligibility and coverage rules may vary across expansion programs within a state. Five additional states have enacted but not yet implemented pharmacy assistance programs (Arizona, Arkansas, Kansas, Oregon and Texas). Another five states have either enacted or implemented a pharmacy discount only program with no direct subsidy (California, Iowa, New Hampshire, Maine and West Virginia). Finally, Washington had a pharmacy discount program that was recently closed after a state court ruled it was unconstitutional. In 2002, Illinois received a federal waiver to implement a Title XIX funded prescription drug benefit similar to Vermont's.

SOURCE: *State Pharmacy Programs: Assistance Designed to Target Coverage and Stretch Benefits*, GAO/HEHS-00-162, August 2001; *State Senior Pharmaceutical Assistance Programs*, National Conference of State Legislatures, December 2000; and *State Pharmacy Assistance Programs*, AARP, Report #9905, April 1999.

Most programs cover all prescription drugs, although a few limit coverage to drugs for specific conditions or maintenance drugs, such as those used to treat diabetes and hypertension. All programs impose some form of enrollee cost sharing, either through annual enrollment fees, deductibles, co-payments, co-insurance or annual spending limits.[9] Most states rely mainly on a nominal co-payment that varies with the cost of the medication to shift some responsibility onto the participants and to encourage use of less expensive or generic substitutes. All pharmacy assistance programs are funded by state appropriations from general revenues plus, in a few cases, dedicated revenues from special taxes and/or tobacco settlement monies. Vermont was the first state to receive federal matching dollars for its pharmacy assistance program through the state's 1115 Medicaid demonstration waiver.[10]

1.4 Pharmacy Benefits for Elderly and Disabled under Medicaid

Pharmacy assistance programs are not the only way in which Medicare beneficiaries can obtain state-sponsored drug benefits. Medicare beneficiaries can qualify for prescription drug coverage under traditional Medicaid as well if their income and assets meet the requirements for supplemental security income (SSI) assistance.

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[9] Connecticut, Illinois, Massachusetts and New York impose an annual enrollment fee, like a premium, ranging from $8-$280 and often determined on the basis of income. Only Massachusetts and Delaware impose an annual limit on the total amount of drug costs the programs will cover for an individual of $1,250 and $2,500, respectively.

[10] Since January 2002, Title XIX-funded pharmacy benefit programs have been approved and are operational in Florida, Illinois, South Carolina, and Wisconsin. The Florida, South Carolina, and Wisconsin programs were approved under the Bush Administration's Pharmacy Plus waiver initiative. In addition, Maryland has received approval to offer a similar pharmacy benefit program through their existing Section 1115 Comprehensive Health Reform Demonstration.

Thirty-four states also provide Medicaid coverage to medically needy Medicare beneficiaries whose income and assets exceed SSI criteria, but who incur medical expenses that are so high that their net incomes put them near or below the poverty level. For these 'dual eligibles' who qualify for both full Medicaid and Medicare benefits, health care services covered under Medicare are supplemented with services provided by the state Medicaid program. Supplemental Medicaid services will vary by state, but most offer outpatient prescription drug coverage, including Vermont.

Medicare beneficiaries may also qualify for prescription drug coverage under Medicaid even if they do not receive SSI assistance. Under the Omnibus Reconciliation Act of 1986 (OBRA 86), states have the option of providing full Medicaid benefits, including outpatient drug coverage, to Medicare beneficiaries with incomes up to 100 percent of FPL and resources not in excess of the SSI resource level (later increased to twice the SSI limit). Vermont is one of eleven states to exercise this option.[11] According to recent estimates, approximately 3.5 million Medicare beneficiaries receive full Medicaid benefits.[12] The majority of these Medicare beneficiaries will have access to outpatient drug coverage through Medicaid either through categorical, income or medically needy eligibility.

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[11] Sometimes referred to as the Qualified Medicare Beneficiary (QMB) program, Medicaid pays Part B premiums and Part A and B coinsurance and deductibles for these individuals. Not all states elect to provide full Medicaid benefits to QMB beneficiaries. Those that do are commonly referred to as 'QMB Plus' states. Beginning in 1993, the Specified Low-Income Medicare Beneficiary (SLMB) program expanded these provisions by mandating Medicaid coverage of Part B premiums only for Medicare beneficiaries with incomes up to 120 percent of FPL and resources that do not exceed twice the SSI limit. However, SLMB eligibles are not entitled to full Medicaid benefits, and thus do not receive outpatient drug benefits through Medicaid. Vermont is a QMB Plus state and makes full Medicaid benefits, including prescription drugs, available to its QMB eligibles.

[12] Counts of dual eligibles are based on HER analysis of CMS' 2000 TPEARTH file.

1.5   Prescription Drug Spending in Vermont

Before turning our attention to the variety of programs that Vermont has initiated to address the gap in outpatient prescription drug coverage for Medicare beneficiaries, it is helpful to review the trend in prescription drug spending in the state. The CMS Office of the Actuary State Health Care Expenditure Accounts (SHEA) provides information on health care expenditures by service, state and region. Unfortunately, the SHEAs do not break out prescription drug spending by payer and do not distinguish between insured and out-of-pocket expenditures. Hence, the summary figures that follow are for prescription drug and health care spending across all residents, not just Medicare beneficiaries. In addition, SHEA expenditures are based on where the health care service or good is provided, not on where the individual is residing. Figures for states or regions with a net outflow of health care dollars (e.g., residents of Vermont spend more on health care services outside of their state than non-residents do on health care services in Vermont) will underestimate health care expenditures by residents of those areas.

Figure 1-5 reveals that the average Vermont resident spends less on prescription drugs than the average resident in New England or the United States. According to the figures, residents of Vermont spent on average $310 on prescription drugs in 1998, compared with an average of $369 in New England and $335 in the United States. On a per resident basis, Vermont spent 16 percent less than Maine and 6 percent less than New Hampshire on prescription drugs. Figure 1-6 demonstrates the exponential growth in per capita prescription drug spending over the last twenty years in Vermont, as well as in New England and the United States as a whole. Between 1980 and 1998, prescription

Figure 1-5
Per Capita Prescription Drug Spending in New England by State and the US, 1998
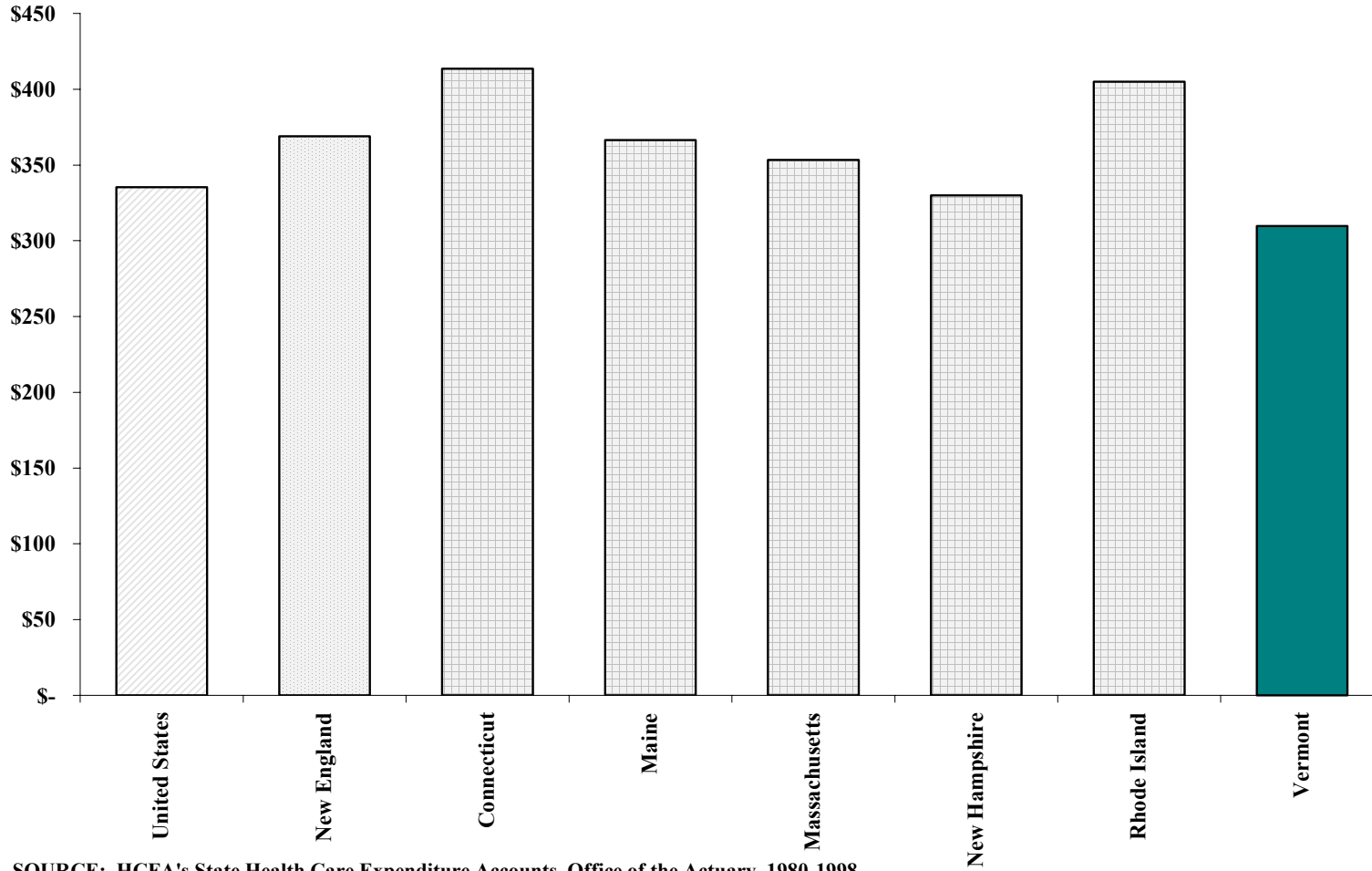
SOURCE: HCFA's State Health Care Expenditure Accounts, Office of the Actuary, 1980-1998.

Figure 1-6
Per Capita Prescription Drug Spending in Vermont, New England and the US, 1980-1998

drug spending grew by an average annual rate of 11.6 percent in Vermont, compared with 11.7 percent in New England and 10.8 percent in the United States. During the last three years for which data are available, per capita expenditures on pharmaceuticals increased on average by 13.0 percent in Vermont, compared with 14.4 and 13.0 percents in New England and the United States, respectively. As previously reported, the pace of drug spending has continued to accelerate in more recent years.

Finally, Figure 1-7 shows that Vermont residents have historically spent a larger proportion of their health care dollars on prescription drugs than either the average for New England or the United States as a whole, although the difference has narrowed in recent years. In 1998, roughly nine cents of every dollar spent on health care went toward the purchase of prescription drugs in Vermont, compared with eight cents on the dollar in New England and nine cents on the dollar in the United States. The share of health care dollars going toward prescription drugs has climbed steadily in New England and the United States over the past two decades. In Vermont, the proportion of health care dollars consumed by prescription medications climbed rapidly in the 1980s, held steady during the early 1990s, and has begun to rise sharply again in recent years.

A review of CMS's historical health care expenditure accounts reveals that Vermonters spend less on all health care goods and services, including prescription drugs, than the average resident of New England or the United States. But the state has tended to rely more heavily on pharmaceuticals for health care than either the region or country as a whole.

Figure 1-7
Prescription Drug Spending as a Share of Total Health Care Spending in Vermont, New England and the US, 1980-1998
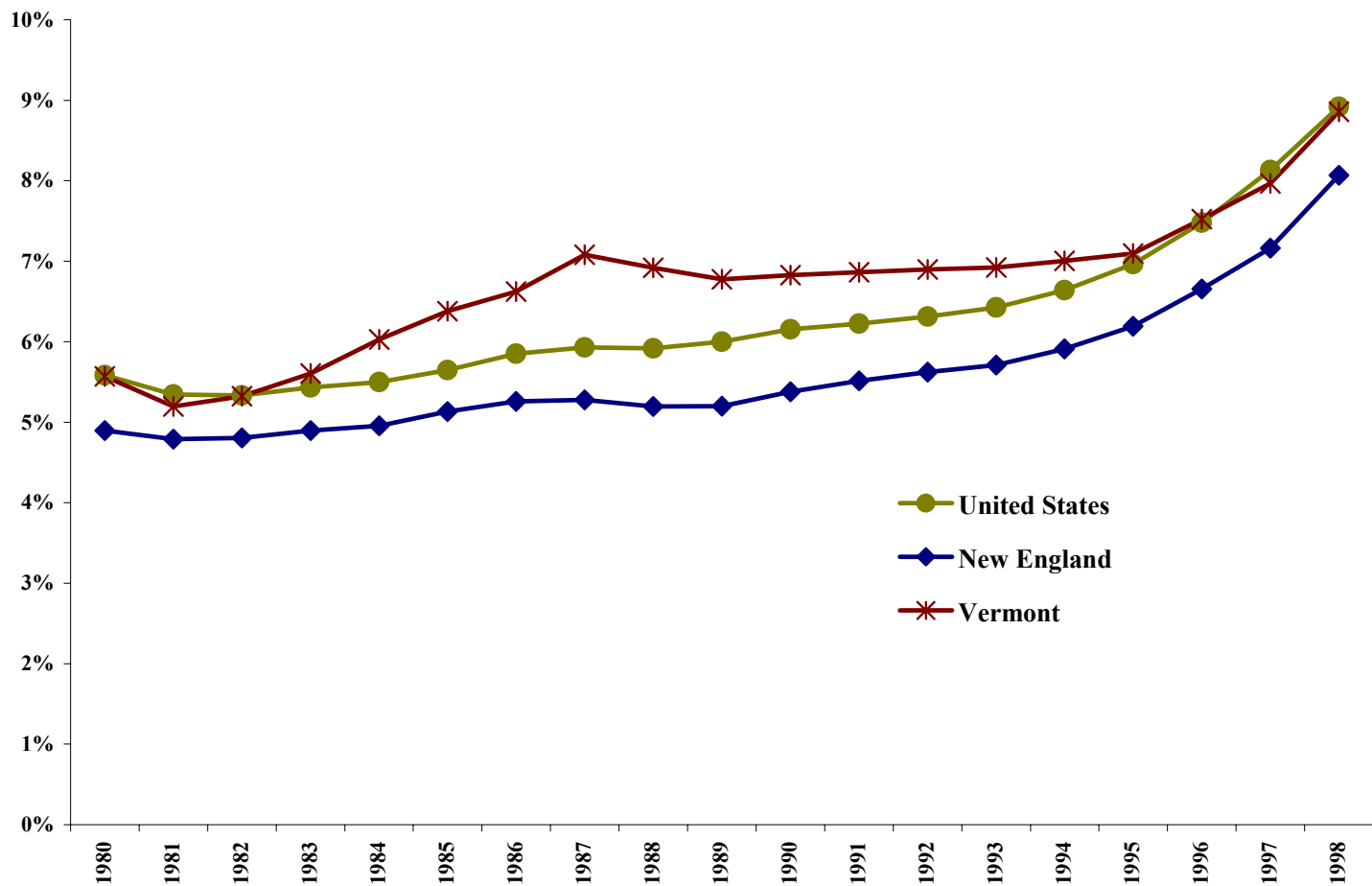
1.6 Impact of State Pharmacy Assistance Programs for Elderly and Disabled

Emerging evidence suggests that state pharmacy assistance programs have helped reduce the number of low-income elderly and disabled Medicare beneficiaries without drug coverage. An estimated one million individuals were enrolled in state pharmacy assistance programs in 1999, accounting for roughly two percent of the insured population. (See Figure 1-2.) Presumably, the majority of these individuals would have remained uninsured without the state initiatives. The proportion of those without prescription drug coverage fell most for individuals in the 100-200 percent poverty group. Between 1996 and 1998, the share of Medicare beneficiaries without prescription drug coverage with incomes greater than 400 percent of poverty fell by only seven percent, compared with 15 percent for those with incomes between 100-175 percent of poverty and 27 percent for those with incomes between 176-200 percent of poverty. (See Figure 1-1.)

The impact of state pharmacy assistance programs can also be seen in the relative decline in the share of out-of-pocket spending across income groups. The share of out-of-pocket spending for prescription drugs fell nearly 30 percent for Medicare beneficiaries with incomes between 136-150 percent of poverty, compared with less than ten percent for those with incomes below poverty (and, hence, likely to be eligible for drug coverage under Medicaid) and less than five percent for those with incomes above 300 percent of poverty. (See Figure 1-3.)

Very few efforts have been made to date to analyze the impact of prescription drug benefits for low-income seniors and people with disabilities on such factors as

utilization of non-drug medical services, the overall cost of health care, health outcomes and the rate at which individuals spend down to Medicaid eligibility. Many of the studies that have been conducted in related areas have been sponsored by the pharmaceutical industry in an effort to demonstrate the cost effectiveness of specific products. More recent policy-oriented studies designed to estimate the program costs of a Medicare outpatient drug benefit tend to ignore the potential for offsetting reductions in medical service use altogether or simply mention it as an issue to be considered in future research.

Among the studies that have been conducted in this area, the results are mixed and vary depending on the type of drug, disease group or population analyzed, as well as the source of research funds. A recent review of 228 published cost effectiveness analyses found that the median cost of pharmaceutical interventions was $11,000 per quality adjusted life year gained (Neumann, *et al*, 2000). However, it is crucial to note that cost effectiveness does not necessarily represent program savings. In fact, very few of the studies reviewed in the synthesis report demonstrated any cost savings. The review article reported that 21 percent of the industry-sponsored studies showed savings, compared with only 9 percent of the non-industry-funded studies. In these cases, pharmaceutical therapy resulted in lower expenditures compared to what patients would have incurred had they not been treated with the drugs. In all other cases, pharmaceutical intervention resulted in an increase in expenditures ranging from $4,000 to $460,000 per quality adjusted life year gained.

Two studies of particular relevance to this analysis found that improving access to outpatient prescription drugs among elderly Medicaid recipients was associated with a

lower rate of provider-based medical service use (Soumerai, *et al*., 1991; Soumerai, *et al*., 1994). The first study found that a Medicaid three-prescription drug cap resulted in significantly higher rates of admission to nursing homes. When the drug limit was removed 11 months later, use of medications returned to previous levels and the likelihood of being admitted to a nursing home fell. A related study found that, among non-institutionalized patients with schizophrenia, the three-prescription monthly payment limit increased the rate of clinic and emergency room mental health visits, and partial hospitalizations. Again, when the cap was discontinued, use of prescription medications and most mental health services reverted to earlier levels. However, neither of these studies examined the effect of the drug cap, or its elimination, on Medicaid expenditures.

Part of the reason for the lack of research on the substitution of pharmaceutical for provider-based medical care is that outpatient drug coverage has only recently become a major policy concern at the federal level. Historically, outpatient drug costs were only a minor component of overall health care expenditures, even among seniors, and not covered under the Medicare program. However, the escalating cost of prescription drugs and the increasing potential for substitution of pharmaceutical for provider-based medical treatments have pushed the issue onto the national health policy agenda. Fortunately, with the implementation of state pharmacy assistance programs, critical information on the substitutability of services and potential program savings, particularly among the disabled and elderly, is now becoming available to answer such questions.

1.7 Purpose and Organization of Report

The main purpose of this report is to analyze the impact of Vermont's pharmacy assistance programs on outpatient prescription drug coverage in the state, on the cost and utilization of outpatient prescription drugs, and on the cost and use of other non-pharmaceutical medical services covered by Medicare. The primary objectives of the study are twofold. The first major objective is to provide state and federal health policy makers with an empirical assessment of the overall cost of providing outpatient prescription drug coverage to low income elderly and disabled populations. The second major objective is to provide health policy makers with an assessment of the potential savings, if any, from the reduction in the use of other medical services such as hospitalizations, physician visits and home health visits that could have been avoided with consistent and timely access to outpatient prescription drugs. The study is intended to inform the debates over Medicare outpatient prescription drug benefits currently taking place in both the federal government and states by providing an empirical foundation for the discussions.

The remainder of this report is organized as follows. Chapter 2 provides a thorough description of Vermont's various pharmacy assistance programs for low income and disabled residents. Chapter 3 uses the state's eligibility files to analyze the composition of and trends in enrollment in the state pharmacy assistance programs, including their impact on the rate at which residents "spend-down" to full Medicaid benefits. Chapter 4 uses the state's eligibility and pharmacy claims files to analyze outpatient prescription drug use and cost for enrollees in the Vermont pharmacy

assistance programs. Chapter 5 uses the Medicare claims files to analyze the impact of the state's pharmacy assistance programs on the substitution of care between prescription drugs and provider-based care administered in an inpatient, outpatient or home setting. The major conclusions and policy implications of the study are summarized in Chapter 6.

2 Description of Vermont's Low-Income Pharmacy Assistance Programs

2.1 Introduction

Vermont offers a number of pharmacy benefit programs to its low-income elderly and disabled residents. The first, called *VScript*, was started in 1989 as a state-funded program to offer low-income Medicare beneficiaries a 50 percent subsidy on maintenance prescription drugs. The second, called *VHAP Pharmacy*, was introduced seven years later under the state's 1115 Medicaid waiver. It employs both state and federal dollars to provide a more generous drug benefit package with less enrollee cost-sharing to seniors and disabled residents with slightly lower incomes than its VScript partner. In 1999 the original VScript became funded through VHAP Pharmacy and in 2000 the state-funded VScript was extended to a higher income population. The expanded VScript program is referred to as *VScript Expanded*.

Finally, in 2001, the *Pharmacy Discount Program* (PDP) was implemented. The initiative was designed to provide access to pharmaceuticals for all adults with incomes below 300 percent of the federal poverty level at the negotiated Medicaid fee schedule less applicable rebates. The PDP was also intended to provide access to pharmaceuticals to all Medicare beneficiaries who lack other outpatient pharmacy coverage regardless of income. However, a federal appeals court, upholding a pharmaceutical industry challenge, ruled in June 2001 that CMS improperly approved Vermont's plan to extend reduced prescription drug prices through Medicaid to seniors and some non-elderly adults who would not otherwise quality for traditional Medicaid assistance. As a result,

the state was forced to cancel the pharmacy discount program until further appeal or modification.[1]

Today, 15.7 percent of all Medicare beneficiaries in Vermont receive outpatient pharmacy assistance under these state programs. An additional 16.6 percent of Medicare beneficiaries in Vermont receive prescription drug assistance as dual eligibles who qualify for full Medicaid benefits. The purpose of this chapter is to provide an overview of the history, objectives, eligibility requirements, benefits and cost sharing arrangements of Vermont's VHAP Pharmacy, VScript and VScript Expanded drug assistance programs. For comparative purposes, the outpatient prescription drug benefit available to dual eligibles through the traditional Medicaid program is also reviewed in this chapter.

2.2   History and Objectives of Vermont Pharmacy Programs

The Vermont pharmacy programs, like most state-administered drug assistance programs, were intended to help those most vulnerable to the absence of a federal drug benefit. This particularly applies to low-income Medicare beneficiaries who are not eligible for, cannot afford or choose not to purchase employer-sponsored retirement plans or Medicare supplemental (Medigap) plans, but who are not poor enough to qualify for Medicaid. The explicit objectives of VScript and VHAP Pharmacy are to help defray the

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[1] The Vermont legislature approved the VHAP Pharmacy Discount Program in May 2000 as part of its 1115 demonstration waiver. The VHAP Pharmacy Discount Program was designed to allow individuals to take advantage of the Medicaid drug rebate program. Eligible individuals included all Medicare beneficiaries with incomes greater than 150 percent of FPL and all other residents with incomes less than 300 percent of FPL. The VHAP Pharmacy Discount Program provided access for its beneficiaries to all drugs including drugs for acute conditions for VScript eligibles. The VHAP Pharmacy Discount Program provided a retail discount only; it did not provide a state subsidy. The VHAP Pharmacy Discount Program was implemented in January 2001 and had enrolled 900 Medicare beneficiaries and 1,789 non-Medicare beneficiaries by the time it was suspended, not including the VScript and VScript Expanded participants who were automatically enrolled in the program.

rising cost of prescription drugs to low-income elderly and disabled residents, to improve access to drugs that maintain their health, and to prevent unnecessary health problems due to inadequate access to prescription drugs.

Achieving these objectives carries two potential indirect benefits as well. First, prescription drug benefits for low-income elderly and disabled may lower overall Medicare expenditures by reducing the need for outpatient and inpatient medical services for people suffering from chronic prescription drug sensitive conditions. Second, by preventing the low-income elderly and disabled with high and expensive prescription drug needs from exhausting all of their financial resources on medications, drug assistance programs may reduce the number of people who spend-down to full Medicaid eligibility. While VScript and VHAP Pharmacy share the same goals, VHAP Pharmacy was introduced as a way of providing a more generous benefits package with less enrollee cost sharing to individuals with lower incomes, and provided a mechanism for accessing federal funding.

2.3 Eligibility Requirements, Pharmacy Benefits and Enrollee Cost Sharing

2.3.1 Eligibility Requirements

The eligibility requirements, covered benefits, and enrollee cost sharing arrangements for VHAP Pharmacy, VScript and VScript Expanded have been changed since each program was originally implemented. The changes in the income limits for the state pharmacy assistance programs are shown graphically in Figure 2-1. The

Figure 2-1
Income Limits for VHAP Pharmacy, VScript and VScript Expanded

VScript
- covers maintenance drugs only
- 80% coins. from 1/89 to 7/97
- 50% coins from 7/97 to 4/99
- $1 - $2 copay from 4/99 to 10/01
- state dollars only up to 4/99
- federal matching dollars after 4/99

VScript Expanded
- maintainance Rx only
- 50% coins up to 10/01
- state dollars only

VHAP Pharmacy
- covers all drugs
- 60% coins from 1/96 to 5/96
- $1-$2 copay from 5/96 to 10/01
- federal matching dollars
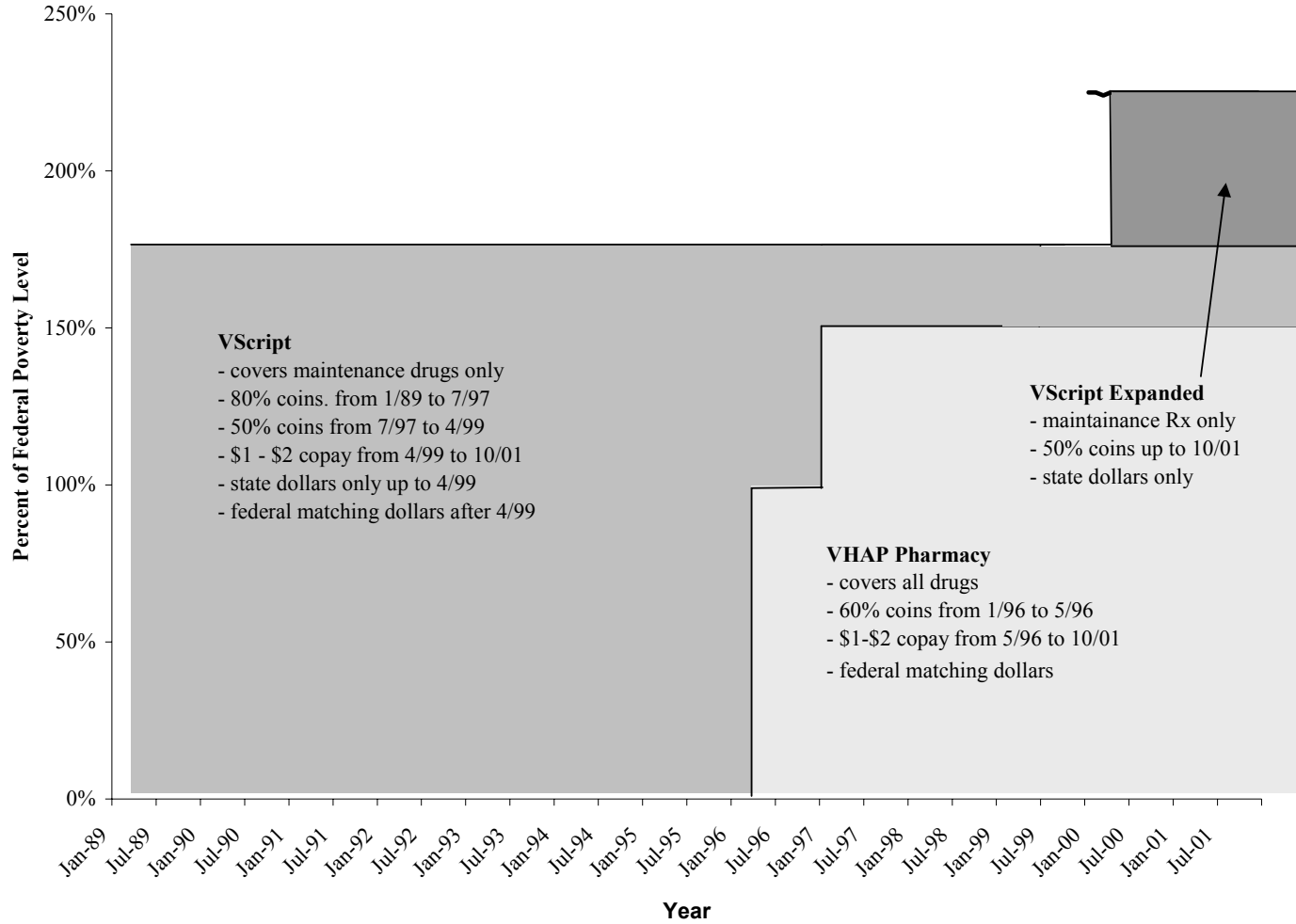
Table 2-1

Comparison of Vermont Programs with Pharmacy Assistance, 2000

	VHAP Pharmacy	VScript	VScript Expanded	Medicaid Duals
Year Started	1996	1989	2000	1965
Eligibility Requirement				
Eligibility Bases	65+/Disabled	65+/Disabled	65+/Disabled	65+/Disabled
Income (% FPL)	150	175	225	100
Asset Limit	None	None	None	SSI / 2 x SSI
Existing Rx Coverage Allowed	No	No	No	Yes
Vermont Resident	Yes	Yes	Yes	Yes
Citizen/Resident Alien	Yes	Yes	Yes	Yes
Covered Drugs	All	Maintenance	Maintenance	All
Enrollee Cost Sharing	$1 or $2	$1 or $2	50%	$1 or $2
Source of Funds	State/Federal	State/Federal	State	State/Federal
Medicare Enrollees	9,748	2,892	2,019	15,454
% Medicare Beneficiaries	10.4%	3.1%	2.2%	16.6%

NOTES: Medicaid duals who qualify as QMBs are allowed assets up to twice the SSI limit.

SOURCE: Bulletin No. 96-4F, General Assembly, State of Vermont; Vermont Medicaid Recipient Eligibility File, 2000; HCFA Denominator File, 2000.

eligibility requirements, covered drug benefits, cost sharing arrangements and number of enrollees in 2000 are listed in Table 2-1.

Eligibility for VScript and VHAP Pharmacy is based on a range of criteria, including age, disability, income, residency, and private pharmacy coverage. (See Table 2-1.) Enrollees in either program must be at least 65 years old or receiving disability benefits from Social Security (OASDI), Medicare or Railroad Retirement. Individuals must not be receiving any other assistance for prescription drug expenses at the time of

enrollment other than VScript or Medicare.[2] At the time of application, individuals must also be native-born or naturalized US citizens or resident aliens lawfully admitted for permanent residence and living in Vermont. Individuals who meet these requirements but who do not otherwise qualify for Medicare benefits because of the two-year waiting period for disability recognition, citizenship or lack of prior waged employment nonetheless remain eligible for the state drug assistance programs.[3]

VScript and VHAP Pharmacy have income (but not asset) requirements, which have been expanded over time. VScript was initially available to individuals with incomes less than 175 percent of the federal poverty level (FPL).[4] In January 1996, the state began offering the more generous VHAP Pharmacy benefits at a lower level of enrollee cost sharing to individuals with incomes up to 100 percent of FPL. In November 1996, the income threshold for VHAP Pharmacy was raised to 150 percent of FPL. When the income criterion for VHAP Pharmacy was increased, the qualifying VScript population was automatically absorbed into the more generous (and partially federally funded) program.

In April 1999, the original VScript became absorbed and funded under the state's 1115 waiver when the income requirement for the VHAP Pharmacy program was expanded to 175 percent of FPL. As a result, in January 2000 the state set the income threshold for VScript at 225 percent of FPL. Finally, in January 2001, Vermont

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[2] People with a privately purchased Medicare supplemental pharmaceutical benefit can drop it without penalty and downgrade to a physician and hospital benefit only in order to be eligible for VScript or VHAP Pharmacy.

[3] Adults with incomes below 150 percent of poverty who do not receive Medicare benefits may be eligible for full medical coverage, including drug coverage, under Vermont's VHAP Uninsured Program. Participants in the VHAP Uninsured program pay a 50 percent co-insurance for prescription drugs. Individuals who receive drug coverage under the VHAP Uninsured Program are not included in our study.

introduced the Pharmacy Discount Program to Medicare eligibles with incomes greater than 150 percent of FPL (with no upper limit) and others with incomes less than 300 percent of FPL.[5] However, as stated earlier, the PDP was suspended in June 2001 when a three-judge panel of the U.S. Court of Appeals for the D.C. Circuit ruled in favor of an industry suit agreeing that the secretary of DHHS lacked the authority to grant the necessary waiver for the VHAP Pharmacy Discount Program.[6]

2.3.2 Pharmacy Benefits under VScript and VHAP Pharmacy

Given the reliance on state funds, VScript's priority has been on prescription drugs considered essential for maintaining the health of seniors and disabled people suffering from chronic conditions, such as hypertension, asthma and diabetes. Individuals who depended on prescription drugs to control their chronic conditions over a long period of time were considered most vulnerable to the lack of a Medicare drug benefit and, thus, most in need of a targeted public pharmacy assistance program. By targeting the chronically ill, the early initiative was also designed to have the greatest effect on reducing the use and cost of other medical services, including those expenses borne by the state's Medicaid program. Thus, under VScript and VScript Expanded, only

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[4] The federal poverty level in 2001 for an individual was $8,590 and, for a married couple with or without children, $11,610.

[5] Individuals with incomes between 150 and 225 percent of FPL who receive maintenance drug coverage under either VScript or VScript Expanded could also receive non-maintenance drug coverage under the Prescription Discount Program.

[6] The ruling was based on the fact that Congress imposed the rebate requirements to reduce the cost of Medicaid. Since the Prescription Discount Program would not result in any Medicaid savings, the court reasoned, DHHS should not have approved the program.

maintenance prescription medications are covered. Maintenance drugs are defined as all medications for which a single 60-day supply is prescribed.[7]

With the introduction of VHAP Pharmacy in 1996, Vermont was able to take advantage of federal matching funds under its 1115 Medicaid waiver for its beneficiaries. VHAP Pharmacy covers all prescription drugs, including contraception medications and devices, insulin supplies and needles and syringes.[8] Fertility, experimental drugs and non-prescription drugs are not covered. In April 1999, when VScript for individuals between 150 and 175 percent of FPL became part of VHAP Pharmacy, coverage remained restricted to maintenance prescription drugs, but cost sharing was reduced to the same level as VHAP Pharmacy. In January 2000, VScript Expanded with maintenance drug coverage was extended to all elderly and disabled residents with incomes between 175 and 225 percent of FPL.

2.3.3 Enrollee Cost Sharing under VScript and VHAP Pharmacy

Both VScript and VHAP Pharmacy require enrollee cost sharing. Initially, both pharmacy assistance programs relied on an enrollee co-insurance (i.e., enrollees were required to pay a percent of prescription costs). VScript imposed an 80 percent co-

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[7] Neither VScript nor VHAP Pharmacy has a formulary. However, enrollees must use a generic drug whenever available, unless a brand name drug is certified by the prescribing physician.

[8] Drugs that are to be used continuously for 30 days or more are prescribed and dispensed in amounts sufficient to allow the patient no fewer than 30 days and no more than 90 days at a time. Up to five refills per script within a given year are permitted. However, a drug can be re-prescribed by the physician as many times as necessary, thus, in effect, eliminating any cap on prescriptions covered.

insurance payment and VHAP Pharmacy a 60 percent co-insurance payment.[9] In May 1996, the VHAP Pharmacy enrollee co-insurance payment was replaced by a two-tiered co-payment system (i.e., enrollees are required to pay a fixed amount per prescription, regardless of the cost). VHAP Pharmacy enrollees are required to pay $1 for prescriptions that cost less than $30 and $2 for prescriptions that cost $30 or higher. The dual co-payments were later applied to the VScript 150-175 percent FPL income group that was absorbed into VHAP Pharmacy in April 1999. However, prior to that, in July 1997, the VScript co-insurance was lowered to 50 percent. The 50 percent co-insurance was applied when VScript was expanded to include the 175-225 percent FPL income group in January 2000.[10] Neither program uses any other form of cost sharing such as deductibles, spending caps, or annual fees. Nor does either program have an out-of-pocket maximum. Enrollee payments are paid to the pharmacy at the time of filling the prescription. The state then pays the pharmacies the traditional Medicaid fee for prescriptions minus the cost sharing.

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[9] Payment for prescribed drugs is made at the lower of the price for ingredients plus the dispensing fee or the usual and customary cost to the general public. For multiple source drugs (i.e., therapeutically equivalent or generic drugs) the price for ingredients is the lower of the CMS listed upper limit, the VHAP listed upper limit, or the Average Wholesale Price (AWP). For non-multiple source drugs (i.e., brand name or drugs other than multiple source), the price for ingredients is 90 percent of the AWP. Vermont state law requires generic substitution whenever possible.

[10] Changes to the cost sharing structure were instituted October 1, 2001. The state instituted a three-tiered co-payment system for both Medicaid and VHAP Pharmacy of $1 for prescriptions below $30, $2 for prescriptions between $30 and $49.99, and $3 for prescriptions $50 or more. Co-payments for VScript were changed to $2 for prescriptions below $30 and $4 for prescriptions $30 or more. Coinsurance rates for VScript Expanded are 41.25 percent, net of pharmacy rebate.

2.4   Administration and Funding of VScript and VHAP Pharmacy

VScript, VScript Expanded and VHAP Pharmacy are administered by the Office of Vermont Health Access which is part of the Department of Prevention, Assistance, and Health Access (PATH), as are all publicly-funded health insurance programs in Vermont. Applications for all pharmacy programs are mailed out with individuals' state income tax returns each year and can be returned to the Department of Taxes by June 15. Applications can also be submitted to the Vermont Health Access Eligibility Services Unit or a PATH district office at any time during the year. Eligibility decisions must be made within 30 days following the date the application. Eligibility is from the date of determination until the following June 30.[11]   Individuals are required to report any changes in their circumstances that may make them ineligible for VHAP Pharmacy within 10 days of the change.

State funds expended under VScript and VHAP Pharmacy are obtained from cigarette tax revenues.[12]   However, by including pharmacy assistance for low-income seniors and disabled who are not covered under traditional Medicaid in its 1115 demonstration waiver, Vermont was able to take advantage of the opportunity to tap federal matching dollars for expenditures under VHAP Pharmacy. Out of the 16 states currently offering drug coverage for low-income elders and disabled, Vermont was the first one to receive partial federal funding for its pharmacy assistance programs.[13]

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[11] If an individual applies before June 30, the enrollee must reapply for eligibility after June 30 of the same year.

[12] Unlike many other states with pharmacy assistance programs, tobacco settlement funds have not been appropriated for VScript or VHAP Pharmacy.

[13] As stated in Chapter 1, Florida, South Carolina, Illinois, Wisconsin, and Maryland have since applied for and receive federal funding for their pharmacy benefit programs.

3

Analysis of Enrollment in Vermont Pharmacy Assistance Programs

3.1   Descriptive Analysis of Program Enrollment

Total enrollment in Vermont's pharmacy assistance programs has grown steadily since the state launched its first initiative over a decade ago. In 1993, 2,650 Medicare beneficiaries were enrolled in VScript.[1]   (See Table 3-1.)   Within two years, VScript enrollment had almost doubled to 4,534, reaching over five percent of all the Medicare beneficiaries in the state. With implementation of the 1115 Medicaid demonstration waiver in 1996, VScript enrollees with incomes less than 150 percent of poverty were automatically switched into the more generous (and partially federally funded) VHAP Pharmacy, leaving 3,691 Medicare beneficiaries with incomes between 150 and 175 percent of FPL in the maintenance drug only VScript program.

VHAP Pharmacy enrollment has risen sharply over the past five years, from 1,714 Medicare beneficiaries in its first year to 9,748 enrollees in 2000. Slightly over ten percent of all Medicare beneficiaries in the state were enrolled in VHAP Pharmacy in 2000. At the same time, another 2,892 individuals are currently enrolled in VScript

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[1]   All figures presented in this section reflect Medicare beneficiary enrollees only. About 1,500 additional individuals have participated in Vermont's pharmacy assistance programs throughout the years who were not Medicare beneficiaries, either because they did not have a sufficient work history to qualify, had not been disabled for a period of two years or did not meet the stricter Medicare citizenship requirements. Counts are based on enrollment at least once during the calendar year. Individuals with two or more periods of enrollment in a given year were counted only once, in the first program of enrollment.

Table 3-1

Number and Percent of Medicare Beneficiaries in Vermont Pharmacy Assistance Programs, 1993-2000

	1993	1994	1995	1996	1997	1998	1999	2000
Pharmacy Assistance Program								
VHAP	.	.	.	1,714	6,722	8,431	9,262	9,748
VScript	2,650	3,894	4,534	3,691	1,772	2,311	2,665	2,892
VScript Expanded	.	.	.	.	.	.	.	2,019
Total Pharmacy Assistance Program Enrollment	2,650	3,894	4,534	5,405	8,494	10,762	11,927	14,659
Total Medicare Beneficiaries	80,020	85,423	87,127	88,674	89,821	90,576	91,846	93,332
% Beneficiaries in Pharmacy Assistance Program	3.3%	4.6%	5.2%	6.1%	9.5%	11.9%	13.0%	15.7%
Total Dual Eligibles	10,760	12,958	14,054	14,361	14,530	14,786	15,161	15,454
% Beneficiaries Dually Eligible	13.4%	15.2%	16.1%	16.2%	16.2%	16.3%	16.5%	16.6%

NOTES:

Numbers are based on enrollment at any time during calendar year.

Individuals who switch between programs within a year are counted only once based on program in which they are first enrolled.

Numbers exclude 1,844 enrollees who were not reported as Medicare beneficiaries.

SOURCE: Vermont Medicaid Recipient Eligibility Files, 1993-2000; CMS Denominator File, 1994-2000.

(150-175 percent of FPL) and 2,019 in VScript Expanded (175-225 percent of FPL). Over two-thirds of the 14,659 individuals participating in state's three pharmacy assistance programs in 2000 were in VHAP Pharmacy, 20 percent in VScript and 14 percent in VScript Expanded. Over 15 percent of the 93,332 Medicare beneficiaries in Vermont currently receive some form of outpatient prescription drug assistance from the state through the three state pharmacy assistance programs.

In addition to the state pharmacy assistance programs, Medicare beneficiaries who receive SSI assistance or are determined to be 'medically needy' are eligible for the same outpatient drug benefits as VHAP Pharmacy enrollees through traditional Medicaid. Medicare beneficiaries who receive state assistance with their Medicare Part B premiums and Part A and B cost sharing as QMBs also qualify for prescription drug coverage under Medicaid in Vermont. In 1993, there were a total of 10,760 dual eligibles in Vermont, accounting for 13.4 percent of the state's 80,020 Medicare beneficiaries.[2] By 2000, the number of dual eligibles had risen by 43.6 percent to 15,454 individuals, representing 16.6 percent of all Medicare beneficiaries.[3]

When Medicaid plus state pharmacy assistance programs are jointly considered, 32.3 percent of all Medicare beneficiaries in Vermont currently receive outpatient prescription drug coverage from the state. This is significantly higher than the 16 percent Medicaid share and two percent state pharmacy assistance share estimated from the 1998

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[2] These numbers are based on an analysis of CMS' denominator file which does not distinguish by type of dual eligibility status. Thus, the number of duals reported here includes both the SSI, medically needy and QMB populations, as well as SLMB individuals who do not receive Medicaid benefits.

[3] Estimates of dual eligibles vary according to the source of data used. Estimates of dual eligibles reported in Table 3-1 are based on the CMS denominator files. However, a recent report by HER using the CMS TPEARTH database suggests that there were a total of 13,848 duals in Vermont in 2000. The state's own eligibility files indicate that the number of duals in 2000 was 16,820. Some of these differences may be due to differences in the way in which dual eligibles are defined.

MCBS for the country as a whole. While state uninsurance figures are not available, it is very likely that Vermont's pharmacy assistance programs have led to an outpatient prescription drug uninsurance rate significantly below the 27 percent national estimate reported earlier. In fact, until the recent court ruling against the VHAP Pharmacy Discount Program, all elderly and disabled Vermont residents had access to some form of outpatient pharmacy assistance in the state either through direct subsidies or from price discounts.

The demographic and income characteristics of the state pharmacy assistance program enrollees are presented in Table 3-2. Of the 14,659 Medicare beneficiaries enrolled in the three state pharmacy assistance programs in 2000, 62 percent were female and 38 percent were male. The proportion of men participating in the state pharmacy assistance programs has increased steadily each year from 27 percent in 1993. Over two-thirds of all enrollees were between the ages 65 and 84. Only 17 percent were less than 65 years old and thus qualify for Medicare on the basis of disability. An additional 13 percent were 85 years old or older.

Because most elderly and disabled individuals with incomes below poverty qualify for full Medicaid benefits in Vermont and those with higher incomes are more likely to have employer-sponsored or commercially purchased drug coverage, it is not surprising that the majority of people participating in the state pharmacy assistance programs have incomes between 100 and 175 percent of FPL. One quarter of all enrollees

Table 3-2

**Distribution of Vermont Pharmacy Assistance Program
Enrollees by Demographic and Income Groups, 2000**

		Number of Enrollees	Percent of Total Enrollees
Sex	Female	9,106	62.1%
	Male	5,553	37.9
Age	0-44	599	4.1
	45-54	712	4.9
	55-64	1,189	8.1
	65-74	5,355	36.5
	75-84	4,839	33.0
	85+	1,965	13.4
Income Group	Below poverty	1,725	11.8
	100-125% FPL	3,621	24.7
	126-150% FPL	4,602	31.4
	151-175% FPL	2,892	19.7
	176-200% FPL	1,175	8.0
	201-225% FPL	844	5.8
Total Enrollment		**14,659**	**100.0**

NOTES:
Numbers are based on enrollment at any time during calendar year.
Individuals who switch programs within year were counted only once
based on program in which they were first enrolled.
Numbers exclude enrollees not reported as Medicare beneficiaries.

SOURCE: Vermont Medicaid Recipient Eligibility File, 2000.

in 2000 had incomes between 100 and 125 percent of FPL. Another 31 percent had incomes between 125 and 150 percent of FPL and 20 percent had incomes between 150 and 175 percent of FPL. Twelve percent of enrollees fell below the federal poverty level and only six percent had incomes above 200 percent of FPL.[4] As the newly implemented VScript Expanded program grows, the proportion of higher income enrollees in the state pharmacy assistance programs is likely to continue to increase.

3.2   Duration and Continuity of Program Enrollment

A review of the transition patterns in Vermont's pharmacy assistance programs reveals a fairly high degree of stability in enrollment. The vast majority of state pharmacy assistance program participants had only one continuous period of enrollment. According to the enrollment figures presented in the first column of Table 3-3, over 80 percent of the unique 21,730 state pharmacy assistance program participants were enrolled for only a single episode during the 1993-2000 period.[5] Another 15.6 percent of program participants had only two VHAP Pharmacy or VScript episode spells and 3.0 percent had only three. Even if the non-state pharmacy assistance spells are included (e.g., dual eligibility spells), over 70 percent of all VHAP Pharmacy or VScript enrollees still had only a single episode. An additional 19.7 percent had only two spells and 5.4

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[4] The 1,725 VHAP Pharmacy enrollees in 2000 who had incomes below the poverty level presumably failed to meet the asset requirements for full Medicaid eligibility either through SSI, medically needy or the QMB program.

[5] Single episodes were defined as all consecutive spells with an end and start date of not more than one day apart. Re-enrollment on the day immediately following the initial disenrollment constitutes a single enrollment spell. If a spell began two days after prior termination, it was treated as a different episode. Using a one-week or one-month disenrollment period to define enrollment spells did not alter the fundamental pattern of enrollment presented in this study.

Table 3-3

Distribution of Vermont Pharmacy Assistance Program Enrollees by Number of Episodes, 1993-2000

Number of Episodes	Number of Enrollees by State Pharmacy Episodes	Percent of Total Enrollees	Number of Enrollees by State Pharmacy and Medicaid Episodes	Percent of Total Enrollees
1	17,428	80.2%	15,341	70.6%
2	3,400	15.6	4,277	19.7
3	644	3.0	1,184	5.4
4	167	0.8	491	2.3
5	58	0.3	198	0.9
6	21	0.1	118	0.5
7	8	0.0	54	0.2
8+	4	0.0	67	0.4
Total Enrollees	**21,730**	**100.0**	**21,730**	**100.0**

NOTES:
Medicaid episodes include full Medicaid eligibility spells through SSI, medically needy or QMB.
Number of episodes per enrollee have not been adjusted for begin and end year censoring of data.

Episodes based on continuous enrollment spells, including same day and next day renewals.
Multiple spells for same individual must have gap of at least one full day to be counted as separate enrollment.

SOURCE: Vermont Medicaid Recipient Eligibility Files, 1993-2000.

percent had only three spells of either pharmacy assistance or dual eligibility enrollment over the seven-year period. These figures indicate very few periods of disenrollment among VHAP Pharmacy and VScript enrollees.

Moreover, the figures presented in Table 3-4 illustrate a relatively long length of enrollment for each state pharmacy assistance episode. Out of a total of 27,332 unique pharmacy assistance episodes (as distinct from unique individuals) between 1993 and 2000, over half lasted for at least one year. An additional 24.7 percent lasted for between

7 and 12 months. Only 20.5 percent of all state pharmacy assistance episodes were for less than half a year and only 5.3 percent were for less than one month. Clearly, most VHAP Pharmacy and VScript participants had relatively long continuous periods of enrollment. Adjustments for censoring of data would result in a shift in the distribution of episodes in favor of longer duration cases.[6]

The distribution of state pharmacy assistance episodes by length of disenrollment is presented in Table 3-5. Disenrollment is defined as the number of days between any two consecutive enrollment spells during which time the individual is not enrolled in any of the state pharmacy assistance programs. Same day and next day renewal does not constitute a disenrollment gap as no disruption in coverage was observed. As stated earlier, only 19.8 percent of the 21,730 unique enrollees had any gap in enrollment. Over one-quarter of all disenrollment spells (26.7 percent) were for more than one year. An additional 24.1 percent of gaps were for between 7 and 12 months and 21.8 percent were for between one and 6 months. The remaining 14.3 percent of disenrollment spells were for less than one month. The disenrollment periods may reflect restrictions regarding re-determination and renewal procedures imposed by the state.[7] They may also indicate changes in individuals' eligibility status based on such factors as their income.

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[6] Periods of enrollment were not adjusted for initial and terminal year censoring of the data. Individuals who enrolled prior to 1993 were treated as if they joined on January 1, 1993 and individuals who were still enrolled at the end of the study were treated as if they disenrolled on December 31, 2000. The absence of adjustment for censoring will bias the distribution of cases toward shorter lengths of episodes. Adjustment for censoring would result in a shift in the distribution of episodes in favor of longer durations.

[7] Initially, individuals could only enroll in a state pharmacy assistance program on July 1 of every year.

Table 3-4

**Distribution of Vermont Pharmacy Assistance Program Episodes by
Length of Episode, 1993-2000**

Length of Episode	Number of Episodes in State Pharmacy Enrollment	Percent of Total
Less than 1 month	1,444	5.3%
Between 2-3 months	1,936	7.1
Between 4-6 months	2,219	8.1
Between 7-12 months	6,742	24.7
More than 12 months	14,991	54.8
Total Episodes	**27,332**	**100.0**

NOTES:
Length of episodes has not been adjusted for begin and end year censoring of data.

Episodes based on continuous enrollment spells, including same day and next day renewals.
Multiple spells for same individual must have gap of at least one full day to be counted as
separate enrollment.

SOURCE: Vermont Medicaid Recipient Eligibility Files, 1993-2000.

Table 3-5

**Distribution of Length of Gap between Vermont Pharmacy Assistance
Program Episodes, 1993-2000**

Length of Gap	Number of Gaps in State Pharmacy Enrollment	Percent of Total
Less than 1 month gap	804	14.3%
Between 2-3 months gap	602	10.8
Between 4-6 months gap	1,183	21.1
Between 7-12 months gap	1,517	27.1
More than 12 months gap	1,496	26.7
Total Gaps	**5,602**	**100**

NOTES:
Gap indicates number of ineligible days occuring between two consecutive VHAP Pharmacy or VScript enrollment spells. Gap defined as disenrollment spell of at least one full day. Same day or next day renewals do not constitute a disenrollment gap.

SOURCE: Vermont Medicaid Recipient Eligibility Files, 1993-2000.

Finally, Table 3-6 illustrates the transition patterns both within the state pharmacy assistance programs as well as between pharmacy assistance programs and full Medicaid benefits. The first column in Table 3-6 reveals that the vast majority of state pharmacy assistance program participants remained in only one pharmacy assistance program throughout the seven-year study period. Of the 21,730 unique enrollees in the state's pharmacy assistance programs, 40 percent remained in VHAP Pharmacy and 32 percent remained in VScript or VScript Expanded for their entire period of eligibility. Only 6,217 individuals (28 percent of all enrollees) shifted between pharmacy assistance programs. Some of these 4,309 VScript enrollees were automatically absorbed into VHAP Pharmacy when the income requirements for VHAP Pharmacy became less restrictive. Conversely, only three percent of enrollees transitioned out of VHAP Pharmacy and into VScript due to an increase in their incomes. The remaining six percent of enrollees exhibited some other multiple transition pattern.

The transition patterns of pharmacy assistance program participants further reveal that, among those who changed between pharmacy assistance and Medicaid, nearly one-half switched only once. According to the results presented in the third column of Table 3-6, 18 percent of the state pharmacy assistance program enrollees participated in VHAP Pharmacy only and 24 percent in VScript or VScript Expanded only. These individuals were never dually eligible for benefits under Medicaid during the study period. However, a total of 2,060 individuals (or 9 percent of all pharmacy assistance participants) transitioned up from dual eligibility status to VHAP Pharmacy and 426

Table 3-6

Distribution of Vermont Pharmacy Assistance Program Enrollees by Type of Transition Pattern, 1993-2000

Type of Transition	State Pharmacy Assistance Program Episodes Only		State Pharmacy Assistance Program Plus Medicaid Epidodes	
	Number of Enrollees	Percent of Total	Number of Enrollees	Percent of Total
VHAP Rx Only	8,633	39.7%	3,937	18.1%
VScript Only	6,880	31.7	5,311	24.4
VScript to VHAP Rx	4,309	19.8	2,986	13.7
VHAP Rx to VScript	633	2.9	385	1.8
Multiple Transitions	1,275	5.9	784	3.6
Medicaid to VHAP Rx	.	.	2,060	9.5
Medicaid to VScript	.	.	426	2.0
VHAP Rx to Medicaid	.	.	535	2.5
VScript to Medicaid	.	.	738	3.4
Multiple Transitions			4,568	21.0
Total Enrollees	**21,730**	**100.0**	**21,730**	**100.0**

NOTES:

Medicaid episodes include all dual eligibility spells of state pharmacy assistance program enrollees.

SOURCE: Vermont Medicaid Recipient Eligibility Files, 1993-2000.

people (or 2 percent) transitioned up from dual eligibility status to VScript or VScript Expanded. Only 6 percent transitioned down from VHAP Pharmacy and VScript to dual eligibility during the study period. A total of 5,352 (or one-quarter of all participants) exhibited more complicated transitioning patterns, reflecting multiple switches within the pharmacy assistance programs and between pharmacy assistance and Medicaid programs. Finally, it is also interesting to note that nearly 40 percent of all state pharmacy assistance enrollees had at least one period of dual eligibility.

3.3 Impact of Pharmacy Assistance Programs on Medicaid Eligibility

One of the goals of the state's pharmacy assistance programs is to prevent Medicare beneficiaries with high drug costs from 'spending down' to full Medicaid eligibility. Designers of the program hope that improved medical management of chronic conditions through reliable access to prescription drugs, as well as a reduction in out-of-pocket spending for those medications, will reduce the number of Medicare beneficiaries who qualify for Medicaid eligibility because of their high medical expenses. Reducing the number of low-income elderly and disabled residents who qualify for Medicaid eases the pressure on the Medicaid budget caused by extending full benefits to these people who tend to be high users of health care services.

As suggested earlier, consistent estimates of dual eligibility enrollment are difficult to obtain. Data from the CMS denominator file indicate that the number of Medicare beneficiaries who qualify for full Medicaid benefits has risen steadily since implementation of the state pharmacy assistance programs. According to the figures presented in Table 3-7, the total number of dual eligible Medicare beneficiaries in Vermont rose from 10,760 in 1993 to 15,454 in 2000, representing an increase of 44 percent.[8] However, the proportion of duals out of all Medicare residents remained fairly constant throughout this period at roughly 16 percent. Yet data from the CMS

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[8] The count of dual eligibles using both the Medicare and Medicaid eligibility files include SLMBs who do not have access to any Medicaid benefits, including outpatient drug coverage.

Table 3-7

Number of Vermont Medicare Beneficiaries Qualifying for Full Medicaid Benefits, 1993-2000

	1993	1994	1995	1996	1997	1998	1999	2000
Based on Federal Medicare Eligibility Files								
Total Dual Eligibles								
Number of Enrollees	10,760	12,958	14,054	14,361	14,530	14,786	15,161	15,454
% Medicare Beneficaries	13.4%	15.2%	16.1%	16.2%	16.2%	16.3%	16.5%	16.6%
Newly Enrolled Dual Eligibles								
Number of Enrollees	.	-	2,574	1,862	1,866	1,768	1,904	-
% Medicare Beneficaries	.	-	3.0%	2.1%	2.1%	2.0%	2.1%	-
Based on State Medicaid Eligibility Files								
Total Dual Eligibles								
Number of Enrollees	19,041	19,410	19,497	19,180	18,147	17,560	17,461	16,820
% Medicare Beneficaries	23.8%	22.7%	22.4%	21.6%	20.2%	19.4%	19.0%	18.0%
Newly Enrolled Dual Eligibles								
Number of Enrollees	.	2,501	2,177	2,431	2,220	1,763	1,615	1,268
% Medicare Beneficaries	.	2.9%	2.5%	2.7%	2.5%	1.9%	1.8%	1.4%

NOTES:

Numbers are based on enrollment at any time during calendar year.

SOURCE: Vermont Medicaid Recipient Eligibility Files, 1993-2000, CMS Denominator File, 1993-2000.

denominator file further indicate that the number of newly enrolled dual eligibles has declined since the implementation and expansion of the VHAP Pharmacy and VScript programs. The total number of newly enrolled dual eligibles fell 26 percent between 1995 and 1999, from 2,574 to 1,904 beneficiaries. In addition, the proportion of newly enrolled dual eligibles out of all Medicare beneficiaries also fell between 1995 and 1996, from 3.0 to 2.1 percent, but has remained fairly constant since then.

According to data from the Vermont Medicaid eligibility files, the state pharmacy assistance programs appear to have had a decelerating effect on the Medicaid spend-down rate among Medicare beneficiaries. (See Table 3-7.) State Medicaid eligibility data indicate that the number of duals fell 12 percent between 1994 and 2000 from 19,041 to 16,820 beneficiaries. Moreover, the share of duals out of total Medicare beneficiaries also fell steadily during this period, from nearly one-quarter in 1994 to less than 20 percent in 2000. Meanwhile, the number of newly enrolled dual eligibles in Vermont declined both in total as well as in proportion to overall Medicare enrollment. The total number of newly enrolled dual eligible cases each year was cut in half between 1994 and 2000 from 2,501 to 1,268 individuals. State eligibility records further indicate that the proportion of Medicare beneficiaries who became eligible for full Medicaid benefits for the first time each year was also reduced by half, from 2.9 percent in 1994 to 1.4 percent in 2000.

It is difficult to establish a causal link between the increase in enrollment in the state's pharmacy assistance programs and the decrease in number of Medicare beneficiaries qualifying for full Medicaid benefits each year from these descriptive statistics. Medicaid enrollment rates among the elderly and disabled are affected by many factors, such as beneficiary health status, demographic trends and income.

Nonetheless, dual eligibility trends lend support to the contention that the VHAP Pharmacy and VScript programs have helped to lower the rate at which Medicare beneficiaries in Vermont spend down to full Medicaid benefits. Further research is needed to analyze this effect.

4

Analysis of Prescription Drug Use and Cost for Enrollees in Vermont Pharmacy Assistance Programs

4.1   Introduction

This next chapter discusses variations in the costs and types of drugs purchased under Vermont's three state pharmacy assistance programs. The primary focus of this chapter is on the VHAP Pharmacy program but comparative information on expenditures and use under the other two state programs – VScript and Medicaid – are also presented. The results provide important information on the use of prescription drug benefits by the elderly and disabled populations in Vermont. This information will be key to understanding the costs in Vermont's VHAP Pharmacy program, and how they compare to the other two state prescription drug benefit programs. In addition, the findings will be useful to Congress as they debate the potential costs of establishing similar benefits in the Medicare program. Until now, most analyses of prescription drug costs for the elderly have relied on survey data or claims from Pennsylvania's PACE program. While PACE is similar to Vermont's and other states' pharmaceutical assistance programs being discussed, little information exists on its generalizability across the nation. This study provides new information that will be useful in considering benefit design and the impact of Vermont's pharmacy assistance programs on the elderly and disabled populations' access to drugs.

This chapter contrasts Vermont's three programs in terms of the types and costs of prescriptions purchased and the populations using them. Because the program

eligibility guidelines for VHAP Pharmacy and VScript changed several times during the last few years, these analyses are restricted to the most recent complete year of data (1999). Further, for comparability purposes, the Medicaid sample is restricted to the dually-eligible (Medicaid and Medicare) populations.

As mentioned in the previous chapter, the prescription benefits in the three state programs vary in terms of coverage and eligible populations. The primary distinction between them is whether they cover all drugs, as in VHAP Pharmacy and Medicaid, or only maintenance drugs, as in VScript. Drug coverage is limited to those produced by manufacturers that participate in the Federal Drug Rebate program or who have signed a rebate agreement with the Commissioner.[1] Prices for VHAP Pharmacy are based on the lower of ingredient price plus dispensing fee or the provider's actual amount charged. The ingredient price for multiple source drugs is based on the lowest of an upper limit set by CMS or Vermont Health Access or the Average Wholesale Price (AWP); for all other drugs, the price is based on 88.1 percent of the AWP.[2] VScript limits its coverage to maintenance drugs or those used continuously for 30 days or more and which are dispensed in amounts of no less than 30 days and no more than 60 days.[3] As will be shown in the analysis, many of the same drugs were covered under all three programs. In 1999, copayments in each program were limited to $1-2 per prescription, depending on the cost of the prescription.

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[1] Vermont Social Welfare Policy Bulletin No. 99-24, section 3202.1 Drugs.

[2] Vermont Prevention, Assistance, Transition, and Health Access Policy Bulletin No. 00-14, section 3303.3.

[3] Vermont Medicaid Pharmacy Manual

The programs also differ in terms of the eligible population. Medicaid covers the poorest – those whose incomes are up to 100 percent of FPL, while in 1999 VHAP Pharmacy enrollees had incomes up to 150 percent of FPL and VScript covered those with incomes up to 175 percent of FPL.[4] These same populations are being discussed in many of the Federal debates regarding prescription drug benefits – low-income elderly and disabled populations up to 175 percent of FPL.

Vermont's three program populations also differ in terms of the health status of the age groups covered – VHAP Pharmacy and VScript benefits are restricted to the elderly (those 65 years or older) and disabled populations, while Medicaid recipients can be any age and disability free as long as they meet the poverty requirements. For this reason, the Medicaid population included in this analysis is restricted to the dually-enrolled Medicaid and Medicare populations. All VHAP Pharmacy and VScript participants who are also entitled to Medicare are included.

4.2   Data Source and Methods

This analysis is based on the complete set of 1999 Medicaid pharmacy claims for state covered or dually-eligible recipients enrolled in one of the three state programs. The sample is comprised of anyone who is elderly or disabled and enrolled at least one month in one of the three programs in 1999. Beneficiaries may be enrolled in more than one program during a year but not during any one month.

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[4] As stated in a Chapter 2, VScript was absorbed into the 1115 Waiver in April 1999, and VScript Expanded was subsequently made available to Medicare beneficiaries with incomes up to 225 percent of FPL in January 2000.

Most pharmacy benefit recipients (90 percent) only enrolled in one program in 1999. The largest of the three programs is Medicaid which comprised about 57 percent of the recipients in our sample. Over one-fourth (25.7 percent) were enrolled only in VHAP Pharmacy while 7.4 percent were only enrolled in VScript. Because enrollees can disenroll and re-enroll in any of these three programs each month, this analysis matches each individual claim by date of service to state enrollment files to match costs and use with the appropriate insurance program. Pharmacy spending and use are reported by program.

4.3   Relative Size of the Three Drug Benefit Programs

In 1999, the state of Vermont spent $46,707,385 on pharmacy benefits for elderly and disabled beneficiaries (Table 4-1).[5] Of that amount, 23 percent was incurred by the VHAP Pharmacy program ($10, 852, 073), 5 percent under VScript ($2,428,754), and the remaining 72 percent was associated with the Medicaid program ($33,532,005).

Differences in spending levels reflect the relative number of participants in each program and their participation rates. VHAP Pharmacy had 9,598 enrollees in 1999, of whom 83.2 percent submitted a claim. This program is slightly more than half the size of Medicaid which had 16,809 dually-eligible enrollees. Almost 90 percent of the Medicaid enrollees submitted at least one prescription claim in 1999. The smallest program in 1999 was VScript with only 3,001 enrollees. This program has the smallest eligibility band –

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[5]   Prescription drug spending amounts reported throughout this chapter are based on total payments, including the federal matching share.

Table 4-1

Vermont Prescription Drug Programs Overview, 1999

	VHAP Pharmacy	VScript	Medicaid
Program Totals			
Payments	$10,852,073	$2,428,754	$33,532,005
Enrollees	9,598	3,001	16,809
Users	7,989	2,371	14,948
Percent Using:	83.2%	79.0%	88.9%
Average Number of Months Enrolled	8.0	6.9	7.8
Total Claims	283,529	42,281	741,325
Claims/User	35.5	17.8	49.5

NOTE: All figures, including those for Medicaid, are based on elderly and disabled participants. Prescription spending amounts are based on total payments, including the federal matching share.

SOURCE: Vermont Medicaid Recipient Eligibility File, 1999 Vermont State Pharmacy Claims File, 1999.

enrolling populations who are within a 25 percentage point spread (150-175 percent of FPL). Still, VScript had a high participation rate with 79 percent of those enrolled submitting claims. Participants were enrolled in each program an average of seven to eight months.

On average, VHAP claimants submitted 35.5 claims per year, twice as many per user as VScript users, but about 29 percent fewer per person than Medicaid claimants. These high participation and claim submission rates suggest selective enrollment may be

occurring, with those needing assistance with drug costs accessing the program either through referral by their pharmacist or other effective outreach practices.

4.4   Average Pharmacy Spending per Enrollee

Differences in program spending also reflect differences in average spending per person (Table 4-2).   Average payments per VHAP Pharmacy enrollee in 1999 were $1,131, substantially more than the $809 per enrollee payment in VScript, yet significantly less than the $1,935 per enrollee payment in Medicaid. These differences may be explained by the relative number of prescriptions submitted in each program. VHAP Pharmacy claimants submitted 2.2 claims per month on average. This is almost twice as many as the VScript participants. Medicaid users, on the other hand, submitted about 60 percent more claims on a per month basis than the VHAP Pharmacy users. Since separate bills are submitted for each prescription item, these differences reflect differences in the number of prescriptions filled for each user.

The number of pills in each prescription also varied between the three programs. These differences appear to reflect each programs' coverage rules. While both VHAP Pharmacy and Medicaid covered all drugs, VScript only covered maintenance drugs or those provided in 30-60 day supplies.   The number of pills per prescription closely reflects these rules, ranging around 30 pills per prescription in VHAP Pharmacy and Medicaid to almost 60 pills per script in VScript. Taking these differences into account, one can see that utilization differences across programs are not quite so dramatic. While

Table 4-2

Per Capita Spending and Use Levels In Vermont
Prescription Drug Programs, 1999

	VHAP Pharmacy	VScript	Medicaid
Total Payments per Enrollee	$1,131	$809	$1,935
Average Number Prescriptions Per Enrollee/Month	2.2	1.2	3.6
Average Number Pills/Prescription	31.3	58.3	26.0
Average Number Pills/Enrollee/Month	68.8	69.9	93.6

NOTE: These figures are based on elderly and disabled participants.
Prescription drug spending amounts are based on total payments, including the federal matching share.

SOURCE: Vermont Medicaid Recipient Eligibility File, 1999 Vermont State Pharmacy Claims
File, 1999.

VScript recipients submitted many fewer prescriptions per enrollee, these were filled in 60-day increments. Taking total number of pills per enrollee, VScript enrollees used almost the same number of pills as VHAP Pharmacy enrollees. Medicaid users, on the other hand, appeared to take substantially more pills, suggesting this population is sicker than either of the other two state covered groups.

4.5   Average Spending Per User

Average spending per claimant also varied by program (Table 4-3).   Average expenditures for VHAP Pharmacy users were 33 percent higher than for VScript users, but only 62 percent of the average Medicaid spending levels. Average payments per user were $1,358 for VHAP Pharmacy, $2,176 for Medicaid, and $1,024 for VScript. These differences reflect variation in both the average costs per month and the number of months of use. VHAP Pharmacy participants had both higher costs per month and longer periods of participation than VScript users. On average, the VHAP Pharmacy program paid $137 per month for 9.9 months per user, while VScript users only averaged $122 per month for 8.4 months participation. Medicaid users had both the highest costs per month and the longest length of participation, suggesting this population is sicker than those participating in the state-only prescription drug programs. While these use rates suggest some variation in program tenure, at least half the participants in each program submitted bills for 11 to 12 months, suggesting these programs have fairly continuous participation throughout the year.

VScript had the highest average payment per claim ($57 per claim). But, as noted above, these claims typically covered 60-day supplies. The relatively lower price per pill ($0.97) compared to $1.37 and $1.76 in VHAP Pharmacy and Medicaid, respectively) suggests VScript recipients either purchased different types of pills or the program received a lower rate for the bulk purchasing policies. Medicaid recipients appeared to

Table 4-3

**Average Spending and Use Per User in Vermont
Prescription Drug Programs, 1999**

	VHAP Pharmacy	**VScript**	**Medicaid**
Average Payments/User			
Mean	$1,358	$1,024	$2,176
Median	878	635	1,347
Average Payments/Month			
Mean	$137	$122	$215
Median	79	53	115
Average Months Used			
Mean	9.9	8.4	10.1
Median	12.0	8.0	12.0
Average Payments/Prescription			
Mean	43	57	45
Median	27	24	24
Average Number Prescriptions/Month			
Mean	2.8	2.9	3.5
Median	2.1	2.3	2.8

NOTE: These figures are based on elderly and disabled participants.
Prescription drug spending amounts are based on total payments, inclding the federal matching share.

SOURCE: Vermont Medicaid Recipient Eligibility File, 1999 Vermont State Pharmacy Claims
File, 1999.

take the most types of pills each month, averaging 3.5 prescriptions per month, compared to only 2.8 or 2.9 scripts per month in the other two programs. Both payments and use appear to be skewed to the right with half of all users in each program being lower than average. This suggests a small number of recipients may be purchasing higher cost drugs or a high number of drugs, thereby driving the higher average costs.

Spending differences were also reflected in average copayments per year. Although each program restricted out-of-pocket costs to $1 to $2 per prescription, monthly copayments ranged from an average of $6.50 per month in Medicaid to $2.50 per month in VScript. These differences reflect the number of prescriptions filled each month.

4.6 Types of Drugs Purchased

The types of drugs most commonly purchased under all three programs were used to treat problems related to cardiovascular systems, electrolyte balancing or metabolic/nutritional systems, and respiratory conditions (Table 4-4). Cardiovascular drugs, including hypotensives, calcium channel blockers and vasodilators, had the highest number of users in all three programs. Oral hypoglycemic agents and potassium replacements had the next highest number of users. Digitalis ranked sixth in the two state programs and seventh in Medicaid's prescription drug benefit. Respiratory system drugs varied from expectorants to cough and cold preparations. However, the latter type of drug was not covered in the VScript program where coverage is limited to maintenance drugs.

Table 4-4

Top 15 Types of Drugs Ranked by The Number of Users in Each Vermont Prescription Drug Program, 1999

Organ System Treated	Type of Drug	Program Ranking		
			VHAP	
		VScript	Pharmacy	Medicaid
Cardiovascular System	Hypotensives, Angiotensin Converting Enzyme Blockers	1	1	1
Cardiovascular System	Calcium Channel Blocking Agents	2	2	2
Cardiovascular System	Vasodilators, Coronary	3	3	3
Electrolyte Balancing System/ Metabolic System, Nutrition	Oral Hypoglycemic Agents, Sulfonylurea Type	4	5	5
Electrolyte Balancing System/Metabolic System, Nutrition	Potassium Replacement	5	4	4
Cardiovascular System	Digitalis Glycosides	6	6	7
Electrolyte Balancing System/Metabolic System, Nutrition	Oral Hypoglycemic Agents, Non-Sulfonylurea Type	7	7	8
Cardiovascular System	Hypotensives	8	8	12
Electrolyte Balancing System/ Metabolic System, Nutrition	Insulins	9	10	9
Cardiovascular System	Hypotensives, Vasodilators	10	12	14
Cardiovascular System	Antimuscarmics, antispasmodics	11	11	10
Respiratory System	Expectorants	12	9	6
Cardiovascular System	Xanthines	13	13	15
Electrolyte Balancing System/Metabolic System, Nutrition	Iron Replacement	15	24	11
Respiratory System	Cough and Cold Preparations	-	14	13

SOURCE: Vermont Medicaid Recipient Eligibility File, 1999, Vermont State Pharmacy Claim File 1999.

Table 4-5 lists the top 50 brand name drugs ranked by VHAP Pharmacy total payments in 1999.[6] These rankings may be due to high numbers of users, high costs per drug, high use per drug, or a combination of these factors. Program differences become more obvious, particularly between the two state-only programs and Medicaid. The top eight drugs in VHAP Pharmacy and VScript are the same, although the exact ranking differs slightly. These include treatments for stomach acids or ulcers, such as Prilosec and Prevacid, and slightly further down Pepcid. Cholesterol treatment drugs, such as Lipitor and Zocor, are also among the highest expenditure groups. Treatments for heart disease also ranked high including the calcium channel blocker Norvasc and the ACE inhibitor Vasotec. Celebrex, which is an anti-inflammatory drug, and Glucophage, which is used to treat Type II diabetes, are also among the top 8 drugs purchased in VHAP Pharmacy and VScript.

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[6] These 50 drugs are not necessarily the top 50 drugs in Medicaid or VScript.

Table 4-5

Vermont Program Expenditures (and Rankings) for the 50 Drugs with the Highest VHAP Expenditures, 1999

Brand Name of Drug	VHAP		Medicaid		Vscript	
PRILOSEC	$744,565	(1)	$1,965,165	(2)	$155,812	(1)
LIPITOR	$392,626	(2)	$570,146	(8)	$92,274	(2)
PREVACID	$293,890	(3)	$814,506	(4)	$63,946	(4)
ZOCOR	$293,823	(4)	$446,305	(9)	$76,173	(3)
NORVASC	$206,578	(5)	$304,754	(16)	$47,912	(5)
VASOTEC	$201,119	(6)	$311,950	(15)	$39,991	(8)
CELEBREX	$170,557	(7)	$326,747	(13)	$42,129	(7)
GLUCOPHAGE	$163,737	(8)	$325,658	(14)	$44,498	(6)
ZYPREXA	$161,356	(9)	$2,000,599	(1)	$28,292	(12)
PROZAC	$156,409	(10)	$736,972	(5)	$25,095	(15)
ZOLOFT	$154,670	(11)	$722,460	(6)	$36,399	(9)
PEPCID	$146,666	(12)	$441,189	(10)	$23,032	(19)
CARDIZEM CD	$145,809	(13)	$233,546	(22)	$27,838	(13)
PAXIL	$145,113	(14)	$597,663	(7)	$36,247	(10)
PRAVACHOL	$123,728	(15)	$176,167	(29)	$28,466	(11)
COZAAR	$105,627	(16)	$130,867	(38)	$27,183	(14)
ZESTRIL	$104,316	(17)	$132,902	(37)	$25,019	(16)
FLOVENT	$102,935	(18)	$229,611	(24)	$22,584	(21)
MEVACOR	$97,690	(19)	$193,078	(27)	$16,888	(29)
REZULIN	$96,657	(20)	$254,262	(20)	$22,945	(20)
TOPROL XL	$94,858	(21)	$124,940	(41)	$21,758	(22)
ATROVENT	$94,587	(22)	$178,617	(28)	$15,078	(34)
NEURONTIN	$87,486	(23)	$417,197	(11)	$23,470	(18)
COUMADIN	$84,957	(24)	$125,725	(40)	$19,526	(25)
PRINIVIL	$82,751	(25)	$158,810	(33)	$21,189	(23)
RELAFEN	$80,748	(26)	$176,001	(30)	$11,380	(46)
LORAZEPAM	$79,994	(27)	$302,827	(17)	$17,470	(28)
ARICEPT	$75,949	(28)	$238,758	(21)	$12,739	(43)
RANITIDINE HCL	$70,477	(29)	$230,113	(23)	$11,725	(45)
IPRATROPIUM BROMIDE	$68,763	(30)	$214,313	(25)	$12,905	(41)
PROPULSID	$68,408	(31)	$327,062	(12)	$24,247	(17)
OXYCONTIN	$67,988	(32)	$275,528	(19)	$8,136	(49)
HUMULIN N	$66,275	(33)	$144,753	(35)	$15,546	(33)
SEREVENT	$65,821	(34)	$136,103	(36)	$15,707	(31)
AMBIEN	$65,400	(35)	$205,940	(26)	$11,043	(47)

Table 4-5 (continued)

**Vermont Program Expenditures for the 50 Drugs with the Highest
VHAP Expenditures, 1999**

Brand Name of Drug	VHAP		Medicaid		Vscript	
FOSAMAX	$65,246	(36)	$116,129	(44)	$19,941	(24)
ENBREL	$64,637	(37)	$82,948	(48)	$14,941	(35)
RISPERDAL	$64,074	(38)	$945,505	(3)	$15,735	(30)
PROCARDIA XL	$63,875	(39)	$160,308	(32)	$15,666	(32)
HYTRIN	$62,749	(40)	$95,027	(47)	$18,167	(26)
BUSPAR	$62,225	(41)	$283,597	(18)	$5,612	(50)
IMDUR	$61,028	(42)	$127,400	(39)	$12,774	(42)
TAMOXIFEN CITRATE	$59,107	(43)	$69,026	(50)	$12,114	(44)
COMBIVENT	$58,651	(44)	$122,920	(42)	$13,781	(38)
PLAVIX	$57,988	(45)	$98,453	(46)	$13,642	(39)
ULTRAM	$57,575	(46)	$165,795	(31)	$13,429	(40)
GLYBURIDE	$57,424	(47)	$112,319	(45)	$17,746	(27)
FUROSEMIDE	$56,952	(48)	$151,883	(34)	$9,203	(48)
XALATAN	$55,561	(49)	$76,590	(49)	$14,549	(36)
DETROL	$53,550	(50)	$117,892	(43)	$14,331	(37)

NOTES:

Expenditure rankings for each program shown in parentheses.

Rankings show relative expenditures for the top 50 drugs in VHAP.

These are not necessarily the top 50 drugs in the Medicaid or Vscript programs.

SOURCE: Vermont Medicaid Recipient Eligibility File, 1999, Vermont State Pharmacy Claim File 1999.

Medicaid prescriptions, on the other hand, seem to be dominated by treatments for mental health and related disorders. The first and third highest payment drugs among the top 50 in the Medicaid program are Zyprexa and Risperdal, two antipsychotic drugs. Antidepressants, such as Prozac and Zoloft also rank high in Medicaid, as do stomach acid reducers, such as Prilosec. Differences in the most commonly used drugs may reflect differences in the age distributions between the qualifying populations in Medicaid and the two state pharmacy assistance programs.

Decomposing costs is useful for understanding whether use levels, number of users, or costliness of individual drugs lead to the rankings in Table 4-5. For example, Table 4-6 shows that Prilosec, which ranked first in total VHAP Pharmacy expenditures per drug, has a high number of users (1,014 people and 10.6 percent of all VHAP Pharmacy enrollees), a high cost per pill ($4.15 per pill), and a fairly long course of treatment (182 pills per year). This is also true of Lipitor, the second highest VHAP Pharmacy drug expenditure item. The $392,626 spent on Lipitor can be explained by a relatively high cost per user ($493), high number of users (796 people), high cost per pill ($2.20) and a long treatment period (222 pills per year). On the other hand, the drug with the highest number of users (Furosemide) has such a low cost that despite its high use, this drug is 48th in terms of total VHAP Pharmacy expenditures. Furosemide is a diuretic that is essential in treating congestive heart failure, kidney, and liver disease.

Table 4-6

Decomposition of VHAP Pharmacy Expenditures for the top 50 VHAP Pharmacy Drugs, 1999

Drug	Total	Payment/ User	Number of Users	Percent of Enrollees	Claims/User	Pills/User	Payment/ Pill
Ambien	$65,400	$222	294	3.06%	4.18	114.26	$2.04
Aricept	75,949	703	108	1.13%	5.44	177.56	3.94
Atrovent	94,587	247	383	3.99%	5.48	120.73	2.44
Buspar	62,225	610	102	1.06%	5.40	160.99	3.56
Cardizem CD	145,809	358	407	4.24%	5.60	208.40	1.69
Celebrex	170,557	263	649	6.76%	3.36	99.04	2.68
Combivent	58,651	186	316	3.29%	3.00	89.88	2.35
Coumadin	84,957	181	470	4.90%	5.67	197.54	1.04
Cozaar	105,627	340	311	3.24%	6.43	239.91	1.42
Detrol	53,550	294	182	1.90%	4.48	136.98	2.22
Enbrel	64,637	7,182	9	0.09%	7.78	201.78	35.57
Flovent	102,935	340	303	3.16%	4.54	102.70	3.45
Fosamax	65,246	353	185	1.93%	5.29	187.68	2.18
Furosemide	56,952	35	1,611	16.78%	5.64	211.06	0.19
Glucophage	163,737	344	476	4.96%	6.00	213.62	1.60
Glyburide	57,424	136	421	4.39%	6.13	239.93	0.59
Humulin N	66,275	246	269	2.80%	6.89	155.84	1.76
Hytrin	62,749	371	169	1.76%	5.70	206.32	1.83

Table 4-6 (continued)

Decomposition of VHAP Pharmacy Expenditures for the top 50 VHAP Pharmacy Drugs, 1999

Drug	Total	Payment/ User	Number of Users	Percent of Enrollees	Claims/User	Pills/User	Payment/ Pill
Imdur	61,028	295	207	2.16%	5.16	180.69	1.60
Ipratropium Brom	68,763	681	101	1.05%	6.32	131.94	5.74
Lipitor	392,626	493	796	8.29%	6.03	222.01	2.20
Lorazsepam	79,994	135	592	6.17%	4.62	117.77	1.57
Mevacor	97,690	607	161	1.68%	6.25	233.31	2.74
Neurontin	87,486	419	209	2.18%	4.33	123.05	3.25
Norvasc	206,578	354	583	6.07%	6.00	222.03	1.59
Oxycontin	67,988	654	104	1.08%	4.70	114.96	4.87
Paxil	145,113	366	396	4.13%	5.35	172.11	2.16
Pepcid	146,666	426	344	3.58%	5.01	161.76	2.74
Plavix	57,988	417	139	1.45%	4.54	151.08	2.81
Pravachol	123,728	552	224	2.33%	6.11	222.67	2.45
Prevacid	293,890	636	462	4.81%	5.13	165.78	3.94
Prilosec	744,565	734	1,014	10.56%	5.35	182.13	4.15
Prinivil	82,751	227	364	3.79%	6.04	217.16	1.02
Procardia XL	63,875	444	144	1.50%	6.13	234.75	1.89
Propulsid	68,408	368	186	1.94%	4.92	149.32	2.67

Table 4-6 (continued)

Decomposition of VHAP Pharmacy Expenditures for the top 50 VHAP Pharmacy Drugs, 1999

Drug	Total	Payment/ User	Number of Users	Percent of Enrollees	Claims/User	Pills/User	Payment/ Pill
Prozac	156,409	611	256	2.67%	5.87	192.02	3.19
Ranitidine HCL	70,477	173	407	4.24%	4.80	158.19	1.15
Relafen	80,748	327	247	2.57%	4.62	136.22	2.41
Rezulin	96,657	812	119	1.24%	6.32	212.11	3.88
Risperdal	64,074	736	87	0.91%	5.83	174.99	4.18
Serevent	65,821	277	238	2.48%	4.42	100.89	3.60
Tamoxifen Citrate	59,107	712	83	0.86%	6.14	227.01	3.11
Toprol XL	94,858	197	481	5.01%	6.23	236.57	0.83
Ultram	57,575	195	296	3.08%	3.72	69.07	3.43
Vasotec	201,119	372	540	5.63%	6.79	257.90	1.45
Xalatan	55,561	292	190	1.98%	5.88	117.86	3.23
Zestril	104,316	217	480	5.00%	5.62	214.35	1.00
Zocor	293,823	647	454	4.73%	5.94	228.10	2.89
Zoloft	154,670	426	363	3.78%	5.31	186.01	2.26
Zyprexa	161,356	1,508	107	1.11%	6.12	188.71	7.46

NOTE: These figures are based on elderly and disabled participants.

SOURCE: Vermont Medicaid Recipient Eligibility File, 1999; Vermont State Pharmacy Claims File; 1999.

Other high use drugs in the VHAP Pharmacy program include Celebrex, which is an anti-inflammatory, and Lorazepam, which is an anxiety and sleep disorder treatment drug. Both drugs have a high number of users, are high to moderately priced ($2.68 and $1.57, respectively), but have relatively short use periods (99 to 118 days, respectively). The drug with the highest cost per pill is Enbrel ($35.57 per pill). This extremely expensive drug is used by few, but is important in treating severe rheumatoid arthritis. Enbrel is used by recipients in each of the three state drug programs and provides an interesting opportunity to compare price differences. VHAP Pharmacy participants pay $35.57 per pill (Table 4-6), while VScript pays $22.61 per pill (Table 4-7) and Medicaid pays $30.75 (Table 4-8). These price differences may be explained by different contract rules. VScript prescriptions are restricted to 60-day supplies which may result in a lower bulk purchasing price.

As noted earlier, many of the same drugs are important in both the VScript and VHAP Pharmacy programs. In most cases, VScript has a slightly lower price per pill than VHAP Pharmacy (Table 4-7). The three drugs with the highest number of users in VScript are among the top VHAP Pharmacy drugs – Furosemide, Lipitor and Prilosec. The drug with the highest cost per user is still Enbrel.

Medicaid expenditures, on the other hand, may be explained by a high use of expensive drugs (Table 4-8). Two of the most expensive drugs in Medicaid (among these 50 drugs) are Zyprexa and Risperdal, both of which are antipsychotic medicines. They rank second and fourth in terms of cost per pill $8.49 and $4.91 per pill, respectively) and

Table 4-7

Decomposition of VScript Expenditures for the top 50 VHAP Pharmacy Drugs, 1999

Drug	Total	Payment/ User	Number of Users	Percent of Enrollees	Claims/User	Pills/User	Payment/ Pill
Ambien	$11,043	$143	77	2.57%	2.92	87.32	$1.79
Aricept	12,739	708	18	0.60%	3.28	221.11	3.12
Atrovent	15,078	186	81	2.70%	3.00	171.46	1.14
Buspar	5,612	267	21	0.70%	2.81	92.24	2.71
Cardizem CD	27,838	296	94	3.13%	3.50	213.33	1.39
Celebrex	42,129	322	131	4.37%	2.03	150.51	2.09
Combivent	13,781	184	75	2.50%	2.61	173.12	1.08
Coumadin	19,526	150	130	4.33%	3.65	228.69	0.68
Cozaar	27,183	286	95	3.17%	3.81	245.44	1.16
Detrol	14,331	292	49	1.63%	2.67	184.22	1.66
Enbrel	14,941	7,471	2	0.07%	7.50	464.00	22.61
Flovent	22,584	293	77	2.57%	2.58	168.56	1.88
Fosamax	19,941	298	67	2.23%	2.61	179.60	1.70
Furosemide	9,203	23	392	13.06%	3.20	209.11	0.11
Glucophage	44,498	301	148	4.93%	3.45	231.00	1.33
Glyburide	17,746	135	131	4.37%	3.89	262.49	0.50
Humulin N	15,546	207	75	2.50%	4.35	258.97	0.84
Hytrin	18,167	336	54	1.80%	4.02	235.04	1.34

Table 4-7 (continued)

Decomposition of VScript Expenditures for the top 50 VHAP Pharmacy Drugs, 1999

Drug	Total	Payment/ User	Number of Users	Percent of Enrollees	Claims/User	Pills/User	Payment/ Pill
Imdur	12,774	200	64	2.13%	2.86	160.94	1.12
Ipratropium Bromide	12,905	561	23	0.77%	3.52	198.74	3.48
Lipitor	92,274	403	229	7.63%	3.00	210.34	1.89
Lorazsepam	17,470	116	150	5.00%	4.11	121.67	1.44
Mevacor	16,888	582	29	0.97%	4.03	238.97	2.46
Neurontin	23,470	385	61	2.03%	2.20	155.11	2.11
Norvasc	47,912	305	157	5.23%	3.60	230.88	1.31
Oxycontin	8,136	339	24	0.80%	2.83	76.42	3.18
Paxil	36,247	318	114	3.80%	3.96	156.03	2.02
Pepcid	23,032	344	67	2.23%	2.34	157.16	2.34
Plavix	13,642	401	34	1.13%	2.24	177.29	2.18
Pravachol	28,466	474	60	2.00%	3.47	225.77	2.08
Prevacid	63,946	598	107	3.57%	2.68	185.07	3.24
Prilosec	155,812	680	229	7.63%	3.02	209.75	3.29
Prinivil	21,189	198	107	3.57%	3.62	219.99	0.85
Procardia XL	15,666	412	38	1.27%	3.58	226.05	1.61
Propulsid	24,247	362	67	2.23%	2.56	156.08	2.18

Table 4-7 (continued)

Decomposition of VScript Expenditures for the top 50 VHAP Pharmacy Drugs, 1999

Drug	Total	Payment/ User	Number of Users	Percent of Enrollees	Claims/User	Pills/User	Payment/ Pill
Prozac	25,095	386	65	2.17%	3.78	151.62	2.54
Ranitidine HCL	11,725	140	84	2.80%	2.55	168.49	0.85
Relafen	11,380	271	42	1.40%	2.71	152.64	1.80
Rezulin	22,945	765	30	1.00%	3.50	219.67	3.28
Risperdal	15,735	684	23	0.77%	5.43	187.87	3.85
Serevent	15,707	296	53	1.77%	3.06	190.57	1.65
Tamoxifen Citrate	12,114	551	22	0.73%	3.27	217.50	2.77
Toprol XL	21,758	169	129	4.30%	3.38	229.60	0.71
Ultram	13,429	200	67	2.23%	3.66	88.24	2.56
Vasotec	39,991	294	136	4.53%	3.90	258.21	1.13
Xalatan	14,549	231	63	2.10%	3.41	215.63	1.13
Zestril	25,019	194	129	4.30%	3.47	237.19	0.83
Zocor	76,173	544	140	4.67%	3.26	212.26	2.57
Zoloft	36,399	308	118	3.93%	3.97	156.51	1.94
Zyprexa	28,292	1,132	25	0.83%	4.12	130.80	8.69

NOTE: These figures are based on elderly and disabled participants.

SOURCE: Vermont Medicaid Recipient Eligibility File, 1999; Vermont State Pharmacy Claims File, 1999.

Table 4-8

Decomposition of Medicaid Expenditures for the top 50 VHAP Pharmacy Drugs, 1999

Drug	Total	Payment/ User	Number of Users	Percent of Enrollees	Claims/User	Pills/User	Payment/ Pill
Ambien	$205,940	$273	753	4.48%	5.21	129.31	$2.12
Aricept	238,758	791	302	1.80%	6.77	195.91	$4.43
Atrovent	178,617	243	734	4.37%	5.42	108.98	$3.07
Buspar	283,597	690	411	2.45%	6.68	177.94	$3.63
Cardizem CD	233,546	377	619	3.68%	6.84	219.02	$1.76
Celebrex	326,747	273	1,197	7.12%	3.73	103.91	$2.66
Combivent	122,920	191	643	3.83%	4.63	94.60	$2.54
Coumadin	125,725	167	754	4.49%	6.87	192.32	$1.03
Cozaar	130,867	343	381	2.27%	7.48	238.53	$1.44
Detrol	117,892	332	355	2.11%	5.21	145.55	$2.26
Enbrel	82,948	5,530	15	0.09%	5.93	184.20	$30.75
Flovent	229,611	322	713	4.24%	4.59	101.33	$3.57
Fosamax	116,129	365	318	1.89%	6.28	198.17	$1.88
Furosemide	151,883	46	3,272	19.47%	7.38	225.96	$0.26
Glucophage	325,658	381	855	5.09%	7.57	230.81	$1.58
Glyburide	112,319	154	731	4.35%	7.82	250.98	$0.62
Humulin N	144,753	257	564	3.36%	7.00	154.56	$1.99
Hytrin	95,027	410	232	1.38%	6.79	217.03	$1.94

Table 4-8 (continued)

Decomposition of Medicaid Expenditures for the top 50 VHAP Drugs, 1999

Drug	Total	Payment/ User	Number of Users	Percent of Enrollees	Claims/User	Pills/User	Payment/ Pill
Imdur	127,400	316	403	2.40%	5.64	172.61	$1.75
Ipratropium Bromide	214,313	651	329	1.96%	6.46	103.67	$6.98
Lipitor	570,146	535	1,066	6.34%	6.83	231.05	$2.26
Lorazsepam	302,827	164	1,845	10.98%	6.37	119.17	$1.83
Mevacor	193,078	795	243	1.45%	7.82	268.39	$3.01
Neurontin	417,197	601	694	4.13%	6.38	169.07	$3.28
Norvasc	304,754	375	812	4.83%	7.28	239.40	$1.59
Oxycontin	275,528	830	332	1.98%	7.96	164.18	$4.47
Paxil	597,663	495	1,208	7.19%	7.07	207.29	$2.37
Pepcid	441,189	486	908	5.40%	6.38	180.36	$2.80
Plavix	98,453	397	248	1.48%	5.29	143.06	$2.76
Pravachol	176,167	603	292	1.74%	7.36	244.95	$2.46
Prevacid	814,506	669	1,218	7.25%	5.89	175.60	$3.87
Prilosec	1,965,165	864	2,274	13.53%	6.63	204.67	$4.23
Prinivil	158,810	230	691	4.11%	7.13	225.55	$1.03
Procardia XL	160,308	486	330	1.96%	7.18	241.87	$2.04
Propulsid	327,062	516	634	3.77%	6.69	178.90	$2.85

Table 4-8 (continued)

Decomposition of Medicaid Expenditures for the top 50 VHAP Drugs, 1999

Drug	Total	Payment/ User	Number of Users	Percent of Enrollees	Claims/User	Pills/User	Payment/ Pill
Prozac	736,972	805	915	5.44%	8.03	234.43	$3.45
Ranitidine HCL	230,113	201	1,145	6.81%	6.18	181.91	$1.20
Relafen	176,001	322	546	3.25%	4.96	137.54	$2.42
Rezulin	254,262	963	264	1.57%	7.83	239.59	$4.01
Risperdal	945,505	1,135	833	4.96%	9.10	225.60	$4.91
Serevent	136,103	302	450	2.68%	4.86	110.80	$3.47
Tamoxifen Citrate	69,026	697	99	0.59%	7.20	223.48	$3.22
Toprol XL	124,940	215	580	3.45%	7.07	244.37	$0.86
Ultram	165,795	218	761	4.53%	4.85	86.22	$3.20
Vasotec	311,950	359	869	5.17%	7.63	248.13	$1.56
Xalatan	76,590	320	239	1.42%	6.64	113.96	$4.00
Zestril	132,902	232	574	3.41%	6.32	225.91	$1.01
Zocor	446,305	736	606	3.61%	7.05	249.41	$2.95
Zoloft	722,460	544	1,328	7.90%	7.82	220.13	$2.48
Zyprexa	2,000,599	2,184	916	5.45%	9.86	241.10	$8.49

NOTE: These figures are based on elderly and disabled participants.

SOURCE: Vermont Medicaid Recipient Eligibility File, 1999; Vermont State Pharmacy Claims File, 1999.

both have a relatively high number of users. High use and high cost also explain the total program costs for Prilosec and Pepcid, two stomach acid reducers which are widely used by the Medicaid population.

4.7   Conclusion

These results show the range in the relative importance and costs of prescription drugs purchased under these three state programs. Total program costs vary by the cost of the drug and its level of use within the covered populations. Certain drugs, such as Prilosec, Lipitor, and Prevacid, stand out as being used by many and having relatively high treatment costs. Other drugs, such as Furosemide, are also widely used. This drug is relatively inexpensive, but benefits many without generating extremely high program costs.

Average spending per user in these three programs is consistent with estimates of Medicare beneficiaries nationally (Moon and Storeygard, 2001). Analysis of the Medicare Current Beneficiary Survey (MCBS) suggests that, nationally, elderly beneficiaries with incomes below 135 percent of poverty spent $1,683 in 2000, while those between 135 and 175 of FPL spent $1,842 per year on prescription drug items. In Vermont, the 1999 average spending levels for these low income populations were between $809 and $1,935 per person, although the lowest income individuals in Vermont had the highest average expenditures.

Differences in prices paid between programs are noticeable. VScript enrollees had lower costs per pill than other state-covered enrollees. These differences may be due

to Vermont negotiating lower rates for bulk purchases such as those filled in the VScript maintenance program. Medicaid also had lower prices per drug than VHAP Pharmacy, suggesting the state's VHAP Pharmacy program has untapped purchasing power which it may be able to use to reduce program costs. Moreover, many of the top 50 VHAP Pharmacy drugs have gone through relatively high price growths over the last few years (Families USA, 2001). The price of Furosemide, for example, grew 12.2 times faster than the CPI between January 2000 and January 2001. Other drugs, including Zocor, Pepcid, Paxil and Lipitor, grew three or more times faster than the rate of inflation during this time period. The rapid escalation in price of certain drugs will greatly influence the cost of Vermont's state programs over the next few years.

Understanding the underlying factors that explain differences in these three state program costs is important for evaluating future drug program costs. In Vermont, this information will be crucial to understanding budget implications if the state's population grows or the Legislature chooses to change the program rules or coverage policies. Other benefit design options are available. For example, some states restrict prescription coverage to items included in a formulary list. While Vermont imposes strict income requirements for eligibility, and restricts coverage to drugs produced by certain manufacturers, these programs impose few restrictions on benefit design, covering almost all drugs. In fact, comparisons across the three programs revealed that many of the same drugs are being purchased, although the price paid under each program may vary. Again, this appears to be related to purchasing rules rather than restrictions on the types of drugs covered under each program.

Vermont provides a magnifying glass for the rest of the nation for understanding the potential costs of an outpatient prescription drug benefit for low-income Medicare beneficiaries. A significant proportion of enrolled beneficiaries use the pharmacy assistance coverage. At the very least, Vermont is a model for learning how to enroll populations who need outpatient prescription drugs. These programs, and the lessons that can be learned from them, will be important as the size of the elderly population continues to grow over the next few decades and health care costs continue to rise. While this chapter examined the costs of an outpatient prescription drug program, in the next chapter we turn our attention to the potential benefit of state pharmacy assistance programs in terms of the substitutability of pharmaceutical for provider-based medical treatments and, hence, potential Medicare savings.

5

Impact of Vermont's Pharmacy Assistance Programs on Medicare Service Use and Expenditures

5.1   Introduction

Several recent studies provide evidence that reliable and consistent access to outpatient prescription drugs may reduce the use and costs of non-drug medical services.[1] Lichtenberg (1996, 2001a, 2001b) used data from the 1996 Medical Expenditure Panel Survey to show that replacing older drugs with more recently FDA-approved medications reduces non-drug medical expenses, most notably hospital expenditures. Similarly, Soumerai, *et al.* (1994, 1991, 2001) looked at payment restrictions imposed by New Hampshire Medicaid on drugs for acute mental illness and found that limits on coverage resulted in an increased number of clinic visits, emergency room encounters and partial hospitalizations, and higher Medicaid payments. Subsequent elimination of the spending caps caused the use of most services to return to baseline levels. Comparable results were obtained from a more generalizable study of higher cost sharing for 'essential' drugs among the elderly in Canada (Tamblyn, *et al.*, 2001).

Alternatively, as the Institute of Medicine's report on medical errors documented, outpatient prescription drug use may actually contribute to more frequent adverse events and medical complications, resulting in an increased use of medical services and higher expenditures (Kohn, *et al.,* 1999). Pharmaceuticals may also be a complement to certain

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[1] The Congressional Budget Office (October 2002) recently released a report titled "Issues in Designing a Prescription Drug Benefit for Medicare" that contains a useful review of the literature on substitution of drug for non-drug medical services. See also, Lexchin and Grootendorst (2002) "The Effects of Prescription Drug User Fees on Drug and Health Services Use and Health Status: A Review of the Evidence."

types of services such as physician visits for monitoring the use and side effects of medications, as well as for writing new prescriptions. If pharmaceuticals and physician services are complementary, then a Medicare outpatient drug benefit may lead to higher per capita Part B expenditures.

To analyze the impact of Vermont's pharmacy assistance programs on Medicare spending, we employ a quasi-experimental study design in which enrollees in pharmacy assistance programs are considered the 'treatment' group and non-participating non-dually eligible beneficiaries are used as the 'comparison' group.[2] The impact of outpatient drug coverage on Medicare expenditures is evaluated by comparing the change in Medicare expenditures of pharmacy assistance enrollees before versus after enrollment to the change in expenditures of non-participants over the same time period. The difference in the expenditure changes of participants and non-participants measures the marginal impact of the pharmacy program. The study design faces two major limitations, discussed in greater detail below. First, assignment to treatment versus comparison groups is not randomized, so there may be self-selection of sicker individuals into the treatment group, which could bias the results. Second, the comparison group may itself have drug coverage (and the treatment group may have had prior coverage), which could also bias the results. Both data limitations could cause significant bias in the measurement of the effect of enrollment in state pharmacy assistance programs on Medicare expenditures.

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[2] The group of Medicare beneficiaries who were never enrolled in Medicaid or state pharmacy assistance programs has been somewhat awkwardly labeled the "Medicare Only" sample. This term should not be interpreted to necessarily imply a lack of private Medicare supplemental coverage.

5.2   Description of Basic Model

The basic Medicare expenditure model employed in this study can be summarized as follows:

$$Y_{it} = \alpha_i + T_t \beta_1 + H_{it} \beta_2 + X_{it} \beta_3 + P_{it}^M \beta_4 + E_{it=1...T}^V \beta_5 + E_{it=1...T}^S \beta_6 + \varepsilon_{it}$$

where Y_{it} = annualized Medicare expenditures for beneficiary i in year t;

α_i = the intercept term;

T_t = a vector of zero-one dummies for each year in the study;

H_{it} = a continuous prospective DCG/HCC risk adjustment index normalized to 1 that varies by beneficiary and year;

X_{it} = a vector of additional beneficiary-level characteristics, some of which may change over time;

P_{it}^M = the proportion of the Medicare entitlement period an individual is enrolled in Medicaid with drug benefits during year t;

$E_{it=1...T}^V$ = a vector of indicator variables reflecting the proportion of the Medicare entitlement period an individual is enrolled in VHAP Pharmacy for each consecutive year of enrollment from $t=1$ through $t=T$;

$E_{it=1...T}^S$ = a vector of indicator variables reflecting the proportion of the Medicare entitlement period an individual is enrolled in VScript for each consecutive year of enrollment from year $t=1$ through year $t=T$; and

ε_{it} = a random error term.

The equation represents a 'differences-in-differences' (DD) model in which the impact of the drug benefit is measured as the change in average Medicare expenditures before versus after enrollment in VHAP Pharmacy and VScript relative to the change over the same time period among Medicare beneficiaries who were not enrolled in a state pharmacy assistance program.[3] The coefficients on the year-level dummies, β_1, capture changes in medical use and costs over time that are common to both pharmacy assistance enrollees and non-enrollees. The coefficients on the health status indicators, β_2, β_3 and β_4, measure between-group differences in health that are unrelated to pharmacy assistance. The coefficients on the vector of year-specific enrollment variables for VHAP Pharmacy and VScript, β_5 and β_6, respectively, thus, measure the change in Medicare spending among pharmacy assistance recipients after enrollment relative to the change in expenditures among non-enrollees over the same time period.[4] If access to pharmaceuticals results in substitution of drug for Medicare-covered medical services, the coefficients on VHAP Pharmacy and VScript enrollment will be negative, indicating a relative reduction in per capita program spending.   If, on the other hand,

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[3] The ideal comparison group for this study would have been eligible but unenrolled Medicare beneficiaries who shared the same health status profile as the treatment group, including a possible precipitating acute care event. However, the data did not permit us to identify eligible but unenrolled individuals. Future analysis of survey data will allow us to identify eligible but unenrolled beneficiaries. In future analyses of claims data, we will also subset the sample on the basis of such health status indicators as diagnoses and precipitating hospitalizations.

[4] The focus of this study is on the impact of enrollment in one of Vermont's pharmacy assistance programs on Medicare expenditures. However, the Medicaid enrollment variable can equally be thought of as a DD estimator measuring the effect of Medicaid enrollment on Medicare spending. Medicaid enrollment implies payment of Medicare cost sharing and coverage of additional benefits, including outpatient prescription drugs. Medicaid enrollment is also not random, and may be strongly associated with poor health and high medical expenditures as individuals "spend down" to satisfy Medicaid income and asset limits.

pharmaceuticals and other treatments are complements rather than substitutes, or result in greater adverse events, the coefficients for VHAP Pharmacy and VScript will be positive, indicating a relative increase in per capita program spending.

The marginal effects of the drug benefit are estimated separately for each year of enrollment and for each of the two programs.[5] For example, for a given individual's first year of enrollment in VHAP Pharmacy (regardless of the calendar year in which it occurs), the variable $E_{it=1}^{V}$ equals the proportion of the Medicare entitlement period for that year that the individual was enrolled in the pharmacy program and all other enrollment variables equal zero. If an individual spent six months in VHAP Pharmacy and six months in VScript during their first year of participation in any program, then $E_{it=1}^{V} = 0.5$ and $E_{it=1}^{S} = 0.5$ and all other enrollment variables equal zero. During their second year of enrollment in VHAP Pharmacy, $E_{it=2}^{V}$ equals the proportion of the period enrolled and all other enrollment variables equal zero. If an individual was first enrolled in VScript in 1995, VHAP Pharmacy in 1996 and VScript again in 1997, then $E_{it=1}^{S} > 0$, $E_{it=2}^{V} > 0$, and $E_{it=3}^{S} > 0$, respectively, and all other enrollment variables for

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[5] Numerous alternatives to the enrollment variable specification were tested, including a single enrollment dummy for VHAP Pharmacy and VScript, both jointly and separately. A single enrollment variable averages the program effects over all years of enrollment and fails to uncover any duration effect of drug coverage. For this evaluation, we felt it was important to trace out the year-specific treatment effects in order to decompose the short versus long-run impact of drug coverage. Year-specific dummies offer the additional advantage of helping to control for selection based on precipitating events, as discussed below. We also deemed it important for policy purposes to estimate the VHAP Pharmacy and VScript effects separately, given the differences in cost sharing and drug coverage, as discussed below.

each year equal zero.[6] We also had access to enrollment data from 1993, so the VScript enrollment vector is based on a possible start date of 1993.

To account for the fact that VHAP Pharmacy enrollees paid a co-insurance rate of 50 percent during the first four months of 1996, all participants during that period were assigned to VScript for the purposes of this study. Similarly, to account for the fact that the $1 to $2 co-payment was adopted by VScript during the last eight months of 1999, all enrollees during that period were assigned to VHAP Pharmacy. Given the short period of time during which the co-insurance rules overlapped, the number of beneficiaries who were reassigned to a program for the purposes of this evaluation was relatively low. Moreover, as previously shown in Chapter 4, the prevalence of individual drugs purchased was remarkably similar across the two programs. Reassignment on the basis of the cost sharing rules should, thus, not affect the model's results.

If consistent access to pharmaceuticals has a beneficial and cumulative effect on health status, then the coefficients on the year-level enrollment variables will be negative and getting larger (in absolute terms) over time. If drug coverage is sought for the treatment of an acute short-term illness, then any beneficial effects of the pharmaceutical treatment will diminish and the coefficients will be negative and getting smaller (in absolute terms) over time. Under the "drugs as complements" or adverse events

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[6] While the possible permutations of enrollment sequence are many, in actuality, the vast majority of all pharmacy assistance participants enrolled in one program only and remained in that program, with the lone exception of VScript enrollees who were automatically transferred into VHAP Pharmacy when the income eligibility thresholds were raised. Analysis of state eligibility data revealed that 72 percent of all VHAP Pharmacy and VScript participants between 1993 and 2000 were enrolled in just one program. An additional 20 percent switched from VScript to VHAP Pharmacy and 3 percent from VHAP Pharmacy to VScript. Less than 6 percent of all participants switched between the two programs more than once. (See Chapter 3.)

hypotheses, cumulative effects will lead to positive and increasing coefficients over time, while diminishing effects will lead to positive and decreasing coefficients over time.

An additional enrollment variable, P_{it}^{M}, is included in the model to reflect differences in spending unique among low-income beneficiaries who are also receiving full benefits under Medicaid. The Medicaid enrollment variable is defined as the proportion of a given annual Medicare entitlement period that an individual is also dually enrolled in Medicaid. An individual may have multiple VHAP Pharmacy, VScript and Medicaid enrollment episodes in a given year or across years. But enrollment episodes in different programs are not allowed to overlap.

The validity of the DD model relies on two critical assumptions. First, in the absence of an outpatient drug benefit, changes in expenditures between the treatment and comparison groups should be the same over time. Second, the pharmacy assistance program should have no 'spill over' effects on the use and cost of services among the comparison population. Neither of these assumptions may be warranted. Medicare beneficiaries are likely to enroll in state pharmacy assistance programs precisely because they suffer from chronic illnesses with extensive and persistent health care needs. In the absence of a drug benefit, the health care costs of program enrollees are likely to increase over time relative to those of the comparison population. Moreover, if Medicare beneficiaries adversely self-select into state-sponsored pharmacy assistance programs, then an increase in enrollment over time should leave a residual pool of relatively healthier and less costly non-participating Medicare recipients.

We attempt to control for between-group differences in health status in three ways. First, to capture differences in beneficiary health status that are unrelated to the program, including differences between the treatment and comparison populations, we use the prospective Diagnostic Cost Group Hierarchical Condition Category (HCC) risk adjustment score, H (Pope, *et al.*, 2000; Kautter, *et al.*, 2001). Since the risk score is calculated on an annual basis, the index should also help control for changes over time in the health status of a given beneficiary. The HCC risk score incorporates the effect on expenditures of demographic characteristics (24 age/sex cells); aged originally entitled by disability; prior year Medicaid enrollment status; and prior year diagnoses (ICD-9 codes) from inpatient, hospital outpatient and Part B claims. Under the HCC model, risk scores for individuals with less than nine months of Medicare eligibility in a given year are calculated using the age and sex version of the Diagnostic Cost Group model, which is derived from the current year age and sex of the beneficiary only (Pope, *et al.*, 2000; Kautter, *et al.*, 2001). We used the prospective risk score rather than the concurrent model, which relies on current year diagnoses to predict current year expenditures, because the results from the prospective model are less likely to be endogenous to the outpatient drug benefit. If the number and severity of coexisting conditions are mitigated by access to outpatient drugs, the concurrent model will "explain" away some of the treatment effect, leading to an under-estimation of any savings.

Second, we control for several other potential sources of between-group differences in health status by including two additional indicator variables, denoted in the model equation by the vector of beneficiary-level covariates, *X*, some of which may

change over time.[7] The first is a zero-one indicator for beneficiaries entitled to Medicare by end-stage renal disease (ESRD) as identified by the Medicare status variable on the denominator file. The purpose of this variable is to control for the extremely high cost of the disease, a diagnosis that is not captured by the HCC algorithm. The second is a year and individual-level dummy set equal to one if the year included any part of the last six months of a person's life, and otherwise equal to zero. The purpose of this dummy is to capture the high costs associated with the end-of-life phase which may be independent of drug coverage. The Medicaid enrollment variable also serves as a proxy for differences in health status among VHAP Pharmacy and VScript participants associated with dual eligibility.

Finally, we attempt to control for between-group differences in health status through the use of the initial year of enrollment variables, $E_{it=1}^{V}$ and $E_{it=1}^{S}$. If an individual is induced to sign up for one of the state pharmacy assistance programs because of an unanticipated need for pharmaceuticals following the onset of an acute episode, a decline in spending immediately following enrollment may have more to do with regression to the mean than with access to outpatient drugs. Such a 'precipitating illness' event would be evidenced by a very large positive coefficient on $E_{it=1}^{V}$ or $E_{it=1}^{S}$ (e.g., the year of initial enrollment) and a much smaller positive (or even negative) coefficients on the subsequent year enrollment variables. Failure to control for the higher

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[7] The impact of beneficiary demographic characteristics such as age, gender and disability on expenditures was captured indirectly in the HCC algorithm.

expenditures associated with a precipitating acute illness will lead to a misinterpretation of a regression to the mean and an over-estimation of the long-run savings effect.[8]

The model is estimated on logged expenditures to account for the skewness of the expenditure data toward expensive outliers for those with a claim. However, because of the non-trivial proportion of beneficiaries without a claim, particularly within individual service categories, the results were estimated using a two-part model. The two-part model estimates the probability of any expenditure and the level of non-zero expenditures among Medicare claimants separately (Duan, *et al*, 1983). The probability model is estimated using logit and the conditional logged expenditure model is estimated using ordinary least squares. A set of group- and service-specific smearing factors based on individual residuals are used to retransform the results back into the original dollar scale (Duan, *et al*, 1983; Manning, 1998; Mullahy, 1998). Robust standard errors are estimated in the first stage regressions to control for the autocorrelation of the error terms. The standard errors in the combined two-part model are estimated using bootstrapped techniques.[9]

The model is estimated on Medicare expenditures for inpatient, outpatient, and physician services separately to accommodate potential differences in the correlation

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[8] We also tried to control for differences in health status between the pharmacy assistance participants and the non-participants through the use of a beneficiary-level fixed effects model. The beneficiary-level fixed effects specification controls for the correlation between multiple observations for the same individual over time. The fixed effects model offers the additional advantage of controlling for unobservable differences in beneficiary health status, some of which will be correlated with enrollment in the state pharmacy assistance programs. However, given the relative stability of individual health status over time, there was a high degree of correlation between risk scores and individual fixed effects. In the end, we chose to report the more transparent risk scores without fixed effects, rather than employ the unobservable fixed effects specification.

[9] A description of the two-part model estimation procedures is provided in Appendix A.

between drug and non-drug care across the individual service categories.[10] Inpatient expenditures are based on facility payments for services provided in an acute, rehab or specialty care hospital; a skilled nursing facility; and a long-term care hospital. Outpatient expenditures comprise facility payments for services administered in a hospital outpatient department or a freestanding ambulatory care clinic. Physician expenditures include all payments for professional services provided in any setting, including a physician's office. One might expect that acute care services generally provided in inpatient and, to a lesser degree, outpatient facilities are more likely to be substitutes for drugs, while services geared toward disease prevention and monitoring typically provided in a physician's office are more likely to be complementary with drug therapies.

Medicare expenditures are annualized by dividing by the proportion of a given year that the beneficiary is alive and entitled to both Part A and B benefits. The annualization of Medicare payments controls for the possible endogenous effect of death on expenditures. If drugs keep people alive longer, annual expenditures will increase and drugs will appear to raise costs whereas, on an annualized basis, they do not. However, the marginal effect of the program relative to annual total Medicare expenditures will vary according to how long an individual is entitled to Part A and B benefits in a given year. To control for differences in length of Medicare enrollment, observations are

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[10] The model was estimated over total Medicare expenditures as well, including inpatient, outpatient, professional, durable medical equipment and home health. However, important variation in the service use profiles across individual beneficiaries, as well as heteroscedasticity in the error term which invalidates the assumption of the smearing retransformation, make the results for total expenditures less robust. For policy and technical reasons, we report only the service-level results here.

weighted by the proportion of the year a person is alive and entitled to both Part A and B benefits.

5.4 Description of Study Sample

The sample is based on Medicare beneficiaries whose permanent residence was in Vermont at any time between 1994 and 1999. Because of the need for an initial base year for the prospective risk scores, the model is estimated over 1995 to 1999 observations only, with the 1995 risk scores based on 1994 claims. Beneficiaries who were enrolled in Medicare managed care for at least one month are also excluded for the year in which they were enrolled, as well as individuals who were not entitled to both Part A and B benefits at any time during the year. Beneficiaries who were dually eligible for full drug benefits under Medicaid and never participated in either state pharmacy assistance program, as well as those less than 65 years old, are also excluded. The Medicaid enrollment variable, thus, captures the (non-overlapping) period of time in a given year that a VHAP Pharmacy or VScript participant was dually eligible for full Medicaid benefits.[11] The final sample includes 314,023 beneficiary-year observations. There are a total of 18,156 beneficiary-year observations with at least one VHAP Pharmacy episode and 11,823 beneficiary-year observations with at least one VScript

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[11] To test the generalizability of the results, we estimated the model over all beneficiaries, including dually eligible beneficiaries who were never enrolled in VHAP Pharmacy or VScript and the non-elderly. The coefficient for Medicaid enrollment showed significantly higher expenditures among the dually eligible, and the coefficient on the HCC risk score was also slightly higher. The coefficients for VHAP Pharmacy and VScript enrollment remained unchanged from the more restricted sample specification.

episode. The majority of the sample, 288,685 beneficiary-year observations, had no episode in either state program.[12]

5.5   Sources of Data

State data sources include the Vermont Medicaid Eligibility Data Files and the Vermont Medicaid Recipient Base Data Files from 1993 through 1999. The state eligibility file provides a record of all enrollment episodes by type of program, including VHAP Pharmacy, VScript, and dual eligibility in Medicaid. Program codes further identify the basis of program eligibility, which was crucial for distinguishing between duals who had access to outpatient drug coverage under Medicaid and those who only had their Medicare premiums, co-payments and deductibles covered but were not eligible for Medicaid benefits.[13]   Start and end dates are also provided for each enrollment episode. The state's recipient base file provides unique Medicaid and Medicare identifiers for each enrollee, allowing us to link individual records between the state and federal files.

Federal data sources include annual claims files for inpatient, outpatient and physician services from 1994 through 1999. We also obtained information on beneficiary demographic characteristics, Medicare entitlement, Medicare eligibility status and dual eligibility status for the study period from the Medicare denominator file.

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[12] Please keep in mind that a person can be in VHAP Pharmacy, VScript, and the Medicare only sample during the same year, though not at the same time. As a result, the sum of person- and year-level VHAP Pharmacy enrollees, person- and year-level VScript enrollees, and person- and year-level Medicare only group members will exceed the total number of unique person- and year-level observations. However, when weighting by the proportion of the year enrolled in each group, the sum will equal the number of unique beneficiary-year observations.

[13] The relatively few dual eligibles who were not entitled to Medicaid benefits were excluded from the Medicaid enrollment variable.

Medicare claims data and entitlement records allow us to determine service utilization and annualized program expenditures for all Medicare beneficiaries residing in Vermont during the study period. By linking the state eligibility files with the federal claims files through the unique Medicare beneficiary identifiers, we are able to apportion eligibility according to the beneficiaries' enrollment in Medicaid, VHAP Pharmacy and VScript. As stated earlier, we used the claims files and the denominator file to calculate the prospective HCC risk scores for each year of Medicare entitlement as well.

5.6   Results of Descriptive Analysis

The demographic and health status characteristics for each of the sample groups, prior to excluding the non-elderly, are presented in Table 5-1. Sample means and their standard errors, shown in the first three columns, are based on 1997 data, the first year of significant VHAP Pharmacy enrollment. The significance of differences in sample means is shown in the last two columns. Sample groups include all beneficiaries enrolled in VHAP Pharmacy at any time in 1997, all beneficiaries enrolled in VScript at any time during the year, and all beneficiaries never enrolled in any of the state's drug benefit programs, including Medicaid, during the year. Individuals who transition between VHAP Pharmacy and VScript will appear in both treatment groups. Group means are weighted by the percent of the year an individual is alive and entitled to Part A and B benefits and by the percent of the Medicare entitlement period an individual is enrolled in each program. As a result, sample means reflect averages over total days of Medicare entitlement and program enrollment, rather than over individual lives.

Table 5-1

**Baseline Demographic, Health Status, Utilization and Expenditure
Characteristics by Sample Group**

	Sample Group			Difference in Group Means	
	Medicare/ VHAP Rx	Medicare/ VScript	Medicare Only	VHAP Rx vs. Medicare	VScript vs. Medicare
	Mean *(Std Err)*	Mean *(Std Err)*	Mean *(Std Err)*	Mean *(T-Test)*	Mean *(T-Test)*
Sample Group Size	5,086	1,561	65,692	-	-
Demographic Characteristics					
Female	58.5%	58.4%	58.0%	0.5	0.4
	(0.69)	*(1.25)*	*(0.19)*	*-(0.5)*	*-(0.2)*
White	98.5	99.1	98.7	-0.2	0.4
	(0.17)	*(0.24)*	*(0.04)*	*(-1.1)*	*-(1.0)*
Disabled	23.5	15.8	11.1	12.4 ***	4.7 ***
	(0.59)	*(0.92)*	*(0.12)*	*(23.5)*	*(4.6)*
Age < 65 Years	13.3	5.3	7.0	6.3 ***	-1.7 **
	(0.48)	*(0.57)*	*(0.10)*	*-(14.6)*	*(-2.2)*
65-74 Years	38.3	42.1	51.6	-13.3 ***	-9.5 ***
	(0.68)	*(1.25)*	*(0.19)*	*(-16.2)*	*(-6.0)*
75-84 Years	35.7	40.9	31.2	4.5 ***	9.7 ***
	(0.67)	*(1.24)*	*(0.18)*	*-(5.9)*	*-(6.6)*
> 84 Years	12.7	11.7	10.2	2.5 ***	1.5
	(0.47)	*(0.81)*	*(0.11)*	*-(5.1)*	*-(1.6)*
Health Status					
HCC Risk Score	0.97	0.97	0.82	0.14 ***	0.15 ***
	(0.01)	*(0.02)*	*(0.03)*	*-(0.13)*	*-(0.07)*
Utilization and Expenditures					
Share of Benes. with a Claim	90.5	92.2	90.0	0.5	2.2 **
	(0.41)	*(0.68)*	*(0.12)*	*(1.08)*	*(2.34)*
Total Medicare Payment	$4,804	$4,668	$3,634	$1,170 ***	$1,034 ***
	(158)	*(249)*	*(36)*	*(7.7)*	*(3.6)*

NOTES:

Means and standard errors are based on 1997 data, the first year with a significant number of VHAP Pharmcy enrollees.

Beneficiary may appear in more than one sample if individual transitioned between drug benefit programs in 1997.

Medicare only group consists of beneficiaries who were never enrolled in VHAP Pharmacy, VScript or Medicaid during the study period.

Sample means weighted by % of year alive and entitled to Part A & B benefits, as well as by % of entitlement period enrolled in program.

The HCC risk score is based on the prospective payment model normalized to a national average of 1.00.

Disabled refers to Medicare beneficiaries originally and currently entitled by disability.

Medicare payment includes inpatient, outpatient, professional, home health, and durable medical equipment services.

'***' indicates statistical significance at the 1% level, '**' at the 5% level and '*' at the 10% level.

Computer output: newvt07a and newvt07b

SOURCE:

RTI analysis of Medicare claims data, 1995-1999.

According to the state eligibility files, 5,086 Medicare beneficiaries were enrolled in VHAP Pharmacy at least once during 1997, 1,561 were enrolled in VScript, and 65,692 were never enrolled in any state drug benefits program. The results of the descriptive analysis show that men and women were equally distributed across the VHAP Pharmacy, VScript and Medicare only samples, with 58 percent being female and roughly 99 percent of enrollees in all three of these groups being white.

The remaining baseline statistics suggest that VHAP Pharmacy and VScript enrollees have poorer health status than the Medicare only sample evidenced by a larger proportion of beneficiaries originally or currently entitled by disability and the very old, as well as by higher risk scores. Only 11 percent of the Medicare only sample were originally or currently entitled on the basis of disability, compared with 24 percent of VHAP Pharmacy enrollees and 16 percent of VScript enrollees. Similarly, 10 percent of the Medicare only group was over the age of 84, compared with 13 percent of VHAP Pharmacy enrollees and 12 percent of VScript enrollees. All of these differences were statistically significant at the one percent level, with the exception of the proportion of the very old in VScript.

The HCC risk scores further demonstrate that enrollees in VHAP Pharmacy and VScript have significantly poorer health status than non-dual non-enrollees (though still slightly better health status than the nation as a whole). The 1997 scores reflect predicted total Medicare expenditures based on 1996 inpatient, hospital outpatient, and Part B diagnoses; Medicaid enrollment status; original reason for entitlement; and demographic characteristics. Predicted expenditures are calibrated on the five percent sample of

Medicare beneficiaries and normalized to one by dividing by national mean expenditures. A group risk score of 1.00 means that average predicted expenditures for that sample are equal to average predicted expenditures for all Medicare beneficiaries in the country. The 1997 risk score for both VHAP Pharmacy and VScript was 0.97, compared with a risk score of 0.82 for Medicare only beneficiaries. Group differences in risk scores were also statistically significant at the one percent level.

A similar set of statistics for Medicare-covered service utilization and expenditures for each of the sample groups is presented at the bottom of Table 5-1. All three groups accessed services at least once during the year at roughly the same rate. Approximately 90 percent of all Medicare only beneficiaries filed at least one Medicare claim during 1997, compared with 91 percent of the VHAP Pharmacy enrollees and 92 percent of VScript enrollees. However, both treatment groups experienced higher intensity of services than the Medicare only sample, evidenced by average Medicare expenditures. In 1997, average expenditures across all beneficiaries (claimants and non-claimants) were $3,634 for the Medicare only group, $4,804 for the VHAP Pharmacy group and $4,668 for the VScript group. Differences in the proportion of claimants (with the exception of VHAP Pharmacy) and average spending between the Medicare only sample and the two treatment groups were significant at the five or one percent levels.

5.7 Evidence of Adverse Selection

The baseline demographic, health status, utilization, and expenditure patterns for the sample groups suggest that VHAP Pharmacy and VScript enrollees are in poorer health and use more Medicare-covered services than the comparison group of non-

enrollees. It is unclear from the descriptive analysis whether these observed patterns represent underlying differences in health status between Medicare beneficiaries who are eligible for the state pharmacy assistance programs versus those who are ineligible (e.g., lower income versus higher income beneficiaries) or, alternatively, reflect adverse selection into the state-sponsored programs (e.g., low-income enrolled versus low-income unenrolled beneficiaries). If low-income beneficiaries adversely self-select into state-sponsored drug assistance programs on the basis of poor health and a need for drugs, the results of the regression analysis may be biased and unrepresentative of the targeted low-income population as a whole. If eligible but unenrolled beneficiaries consume fewer prescription medications, they are less likely to generate savings by substituting drug for non-drug care.[14]

Further evidence of adverse selection into the state pharmacy assistance programs is presented in Figure 5-1. The figure shows average total Medicare expenditures for three cohorts of VHAP Pharmacy/VScript participants based on their *initial* year of enrollment, 1997, 1998, and 1999, respectively. For each cohort of initial year enrollees, average Medicare expenditures are traced both backwards and forwards over time from 1994 through 1999. For example, the line for the 1997 cohort shows average Medicare expenditures by year for all VHAP Pharmacy and VScript participants who first enrolled in either of the two state pharmacy assistance programs in 1997. Expenditures are

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[14] Information on the consumption of drug and non-drug medical services among eligible but unenrolled Medicare beneficiaries in Vermont will be collected through a survey during the second phase of this study, allowing us to better assess the extent of adverse selection into the pharmacy assistance program.

Figure 5-1
Average Total Medicare Expenditures for Cohort of State Pharmacy Assistance Enrollees and Medicare Only Beneficaries
Based on Year of Enrollment

- 1997 Cohort - State Pharmacy Assistance Enrollees
- 1998 Cohort - State Pharmacy Assistance Enrollees
- 1999 Cohort - State Pharmacy Assistance Enrollees
- 1997 Cohort - Medicare Only Beneficiaries
- 1998 Cohort - Medicare Only Beneficiaries
- 1999 Cohort - Medicare Only Beneficiaries
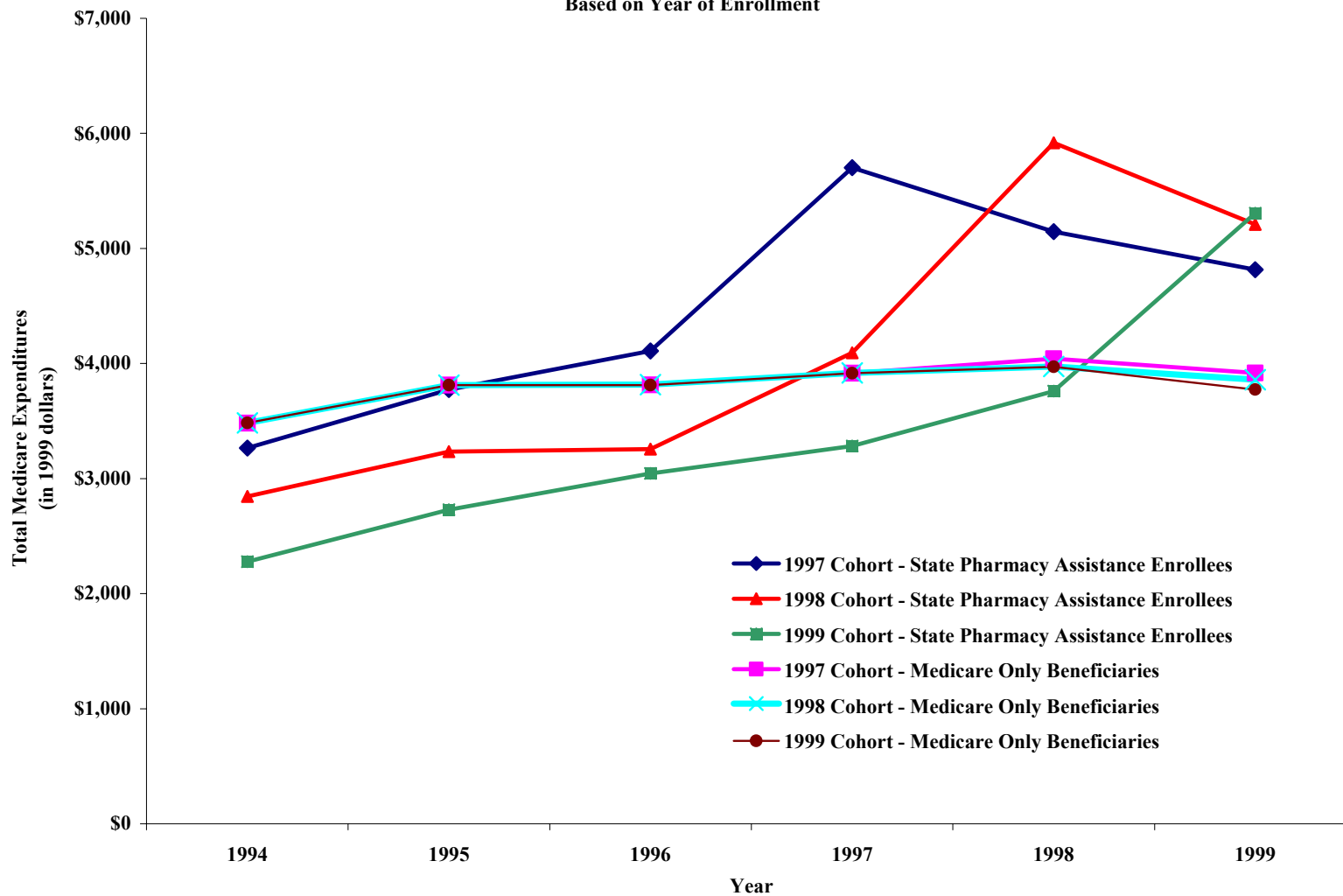
annualized, weighted by the percentage of year in Medicare, and adjusted for inflation using the Medicare inpatient producer price index. Average annualized expenditures for three similar cohorts of Medicare only beneficiaries based on all individuals enrolled in Medicare (but not enrolled in Medicaid or the state pharmacy assistance programs) in 1997, 1998, and 1999, respectively, are also provided for comparative purposes.[15]

The figure shows that average Medicare spending climbed gradually prior to initial enrollment and peaked during beneficiaries' first year of enrollment in VHAP Pharmacy or VScript for all three cohorts of program enrollees. Then average spending declined again during the next few years of participation, returning closer to their pre-enrollment levels. In sharp contrast, average spending trends for the Medicare only cohorts show practically no variation in real spending over the same time period. This relative spending peak among program participants at the time of enrollment supports the hypothesis that individuals are induced to enroll in state pharmacy assistance programs because of a precipitating acute illness and an associated need for prescription medications. The initial decline in spending following enrollment may therefore reflect a return to individuals' relatively better pre-enrollment health status ("regression to the mean"), as opposed to a substitution of drug for non-drug care.

In sum, the baseline descriptive statistics and the cohort expenditure analysis suggest that VHAP Pharmacy and VScript enrollment is characterized by two distinct types of selection. First, enrollees appear to have poorer baseline health status than non-enrollees, independent of the precipitating illness event. Thus, expenditure growth is likely to be higher among enrollees than non-enrollees in the absence of the outpatient

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[15] The Medicare only cohorts are based on each set of total current-year enrollees, and are not limited to newly enrolled beneficiaries. As a result there is a high degree of overlap across the three Medicare only cohorts.

drug intervention. Failure to control for the relatively higher expenditure growth rate among enrollees will lead to an underestimation of the savings effect. Second, eligible beneficiaries appear to sign up for pharmacy assistance mainly when they experience an acute illness and require prescription medications on an outpatient basis. Failure to control for the spike in medical expenditures during the initial year of enrollment will result in an overestimation of the savings effect. A decline in spending stemming from a 'regression to the mean' will be incorrectly attributed to substitution of drug for non-drug care.

5.8 Results of the Multivariate Analysis

5.8.1 Sample Means

The sample means and standard errors for the variables in the regression model across all observations (excluding dual eligibles who were never enrolled in either of the state pharmacy assistance programs and the non-elderly) are shown in Table 5-2.[16] Average annualized payments for the restricted sample over the study period were $3,766 before controlling for any factors. The observations are evenly distributed across the five years, with 1995 being the omitted variable. The average HCC risk score for the restricted sample was 0.85, well below the national average of 1.00 over all beneficiaries,

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[16] It is important to keep in mind that the model is estimated over 314,023 unique year- and person-level observations. Each individual will likely appear in multiple years and may even appear multiple times in a given year if that person transferred between programs. As a result, the sample mean for variables that can only occur once for each individual, like death, will be calculated over all 314,023 observations and, hence, will appear unrealistically low.

Table 5-2

Sample Means and Standard Errors for Model Variables

	Sample Means *(Standard Errors)*
Medicare Payment ($)	3,766 *(17.598)*
1996	19.76 *(0.071)*
1997	20.00 *(0.071)*
1998	20.28 *(0.072)*
1999	20.45 *(0.072)*
HCC Risk Score	0.850 *(0.128)*
ESRD	0.209 *(0.008)*
Died	2.500 *(0.028)*
Medicaid Enrollment	1.504 *(0.020)*
1st Year Enrollment in VHAP Pharmacy	0.644 *(0.012)*
2nd Year Enrollment in VHAP Pharmacy	0.921 *(0.016)*
3rd Year Enrollment in VHAP Pharmacy	0.727 *(0.014)*
4th Year Enrollment in VHAP Pharmacy	0.523 *(0.012)*
5th Year Enrollment in VHAP Pharmacy	0.589 *(0.013)*
6th Year Enrollment in VHAP Pharmacy	0.405 *(0.011)*
7th Year Enrollment in VHAP Pharmacy	0.247 *(0.009)*
1st Year Enrollment in VScript	0.438 *(0.009)*
2nd Year Enrollment in VScript	0.687 *(0.014)*
3rd Year Enrollment in VScript	0.743 *(0.014)*
4th Year Enrollment in VScript	0.423 *(0.011)*

Table 5-2 (Continued)

Sample Means and Standard Errors for Model Variables

	Sample Means *(Standard Errors)*
5th Year Enrollment in VScript	0.109
	(0.005)
6th Year Enrollment in VScript	0.058
	(0.004)
7th Year Enrollment in VScript	0.018
	(0.002)

NOTES:

The denominator for calculating the sample means is unique program-, year- and person-level observations (n=314,023).

Expenditures are annualized for partial year entitlement and weighted by percent of year alive and entitled to Part A and B benefits.

 Medicaid, VHAP Rx and VScript enrollment variables represent percent of Medicare entitlement period individual is enrolled in each program.

1995 is omitted year variable.

Medicare beneficiaries who were ever dually eligible, but never in VHAP Rx or VScript, were omitted from restricted sample.

Standard errors for all estimates are given in parentheses.

 '***' indicates significance at 1% level; '**' at 5% level; and '*' at 10% level.

Computer output: newvt06s, newvt06u

SOURCE: RTI analysis of Medicare claims data, 1995-1999.

reflecting both the exclusion criteria as well as the better health status of Medicare beneficiaries who live in Vermont.[17] Less than one percent of all observations suffered from ESRD and less than three percent died during the study period. The percentage of Medicaid enrollees with drug benefits who were also enrolled in one of the two state pharmacy assistance programs at some point during the study was 1.5 percent.

The very small means for the year-specific enrollment variables reflect several factors. First, the values are averaged over percentages (not zero-one dummies) reflecting the proportion of the year enrolled. Second, individuals who enrolled in VScript in 1993 or 1994 will not have a first or second year value since the regression sample is based on 1995-1999 observations. Third, there were only 11,575 *unique* enrollees in the pharmacy assistance programs between 1994 and 1999. If all of these were enrolled for a full 12 months and all of them first enrolled in the same year, the proportion of participants in a given year in the sample would be 2.9 percent (reflecting the maximum value of the mean). Summing over first year VHAP Pharmacy and VScript enrollees, the mean is 1.1 percent. Summing over second year enrollees, the mean is 1.6 percent. The fact that some participants enrolled prior to 1995 and some were enrolled during their first and second years for less than 12 months further contributes to the very small means for the year-specific enrollment variables.

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[17] The average HCC risk score for the full sample is 0.88, including the dually eligible and non-elderly, indicating that the Medicare population in Vermont is in better health than the Medicare population in the country as a whole.

5.8.2 First-Stage Results of Two-Part Model

The first-stage regression results of the two-part model are presented in Table 5-3 for each of the three service categories. The first column under each service category contains the odds ratios for having at least one claim for that type of service. The odds ratio is the probability of having a claim divided by the probability of not of having a claim. For example, the odds ratio for the death indicator variable shows the probability of having a claim among decedents relative to the probability of having a claim among non-decedents. Accordingly, an odds ratio less than one indicates that decedents have a lower probability of accessing care than non-decedents, while an odds ratio greater than one indicates that decedents have a higher probability of having a claim than non-decedents. An odds ratio equal to one indicates identical probabilities. The second column presents log payments for each type of service conditional on having a claim. The standard errors for each coefficient are presented below the estimate. T-tests were conducted to determine whether the estimated odds ratios were statistically significantly different from one and the log expenditure coefficients were statistically significantly different from zero. The R^2 value and sample size for each model and service category are presented in the bottom two rows. The probability and log expenditure models generally explain between five and ten percent of the variation in accessing care and Medicare payments, respectively.

Table 5-3

Impact of Vermont State Pharmacy Assistance Programs on Medicare Payments:
First Stage Logistic and Conditional OLS Results

	Inpatient Services		Outpatient Services		Physician Services	
	Odds Ratio of Any Expenditures	*Level of (Logged) Expenditures*	*Odds Ratio of Any Expenditures*	*Level of (Logged) Expenditures*	*Odds Ratio of Any Expenditures*	*Level of (Logged) Expenditures*
Intercept	-	8.671***	-	4.698***	-	5.226***
		(0.010)		(0.009)		(0.008)
1996	0.968**	0.027**	1.145***	0.051***	1.078***	0.032***
	(0.014)	(0.012)	(0.013)	(0.009)	(0.014)	(0.008)
1997	0.864***	0.075***	1.187***	0.132***	1.104***	0.043***
	(0.013)	(0.012)	(0.014)	(0.009)	(0.015)	(0.009)
1998	0.805***	0.104***	1.356***	0.199***	1.182***	0.098***
	(0.012)	(0.012)	(0.017)	(0.009)	(0.017)	(0.009)
1999	0.701***	0.074***	1.434***	0.182***	1.294***	0.177***
	(0.011)	(0.013)	(0.019)	(0.009)	(0.020)	(0.009)
HCC Risk Score	2.030***	0.080***	3.060***	0.465***	4.685***	0.558***
	(0.015)	(0.004)	(0.049)	(0.005)	(0.110)	(0.004)
ESRD	1.893***	0.511***	7.784***	2.933***	2.390**	0.988***
	(0.225)	(0.047)	(3.281)	(0.063)	(0.900)	(0.049)
Died	6.083***	0.766***	0.781***	0.637***	0.962	1.172***
	(0.140)	(0.012)	(0.022)	(0.017)	(0.035)	(0.015)
Medicaid Enrollment	1.692***	0.062*	1.198**	0.112***	0.890	0.182***
	(0.074)	(0.032)	(0.084)	(0.030)	(0.075)	(0.029)

Table 5-3 (Continued)

Impact of Vermont State Pharmacy Assistance Programs on Medicare Payments
First Stage Logistic and Conditional OLS Results

	Inpatient Services		Outpatient Services		Physician Services	
	Odds Ratio of Any Expenditures	*Level of (Logged) Expenditures*	*Odds Ratio of Any Expenditures*	*Level of (Logged) Expenditures*	*Odds Ratio of Any Expenditures*	*Level of (Logged) Expenditures*
1st Year Enrollment in VHAP Pharmacy	**1.494*****	**0.095***	**0.750*****	**0.132*****	**0.558*****	**0.094****
	(0.103)	**(0.055)**	**(0.052)**	**(0.047)**	**(0.043)**	**(0.045)**
2nd Year Enrollment in VHAP Pharmacy	1.263***	-0.067*	0.834***	0.009	0.693***	-0.020
	(0.066)	(0.039)	(0.044)	(0.034)	(0.041)	(0.031)
3rd Year Enrollment in VHAP Pharmacy	1.207***	-0.078*	0.942	0.020	0.730***	-0.046
	(0.071)	(0.045)	(0.059)	(0.037)	(0.051)	(0.037)
4th Year Enrollment in VHAP Pharmacy	1.231***	0.000	1.030	0.038	0.843**	-0.039
	(0.086)	(0.052)	(0.075)	(0.045)	(0.072)	(0.042)
5th Year Enrollment in VHAP Pharmacy	1.390***	-0.073	1.033	-0.019	0.854**	0.048
	(0.085)	(0.046)	(0.070)	(.039)	(0.066)	(0.038)
6th Year Enrollment in VHAP Pharmacy	1.400***	-0.167***	1.023	0.014	0.931	0.052
	(0.104)	(0.055)	(0.086)	(0.046)	(0.094)	(0.043)
7th Year Enrollment in VHAP Pharmacy	1.304***	-0.115	1.189	-0.131**	0.885	-0.021
	(0.130)	(0.075)	(0.140)	(0.059)	(0.118)	(0.057)
1st Year Enrollment in VScript	**1.645*****	**-0.016**	**0.944**	**0.090**	**0.818***	**0.155*****
	(0.149)	**(0.071)**	**(0.087)**	**(0.061)**	**(0.087)**	**(0.057)**
2nd Year Enrollment in VScript	1.271***	-0.134***	0.964	0.095**	0.909	-0.005
	(0.076)	(0.048)	(0.057)	(0.041)	(0.064)	(0.039)
3rd Year Enrollment in VScript	1.305***	-0.081*	1.216***	0.012	1.107	0.003
	(0.075)	(0.044)	(0.072)	(0.038)	(0.078)	(0.036)

Table 5-3 (Continued)

Impact of Vermont State Pharmacy Assistance Programs on Medicare Payments
First Stage Logistic and Conditional OLS Results

	Inpatient Services		Outpatient Services		Physician Services	
	Odds Ratio of Any Expenditures	*Level of (Logged) Expenditures*	*Odds Ratio of Any Expenditures*	*Level of (Logged) Expenditures*	*Odds Ratio of Any Expenditures*	*Level of (Logged) Expenditures*
4th Year Enrollment in VScript	1.200**	-0.233***	1.041	-0.056	0.988	-0.040
	(0.094)	(0.060)	(0.085)	(0.051)	(0.096)	(0.047)
5th Year Enrollment in VScript	1.346*	-0.349***	0.881	0.105	1.820**	-0.082
	(0.210)	(0.126)	(0.151)	(0.101)	(0.457)	(0.098)
6th Year Enrollment in VScript	1.576**	-0.281	1.155	-0.007	1.179	0.083
	(0.317)	(0.175)	(0.301)	(0.137)	(0.389)	(0.131)
7th Year Enrollment in VScript	0.670	0.378	0.815	0.091	1.385	-0.245
	(0.379)	(0.322)	(0.436)	(0.281)	(0.976)	(0.322)
R^2	0.082	0.076	0.048	0.080	0.060	0.104
Sample Size	314,023	56,831	314,023	249,604	314,023	272,974

NOTES:

Results from probability model are presented as odds ratios.

Medicare payments are annualized for partial year entitlement.

Both logistic and OLS regressions are weighted by percent of year alive and entitled to both Part A and B benefits.

Medicaid, VHAP Pharmacy and VScript enrollment variables reflect percent of Medicare entitlement period individual is enrolled in each program.

Medicare beneficiaries who were ever dually eligible, but never in VHAP Pharmacy or VScript, were omitted from sample.

Inpatient includes facility payments for services provided in an acute, rehab or specialty care hospital, a SNF or a LTC hospital. Outpatient includes facility payments for services provided in a hospital outpatient department or a freestanding ambulatory clinic. Physician category includes professional payments for services provided in any setting, including a physician office.

1995 is the omitted year variable.

Robust standard errors for each estimate are adjusted for multiple observations for each individual and are shown in parenthesis.

'***' indicates significance at 1% level; '**' at 5% level; and '*' at 10% level.

Computer output: *strun09b*

SOURCE: RTI analysis of Medicare claims data, 1995-1999.

The results show that the odds of having an inpatient claim are decreasing over time, though the intensity of resource use once admitted to an inpatient facility is increasing. In contrast, the odds of filing an outpatient or physician claim, as well as the intensity of outpatient and physician service use among claimants, are increasing over time. These changes reflect the shift in the site of care during the past decade from inpatient to outpatient facilities and the increasing severity of the average residual hospital admission. The odds ratios and log expenditure coefficients for all year dummies were statistically significant at the one percent level.

The first-stage results further indicate, not surprisingly, that the health status index is strongly and positively correlated with both the odds of service use and the intensity of service use across all types of service. The risk score coefficients indicate that a unit increase in the index (e.g., from 1.00 to 2.00, indicating a doubling of predicted future expenditures) is associated with a doubling of the odds of having an inpatient claim, a tripling of the odds of having an outpatient department claim, and nearly a five-fold increase in the odds of having a physician service claim, all of which are statistically significant at the one percent level. The risk score is also positively and significantly correlated with the intensity of resource use once services are accessed.

In addition, Medicare beneficiaries with ESRD are significantly more likely to access services and to use more services once accessed, particularly those like kidney dialysis that are administered in an outpatient setting, than beneficiaries without ESRD. The odds of having an inpatient claim and the level of inpatient expenditures are also significantly higher during the last year of a beneficiary's life. The intensity of service use among beneficiaries with an outpatient or physician claim during the last six months of their terminal year of life also increases significantly, though not the odds of having an

outpatient or physician claim. Finally, beneficiaries who are enrolled in Medicaid have a significantly greater odds of accessing inpatient and outpatient services (though a lower odds of having a physician claim), as well as a greater intensity of resource use across all types of services. Most of the results associated with health status (e.g., risk score, ESRD, six month period prior to death, and Medicaid enrollment) are all statistically significant at the one percent level.

Next, the year-specific VHAP Pharmacy and VScript enrollment indicators reveal a sharp increase in the odds of being admitted to an inpatient facility and a higher intensity of service use among inpatients during beneficiaries' first year of participation in the state pharmacy assistance programs.[18] The odds ratio was 1.49 for first-year VHAP Pharmacy enrollees and 1.65 for first-year VScript enrollees. Both were statistically significant at the one percent level. In contrast, the positive coefficients from the conditional expenditure model were only marginally statistically significant (VHAP Pharmacy) or statistically insignificant (VScript). While the greater odds of hospitalization continued throughout the subsequent enrollment years, albeit at a slower rate, the intensity of inpatient service use among claimants actually declined in both relative terms (e.g., the coefficients became negative after year one) and absolute terms (e.g., the coefficients tended to become larger in absolute terms over time). The greater odds of having an inpatient claim were statistically significant at the one percent level for

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[18] It is important to recall that all coefficients on the VHAP Pharmacy and VScript enrollment variables are derived from the underlying difference-in-difference model structure. These coefficients reflect differences after versus before program enrollment relative to the change over the same time period among non-enrolled Medicare beneficiaries.

most of the post-enrollment years and the lower intensity of inpatient resource use was statistically significant at the ten percent level for only half of the post-enrollment years.

The results were somewhat different for outpatient and physician services. The odds of using outpatient and, in particular, physician services after enrolling in VHAP Pharmacy and VScript were generally lower during the initial year of enrollment, yet the intensity of service use was higher. The odds ratio for outpatient services was 0.75 for first-year VHAP Pharmacy enrollees and 0.94 for first-year VScript enrollees. Both coefficients were statistically significant at the one percent level. The odds ratio for physician services was 0.56 for first-year VHAP Pharmacy enrollees and 0.82 for first-year VScript enrollees. The coefficient for outpatient services was statistically insignificant and the coefficient for physician services was significant at the ten percent level. In contrast, the intensity of service use among claimants was higher in year one. The conditional log expenditure coefficients for outpatient and physician services, respectively, were 0.11 and 0.18 for VHAP Pharmacy and 0.09 and 0.16 for VScript. Each of these, except the coefficient for outpatient services for VScript, was statistically significant at the one percent level.

However, the lower odds of using outpatient and physician services and the intensity of service use among claimants (as well as their statistical significance) tended to disappear over time. The odds ratios for using outpatient services after the first year of enrollment were statistically indistinguishable from zero for both VHAP Pharmacy and VScript. The odds ratios for using physician services increased but remained less than one (and remained statistically significant at the one or five percent levels) for most post-

enrollment years among VHAP Pharmacy participants. The odds ratios for using physician services among VScript participants during the post-enrollment period were not statistically significantly different from one. Similarly, the higher intensity of service use among claimants quickly disappeared after the first year as well. In almost all cases, the coefficients on the conditional log expenditures after year-one were not statistically different from zero.

These first-part probability and conditional expenditure results support the earlier descriptive results suggesting that state pharmacy assistance program participants are most likely to apply for outpatient drug benefits following an acute hospitalization and a sudden need for outpatient prescription medications. The odds of having an inpatient claim and the intensity of inpatient services conditional on being admitted to a hospital increased dramatically during the first year of enrollment, while the odds of having an outpatient or physician claim were actually lower. The fact that the odds of having any type of claim fell and, for outpatient and physician services, became statistically indistinguishable from zero after year-one, suggests a 'regression to the mean' among program participants after the initial year spike. These results suggest that the findings are being driven by adverse selection into state pharmacy assistance programs, rather than any substitution of drug for non-drug care. One interesting exception is the odds of accessing physician services among VHAP Pharmacy enrollees, which was less than one during the initial year of enrollment and remained less than one and statistically significant during most of the post-enrollment period. Further scrutiny would help ascertain whether this finding reflects a substitution of drug for medical care

administered in a physician's office or, alternatively, lower income beneficiaries are more likely to use inpatient that outpatient services.

5.8.3 Two-Part Model Results

The results from the two-part model are presented in Table 5-4. The two-part model combines the first-stage probability and conditional expenditure results into a single estimate.[19] The coefficients reflect the marginal effect of each of the models covariates on average total Medicare expenditures taking into account both the probability of using services and the intensity of service use among claimants. The two-part results are retransformed back to their original dollar value using a sample- and service-level smearing factor. The bootstrapped standard errors are presented in parentheses under each of the model's estimated coefficients.

First, the two-part model results indicate that Medicare expenditures for inpatient services were declining over time, by $351 between 1995 and 1999, while payments for outpatient and physician services increased by $163 and $232, respectively, over the same period. All year dummy coefficients were statistically significant at the one percent level, with the exception of inpatient services in the first three years.

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[19] For a more complete discussion of how the two first-stage regression results are used to obtain the two-part model parameter estimates, see Appendix A.

Table 5-4

**Impact of Vermont State Pharmacy Assistance Programs on Medicare Payments
Two Part Model Results with Log Retransformation**

	Inpatient Services	Outpatient Services	Physician Services
1996	16.8	47.1***	42.7***
	(37.9)	(7.1)	(11.2)
1997	-40.5	110.6***	57.1***
	(38.6)	(7.2)	(10.9)
1998	-77.2*	173.5***	128.0***
	(42.6)	(8.9)	(12.0)
1999	-350.6***	162.8***	232.1***
	(39.7)	(8.2)	(10.9)
HCC Risk Score	1,281.7***	412.0****	754.8***
	(14.8)	(7.4)	(9.8)
ESRD	3,517.7***	10,788.0***	1,940.1***
	(493.9)	(627.7)	(150.0)
Died	10,252.8***	519.8***	1,977.9***
	(149.0)	(17.9)	(37.1)
Medicaid Enrollment	959.0***	92.7***	197.4***
	(88.1)	(18.5)	(26.1)
1st Year Enrollment in VHAP Pharmacy	**849.6***	**71.8**	**61.6**
	(146.4)	**(36.2)**	**(45.4)**
2nd Year Enrollment in VHAP Pharmacy	192.3	-7.5	-51.1
	(137.6)	(24.7)	(44.4)
3rd Year Enrollment in VHAP Pharmacy	97.0	9.6	-76.7
	(164.9)	(23.8)	(41.9)*
4th Year Enrollment in VHAP Pharmacy	319.2*	29.2	-58.1
	(147.6)	(30.0)	(42.6)
5th Year Enrollment in VHAP Pharmacy	324.4**	-11.2	42.3
	(149.0)	(27.5)	(42.3)
6th Year Enrollment in VHAP Pharmacy	101.9	11.6	53.7
	(160.7)	(38.5)	(57.0)
7th Year Enrollment in VHAP Pharmacy	123.0	-79.6*	-33.2
	(261.4)	(47.0)	(69.4)
1st Year Enrollment in VScript	**723.3***	**59.4**	**160.4***
	(211.6)	**(33.7)**	**(51.9)**
2nd Year Enrollment in VScript	36.7	64.4**	-12.9
	(157.9)	(26.7)	(45.5)
3rd Year Enrollment in VScript	208.6*	23.2	11.7
	(124.1)	(28.7)	(35.7)
4th Year Enrollment in VScript	-295.6	-36.7	-46.3
	(200.9)	(38.9)	(53.7)
5th Year Enrollment in VScript	-405.7	64.3	-46.2
	(394.9)	(73.4)	(128.5)
6th Year Enrollment in VScript	3.7	5.9	107.2
	(507.6)	(98.3)	(160.9)
7th Year Enrollment in VScript	319.4	49.0	-252.9
	(1,223.1)	(218.6)	(397.3)

Table 5-4 (Continued)

Impact of Vermont State Pharmacy Assistance Programs on Medicare Payments
Two Part Model Results with Log Retransformation

NOTES:

Medicare expenditures are annualized for partial year entitlement.

Both logistic and OLS regressions are weighted by percent of year alive and entitled to both Part A and B benefits.

Total services include expenditures for inpatient, hospital outpatient, professional, home health and DME-related services.

Medicaid, VHAP Pharmacy and VScript enrollment variables reflect percent of Medicare entitlement period individual is enrolled in each program.

Medicare beneficiaries who were ever dually eligible, but never in VHAP Pharmacy or VScript, were omitted from sample.

Inpatient includes facility payments for services provided in an acute, rehab or specialty care hospital, a SNF or a LTC hospital. Outpatient includes facility payments for services provided in a hospital department or a freestanding ambulatory clinic. Physician category includes professional payments for services provided in any setting, including a physician office.

1995 is the omitted year variable.

Log retransformations are based on sample- and service-specific "smearing" factors using mean of exponentiated residuals.

Robust standard errors for each estimate are adjusted for multiple observations for each individual and are shown in parenthesis.

'***' indicates significance at 1% level; '**' at 5% level; and '*' at 10% level.

Computer output: *strun09a1*

SOURCE:

RTI analysis of Medicare claims data, 1995-1999.

Second, all of the health status variables were strong predictors of Medicare expenditures. A unit increase in the risk score index is associated with a $1,282 increase in Medicare payments for inpatient services, a $412 increase in payments for outpatient services, and a $755 increase in payments for physician services. Similarly, Medicare beneficiaries with ESRD had $3,518 higher inpatient expenditures, $10,788 higher outpatient expenditures, and $1,940 higher physician expenditures. Medicare payments also increased in the terminal year of life for all three services by $10,253, $520 and $1,978, respectively. Finally, Medicare beneficiaries who were also enrolled in Medicaid had higher payments for all three types of services of $959, $93 and $197, respectively. All coefficients relating to health status were statistically significant at the one percent level.

Third and most importantly are the effects of pharmacy program enrollment on medical expenditures. The VHAP Pharmacy and VScript enrollment variables generally reflect an increase in Medicare expenditures during the first year of enrollment, followed by a regression to the mean in subsequent years, after controlling for both external trends common to enrollees and non-enrollees alike, as well as between-group variation in health status. Medicare expenditures increased $850 for inpatient services, $72 for outpatient services, and $62 for physician services for first-year VHAP Pharmacy enrollees and $723, $59, and $160, respectively, for first-year VScript enrollees. All first-year medical spending increases, with the exception of physician services for VHAP Pharmacy enrollees, are statistically significant at the ten percent level or higher. The coefficients for the subsequent year enrollment variables for both VHAP Pharmacy and

VScript, as well as for all service categories, were largely not statistically significantly different from zero, indicating a return to pre-enrollment medical spending trends after the initial spike in expenditures.

The results of the two-part model are summarized in Table 5-5. The estimated impact of the pharmacy assistance programs has been consolidated into an initial year effect and a longer-run effect that averages all year-level changes after the first year of enrollment. The results support the earlier interpretation of an initial year spike in expenditures, particularly for inpatient services, followed by a resumption of pre-enrollment trends. Average actual inpatient expenditures prior to enrollment in the state pharmacy assistance programs were $1,895 for VHAP Pharmacy enrollees and $2,843 for VScript enrollees. Inpatient spending increased 45 percent during year-one of VHAP Pharmacy and 25 percent during year-one of VScript.[20] Initial year outpatient spending rose 17 percent for VHAP Pharmacy and 10 percent for VScript, and 9 and 17 percents, respectively, for physician services. The initial year spending increase is highly significant across both programs and all services, except for physician payments among VHAP Pharmacy enrollees. After year-one, inpatient spending continued to be higher by 10 percent annually for VHAP Pharmacy enrollees, but by less than one percent annually for VScript enrollees. In slight contrast, Medicare expenditures for outpatient and physician services fell after the initial year of enrollment, with the exception of outpatient payments for VScript, which continued to be higher with a growth rate of 5 percent annually. The average changes across subsequent years are largely not statistically

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[20] Initial and subsequent year spending changes are based on difference-in-difference estimators and, thus, are net of any changes over time that are common to both groups of beneficiaries.

Table 5-5

Estimated Change in Medicare Expenditures after Enrollment in VHAP Pharmacy or VScript

	Inpatient Services	Outpatient Services	Physician Services
VHAP Pharmacy			
Average annual expenditures before enrollment ($)	1,895	432	706
Estimated change during first year of enrollment ($)	850[1]	72[1]	62
Percent Difference (%)	*44.9*	*16.7*	*8.8*
Estimated average annual change during subsequent years of enrollment ($)	193[1]	-3	-27
Percent Difference (%)	*10.2*	*-0.7*	*-3.8*
VScript			
Average annual expenditures before enrollment ($)	2,843	589	966
Estimated change during first year of enrollment ($)	723[1]	59[1]	160[1]
Percent Difference (%)	*25.4*	*10.0*	*16.6*
Estimated average annual change during subsequent years of enrollment ($)	14	27	-13
Percent Difference (%)	*0.5*	*4.6*	*-1.3*

NOTES:

Average annual expenditures before enrollment based on actual expenditures averaged across all pre-enrollment years.

Estimated change in expenditures based on results of two-part model and are net of any spending trends shared by all beneficiaries.

Expenditures are annualized for partial year entitlement and weighted by share of entitlement period in VHAP Pharmacy or VScript.

Inpatient includes facility payments for services provided in an acute, rehab or specialty care hospital, a SNF or a LTC hospital. Outpatient includes facility payments for services provided in a hospital outpatient department or a freestanding ambulatory clinic. Physician category includes professional payments for services provided in any setting, including a physician office.

[1] indicates at least 5% significance level.

Computer output: *strun09k*

SOURCE: RTI analysis of Medicare claims data, 1995-1999.

significantly different from zero, with the exception of inpatient payments among VHAP Pharmacy enrollees.

5.9　Conclusions

The results of this study fail to reveal any savings to the Medicare program resulting from the provision of outpatient prescription benefits and a subsequent substitution of drug for non-drug care among VHAP Pharmacy and VScript participants. The findings suggest that beneficiaries generally sign up for drug benefits only after they experience an acute inpatient episode and a subsequent need for outpatient prescription medication.　After the initial year spike in Medicare payments, expenditures return to their pre-enrollment levels.　This pattern of initial spike followed by regression to mean holds true for both VHAP Pharmacy and VScript and for inpatient, outpatient, and physician services.　The different cost sharing rules and coverage restrictions associated with the VHAP Pharmacy and VScript programs appeared to have no discernible effect on spending trends for Medicare-covered services.　Nor were the individual service categories differently affected.　The general results applied to both programs and all service categories.

Despite the incorporation of individual risk scores to capture differences in health status between individuals at a point in time, as well as changes in health status for the same individual over time, the study was seriously impacted by the inability to control fully for adverse self-selection into the state-sponsored programs, either on the basis of baseline health status differences or the precipitating event phenomenon.　Individuals

enrolling in drug assistance programs because they suffer from chronic conditions may have a more rapid increase in service use and expenditures than non-enrollees. Failure to control for adverse selection emanating from differences in baseline health status will cause the model to underestimate the potential benefit of drug coverage on the use and cost of other services. Alternatively, as the study shows, individuals who sign up for the state pharmacy assistance programs because of a precipitating acute event will have high first-year expenditures, followed by a resumption of pre-enrollment trends. Failure to control for adverse selection emanating from a precipitating acute event will cause the model to overestimate any potential savings effect.

The study was further limited by a lack of information on drug coverage for the members of the comparison group, as well as prior drug coverage among the pharmacy assistance participants. If VHAP Pharmacy and VScript enrollees had drug coverage before enrolling in the state pharmacy assistance programs (or if the majority of participants signed up for benefits as far back as 1989 when VScript began), any savings effect may have been exhausted by the time of the study. Similarly, if the non-enrollee comparison group members experienced a comparable shift in outpatient prescription drug coverage during the study period, then any savings effect would have been absorbed by the time dummies.

The ideal comparison group for this kind of study would be Medicare beneficiaries who lacked insurance coverage for outpatient drugs throughout the study period, who suffered from chronic conditions such as heart disease, diabetes and hypertension, and who experienced a recent acute inpatient episode. The model could

then be used to examine the change in Part A and B expenditures for such a sample after the provision of an outpatient drug benefit program. Without such a similarly composed comparison group, ascertaining the impact of pharmacy assistance on Medicare-covered services in a retrospective study remains problematic.

Three caveats worth noting with regard to generalizing our results are, first, that the hypothesized savings from improved health status or the substitution of pharmaceutical for medical therapies should only be realized among Medicare beneficiaries who previously lacked outpatient drug coverage either through Medicaid, employer-based insurance, or supplemental policies. Extending outpatient drug benefits to Medicare beneficiaries who currently have coverage will only result in increased federal expenditures. Second, access to drug coverage *per se* does not lower the use of other medical services, but rather medical service use is dependent on the actual use of and adherence to prescribed medications. When measured over users of prescription medications only, particularly those who rely on drugs to control or maintain chronic conditions, substitution of care and reductions in non-drug medical expenditures may be more apparent. Finally, the model does not investigate the important issue of quality or health outcomes. While perhaps having no discernible effect on use and cost of medical services, reliable access to outpatient prescription medications may have important benefits for health outcomes.

6 Conclusions and Policy Implications

6.1 Conclusions and Policy Implications

Since the implementation of the 1115 waiver in 1996, Vermont has made major strides in extending outpatient drug benefits to its low-income elderly and disabled residents. Over 15 percent of all Medicare beneficiaries in Vermont were enrolled in the state's targeted outpatient drug assistance programs in 2000, representing 14,659 individuals. Of those, 66 percent were in VHAP Pharmacy (100-150 percent FPL), 20 percent in VScript (151-175 percent FPL) and 14 percent in VScript Expanded (176-225 percent FPL). The number of elderly and disabled individuals without a prescription drug benefit in Vermont is likely to continue to fall as beneficiaries begin signing up for the more recently implemented VScript Expanded program.

Based on the Vermont experience, state pharmacy assistance programs can fill an important gap in prescription insurance coverage among low-income elderly and disabled Medicare beneficiaries. The programs provide a useful vehicle for targeting outpatient drug coverage to individuals who are least likely to have access to pharmaceutical benefits under employer-based, privately purchased supplemental or Medicaid plans. Either by targeting specific types of drugs (i.e., maintenance drugs only) or specific types of illnesses (i.e., chronic diseases), state pharmacy programs can also maximize the cost effectiveness of public assistance by focusing benefits on individuals who most need these services. Further, as Vermont and other states are beginning to realize, pharmacy

assistance plans can be incorporated into Medicaid waivers as a way of spreading the financial burden of such programs across federal and state governments, as well as to the beneficiary through various forms of individual co-payments. As Vermont has demonstrated, additional state funds can then be used to expand coverage to individuals whose incomes do not meet the waiver requirements.

Although we do not have information on prior coverage, analysis of the state's claims data suggests that the Vermont pharmacy assistance programs provide access to outpatient prescription drugs to a large proportion of the state's low-income beneficiaries. Over 80 percent of the nearly 12,600 individuals enrolled in VHAP Pharmacy or VScript in 1999 had at least one outpatient pharmacy claim during the year, and most of these users had over 30 claims. With an average drug payment of $1,054 per enrollee in 1999, the total cost of the program was $13.3 million, including both state and federal expenditures. The average payments for each VHAP Pharmacy enrollee were greater than the average payments for each VScript enrollee.

Both pharmacy assistance programs appear to be used most by individuals who suffer from chronic conditions such as heart disease, stomach ulcers, high cholesterol, and diabetes. Three brand name drugs, Prilosec, Prevacid and Pepcid, used for treating stomach acids and ulcers, accounted for over 10 percent of total VHAP Pharmacy and VScript expenditures in 1999. An additional 7 percent of total program spending was for two cholesterol drugs (Lipitor and Zocor), 4 percent for two heart disease drugs (Norvasc and Vasotec), 3 percent for two mental illness drugs (Zoloft and Prozac) and 2 percent for one diabetes drug (Glucophage). Similarities in the predominance of drugs for the treatment of chronic conditions in both VHAP Pharmacy and VScript, despite the lack of

any such coverage restrictions for VHAP Pharmacy, suggest that state-sponsored outpatient drug assistance programs are playing an important role in helping low income beneficiaries manage their chronic diseases.

However, despite the hypothesized negative correlation between outpatient drug coverage and use of other Medicare-covered services, we failed to find any conclusive evidence of a substitution of drug for non-drug medical care among pharmacy assistance recipients in Vermont. In fact, our study found that annual per capita Medicare spending for inpatient services increased by $850 on initial enrollment in VHAP Pharmacy and $723 on initial enrollment in VScript compared to the spending trend among non-enrolled Medicare beneficiaries. During the first year of enrollment, Medicare spending for outpatient services increased by $72 among VHAP Pharmacy participants and $59 among VScript participants and by $62 and $160, respectively, for professional services. All of these differences, except professional payments for VHAP Pharmacy, were highly statistically significant.

The study further found that annual per capita Medicare spending declined sharply following the first year of participation in the state pharmacy assistance programs. In most cases, the difference in inpatient expenditures during later years of participation relative to the spending trend among non-participating Medicare beneficiaries was still positive, but generally not statistically significantly different from zero. The changes in payments for outpatient and professional services during subsequent years of enrollment were more likely to be negative, but also statistically insignificant. These results suggest that there may be no long-run substitution effects

and, hence, no savings resulting from better access to outpatient drugs either, at least when averaged across all Medicare beneficiaries.

Finally, while no savings were observed, there may have been positive health outcomes, such as improved health status or lower rates of morbidity. This study, however, did not look at health outcomes.

6.2   Study Limitations

Our findings about substitution of drug for non-drug care are inconclusive because we were unable to isolate fully the effect of outpatient drug coverage on medical service use from other factors that may have affected trends in the utilization of care and, hence, Medicare expenditures. The study's main limitations can be divided into three broad categories: selective enrollment in pharmacy assistance programs, the absence of a good comparison group, and lack of information on prior drug coverage among enrollees and non-enrollees.

First, pharmacy assistance recipients appear to enroll in state programs in response to an acute health care episode. Because adverse selection into pharmacy assistance programs leads to higher medical care expenditures during the post-enrollment period, the model may pick up the effect of poor health status, rather than substitution of care, on Medicare spending. If not controlled for, selective enrollment on the basis of poor health makes it look as if access to outpatient drug benefits results in the use of more medical services, not fewer, even when substitution of care may have occurred. Of course, if access to outpatient drugs leads to better health, health status will be endogenously determined by program enrollment. Fully controlling for differences in

health status over time between participants and non-participants would undermine our ability to assess the impact of drug coverage on medical service use and costs. The challenge is to control only for differences in health status that are not the result of outpatient drug coverage.

Second, differences in the underlying health status of enrollees and non-enrollees, independent of the precipitating illness effect, that cause their respective expenditures to deviate over time will also bias the results. Pharmacy assistance participants are, by definition, poorer than regular Medicare beneficiaries. They have also been shown to have more (and more intensive) medical encounters than non-participating non-dually eligible beneficiaries. As a result of these differences, it is possible that the expenditure growth rates for these two groups will not be same. The prospective HCC risk scores are a crude instrument for controlling for individual variation in health status over time and can do only a limited job of controlling for external deviations in spending trends among enrollees and non-enrollees. The information necessary to identify the most appropriate comparison group, namely, eligible but unenrolled beneficiaries who suffer from similar chronic conditions as enrollees, experienced a precipitating event and did not have outpatient drug coverage, was not available.

The third confounding factor that we were unable to control for was prior outpatient drug coverage among both program participants and non-participants. Substitution of care is most likely to occur (and savings on other non-drug medical services realized) only if individuals lack outpatient drug coverage prior to enrollment in the state-sponsored programs. If a significant number of enrollees had such coverage prior to enrollment and dropped it to take advantage of the state subsidy, the experience

of state pharmacy assistance enrollees does not accurately represent the change from no drug coverage to drug coverage. Similarly, changes in outpatient drug coverage among the comparison group during the study period would also bias the differences-in-differences results. Any change in the proportion of comparison group members with access to outpatient pharmaceuticals could affect the use of Medicare covered services and bias the savings estimate.

6.3   Areas of Future Research

Additional research remains to be done to better understand the impact of outpatient prescription drug coverage on health status, medical service use and expenditures among Medicare beneficiaries. Several areas for future work have been suggested by this study. First, enrollment decision models are needed to better understand the extent and form of adverse selection into state pharmacy assistance programs. Variables for predicting enrollment independent of health status and expenditures would be helpful for controlling for selection bias in expenditure models.

Second, future studies should focus on specific diseases, such as individual chronic conditions, for which access to outpatient pharmacy benefits would be most effective and substitution of drug for non-drug care most likely to occur. The chronic conditions identified in Chapter 4 with the most commonly prescribed drugs would be good candidates for a more targeted study. A better matched comparison group based on beneficiaries with similar conditions and a precipitating event without prior drug coverage would further help isolate the impact of drug benefit on service use and costs.

The results of a more targeted study would be less generalizable, but more likely to reveal opportunities for Medicare savings

Third, information should be collected on prior coverage among program enrollees and incorporated in future studies. Fourth, information on both the use of and compliance with prescription medications would further help control for factors that mitigate the potential effect of drug coverage on medical service use and costs. Fifth, information on health status, drug coverage, service use and expenditures among eligible but unenrolled beneficiaries would help identify and characterize a better comparison group. Sixth, work needs to be done to measure potential savings to states from a pharmacy assistance program through a reduction in the Medicaid spend-down rate among elderly and disabled Medicare beneficiaries. The survey of both program participants and eligible but unenrolled beneficiaries to be conducted under the next phase of this contract should go a long way toward meeting many of these research needs.

Finally, future research in this area should examine the impact of an outpatient prescription drug benefit on health outcomes, such as improved quality of life, improved health status, fewer morbidities or complicating conditions, and lower mortality rates.

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Appendix A

Two-Part Estimation and Log Retransformation Procedures

The purposes of this methodological appendix are: (1) to provide a rationale for using a two-part model for estimating the impact of the state pharmacy benefits assistance program on medical expenditures in Chapter 5; (2) to explain how the two-part model actually works; and (3) to make the relationship between the first-stage logitistic and OLS results presented in Table 5-3 and the two-part or second-stage results shown in Table 5-4 more transparent to the reader.

The two-part model is frequently used when analyzing medical expenditures in health services research to reflect the fact that payments are determined by both the number of people who use services and the quantity of services used among those who access care. The two-part model allows the determinants of having any service use (sometimes referred to as the 'extensive margin') to differ from the determinants of service quantity among users (referred to as the 'intensive margin'). The individual components of the two-part model may or may not have the same variables. Moreover, in a two-part model, the coefficients on any variables common to both components are not constrained to be the same in both parts. The relaxation of this restriction is particularly important when only a small proportion of the study population actually uses services and incurs any expense at all.

In very general terms, health care expenditures are derived in a two-part model as follows:

Expenditures = Prob. of Using Services × Quantity of Service Use among Users   Eq. (1)

In other words, health care expenditures equal the probability of accessing services measured over everyone in the sample multiplied by the average expenditures among only those who actually used services. In practice, however, the empirical equation for estimating the marginal effect of a given explanatory variable on expenditures becomes much more complex and depends on whether the explanatory variable being estimated is a dichotomous or continuous variable. The equation for estimating the marginal effect of a dummy explanatory variable is presented below, followed by a description of the specific estimation procedures. The equation for estimating the marginal effect of a continuous variable is presented at the end of this appendix.

Estimating the Marginal Effect when the Explanatory Variable is a Dummy

When the explanatory variable is a dichotomous variable, denoted by x in the following equations, (like the year, ESRD or DIED dummies in Table 5-4), the procedure for estimating its marginal effect, β_x, on health care expenditures in the two-part model can be expressed by the following set of equations:

$$\beta_x = \frac{1}{N} \sum_{i=1...N} \left[\left(\hat{P}_i^{x=1} \times \exp\left(\hat{E}_i^{x=1}\right) \times S_j \right) - \left(\hat{P}_i^{x=0} \times \exp\left(\hat{E}_i^{x=0}\right) \times S_j \right) \right] \qquad \text{Eq. (2a)}$$

and

$$S_j = \frac{1}{n} \sum_{i=1...n} \exp\left(\varepsilon_{ij}\right) \qquad \text{Eq. (2b)}$$

where

β_x = the marginal effect of dummy variable x in the two-part model;

$\hat{P}_i$ = the predicted probability of using services for observation i;

$\hat{E}_i$ = the predicted expenditure for observation i;

S_j = a set of j mutually exclusive group- and service-specific smearing factors;

ε_{ij} = residuals for observation i from the conditional expenditure model arrayed by group- and service-specific category j; and

n = the number of individuals in each of the j mutually exclusive group- and service categories; and

N = the total study sample.

The superscripts attached to $\hat{P}_i$ and $\hat{E}_i$ refer to the need to calculate the predicted values of the first-stage logistic and OLS models twice, once setting the explanatory variable, x, to 1 and again setting the explanatory variable to 0, and letting all other explanatory variables equal their observed values.

Steps for Estimating the Marginal Effect of a Dummy Variable

The application of the two-part framework in Equation (2a) to the expenditure model used in Chapter 5 can perhaps be better understood by outlining the specific sequence of estimation procedures.[1] The specific steps for estimating the impact of a given explanatory variable, x, on expenditures in a two-part model when the explanatory variable is a dummy variable are as follows:

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[1] Unfortunately, a numerical example of the estimation equation that would allow us to derive the two-part results presented in Table 5-4 from the first-stage logistic and OLS results presented in Table 5-3 is not possible because of the need to take the mean over a very large number of observations. When estimating Equation (2a), the mean across the individual-level solutions is not equivalent to evaluating the equation at the mean of its component variables.

Step 1: Estimate the probability of any service use over all observations. (The first-stage logitistic results are presented as odds ratios in the first column under each service category in Table 5-3.)

Step 2: Predict the probability of service use over everyone setting the explanatory variable to 1 and keeping all other variables at their observed values, $\left(\hat{P}_i^{x=1}\right)$.

Step 3: Predict the probability of service use over everyone setting the explanatory variable to 0 and keeping all other variables at their observed values, $\left(\hat{P}_i^{x=0}\right)$.

Step 4: Estimate natural lognormal expenditures over service users only. (The first-stage OLS results are shown in log dollars in the second column under each service category in Table 5-3.)

Step 5: Calculate a constant "smearing" factor over users only, $\left(S_j\right)$, to adjust for the retransformation of the error term in the lognormal expenditure regression by taking the mean of the exponentiated residuals, $\left(\exp(\varepsilon_i)\right)$. Separate smearing factors may be calculated for selected sub-groups to adjust for heteroscedasticity in the error term. In our study, six unique smearing factors were used, one for each mutually exclusive study group (e.g., treatment versus control populations) and service type (e.g., inpatient, outpatient and physician) combination. The treatment group smearing factor was based on ever-enrolled individuals. The smearing

factors are then assigned to all observations based on their service and group characteristics.

Step 6: Predict natural log expenditures over everyone setting the explanatory variable to 1 and keeping all other variables at their observed values, $\left(\hat{E}_i^{x=1}\right)$.

Step 7: Predict natural log expenditures over everyone setting the explanatory variable to 0 and keeping all other variables at their observed values, $\left(\hat{E}_i^{x=0}\right)$.

Step 8: Calculate the product of the predicted probabilities $\left(\hat{P}_i^{x=1}\right)$, the exponentiated predicted log expenditures $\left(\exp\!\left(\hat{E}_i^{x=1}\right)\right)$, and the smearing factor $\left(S_j\right)$ at the individual-level when the explanatory variable was set to 1 across all observations. (First term on the right hand side of Equation (2a).)

Step 9: Calculate the product of the predicted probabilities $\left(\hat{P}_i^{x=0}\right)$, the exponentiated predicted log expenditures $\left(\exp\!\left(\hat{E}_i^{x=0}\right)\right)$, and the smearing factor $\left(S_j\right)$ at the individual-level when the dummy variable was set to 0 across all observations. (The second term on right hand side of Equation (2a).)

Step 10: Finally, the estimated marginal effect of the explanatory variable, β_x, is determined by taking the mean of the difference between the Step 8 results and the Step 9 results.

Step 11: Repeat Steps 1 through Step 10 for each additional dummy explanatory variable in the two-part model individually. The first-stage logistic and OLS regressions only need to be run once.

Estimating the Marginal Effect when the Explanatory Variable is Continuous

When the explanatory variable is a continuous variable (like the HCC risk score and the Medicaid, VHAP Pharmacy and VScript enrollment variables in Table 5-4), you can no longer simply substitute in the 1 and 0 values for the observed values in a mechanical fashion as before. Rather, you must now take the derivative of Equation (1) with respect to the explanatory variable, evaluate the derivative over all observations, and take the mean of the individual-level solutions.

The equation for estimating the marginal effect of a continuous explanatory variable on health care expenditures in the two-part model, α_x, becomes:

$$\alpha_x = \frac{1}{N} \sum_{i=1\ldots N} \left[\left(\delta_x \times \hat{P}_i \left(1 - \hat{P}_i \right) \times \exp\left(\hat{E}_i \right) \times S_j \right) + \left(\gamma_x \times \hat{P}_i \times \exp\left(\hat{E}_i \right) \times S_j \right) \right] \qquad \text{Eq. (3)}$$

where

α_x = the marginal effect of the continuous variable x in the two-part model;

δ_x = the parameter estimate for the continuous variable x from the first-stage probability regression (as reported in the first column under each service category in Table 5-3); and

γ_x = the parameter estimate for the continuous variable x from the first-stage lognormal expenditure regression (as reported in the second column under each service category in Table 5-3).

The definition of all other variables in Equation (3) remains the same as in Equations (2a) and (2b). The major difference between the estimation equation for the dummy variable and the continuous variable is the need to use the parameter estimates from the first-stage logistic and OLS regressions. These are reported for each service category in Table 5-3. Otherwise, the marginal effects of continuous explanatory variables on expenditures in a two-part model are obtained by solving Equation (3) at the individual level over all observations and taking the mean of the solutions.