Research Report

Modeling Dr. Dynasaur 2.0 Coverage and Finance Proposals

Effects of the Expansion of Vermont's Dr. Dynasaur Program to All Individuals Through Age 25

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Preface

The Vermont General Assembly mandated a study of an expansion of the Dr. Dynasaur program to cover all residents of Vermont through age 25, regardless of income. The current Dr. Dynasaur program, which we refer to as Dr. Dynasaur 1.0, combines the state's Medicaid program and Children's Health Insurance Program for children ages 0 through 18 to provide a seamless insurance program for those with family incomes below 317 percent of the federal poverty level. This report, authored collaboratively by RAND and Optumas, presents an analysis of the proposed program. For 2019 through 2023, this analysis estimates (1) projected costs (per member per month and total); (2) a simulated behavioral response of individuals, families, and businesses in response to the implementation of the program; and (3) federal and state cost estimates, including administrative costs.

This work was sponsored by the State of Vermont, Agency of Administration, and was commissioned in response to a Vermont State Legislative requirement (Section C.112 of H.875 of 2016). This legislation directed the Agency of Administration to study extending Dr. Dynasaur to cover all Vermont residents through age 25 in Vermont under a single program, regardless of income level. This report should be of relevance to individuals and organizations who have an interest in health insurance policy both within and outside the state of Vermont. The target audience for this report is the Vermont State legislators who commissioned the report.

This research was conducted in RAND Health, a division of the RAND Corporation. A profile of RAND Health, abstracts of its publications, and ordering information can be found at www.rand.org/health.

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Summary

This report estimates the effects of expanding Vermont's Dr. Dynasaur program to cover all citizens of Vermont, regardless of income, through age 25. The current Dr. Dynasaur program, which we refer to as Dr. Dynasaur 1.0, combines the state's Medicaid program and Children's Health Insurance Program (CHIP) for children ages 0 through 18 to provide a seamless insurance program for those with family incomes below 317 percent of the federal poverty level. The program expansion, which we refer to as Dr. Dynasaur 2.0, extends insurance to all the remaining children in the state (excluding blind and disabled Medicaid enrollees) and all Vermont residents ages 19 through 25. In addition to describing the resulting distribution of health insurance coverage and health care expenditures, we identified the new revenues required to fund the program expansion, and we explored three alternative financing strategies to raise those funds: (1) an increase in the Vermont income tax, (2) a Vermont payroll tax, and (3) a Vermont business enterprise tax. We used a microsimulation model to generate estimates of insurance coverage choices by individuals and families, including employer-sponsored insurance (ESI), wage changes associated with those insurance choices, and new ESI premiums that result from changes in the ESI risk pool. These components then feed back to the model, including the effect of the new premiums on insurance choice and the effect of wage changes on tax revenues.

We considered two alternative scenarios for Dr. Dynasaur enrollment: (1) enrollment by 100 percent of the eligible population and (2) enrollment by 70 percent of the eligible population. The first scenario characterizes the potential of the program and potential results if there were strong incentive for enrollment. The second scenario, which may be more realistic, relies on a microsimulation model to characterize insurance enrollment choices, which resulted in the enrollment of roughly 70 percent of eligible individuals. Because of concerns that Dr. Dynasaur 1.0 provider reimbursement rates may be too low to assure enrollees of adequate access to care, we have conducted the evaluation using three alternative scenarios regarding provider reimbursement rates for services provided under Dr. Dynasaur 2.0: (1) Medicare rates, (2) commercial rates, and (3) the midpoint between the two. We identified the relative rates by category of service using detailed claims data. Thus, our study provides estimates of how increases in reimbursement rate schedules from the current levels would affect total covered health care expenditures.

The key results of the study are summarized in Table S.1, which presents the following outcomes for 2019:

- Enrollment would increase by more than 260 percent under the 100-percent enrollment scenario and by nearly 200 percent under the 70-percent enrollment scenario.
- Total program expenditures would increase dramatically, in part because of increased reimbursement rates, but largely because of increased enrollment.

- Increases in administrative costs reflect the increased enrollment, but we found that these projections had a large amount of uncertainty.
- New sources of revenues included federal medical assistance percentage (FMAP) funds (which we estimated conservatively at current Medicaid reimbursement rates) and increased premium collections.
- Because we limited premium collection to no more than $60 per family per month ($720 per year), regardless of family income, program expenditures per enrollee far outpace current program revenues per enrollee.
- The resulting additional revenue required ranges from $343 million (with 70-percent enrollment and Medicare reimbursement levels) to $667 million (with 100-percent enrollment and commercial reimbursement levels).
- Given Medicare reimbursement rates, the new tax rates in the three financing strategies that we modeled range from a 2.5–percentage-point additive increase in the income tax schedule (for the 70-percent enrollment scenario) to a 3.9–percentage-point increase in the payroll tax (for the 100-percent enrollment scenario).

Table S.1. Dr. Dynasaur 2.0 Outcomes Modeled for 2019

	Status Quo Level	Change from Status Quo	
		100% Enrollment	70% Enrollment
Enrollment	52,480	137,858	94,928
Total expenditures	192		
Medicare rates		631	435
Midpoint rates		734	513
Commercial rates		837	591
Administrative costs	20	68	48
New revenues (millions of dollars)			
Federal (FMAP for Medicaid and CHIP)		185	103
Premiums		53	37
New revenues required (millions of dollars)			
Medicare rates		461	343
Midpoint rates		564	421
Commercial rates		667	499
Financing strategies			
Income tax	5%		
Additive increment to rate		3.3%	2.5%
Proportional increase to rate		65%	48%
Payroll tax	0%	3.9%	2.9%
Business enterprise tax	0%	3.5%	2.6%

Not surprisingly, the children and young adults who move off ESI and into Dr. Dynasaur 2.0 have considerably lower expected health care costs than those who remain on ESI, increasing the

per-person premiums by nearly $1,000 for those remaining enrolled in ESI. Even though children and young adults are a relatively low-cost population, we estimate that the annual health care expenditures per person for children and young adults in 2019 will be $4,325 with Medicare prices. We estimate that the combination of increased reimbursement rates, large increases in enrollment, and relatively low Dr. Dynasaur premiums (no more than $720 per year) will require significant new tax revenues to meet program obligations.

Acknowledgments

We thank Michael Costa, Robin Lunge, and Devon Green of the Vermont Agency of Administration for their support and guidance throughout the course of this project. In preparing the analysis, we received data inputs from the Vermont Legislative Joint Fiscal Office and the Vermont Tax Department. We are very grateful to these offices for providing insights, data, and advice. Our RAND colleagues Deborah Freund, Christine Eibner, Paul Koegel, and Peter Hussey provided valuable feedback and direction regarding the substantive content and presentation. In addition, we would like to thank two anonymous national health care experts, who were not affiliated with Vermont health care reform, for their insights and their rigorous technical review of the approach and report. Finally, we thank Tricia Soto for excellent administrative assistance.

Abbreviations

ACA	Affordable Care Act
BET	business enterprise tax
CHIP	Children's Health Insurance Program
COMPARE	Comprehensive Assessment of Reform Efforts
COMPARE-VT	Comprehensive Assessment of Reform Efforts—Vermont
ESI	employer-sponsored insurance
FMAP	federal medical assistance percentage
FPL	federal poverty level
LLC	limited liability corporation
OOP	out of pocket
PMPM	per member per month
SHOP	Small Business Health Options Program
VHCURES	Vermont Health Care Uniform Reporting and Evaluation System
VHHIS	Vermont Household Health Insurance Survey

1. Introduction

For decades, Vermont has been a state at the forefront of health insurance and health care system reforms. Historically, Vermont's coverage standards under public health insurance programs, including Medicaid and the Children's Health Insurance Program (CHIP), have exceeded minimum federal requirements, and they have continued to do so since the passage of the federal Affordable Care Act (ACA). Vermont's commitment to "universal access to and coverage for high quality, medically necessary health services for all Vermonters so that they may receive affordable and appropriate health care at the appropriate time in the appropriate setting" was made explicit in 2011 with the passage of Article 48 (H.202).

One of Vermont's successful reforms has been Dr. Dynasaur, which combines the state's Medicaid program and CHIP for children ages 0 through 18 to provide a seamless insurance program for those with family incomes below 317 percent of the federal poverty level (FPL).[1] Originally a state-funded effort, the program became a part of Medicaid and then became part of the state–federal CHIP program. Recent legislation (Section C.112 of H.875 of 2016) now directs the study of a possible next step for Vermont: extending Dr. Dynasaur to cover all Vermont residents through age 25 under a single program, regardless of income level. Throughout this report, we characterize the current program as *Dr. Dynasaur 1.0* and the expanded program as *Dr. Dynasaur 2.0*.

In order to determine the effects of Dr. Dynasaur 2.0, it was necessary first to generate projections of the status quo, Dr. Dynasaur 1.0. We then compared those projections to our assessment of market changes and needed expenditures under Dr. Dynasaur 2.0 (see Table 1.1). That comparison allowed us to report how Dr. Dynasaur 2.0 will affect the status quo. We addressed

- economic issues, including changes in wages and income
- insurance status, meaning changes in where Vermonters get insurance coverage
- health care expenditures, including changes in spending by the state for public programs and Vermonters for employer-sponsored insurance (ESI).

[1] Dr. Dynasaur was created by Act 94 of the Acts and Resolves of 1989. The name was selected to appeal to both children and parents (Eric M. Appleman, "Dr. Dynasaur," 2002, https://www2.gwu.edu/~action/2004/dean/dean0702/drdynasaur.html).

Table 1.1. Comparison of Dr. Dynasaur 1.0 and 2.0

	Dr. Dynasaur 1.0	Dr. Dynasaur 2.0
Eligibility		
Age	0 through 18	0 through 25
Family income	Up to 317% FPL	No limit
Benefits	(Same)	
Physician health	Yes	Yes
Mental health	Yes	Yes
Dental	Yes	Yes
Vision	Yes	Yes
Prescription drugs	Yes	Yes
Premiums	(Same)	
Below 185% FPL	None	None
185%–225% FPL	$15 per month	$15 per month
226%–317% FPL		
With other coverage	$20 per month	$20 per month
With no other coverage	$60 per month	$60 per month
Above 317% FPL	NA	$60 per month
Cost Sharing	(Same)	
Deductible	None	None
Co-insurance	None	None
Annual or lifetime limits	None	None

Access to care for those enrolled in Dr. Dynasaur has also been a focus, with particular attention paid to provider reimbursement rates. As a result, the directing legislation has called for Dr. Dynasaur 2.0 to be evaluated with reimbursement rates set at levels from Medicare rates to commercial rates, all of which are above the current Dr. Dynasaur 1.0 (Medicaid) rates. We therefore evaluated the Dr. Dynasaur expansion using three distinct reimbursement rate scenarios. The lowest rate scenario sets reimbursement at Medicare rate levels. We also analyzed the impact of rate levels that equate to commercial rates and an intermediate reimbursement level that is the midpoint between Medicare and commercial.

Because there is uncertainty regarding many of the features of Dr. Dynasaur 2.0, including how Dr. Dynasaur will be designed to induce enrollment, and, therefore, the extent to which eligible individuals will decide to participate is unknown, we developed two scenarios regarding enrollment levels: (1) 70-percent enrollment, which is roughly the level predicted by our microsimulation modeling in the absence of a mandate, and (2) 100-percent enrollment, which shows the potential of the program and models the largest-scale impact.

Because implementing Dr. Dynasaur 2.0 would require additional state spending, we used the simulation results as the basis for assessing three alternative financing strategies. Those strategies, which are defined to meet Dr. Dynasaur 2.0 revenue requirements, are as follows:

1. an increase to the Vermont income tax

2. a new Vermont payroll tax (in addition to the federal payroll tax)
3. implementation of a business enterprise tax (BET).

This report builds on previous work that developed a microsimulation model of Vermont (Comprehensive Assessment of Reform Efforts—Vermont [COMPARE-VT]).[2] We updated COMPARE-VT and used it, combined with analyses that characterized expenditures, to project insurance coverage and financing consequences of Dr. Dynasaur 2.0 from 2019 through 2023. The microsimulation model characterized changes in insurance status, premium rates, and take-home wages for all Vermont residents. Actuarial estimates served as inputs to the COMPARE-VT model and were based on Vermont's all-payer data set, known as the Vermont Health Care Uniform Reporting and Evaluation System (VHCURES). For our analysis of alternative tax strategies, we used Vermont tax data and the Vermont Household Health Insurance Survey (VHHIS).

Chapter 2 of this report provides a detailed description of our approach to the analysis, including data sources. We then present model results using a series of exhibits and charts in Chapter 3, followed by a discussion of those results in Chapter 4. Chapter 5 shares our conclusions, and the appendix provides additional detail about our approach.

[2] Christine Eibner, Sarah A. Nowak, Jodi L. Liu, and Chapin White, *The Economic Incidence of Health Care Spending in Vermont*, Santa Monica, Calif.: RAND Corporation, RR-901-SVJFO, 2015 (http://www.rand.org/pubs/research_reports/RR901.html).

2. Approach

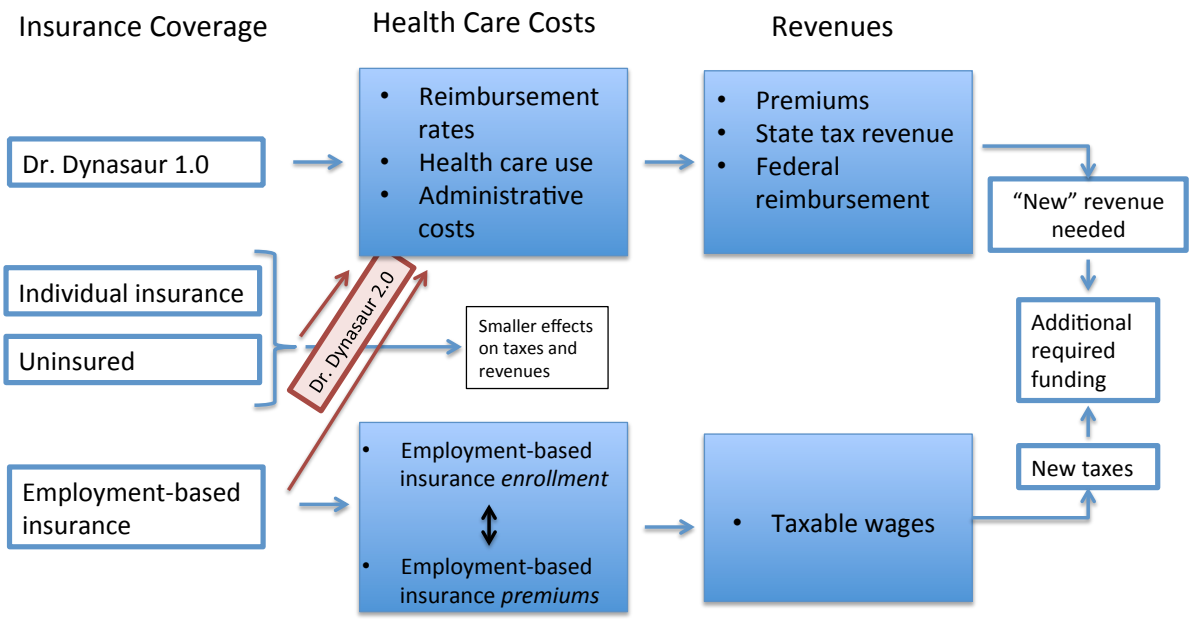
Conceptual Framework

Figure 2.1 presents the conceptual framework that guided the study. The model has four main components: (1) health insurance coverage, (2) health care costs (including Dr. Dynasaur costs), (3) Dr. Dynasaur revenues from current sources, and (4) identification of new funds needed via alternative financing strategies.

1. *Insurance coverage:* On the left, the framework begins with a subset of insurance coverages, including the current approach with Dr. Dynasaur 1.0. Proceeding to the right, arrows highlight the changes that would occur during the transition to Dr. Dynasaur 2.0. The Dr. Dynasaur program expansion includes all of those enrolled in Dr. Dynasaur 1.0 as well as all other Vermont residents under the age of 26 (excluding Medicaid-enrolled blind and disabled and Medicare populations). This includes children under the age of 19 who live in families with incomes that exceed the current Dr. Dynasaur income threshold and who may currently be enrolled in ESI or individual insurance plans or who may be uninsured. It also includes children 19 through 25 years of age regardless of their current insurance status. Most of those who would become eligible for enrollment under Dr. Dynasaur 2.0 are enrolled in ESI.
2. *Health care costs:* The major factors used to estimate the Dr. Dynasaur program costs include the amount of health care utilization by current and new enrollees, the costs of administering the program, and the choice of medical provider reimbursement rates. Health care expenditures in the rest of the health care system were estimated by the enrollment that remained in each insurance type and the characteristics of their risk pools. By removing relatively inexpensive individuals from ESI (children and young adults), those remaining on ESI may have higher per-person premiums because of the change in the risk pool. These changes in the costs of compensation could result in changes in wages (via passback rates, explained in more detail in Chapter 3 and in the appendix).
3. *Dr. Dynasaur revenues:* We explicitly modeled premiums and federal payments for Medicaid and CHIP. For state revenue sources that are currently used to fund Dr. Dynasaur 1.0, we assumed that they would remain unchanged. Finally, we modeled alternative financing strategies to raise the additional funds needed to meet the Dr. Dynasaur 2.0 obligations.
4. *New revenues required and financing strategies to fund Dr. Dynasaur 2.0:* We modeled the new revenues required to fund Dr. Dynasaur 2.0 as the total program costs minus revenues from current sources. As described later in this chapter in the "Financing Strategies" section and in more detail in the appendix, we modeled three alternative taxing strategies that could be used to raise the additional funds needed to support the program: an income tax, a payroll tax, and a BET. Because taxable family incomes are

likely to be affected by changes in ESI coverage, we modeled tax revenues as a function of new family income in the income tax scenario.

Figure 2.1. Conceptual Framework



Data Sources

Vermont Household Health Insurance Survey: The primary data set we used to characterize individuals and families in Vermont is the VHHIS, conducted by the Vermont Department of Health to collect information on demographic characteristics, income, and employment characteristics. The data include information on insurance status and type, private insurance plan premiums, and out-of-pocket (OOP) spending. In the 2014 VHHIS, 4,610 households were interviewed.

Vermont Heath Care Uniform Reporting and Evaluation System: VHCURES, Vermont's all-payer data set, is prepared quarterly and contains individual claims data on health care expenditures by payer and provider service, allowing us to estimate spending by subgroups. In addition to the detailed claims information, the data set contains information about the type of insurance coverage and critical individual demographic information, such as age. It excludes any information about settlements, rebates, or capitation. It also has no information about payments made by individuals, such as the uninsured. We used VHCURES as the primary source for the actuarial analyses and to determine changes in insurance premiums among those with ESI.

Vermont demographic projections: The state of Vermont provided demographic projections for the Vermont population by age from 2014 to 2023.[3] We used these data to make expenditure projections, insurance enrollment projections, and total expenditure projections for the study period.

Vermont tax data: The Vermont Department of Taxes provided three aggregated tax data sets for this project, including a summary of individual income tax returns with aggregate data by gross income percentile, a summary of the payroll tax base by firm size, and aggregate payroll and interest paid by type of business. We used these data to model three new alternative taxes to fund Dr. Dynasaur 2.0.

Cost Analysis: Projected Health Care Expenditures

We performed analyses to characterize expected costs given insurance characteristics, and we projected the expected costs through the study period using assumptions about growth rates and data detailing demographic projections. These analyses are fundamental to understanding the potential effects of Dr. Dynasaur 2.0. The analyses were based on the three most recent years of data available from VHCURES, together with demographic projections supplied by the state of Vermont, to generate estimates of expected health care costs conditional on insurance status and relative reimbursement rates. We conducted additional analyses to determine the consequence of the reimbursement rates on the expected costs, including reimbursement rates set to (1) current levels, (2) Medicare levels, (3) commercial rates, and (4) the midpoint between Medicare and commercial rates. We conducted the expenditure modeling on all Vermont residents up to and including age 25. Additional details can be found in the appendix.

Cost Analysis: Administrative Costs

Although the infrastructure for administering Dr. Dynasaur 2.0 is essentially the same as that for Dr. Dynasaur 1.0, the capacity will have to be increased to handle the large expansion in the covered population. In addition, there may be other important differences depending on program design features, such as the method of collecting premiums. For the purposes of this report, we assumed that those features will reflect the existing system, and for our base case analyses, we assumed that the costs of expanding the infrastructure increased linearly. Although we included implementation costs in this report as one-time fixed costs to be incurred in 2019, we acknowledge that there may be implementation costs we have not identified or anticipated. In addition, these costs may not be limited to 2019. Many of them, for example, may be incurred in 2018 prior to the start date of Dr. Dynasaur 2.0. Finally, our analyses do not take into account the

[3] State of Vermont, Agency of Administration, *Vermont Legislature and Administration Consensus Population Forecast*, July 21, 2016.

implementation of the all-payer model and ACO-based reforms that may impact Medicaid and the commercial market between 2017 and 2023.[4] Based on previous work, we considered four alternative scenarios, each of which included estimates of one-time fixed costs imposed in 2019. Details of our methods and assumptions can be found in the appendix. The four alternative scenarios are defined as follows:

- Base case: We assumed a 10-percent administrative cost rate in each year (2019 through 2023).
- Low-cost scenario: We assumed a 7-percent rate in each year (2019 through 2023).
- High-cost scenario: We assumed a 15-percent rate in each year (2019 through 2023).
- Transition scenario: We assumed a 15-percent rate in 2019, decreasing linearly to 10 percent in 2023.

Microsimulation Model

We adapted RAND's Comprehensive Assessment of Reform Efforts (COMPARE) microsimulation model of the U.S. health economy to mirror Vermont's population and health insurance market (COMPARE-VT). Many of the adaptations using Vermont-specific data sets mirrored those used on a previous analysis for the state of Vermont.[5] Details of the COMPARE-VT model are provided in the appendix. We used the model to generate projections (2019 through 2023) of the status quo (Dr. Dynasaur 1.0) and Dr. Dynasaur 2.0 alternative scenarios. In each case, the model generated projections of insurance coverage, health care expenditures, and changes in wages during the five-year time horizon.

Financing Strategies

Dr. Dynasaur 1.0 revenues are obtained from the federal government through Medicaid and the CHIP federal medical assistance percentage (FMAP),[6] from beneficiaries through premiums, and from other state revenue sources (such as excise taxes). We assumed that each of these current revenue sources in Dr. Dynasaur 1.0 will be maintained. We also assumed that noncompliance with premium payments in Dr. Dynasaur 2.0 will remain the same as among

[4] The Vermont All-Payer Accountable Care Organization Model Agreement (October 27, 2016) is available at http://gmcboard.vermont.gov/sites/gmcb/files/documents/10-27-16-vermont-all-payer-accountable-care-organization-model-agreement.pdf. More information for readers is available via the Centers for Medicare & Medicaid Services (CMS), "Vermont All-Payer ACO Model," last updated October 26, 2016 (https://innovation.cms.gov/initiatives/vermont-all-payer-aco-model), and the Green Mountain Care Board (GMCB), "All-Payer Model," 2017 (http://gmcboard.vermont.gov/payment-reform/APM).

[5] Christine Eibner, Sarah A. Nowak, Jodi L. Liu, and Chapin White, *The Economic Incidence of Health Care Spending in Vermont*, Santa Monica, Calif.: RAND Corporation, RR-901-SVJFO, 2015 (http://www.rand.org/pubs/research_reports/RR901.html).

[6] FMAP is the share of Medicaid costs paid by the federal government.

individuals eligible for Dr. Dynasaur 1.0. We therefore used the observed rates of premium revenue collections rather than the premium schedule for these enrollees. We also assumed that the premium structure of Dr. Dynasaur 1.0 will be maintained in Dr. Dynasaur 2.0. That is, in each of the alternative financing strategies we modeled, we assumed a premium of $60 per member per month (PMPM) for the newly eligible population with incomes above 317 percent of FPL. For those who are newly eligible with incomes below 317 percent of FPL, we maintained the current premium structure ($15 for those with incomes from 185 to 225 percent of FPL; $60 for those with incomes from 226 to 317 percent of FPL).

Given increases in program costs with the implementation of Dr. Dynasaur 2.0, there will be revenue shortfalls that will require new revenue sources to fund the program. We considered three alternative financing scenarios, described in detail in the appendix, to collect additional revenues required to fund Dr. Dynasaur 2.0: (1) an increase to the state income tax, (2) a new payroll tax that is an incremental increase to the existing federal payroll tax, and (3) a new BET. In each case, we used the model to project the new revenues required, and we solved for the new tax rates required to meet those needs. Details of the strategies, as well as methods and assumptions, are provided in the appendix.

Increase in the Vermont income tax: We used projections from the COMPARE-VT model to determine how Dr. Dynasaur 2.0 would affect family incomes. We modeled the distribution of family income in Vermont using the VHHIS data (2014) together with data on taxable income and taxes paid provided by the Vermont Department of Taxes. From these data, we calculated the tax revenues that would be raised by alternative income tax scenarios, and we solved for the new tax rates that would meet Dr. Dynasaur 2.0 revenue requirements. Note that the current average effective tax rate (the aggregate taxes paid divided by total taxable income) is approximately 5 percent in Vermont.

Alternative income tax scenarios that we considered included

- an additive tax rate increase, excluding families who paid no taxes or who received payments through the negative income tax
- a proportional tax rate increase, excluding families who paid no taxes or who received payments through the negative income tax.

Increase in the payroll tax: We obtained payroll tax base data, aggregated by firm size, from the Vermont Department of Taxation. For firms that operated across borders, the Vermont apportionment was determined based on the location of employees. We used these data to solve for a payroll tax increment that would raise the required revenues to meet the obligations of Dr. Dynasaur 2.0. We used the tax base data by firm size to show the incidence of the new tax across firm size in Vermont. Our estimates of the incremental revenues collected by imposing a Vermont payroll tax are in addition to the current payroll tax.

Business enterprise tax: We developed a new BET using the New Hampshire BET as a model.[7] A BET differs from a payroll tax by expanding the tax base to include dividends and interest paid in addition to payroll (total compensation). This more closely resembles the size of a firm's operation than the payroll tax base, and it increases the tax base, resulting in lower incremental tax rates to generate a given revenue target. The Vermont Department of Taxation provided data on total payroll and interest paid, by type of establishment (C corporations, S corporations, and partnerships and limited liability corporations [LLCs]). We used a similar method to that of the payroll tax to apportion interest paid to Vermont. The state currently does not have information on dividends, however, so we used data from New Hampshire on the ratio of dividends to the sum of payroll and interest, by establishment type, to impute dividends for Vermont businesses. Given the BET base, we calculated a BET rate that generated the target revenues, and we show the incidence of the tax across business type.

[7] Data and details regarding the New Hampshire BET were provided to us by the Vermont Department of Taxation. The New Hampshire BET was established in 1993 and is defined in New Hampshire Statures: Chapter 77-E, Business Enterprise Tax.

3. Results

We organize the results section through tables and figures that describe the consequences of Dr. Dynasaur 2.0 relative to Dr. Dynasaur 1.0 (the status quo). We begin by describing the insurance enrollment distribution, by type of insurance, for Vermont residents across the alternative scenarios and projected through the study period. We then develop the components of program costs, including the actuarial value of Dr. Dynasaur coverage, administrative costs, and the distribution of total health care spending across all forms of health care coverage in Vermont. An important question regarding the movement of individuals from ESI to other forms of insurance is what happens to the resources used to pay for the premiums. Do firms keep those resources in the form of increased profits? Are the resources passed back to workers in the form of increased pecuniary wages? We addressed this by providing estimates based on our simulation model of how such changes affect the ESI premiums as well as employees' take-home pay. We then provide findings regarding the financial obligations of the program, including health expenditures, administrative costs, and sources of revenues, such as premiums and federal payments for Medicaid and CHIP. We summarized these expenditures and revenues to quantify the new revenues required to fund the program. Finally, we considered three alternative tax strategies to raise the required revenues, and we estimated the tax rates required for each.

Table 3.1 shows the estimated health insurance distribution (2019 through 2023) for Dr. Dynasaur 1.0 (the status quo) and two scenarios for Dr. Dynasaur 2.0, one with 100-percent enrollment and one with 70-percent enrollment. The 100-percent scenario assumes that every eligible individual enrolls. The 70-percent scenario is the COMPARE-VT estimate of enrollment based on what is known about the program design and premium structure. Both estimates show dramatic growth in the Dr. Dynasaur program and projected decreases in enrollment in ESI, Medicaid, and individual (nongroup) insurance options, as well as a decrease in the rate of the uninsured. However, in the 70-percent scenario, the enrollment decreases and effect on the uninsured are not as significant.

Table 3.1. Health Insurance Enrollment, by Type of Insurance (Thousands)

Status Quo (Dr. Dynasaur 1.0)					
	2019	**2020**	**2021**	**2022**	**2023**
Dr. Dynasaur Status Quo	52	53	53	53	52
Employment-Based	294	292	291	290	290
Medicaid	61	60	60	59	59
Medicare	126	130	134	139	143
Individual	49	48	48	47	44
Other	22	22	22	21	21
Uninsured	27	28	27	27	28
Dr. Dynasaur 2.0 with 100% Enrollment					
Dr. Dynasaur 1.0	52	53	53	53	52
Dr. Dynasaur 2.0 New	138	137	136	135	135
Dr. Dynasaur 2.0 Total	190	189	188	188	187
Employment-Based	212	210	210	208	207
Medicaid	34	34	34	34	34
Medicaid Blind and Disabled	19	19	20	20	21
Medicare	126	130	134	139	143
Individual	36	37	35	35	34
Other	18	18	18	18	18
Uninsured	14	15	15	15	15
Dr. Dynasaur 2.0 with 70% Enrollment					
Dr. Dynasaur 1.0	52	53	53	53	52
Dr. Dynasaur 2.0 New	95	94	94	94	93
Dr. Dynasaur 2.0 Total	147	147	146	146	146
Employment-Based	218	217	215	214	215
Medicaid	50	50	49	49	49
Medicaid Blind and Disabled	19	19	20	20	21
Medicare	126	130	134	139	143
Individual	46	45	45	44	40
Other	20	20	20	20	20
Uninsured	24	24	24	24	24

Figure 3.1 is a visual representation of the information presented in Table 3.1 for the year 2019. It shows the distribution of insurance coverage for the status quo and the Dr. Dynasaur 2.0 scenarios. The most striking results are the large reduction in ESI from the status quo to each of the Dr. Dynasaur 2.0 scenarios and the magnitude of the Dr. Dynasaur 2.0 increases relative to Dr. Dynasaur 1.0 enrollment.

Figure 3.1. Insurance Coverage, Status Quo and Dr. Dynasaur 2.0 (2019)

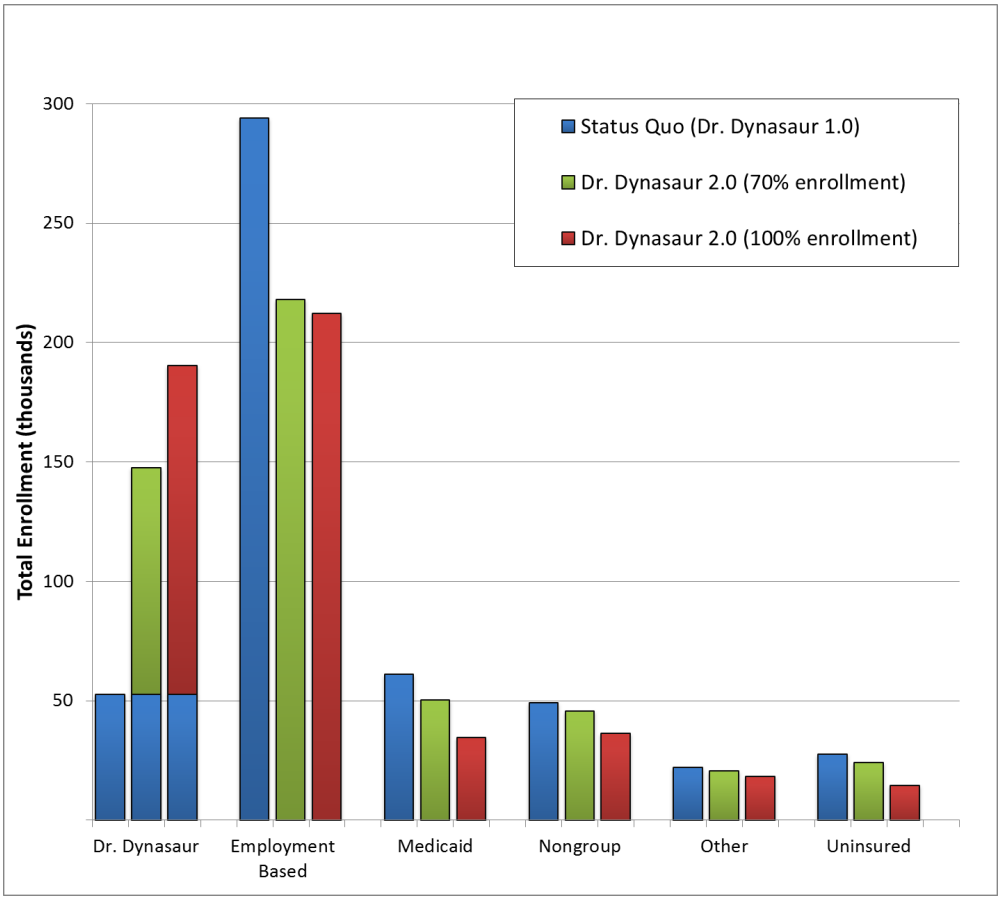


Table 3.2 shows the monthly per person and total expenditures for the current and projected Dr. Dynasaur population. The exhibit also provides projections of expenditures under different assumptions about reimbursement rates, including (1) Medicare rates, (2) midpoint rates between Medicare and commercial rates, and (3) commercial rates. The current rates scenario (a mix of Medicaid and commercial rates) results in the lowest cost, followed closely by Medicare rates. The highest levels of reimbursement are the rates paid by commercial insurance companies. For an additional point of comparison, the midpoint between the commercial and Medicare rates is provided as an approximation of a blended rate that would be a weighted average of current Medicaid rates and commercial rates. The rates grow over time at a 3-percent rate, which is consistent with the rate of growth in Vermont's medical expenditures between 2013 and 2015 (as estimated from VHCURES data). This is somewhat lower than medical expenditure inflation projected by CMS, which ranges from 4.8 to 6.2 percent between 2014 and 2023.[8]

[8] Centers for Medicare & Medicaid Services, "National Health Accounts Projected, Table 2," July 14, 2016 (https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsProjected.html).

Table 3.2. Dr. Dynasaur 1.0 and 2.0 Projected Expenditures per Member and Total, by Reimbursement Rates

Per Member Per Month ($)					
	2019	2020	2021	2022	2023
At Current Rates					
Dr. Dynasaur 1.0	$ 305	$ 313	$ 322	$ 332	$ 341
Dr. Dynasaur 2.0 (100%)	$ 360	$ 370	$ 381	$ 392	$ 404
Dr. Dynasaur 2.0 (70%)	$ 354	$ 364	$ 374	$ 386	$ 397
Dr. Dynasaur 2.0 (100% Enrollment)					
Medicare Rates	$ 360	$ 372	$ 384	$ 396	$ 408
Midpoint Rates	$ 405	$ 418	$ 431	$ 445	$ 459
Commercial Rates	$ 450	$ 464	$ 479	$ 494	$ 509
Dr. Dynasaur 2.0 (70% Enrollment)					
Medicare Rates	$ 354	$ 365	$ 377	$ 390	$ 401
Midpoint Rates	$ 399	$ 411	$ 423	$ 438	$ 451
Commercial Rates	$ 443	$ 456	$ 470	$ 486	$ 501
Total Expenditures (Millions of $)					
At Current Rates					
Dr. Dynasaur 1.0	$ 192	$ 197	$ 203	$ 209	$ 215
Dr. Dynasaur 2.0	$ 823	$ 841	$ 861	$ 883	$ 907
Difference	$ 631	$ 643	$ 658	$ 673	$ 692
Dr. Dynasaur 2.0 (100% Enrollment)					
Medicare Rates	$ 823	$ 843	$ 866	$ 890	$ 917
Midpoint Rates	$ 926	$ 948	$ 974	$ 1,001	$ 1,030
Commercial Rates	$ 1,029	$ 1,053	$ 1,081	$ 1,111	$ 1,144
Difference from Status Quo					
Medicare Rates	$ 631	$ 646	$ 663	$ 681	$ 702
Midpoint Rates	$ 734	$ 751	$ 771	$ 791	$ 815
Commercial Rates	$ 837	$ 856	$ 878	$ 902	$ 929
Dr Dynasaur 2.0 (70% Enrollment)					
Medicare Rates	$ 627	$ 644	$ 662	$ 683	$ 703
Midpoint Rates	$ 705	$ 724	$ 744	$ 768	$ 790
Commercial Rates	$ 783	$ 804	$ 826	$ 852	$ 876
Difference from Status Quo					
Medicare Rates	$ 435	$ 447	$ 459	$ 474	$ 488
Midpoint Rates	$ 513	$ 527	$ 541	$ 558	$ 575
Commercial Rates	$ 591	$ 607	$ 623	$ 643	$ 662

Figure 3.2 shows the estimated growth in the PMPM rates as well as the differences in the estimated rates across the reimbursement rate scenarios. The Medicare and current rate scenarios produce very similar PMPM estimates.

Figure 3.2. Projected PMPM Expenditures, by Reimbursement Rates, for Dr. Dynasaur 2.0

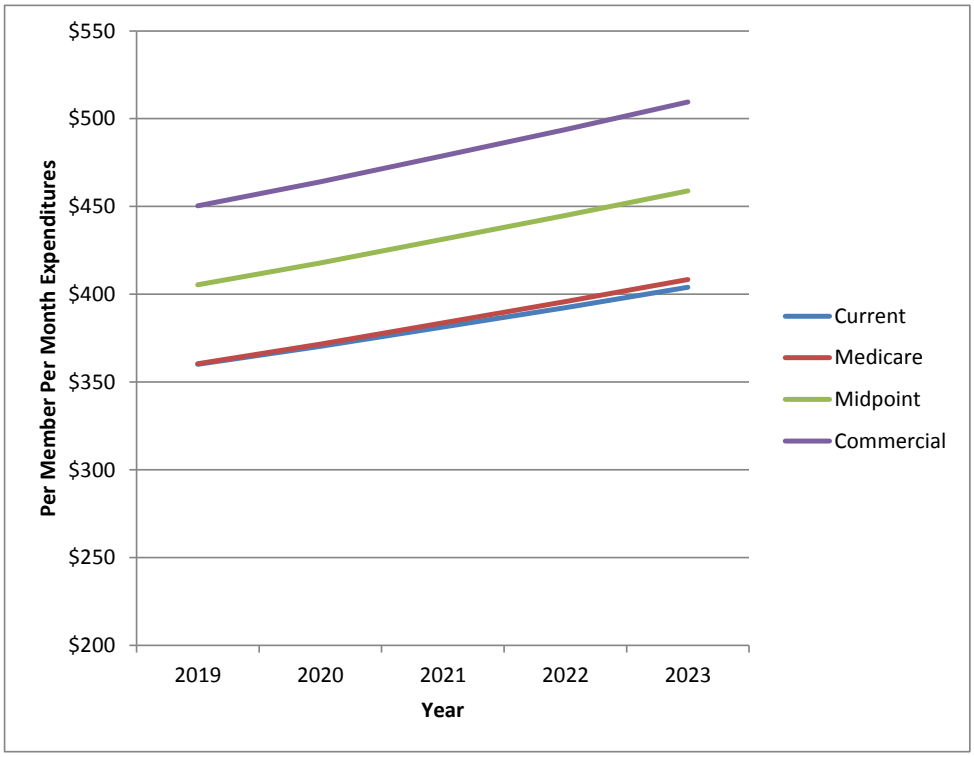


Table 3.3 shows the projected administrative rates. As described above, these projections were calculated in two separate components: administrative costs that were related to (1) the number of enrollees (per member) and (2) the amount of health care use. Because the Dr. Dynasaur 2.0 expansion population could have very different health care needs and, therefore, different patterns of utilization, the distinction could be important. That is, because a significant fraction of total administrative costs is related to the number of health care services used (e.g., prior authorization or coordination of benefits), changes in the relative rates of utilization could affect the administrative cost rate. Differences between the Dr. Dynasaur 1.0 and 2.0 scenarios vary substantially between the *low* cost assumptions scenario (7-percent administrative costs scenario with 70-percent enrollment, resulting in an increase of roughly $30 million per year) and the *high* cost assumptions scenario (15-percent administrative costs scenario with 100-percent enrollment, resulting in an increase of more than $100 million per year). Thus, the uncertainty in the administrative cost estimates is important.

Table 3.3. Administrative Costs for Dr. Dynasaur 1.0 and 2.0 (Millions of Dollars)

	Base Case (10%)*		Low (7%)		High (15%)		Transition (15% to 10%)	
	Dr Dynasaur 1.0	Dr. Dynasaur 2.0	Dr Dynasaur 1.0	Dr. Dynasaur 2.0	Dr Dynasaur 1.0	Dr. Dynasaur 2.0	Dr Dynasaur 1.0	Dr. Dynasaur 2.0
Dr. Dynasaur 2.0 at Medicare Reimbursement Rates, 70% Enrollment Scenario								
2019	19.6	67.2	13.7	46.9	29.4	100.5	29.4	100.5
2020	20.0	65.9	14.0	46.1	29.9	98.9	27.3	121.6
2021	20.3	67.3	14.2	47.1	30.5	101.0	25.2	111.9
2022	20.7	69.0	14.5	48.3	31.1	103.5	23.1	102.2
2023	21.1	70.7	14.7	49.5	31.6	106.0	21.1	70.7
Dr. Dynasaur 2.0 at Medicare Reimbursement Rates, 100% Enrollment Scenario								
2019	19.6	87.7	13.7	61.2	29.4	131.2	29.4	131.2
2020	20.0	86.6	14.0	60.7	29.9	130.0	27.3	121.6
2021	20.3	88.4	14.2	61.9	30.5	132.6	25.2	111.9
2022	20.7	90.4	14.5	63.3	31.1	135.6	23.1	102.2
2023	21.1	92.6	14.7	64.8	31.6	138.9	21.1	92.6

* Scenarios are defined by administrative cost rates in 2015. Total administrative cost rates vary in subsequent years because of the mix between costs based on enrollment and costs based on health care use.

Table 3.4 shows estimates of the total health care expenditures for the status quo case and changes from the status quo for each of the Dr. Dynasaur 2.0 scenarios. We calculated the total change in expenditures from Dr. Dynasaur 1.0 based on the current rate scenario. Both of the Dr. Dynasaur 2.0 scenarios (70-percent and 100-percent enrollment) in which current reimbursement rates are used show that total health care expenditures stay roughly the same as the status quo. This is because the COMPARE-VT model does not assume large changes in utilization for those who change insurance plans, other than uninsured. Because there are very few Vermont residents who are uninsured, the resulting change in total expenditures is small. Thus, increases in reimbursement rates in Dr. Dynasaur 2.0 (e.g., the commercial rate scenario) result in increased total expenditures for the Vermont health economy. The very large decline in ESI and Medicaid expenditures under Dr. Dynasaur 2.0 are roughly offset by increases in Dr. Dynasaur 2.0 with Medicare rates.

Table 3.4. Vermont Total Health Care Expenditures, by Insurance Status (Millions of Dollars)

	2019	2020	2021	2022	2023
Dr. Dynasaur 1.0 (Status Quo)					
Dr. Dynasaur 1.0 at current rates	192	197	203	209	215
ESI	1,983	2,033	2,078	2,119	2,170
Medicaid	608	620	627	645	657
Medicare	1,883	2,000	2,130	2,263	2,405
Individual	248	248	258	258	248
Other	364	372	380	386	392
Uninsured	112	118	119	120	124
Total	5,390	5,588	5,795	6,000	6,212
Change in Expenditures with Dr. Dynasaur 2.0 (100% Enrollment)					
Dr. Dynasaur 2.0 less Dr. Dynasaur 1.0 at current rates*					
Current rates	631	643	658	673	692
Medicare rates	631	646	663	681	702
Midpoint rates	734	751	771	791	815
Commercial rates	837	856	878	902	929
ESI	(358)	(381)	(372)	(392)	(406)
Medicaid	(146)	(144)	(149)	(157)	(163)
Medicare	-	-	-	-	-
Individual	(53)	(39)	(60)	(45)	(42)
Other	(21)	(21)	(22)	(22)	(23)
Uninsured	(49)	(52)	(50)	(51)	(54)
Total (with current rates)	3	6	5	6	4
Change in Expenditures with Dr. Dynasaur 2.0 (70% Enrollment)					
Dr. Dynasaur 2.0 less Dr. Dynasaur 1.0 at current rates*					
Current rates	410	419	429	441	453
Medicare rates	435	447	459	474	488
Midpoint rates	513	527	541	558	575
Commercial rates	591	607	623	643	662
ESI	(351)	(361)	(371)	(381)	(387)
Medicaid	(53)	(53)	(52)	(59)	(64)
Medicare	-	-	-	-	-
Individual	(20)	(12)	(15)	(15)	(12)
Other	(7)	(7)	(7)	(7)	(7)
Uninsured	(4)	(12)	(10)	(8)	(11)
Total (with current rates)	(25)	(26)	(26)	(28)	(29)

***** Each of the changes in Dr. Dynasaur expenditures is relative to Dr. Dynasaur 1.0 at current rates.

Table 3.5 contains the estimated mean annual per capita health care expenditures for each scenario, presented by insurance type from 2019 through 2023. For the Dr. Dynasaur program, we computed the expenditures with the four different reimbursement rate options. Current reimbursement rates result in the lowest costs, with Medicare rates being similar and commercial

rates being significantly higher than the current rates. Each of these options is substantially lower than the resulting ESI insurance rates. This means that the individuals leaving ESI for Dr. Dynasaur have lower expected costs than those that remain on ESI. Thus, although the total costs of ESI premiums for family plans will fall (as a result of a reduction in dependent coverage), the change in the ESI risk pool will result in higher per person ESI premiums. Under the 100-percent enrollment scenario, the per capita expenditures of those who remain on ESI will increase by about $1,000. The increase in ESI premiums (per person) could affect either firms' decisions to offer ESI or employees' decisions to enroll.

Table 3.5. Vermont Mean Annual per Capita Health Care Expenditures, by Insurance Type

	2019	2020	2021	2022	2023
Status Quo (Dr. Dynasaur 1.0)					
Dr. Dynasaur Status Quo					
Current Rates	$ 3,656	$ 3,757	$ 3,862	$ 3,987	$ 4,095
Employment-Based	$ 6,748	$ 6,953	$ 7,151	$ 7,308	$ 7,483
Medicaid	$ 9,967	$ 10,299	$ 10,524	$ 10,915	$ 11,089
Medicare	$ 14,925	$ 15,336	$ 15,841	$ 16,328	$ 16,858
Nongroup	$ 5,053	$ 5,161	$ 5,346	$ 5,489	$ 5,676
Other	$ 16,566	$ 17,038	$ 17,518	$ 18,012	$ 18,522
Uninsured	$ 4,091	$ 4,223	$ 4,351	$ 4,411	$ 4,507
Dr. Dynasaur 2.0 with 100% Enrollment					
Dr. Dynasaur 2.0					
Current Rates	$ 4,322	$ 4,444	$ 4,576	$ 4,708	$ 4,847
Medicare Rates	$ 4,325	$ 4,459	$ 4,603	$ 4,749	$ 4,901
Midpoint Rates	$ 4,865	$ 5,014	$ 5,175	$ 5,337	$ 5,507
Commercial Rates	$ 5,404	$ 5,569	$ 5,747	$ 5,926	$ 6,113
Employment-Based	$ 7,663	$ 7,872	$ 8,109	$ 8,299	$ 8,523
Medicaid	$ 13,426	$ 13,960	$ 14,137	$ 14,536	$ 14,740
Medicare	$ 14,925	$ 15,336	$ 15,841	$ 16,328	$ 16,858
Nongroup	$ 5,364	$ 5,690	$ 5,741	$ 6,011	$ 6,017
Other	$ 18,701	$ 19,235	$ 19,779	$ 20,349	$ 20,946
Uninsured	$ 4,405	$ 4,420	$ 4,577	$ 4,658	$ 4,792
Dr. Dynasaur 2.0 with 70% Enrollment					
Dr. Dynasaur 2.0					
Current Rates	$ 4,085	$ 4,198	$ 4,319	$ 4,449	$ 4,576
Medicare Rates	$ 4,253	$ 4,386	$ 4,519	$ 4,675	$ 4,817
Midpoint Rates	$ 4,784	$ 4,932	$ 5,080	$ 5,254	$ 5,413
Commercial Rates	$ 5,314	$ 5,477	$ 5,641	$ 5,833	$ 6,008
Employment-Based	$ 7,484	$ 7,723	$ 7,925	$ 8,108	$ 8,280
Medicaid	$ 11,030	$ 11,358	$ 11,639	$ 11,955	$ 12,193
Medicare	$ 14,925	$ 15,336	$ 15,841	$ 16,328	$ 16,858
Nongroup	$ 4,994	$ 5,186	$ 5,412	$ 5,552	$ 5,859
Other	$ 17,478	$ 17,973	$ 18,487	$ 19,014	$ 19,558
Uninsured	$ 4,510	$ 4,433	$ 4,576	$ 4,706	$ 4,647

Table 3.6 shows our estimates of the average annual OOP expenditures by insurance type. We assume that the OOP expenditures of Dr. Dynasaur 2.0 will be 0 for covered services. Because in the VHCURES data we did not observe services that were not covered, we set the OOP to zero for Dr. Dynasaur. The increases in the OOP expenditures for each of the other categories (excluding Medicare) are a consequence of their worsening risk pools and their

overall increased per person expenditures as a result of moving relatively inexpensive individuals to Dr. Dynasaur.

Table 3.6. Vermont Annual per Capita Health Care Expenditures Paid Out of Pocket, by Insurance Type (Dollars)

Status Quo (Dr. Dynasaur 1.0)					
	2019	**2020**	**2021**	**2022**	**2023**
Dr. Dynasaur 1.0	-	-	-	-	-
Employment-Based	549	560	576	591	606
Medicaid	457	474	485	500	511
Medicare	1,515	1,560	1,611	1,660	1,719
Individual	825	851	870	899	936
Other	791	815	840	863	886
Uninsured	415	438	457	472	472
Dr. Dynasaur 2.0 with 100% Enrollment					
Dr. Dynasaur 1.0	-	-	-	-	-
Dr. Dynasaur 2.0	-	-	-	-	-
Employment-Based	654	664	685	705	728
Medicaid	647	671	681	700	714
Medicare	1,515	1,560	1,611	1,660	1,719
Nongroup	919	944	980	987	1,005
Other	919	946	977	1,003	1,031
Uninsured	531	545	563	570	586
Dr. Dynasaur 2.0 with 70% Enrollment					
Dr. Dynasaur 1.0	-	-	-	-	-
Dr. Dynasaur 2.0	-	-	-	-	-
Employment-Based	636	649	667	686	702
Medicaid	506	522	536	551	563
Medicare	1,515	1,560	1,611	1,660	1,719
Nongroup	848	871	898	926	978
Other	841	866	894	918	942
Uninsured	443	462	482	502	503

Table 3.7 presents a summary of ESI, including the number of individuals covered, the total expenditures, and the mean premiums paid. For comparison, the table also includes premiums for the Small Business Health Options Program (SHOP) and individual Silver levels based on a 40-year-old nonsmoker. These are drawn directly from the simulated employer (group) and individual (nongroup) insurance markets in the COMPARE simulation. Even though per person expenditures increase, as shown in Table 3.8, total ESI expenditures decrease because fewer individuals are enrolled in ESI under Dr. Dynasaur 2.0.

Table 3.7. Vermont Employer-Sponsored Insurance: Coverage, Expenditures, and Premiums

Status Quo (Dr. Dynasaur 1.0)					
	2019	2020	2021	2022	2023
Enrollment (Thousands)	294	292	291	290	290
Expenditures ($M)	1,983	2,033	2,078	2,119	2,170
Premiums ($)					
ESI	5,234	5,127	5,441	5,427	5,712
SHOP Silver	4,529	4,798	4,852	4,926	5,051
Individual Silver	4,141	4,232	4,388	4,522	4,714
Dr. Dynasaur 2.0 (100% Enrollment)					
Enrollment	212	210	210	208	207
Expenditures ($M)	1,625	1,652	1,706	1,727	1,765
Premiums ($)					
ESI	5,065	5,610	5,473	5,816	6,226
SHOP Silver	5,025	4,986	5,287	5,206	5,776
Individual Silver	4,088	4,360	4,399	4,628	4,643

Table 3.8 shows the effect Dr. Dynasaur has on family income. Employees who obtain ESI for family members typically pay a fraction of the premium directly through wage withholdings. The average fraction of premiums paid by employees through withholdings is 33 percent in our COMPARE-VT simulations. By moving family members off ESI dependent coverage, families immediately realize an increase in take-home pay of this amount because the family is not paying premiums for the dependents. Though this increase in take-home pay is taxable, it does not represent an increase in total earned income (the amount reported in salary and wages). The fraction of the premium paid by the employer, however, is also likely to be "passed back" to the worker in the form of increased pecuniary compensation. In the long run, this passback rate has been estimated to be as high as 95 percent, thus keeping the total compensation costs for employers roughly unchanged.[9] This form of wage increase is reflected as an increase in family income (both self-reported in surveys and reported to the Internal Revenue Service, for example, in W-2 forms) and is taxable. We estimate that the increase in family income could be about

[9] Dana P. Goldman, Neeraj Sood, and Arleen Leibowitz, "Wage and Benefit Changes in Response to Rising Health Insurance," *Forum for Health Economics & Policy*, Vol. 8, 2005, pp. 1–17; Jonathan Gruber, "The Incidence of Mandated Maternity Benefits," *American Economic Review*, 1994, pp. 622–641; Jonathan Gruber and Alan B. Krueger, "The Incidence of Mandated Employer-Provided Insurance: Lessons from Workers' Compensation Insurance," *Tax Policy and the Economy*, Vol. 5, MIT Press, 1991, pp. 111–144 (http://www.nber.org/chapters/c11270.pdf); David M. Cutler and Brigitte C. Madrian, "Labor Market Responses to Rising Health Insurance Costs: Evidence on Hours Worked," *RAND Journal of Economics*, Vol. 29, No. 3, Autumn 1998, pp. 509–530; Louise Sheiner, "Health Care Costs, Wages, and Aging," FEDS Discussion Paper No. 99-19, January 14, 1999 (http://papers.ssrn.com/sol3/papers.cfm?abstract_id=165530).

$1,000 per ESI enrolled family on average during the study period if Dr. Dynasaur 2.0 were adopted with 100-percent enrollment. The value for any particular household could vary substantially in practice, depending on employee characteristics, such as the number of dependents, and current payroll arrangements regarding premium contributions. The table also shows the distribution of the wage increases across the family income distribution (by deciles of FPL). These data are a function of all families in the decile, and, therefore, they reflect both the wage increase for those on ESI and the fraction of families on ESI in the income decile.

Table 3.8. Vermont Mean Family Income, by Dr. Dynasaur Scenario and Year

Table 3.8.A. Family Income in Percentage of FPL, for Those with ESI

Year	Dr. Dynasaur 1.0 (Status Quo)	Dr. Dynasaur 2.0 100% Enrollment	Difference
2014	498	502	3.6
2019	495	502	6.5
2020	494	498	4.3
2021	494	500	5.9
2022	493	498	4.9
2023	492	497	5.0

Table 3.8.B. Family Income in Dollars, for Those with ESI

Year	Dr. Dynasaur 1.0 (Status Quo)	Dr. Dynasaur 2.0 100% Enrollment	Difference
2014	$ 82,345	$ 83,037	$ 692
2019	$ 81,512	$ 82,681	$ 1,169
2020	$ 81,329	$ 82,153	$ 824
2021	$ 81,357	$ 82,452	$ 1,095
2022	$ 81,247	$ 82,170	$ 923
2023	$ 81,234	$ 82,182	$ 948

Table 3.8.C. Mean Change in Family Income, by FPL (All Families)

Mean Family Income Effect by FPL Decile (2019)		
	Dr. Dynasaur 2.0	
Income (FPL)	70% Scenario	100% Scenario
<100%	$ 129	$ 140
100 to 199%	$ 261	$ 265
200 to 299%	$ 408	$ 401
300 to 399%	$ 529	$ 652
400 to 499%	$ 597	$ 771
500 to 599%	$ 506	$ 658
600 to 699%	$ 562	$ 762
700 to 799%	$ 503	$ 671
800+%	$ 506	$ 640

NOTE: Dr. Dynasaur 2.0 has an effect on taxable family income. By moving family members off ESI dependent coverage, wages increase as costs of compensation are "passed back" to employees. The additional income is taxable. The cost of ESI paid by employers is not taxed.

Table 3.9 summarizes enrollment and expenditures associated with each of the Dr. Dynasaur scenarios and reimbursement rate options from 2019 through 2023. These results are presented for both the 100-percent enrollment scenario and the 70-percent enrollment scenario. The differences between total expenditures in Dr. Dynasaur 1.0 and 2.0 are shown as well. Combined with changes in revenues (Table 3.10) and changes in administrative costs (Table 3.3), these differences quantify the need for new revenues to fund the program. Increased health expenditures range from $435 million (70-percent enrollment scenario with Medicare reimbursement rates) to $837 million (100-percent enrollment scenario with commercial reimbursement rates) in 2019. In 2023, that range is $488 million to $929 million.

Table 3.9. Dr. Dynasaur 1.0 and 2.0, Coverage and Expenditures (PMPM and Total)

	2019	2020	2021	2022	2023
Enrollment (member years in thousands)					
Dr. Dynasaur 1.0	52	53	53	53	52
Dr. Dynasaur 2.0 (100% Enrollment)	190	189	188	188	187
Dr. Dynasaur 2.0 (70% Enrollment)	147	147	146	146	146
Expenditures					
Current Rates					
PMPM					
Dr. Dynasaur 1.0 (Status Quo)	$ 305	$ 313	$ 322	$ 332	$ 341
Total (Millions $)					
Dr. Dynasaur 1.0	$ 192	$ 197	$ 203	$ 209	$ 215
Medicare Rates					
PMPM					
Dr. Dynasaur 2.0	$ 360	$ 372	$ 384	$ 396	$ 408
Difference from Status Quo	$ 56	$ 59	$ 62	$ 63	$ 67
Total (Millions $)					
Dr. Dynasaur 2.0 (100% Enrollment)	$ 823	$ 843	$ 866	$ 890	$ 917
Difference from Status Quo	$ 631	$ 646	$ 663	$ 681	$ 702
Dr. Dynasaur 2.0 (70% Enrollment)	$ 627	$ 644	$ 662	$ 683	$ 703
Difference from Status Quo	$ 435	$ 447	$ 459	$ 474	$ 488
Midpoint Rates					
PMPM					
Dr. Dynasaur 2.0	$ 405	$ 418	$ 431	$ 445	$ 459
Difference from Status Quo	$ 101	$ 105	$ 109	$ 113	$ 118
Total (Millions $)					
Dr. Dynasaur 2.0 (100% Enrollment)	$ 926	$ 948	$ 974	$ 1,001	$ 1,030
Difference from Status Quo	$ 734	$ 751	$ 771	$ 791	$ 815
Dr. Dynasaur 2.0 (70% Enrollment)	$ 705	$ 724	$ 744	$ 768	$ 790
Difference from Status Quo	$ 513	$ 527	$ 541	$ 558	$ 575
Commercial Rates					
PMPM					
Dr. Dynasaur 2.0	$ 450	$ 464	$ 479	$ 494	$ 509
Difference from Status Quo	$ 146	$ 151	$ 157	$ 162	$ 168
Total (Millions $)					
Dr. Dynasaur 2.0 (100% Enrollment)	$ 1,029	$ 1,053	$ 1,081	$ 1,111	$ 1,144
Difference from Status Quo	$ 837	$ 856	$ 878	$ 902	$ 929
Dr. Dynasaur 2.0 (70% Enrollment)	$ 783	$ 804	$ 826	$ 852	$ 876
Difference from Status Quo	$ 591	$ 607	$ 623	$ 643	$ 662

Table 3.10 presents the Dr. Dynasaur revenues, by current source of funds, and the additional revenues that would be required for each year from 2019 through 2023. The revenues include income from the monthly premiums (annualized) as well as revenue from federal sources, such as Medicaid and CHIP. The estimates of additional revenue required at the bottom of the table are the revenue targets for the tax scenarios to follow. Total new revenues from premium collections are approximately $35 million and $50 million, respectively, in the 70-percent and 100-percent enrollment scenarios. New federal revenues range from $163 to $185 million for the

100-percent enrollment scenario and from $87 to $103 million for the 70-percent enrollment scenario. These estimates may be conservative because we assumed that the federal matching funds would be constrained by the Medicaid upper payment limit, which limits FMAP payments if, for example, reimbursement rates are set very high. We therefore calculated the FMAP payments at Medicare reimbursement levels for each of the reimbursement rate scenarios.

Table 3.10. Dr. Dynasaur Revenues, by Scenario

	2019	2020	2021	2022	2023
	Revenues (Millions $)				
Revenues from premiums					
Dr. Dynasaur 1.0 (Total)	$ 1.09	$ 1.09	$ 1.09	$ 1.09	$ 1.09
Medicaid population	$ 0.19	$ 0.19	$ 0.19	$ 0.19	$ 0.19
CHIP population	$ 0.90	$ 0.90	$ 0.90	$ 0.90	$ 0.90
Dr. Dynasaur 2.0 (Total)	$ 54.02	$ 53.41	$ 52.86	$ 52.40	$ 51.99
Medicaid population	$ 1.29	$ 1.27	$ 1.25	$ 1.24	$ 1.22
CHIP population	$ 12.10	$ 11.93	$ 11.78	$ 11.68	$ 11.58
Other (income > 317% FPL)	$ 40.63	$ 40.20	$ 39.82	$ 39.48	$ 39.18
New revenues from premiums (100%)	$ 52.93	$ 52.32	$ 51.77	$ 51.31	$ 50.90
New revenues from premiums (70%)	$ 37.05	$ 36.62	$ 36.24	$ 35.92	$ 35.63
New federal revenues*					
100% enrollment scenario	$ 185	$ 163	$ 166	$ 169	$ 173
Medicaid (FMAP = 0.54)	$ 91	$ 92	$ 93	$ 94	$ 96
CHIP (FMAP = 0.68)**	$ 94	$ 72	$ 73	$ 75	$ 76
70% enrollment scenario	$ 103	$ 87	$ 88	$ 90	$ 92
Medicaid (FMAP = 0.54)	$ 36	$ 37	$ 37	$ 38	$ 39
CHIP (FMAP = 0.68)**	$ 67	$ 50	$ 51	$ 52	$ 53
Additional revenues required (100% enrollment scenario)***					
Using Medicare rates	$ 461	$ 497	$ 514	$ 531	$ 550
Using midpoint rates	$ 564	$ 602	$ 621	$ 641	$ 663
Using commercial rates	$ 667	$ 707	$ 729	$ 751	$ 777
Additional revenues required (70% enrollment scenario)***					
Using Medicare rates	$ 343	$ 369	$ 381	$ 396	$ 410
Using midpoint rates	$ 421	$ 449	$ 463	$ 480	$ 497
Using commercial rates	$ 499	$ 529	$ 545	$ 565	$ 584

* New federal revenues are calculated using current Medicare reimbursement rates.

** CHIP FMAP = 0.68 + 0.23 in fiscal year 2019; 0.68 otherwise.

*** Additional revenues required include increases in administrative and health care expenditure costs as well as changes in revenues from sources enumerated in the table; all other revenue sources remain unchanged.

Table 3.11 presents the income tax revenues required to cover the additional costs for Dr. Dynasaur from 2019 through 2023. The current average effective tax rate (total taxes paid divided by total taxable income) is about 5 percent in Vermont. We estimated the total revenue raised based on aggregating estimates from each percentile of family income. Results are presented for alternate scenarios (100-percent and 70-percent enrollment scenarios for each of the reimbursement rate scenarios). The 70-percent enrollment scenario combined with Medicare reimbursement rates results in the lowest revenue shortfall and, consequently, the lowest new tax

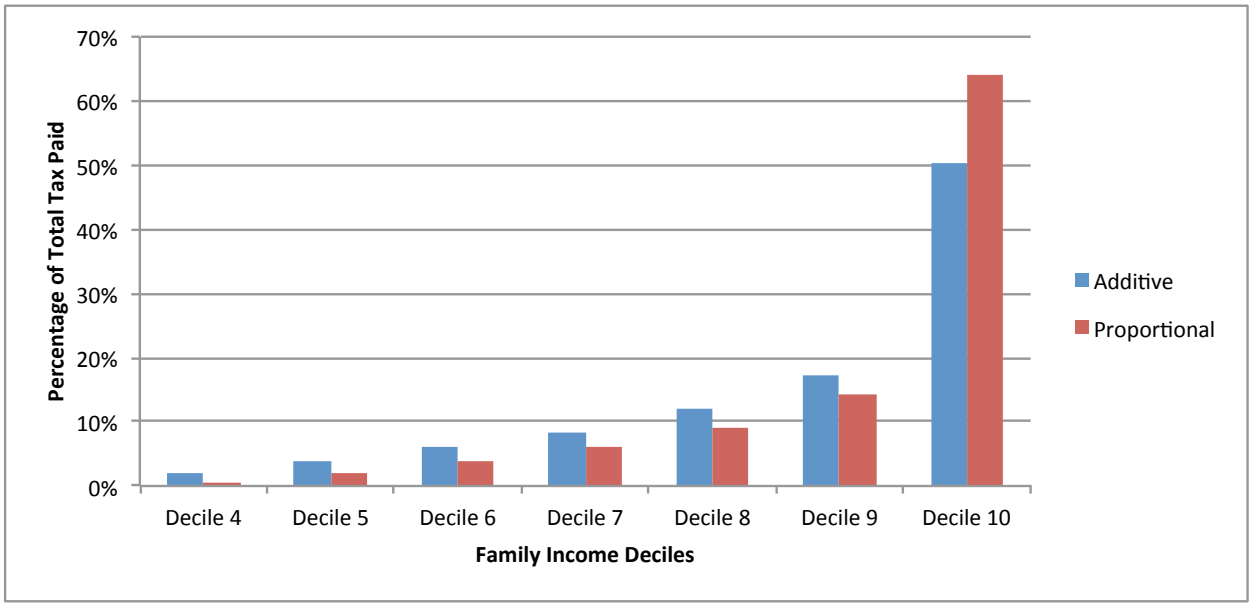
rates. The constant increment to the tax rate (an additive tax scenario, which shifts all tax rates up by a fixed amount) required to meet the revenue needs ranges from 2.5 to 2.8 percent. The proportional tax rate increase (which shifts the tax schedule up proportionally) is around 50 percent. The high-cost scenario (100-percent enrollment with reimbursement rates set to commercial levels) would require additive tax rate increases of between 4.8 and 5.4 percent and proportional tax increases of around 100 percent.

Table 3.11. New Revenues—Scenario 1: Income Tax (Millions of Dollars)

	2019	2020	2021	2022	2023
Medicare Rates					
70% Enrollment Scenario					
Revenues Required	$ 343	$ 369	$ 381	$ 396	$ 410
Additive Rate Increase	2.5%	2.6%	2.7%	2.8%	2.8%
Proportional Rate Increase	48.3%	51.5%	52.6%	54.1%	55.5%
100% Enrollment Scenario					
Revenues Required	$ 461	$ 497	$ 514	$ 531	$ 550
Additive Rate Increase	3.3%	3.6%	3.6%	3.7%	3.8%
Proportional Increase	65.0%	69.4%	71.0%	72.6%	74.5%
Midpoint Rates					
70% Enrollment Scenario					
Revenues Required	$ 421	$ 449	$ 463	$ 480	$ 497
Additive Rate Increase	3.0%	3.2%	3.3%	3.4%	3.4%
Proportional Rate Increase	59.3%	62.6%	64.0%	65.7%	67.3%
100% Enrollment Scenario					
Revenues Required	$ 564	$ 602	$ 621	$ 641	$ 663
Additive Rate Increase	4.1%	4.3%	4.4%	4.5%	4.6%
Proportional Increase	79.5%	84.0%	85.8%	87.6%	89.8%
Commercial Rates					
70% Enrollment Scenario					
Revenues Required	$ 499	$ 529	$ 545	$ 565	$ 584
Additive Rate Increase	3.6%	3.8%	3.9%	4.0%	4.1%
Proportional Rate Increase	70.3%	73.8%	75.3%	77.3%	79.0%
100% Enrollment Scenario					
Revenues Required	$ 667	$ 707	$ 729	$ 751	$ 777
Additive Rate Increase	4.8%	5.1%	5.2%	5.3%	5.4%
Proportional Increase	93.9%	98.6%	100.7%	102.7%	105.2%

Figure 3.3 presents the incidence of the two income tax scenarios (additive and proportional), showing that the proportional scenario is more progressive than the additive scenario.

Figure 3.3. Incidence of Increased Income Tax by Family Income Deciles



NOTES: The additive tax is a constant increment to the tax rate throughout the tax schedule. The proportional tax increases the tax schedule by the same proportion throughout the schedule. The incidence rates do not vary by decile with the magnitude of either tax.

Table 3.12 presents the payroll tax revenues required to cover the additional costs for Dr. Dynasaur from 2019 through 2023. These results include the revenue raised from different firm sizes. We present the results for each of the combinations of enrollment and reimbursement scenarios. The estimated increase in the payroll tax varies from a low (for the 70-percent enrollment scenario and Medicare prices) of approximately 3 percent per year to a high (for the 100-percent enrollment scenario and commercial reimbursement rates) of more than 6 percent per year.

Table 3.12. New Revenues—Scenario 2: Payroll Tax (Millions of Dollars)

	2019	2020	2021	2022	2023
Vermont Payroll Tax Base					
Firm Size					
0 or not reported	$ 726	$ 733	$ 740	$ 748	$ 755
1 to 4	$ 433	$ 437	$ 442	$ 446	$ 450
5 to 10	$ 290	$ 293	$ 296	$ 299	$ 302
11 to 25	$ 616	$ 622	$ 628	$ 635	$ 641
26 to 50	$ 838	$ 847	$ 855	$ 864	$ 872
51 to 100	$ 1,378	$ 1,392	$ 1,406	$ 1,420	$ 1,434
100+	$ 7,533	$ 7,608	$ 7,684	$ 7,761	$ 7,839
Total	$ 11,814	$ 11,932	$ 12,051	$ 12,172	$ 12,294
Dr. Dynasaur 2.0 at Medicare Rates (Millions of $)					
100% Enrollment Scenario					
Revenues Required	$ 461	$ 497	$ 514	$ 531	$ 550
Incremental Tax Rate	3.9%	4.2%	4.3%	4.4%	4.5%
70% Enrollment Scenario					
Revenues Required	$ 343	$ 369	$ 381	$ 396	$ 410
Incremental Tax Rate	2.9%	3.1%	3.2%	3.3%	3.3%
Dr. Dynasaur 2.0 at Midpoint Rates (Millions of $)					
100% Enrollment Scenario					
Revenues Required	$ 564	$ 602	$ 621	$ 641	$ 663
Incremental Tax Rate	4.8%	5.0%	5.2%	5.3%	5.4%
70% Enrollment Scenario					
Revenues Required	$ 421	$ 449	$ 463	$ 480	$ 497
Incremental Tax Rate	3.6%	3.8%	3.8%	3.9%	4.0%
Dr. Dynasaur 2.0 at Commercial Rates (Millions of $)					
100% Enrollment Scenario					
Revenues Required	$ 667	$ 707	$ 729	$ 751	$ 777
Incremental Tax Rate	5.6%	5.9%	6.0%	6.2%	6.3%
70% Enrollment Scenario					
Revenues Required	$ 499	$ 529	$ 545	$ 565	$ 584
Incremental Tax Rate	4.2%	4.4%	4.5%	4.6%	4.7%

Figure 3.4 shows the incidence of the payroll tax by the size of the firm, indicating that the majority of the new revenues are raised from large firms.

Figure 3.4. Incidence of Increased Payroll Tax, by Size of Firm

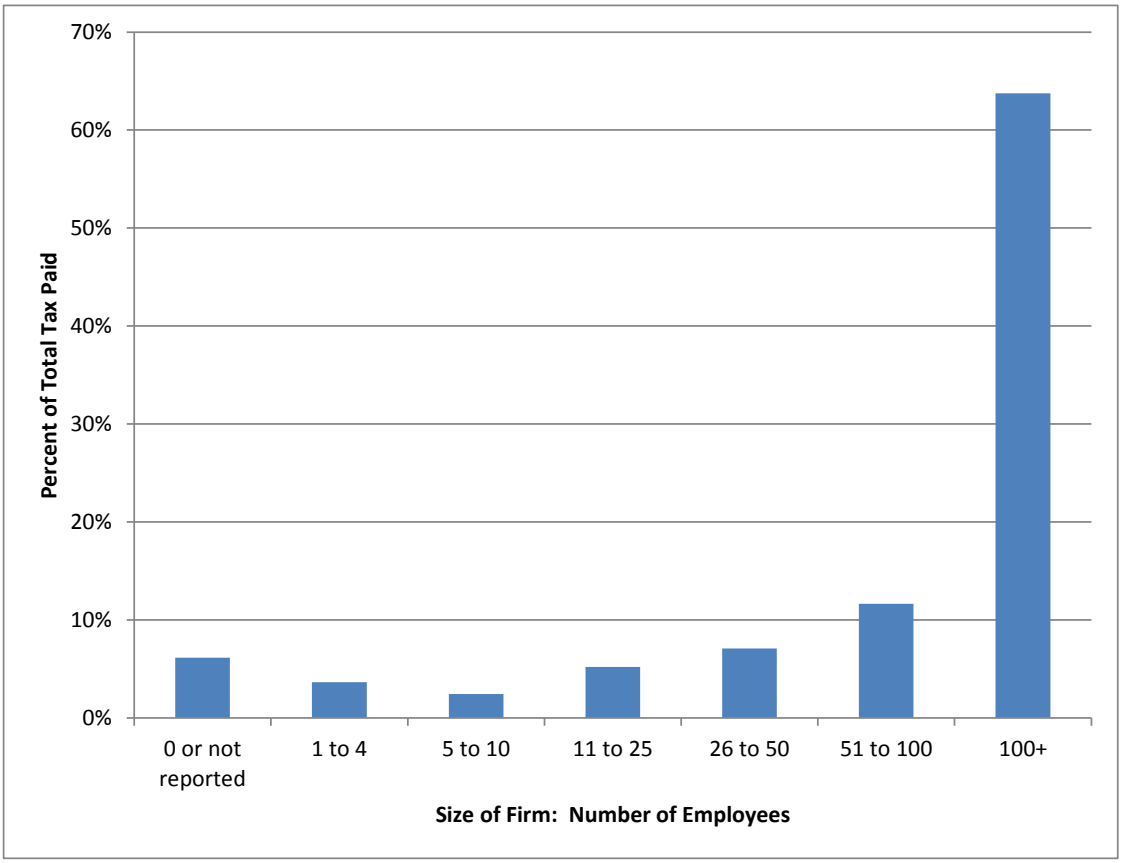


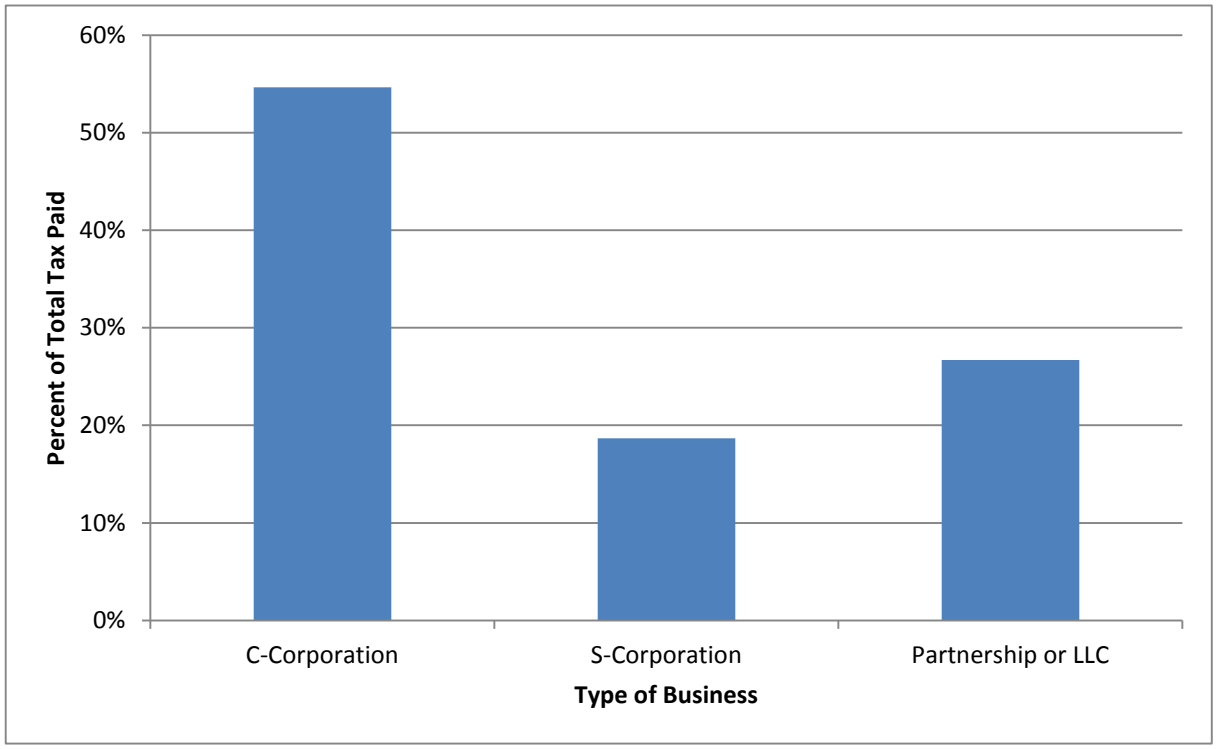
Table 3.13 presents the BET revenues required to cover the additional costs for Dr. Dynasaur from 2019 through 2023. These results include the revenue raised from each type of corporation. The estimated tax rates are slightly lower than the payroll tax scenario, reflecting the larger tax base of the BET. Under the 70-percent enrollment and Medicare reimbursement rate scenario, the BET tax rates range from 2.6 to 3 percent. Under the 100-percent enrollment and commercial reimbursement rate scenario, the BET tax rate ranges from 5.1 to 5.7 percent.

Table 3.13. New Revenues—Scenario 3: Business Enterprise Tax (Millions of Dollars)

	2019	2020	2021	2022	2023
Business Enterprise Tax Base (Millions $)					
Type of Business Enterprise					
C-Corporation	$ 7,136	$ 7,208	$ 7,280	$ 7,353	$ 7,426
S-Corporation	$ 2,438	$ 2,462	$ 2,487	$ 2,512	$ 2,537
Partnership or LLC	$ 3,486	$ 3,521	$ 3,556	$ 3,591	$ 3,627
Total	$ 13,060	$ 13,190	$ 13,322	$ 13,456	$ 13,590
Dr. Dynasaur 2.0 (Current Rates, Millions $)					
100% Enrollment Scenario					
Revenues Required	$ 461	$ 497	$ 514	$ 531	$ 550
Incremental Tax Rate	3.5%	3.8%	3.9%	3.9%	4.0%
70% Enrollment Scenario					
Revenues Required	$ 343	$ 369	$ 381	$ 396	$ 410
Incremental Tax Rate	2.6%	2.8%	2.9%	2.9%	3.0%
Dr. Dynasaur 2.0 (Current Rates, Millions $)					
100% Enrollment Scenario					
Revenues Required	$ 564	$ 602	$ 621	$ 641	$ 663
Incremental Tax Rate	4.3%	4.6%	4.7%	4.8%	4.9%
70% Enrollment Scenario					
Revenues Required	$ 421	$ 449	$ 463	$ 480	$ 497
Incremental Tax Rate	3.2%	3.4%	3.5%	3.6%	3.7%
Dr. Dynasaur 2.0 (Current Rates, Millions $)					
100% Enrollment Scenario					
Revenues Required	$ 667	$ 707	$ 729	$ 751	$ 777
Incremental Tax Rate	5.1%	5.4%	5.5%	5.6%	5.7%
70% Enrollment Scenario					
Revenues Required	$ 499	$ 529	$ 545	$ 565	$ 584
Incremental Tax Rate	3.8%	4.0%	4.1%	4.2%	4.3%

Figure 3.5 presents the incidence of the BET by type of business, showing that the majority of new revenues are raised from C corporations.

Figure 3.5. Incidence of Business Enterprise Tax, by Type of Business



4. Discussion

The proposed expansion of Dr. Dynasaur would substantially change the health insurance environment for young people in Vermont. By including all individuals through the age of 25, regardless of income, Dr. Dynasaur 2.0 could come close to creating a universal health care system for young people in Vermont, excluding only those who qualify for Medicare and some subsets of Medicaid (those who are blind and disabled). The benefits of such a system could be significant, eliminating concerns about coverage gaps and elements of administrative costs, such as coordination of benefits. Because the number of uninsured individuals in Vermont is low, the Dr. Dynasaur 2.0 expansion is primarily a matter of moving individuals from one insurance type to another. As a result, if there were no changes in prices (or reimbursements) for care, there would be enough money spent in the system to cover the insurance costs, and it would be a matter of moving the money from one sponsor to another. In that case, the challenge would be to determine how to design the system to move the revenues that are currently funding ESI to Dr. Dynasaur. If, however, Dr. Dynasaur reimbursement rates increase to Medicare or commercial levels, an additional challenge would be to determine how best to finance the additional costs that would arise from the reimbursement rate increases for those previously enrolled in Dr. Dynasaur 1.0. This study examines these issues by building a model of the Vermont health care system that starts with sound estimates of the expected expenditures for the populations concerned, combines those estimates with microsimulation modeling that characterizes how the Dr. Dynasaur expansion has rippling effects through ESI, and models three alternative financing strategies to obtain funding for the program.

Reimbursement Rates

One of the striking results of the modeling is the importance of the reimbursement rates. Because Medicaid and commercial rates differ substantially, a decision to increase Dr. Dynasaur reimbursement rates to commercial rate levels would increase costs substantially even without expanding enrollment. Expanding Dr. Dynasaur to include all individuals through age 25 could move between 80,000 and 90,000 individuals from ESI to Dr. Dynasaur. With additional enrollees coming from nongroup coverage and Medicaid, the number of enrollees could easily more than triple. Because most of those new enrollees would be coming from ESI, they are currently paying commercial rates. Thus, a decision to set Dr. Dynasaur reimbursement rates at Medicare levels would remove substantial revenues from the health care system because the care for these individuals would be reimbursed at a lower rate. Undoubtedly, reducing the heterogeneity in reimbursement rates will create winners (those who previously served largely a Medicaid population) and losers (those who served primarily a commercially insured

population). The current-rate scenarios, which result in blended reimbursement rates, offer a reasonable approximation of what providers are currently receiving in payments on average.

Level of Enrollment or Program Participation

In addition to the issues of equity and efficiency, our simulation results show that the amount of new revenues required to fund Dr. Dynasaur 2.0 differs considerably depending on the reimbursement rates chosen as well as the fraction of eligible enrollees who participate in Dr. Dynasaur. Our 100-percent enrollment scenario shows the largest potential impact of the program if it were to mature into a near-universal system for Vermont residents under age 26. Without program features that essentially mandate enrollment, however, enrollment is likely to fall considerably short of that mark. Our COMPARE-VT model, which characterizes insurance choice decisions, estimates that roughly 70 percent of eligible enrollees will participate. One of our findings is that the program cost implications of the level of participation are substantial. In addition to the important consequences of the level of enrollment, however, we found that the current variation in health care prices across insurance type has substantial implications for program design. Setting reimbursement rates to commercial levels for all Dr. Dynasaur enrollees will mean substantial increases in costs for the Dr. Dynasaur 1.0 enrollees as well as substantial increases in costs caused by expanding the covered population. The new revenues required to fund the program, if fully raised by new taxes, would require large tax increases.

Program Design

Another important implication of our analyses is that the mechanism for incentivizing or mandating enrollment is important. The potential enrollment is large, but some of the benefits of Dr. Dynasaur 2.0 may only be realized as it approaches a near-universal system for young Vermonters, eliminating insurance seams and minimizing administrative costs, such as coordination of benefits. We found that about 70 percent of the newly eligible under Dr. Dynasaur 2.0 would enroll purely as a result of the behavioral incentives inherent in the relatively low premium rates. Our model assumes a high wage passback rate of 95 percent and perfect knowledge. In reality, many may feel that a premium of $60 PMPM is not a large savings relative to the explicit withholdings from a paycheck. With little understanding that the vast majority of the ESI premium (explicitly paid for mostly by the employer) is actually paid for by reductions in wages, the participation rate in Dr. Dynasaur 2.0 might be lower.

Dr. Dynasaur 1.0 requires premium payments of no more than $60 per month from any family. Although we did not examine this in our scenarios, implementing a higher maximum premium than $60 per family, even for those with income above 317 percent of FPL, could be one strategy by which tax rates could be kept lower. If, for example, affluent families with eligible members were required to pay a fair premium (or fee) regardless of whether the member enrolled or not, participation would undoubtedly be much higher, and the net cost to the program

would be small. The revenue shortfall, the majority of which would be generated by increasing reimbursement rates among those already eligible for Dr. Dynasaur 1.0, would be substantially lower. Such a policy, however, might not be feasible in the absence of some assurance that the benefits of ESI cost reductions will be realized as increased take-home pay. Even if, as suggested in the literature,[10] most of those funds do get passed back in the form of increased wages in the long run, it may be safe to assume that few families are aware of this or confident that they will recoup the resources, and, in addition, no one really knows how much time has to pass to reach the "long run." These are important barriers to extracting the resources tied up in ESI. Another potential limitation of a high-premium policy is that it could create a large implicit tax. Consider, for example, premiums that are means-tested so that they increase from $60 PMPM at 300 percent of FPL to $350 PMPM at 400 percent of FPL.

The financing strategies that we modeled, including contributions across the population, have the advantage of being in the shape of broadly funded social policies that most families will benefit from at some point in their evolution. Regardless of the tax scenario, however, lower premiums or fees will result in higher tax rates, and those who benefit from the program will not necessarily be those who contribute to the funding.

Tax Scenarios

We found that the annual revenue shortfalls are substantial, ranging from $341 million (70-percent enrollment with Medicare reimbursement rates, 2019) to $805 million (100-percent enrollment with commercial reimbursement rates, 2023) during the study period. Our analyses suggest, therefore, that program features that set reimbursement rates and encourage enrollment will have important cost implications. Our estimated revenue requirements across the scenarios will require wide variation in the tax rates, including

- an additive income tax increment of 2.5 to 5.4 percentage points
- a proportional income tax increase of 48.3 to 105.2 percent
- payroll tax rate increases from 2.9 to 6.3 percentage points
- a new BET with tax rates from 2.6 to 5.7 percent.

Advantages of the income tax are that it can be designed to mirror the progressive tax structure of the current Vermont income tax schedule and that it can be designed so that everyone has some stake in the outcome. In addition, additional fees could be collected through the income tax so that those that are benefiting are those that pay (that is, premiums or fees could be collected directly through the income tax, both reducing the cost of collecting premiums and

[10] Jonathan Gruber, "The Incidence of Mandated Maternity Benefits," *American Economic Review*, 1994, pp. 622–641.

increasing compliance with premium requirements). An important disadvantage is the loss of the health insurance tax deductibility for those who do not itemize their deductions.

The payroll and BET policies share the advantages of maintaining the federal tax advantage that is provided through ESI. As with any taxes, however, they could still have adverse behavioral responses, such as a slowing of wage growth to leave total compensation costs unchanged or a substitution from labor to capital to avoid the additional tax on labor. The BET has the slight advantages over the payroll tax of (1) having a larger tax base, resulting in lower tax rates, and (2) spreading the tax base beyond the cost of labor, reducing the incentive to limit labor. Either of these taxes could create some issues with firms' decisions to locate in Vermont or to move out of Vermont. It is important to note that, although we modeled each of these tax scenarios separately, they could be combined (for example, an income tax and a payroll tax) to raise the required revenues with considerably lower rate increases.

Limitations

Generating forecasts or projections of the future is fraught with uncertainty in the best of circumstances. Our application is no exception. First, the health care environment may undergo significant changes in the next several years, possibly even before the targeted implementation date of Dr. Dynasaur 2.0. Not only has Vermont recently moved forward with the implementation of an all-payer model and ACO-based reforms, either of which could have important implications for Dr. Dynasaur, but there is also growing uncertainty with respect to the future of the ACA.[11] We have considered the implications of none of these programs in our work.

Second, our estimates and projections are only as good as the data with which they are made. Vermont has the advantage of having two excellent data sets with which we developed the majority of our analyses (the VHCURES and VHHIS data sets). Both have limitations, however. Though rich in measures, the VHHIS has a relatively small sample, increasing the uncertainty of our estimates. The VHCURES is a nearly all-payer data set, but it is missing several populations that are important to Dr. Dynasaur: the uninsured and some privately insured. We have assumed that neither of these holes is large enough to cause substantial problems with our estimates, and we have adjusted estimates to be population-wide. One of the strengths of the COMPARE model, however, is its ability accommodate behavioral changes. Among those, for example, are changes in health care utilization as a function of insurance, but in the absence of information on the uninsured, the behavioral responses are very small (changing from one type of insurance to

[11] The Vermont All-Payer Accountable Care Organization Model Agreement (October 27, 2016) is available at http://gmcboard.vermont.gov/sites/gmcb/files/documents/10-27-16-vermont-all-payer-accountable-care-organization-model-agreement.pdf. More information for readers is available via CMS, "Vermont All-Payer ACO Model," last updated October 26, 2016 (https://innovation.cms.gov/initiatives/vermont-all-payer-aco-model), and GMCB, "All-Payer Model," 2017 (http://gmcboard.vermont.gov/payment-reform/APM).

another). In addition, we do not account for changes in utilization that might come about because of lower cost-sharing in Dr. Dynasaur relative to ESI.

Third, the implementation of Dr. Dynasaur 2.0 is a very large intervention. Unlike smaller program changes that would be unlikely to produce large changes in markets, Dr. Dynasaur 2.0 could affect several hundred thousand Vermonters. By altering the existing payment rates to physicians—for example, setting them high to improve access to care—there will undoubtedly be provider effects. We have neither modeled provider responses, including both private physicians and hospitals, nor considered whether these large changes might result in shortages of providers. Such concerns are relevant for vision, dental, and physical and mental health care services.

Fourth, we have not accounted for unforeseen sources of uncertainty, such as fluctuations in the business cycle (e.g., recessions), that may have a significant impact on the key output measures.

Fifth, we have not modeled any behavioral responses to the proposed taxes. As the increases in tax rates become large, these responses could become important. In addition to the possible labor supply effects of an increase in income tax, there could be long-term wage stagnation from increased payroll taxes (costs of compensation), and there could be a substitution of capital for labor. These concerns could be limited by minimizing the tax rates, either by using combinations of the strategies or by imposing larger premiums to reduce the revenue shortfall.

5. Conclusions

Expanding Dr. Dynasaur to include virtually all Vermonters age 25 and younger is likely to increase program enrollment by as much as 95,000 people in each of the first five years while reducing the number of the uninsured by less than 10,000 people. However, our estimates of the extent of these enrollment changes vary substantially based on program features that are designed to induce or require program participation. Because program enrollment could more than triple, program costs will grow slightly more than the proportional amount, due to large increases in covered health care expenditures and administrative costs. However, if current reimbursement rates were maintained, total health care expenditures would likely change only modestly, in large part because of how few Vermonters are currently uninsured. As a result, the program's expansion could be financed by capturing the funding sources that are currently paying for insurance in Vermont, or it could be financed by imposing new taxes that raise equivalent revenues. Excluding financing strategies that increase the current program premium structures, we find that increasing program reimbursement rates to commercial levels, which would substantially increase total program covered health care expenditures, would require large increases in tax rates to meet the program obligations.

Appendix: Detailed Approach

Data Sources

Vermont Household Health Insurance Survey: The primary data we used to characterize individuals and families in Vermont were from the VHHIS, conducted by the Vermont Department of Health to collect information on demographic characteristics, income, and employment characteristics. The data include information on insurance status and type, private insurance plan premiums, and out-of-pocket spending. In the 2014 VHHIS, 4,610 households were interviewed. Given the modest size of the VHHIS, we supplemented the analyses with data from the American Community Survey. As part of our analysis, we assessed the strengths and limitations of these two data sources and worked with the state to determine which data were best suited for modeling purposes.

Vermont Heath Care Uniform Reporting and Evaluation System: VHCURES, Vermont's all-payer data set, is prepared quarterly and contains individual claims data on health care expenditures by payer and provider service, allowing us to estimate spending by subgroups. In addition to the detailed claims information, the data set includes information about the type of insurance coverage and critical individual demographic information, such as age. It excludes any information about settlements, rebates, or capitation. It also has no information about payments made by individuals, such as the uninsured. We used the VHCURES as the primary source for the actuarial analyses and to determine changes in insurance premiums among those with ESI.

Vermont demographic projections: The state of Vermont provided demographic projections for the Vermont population by age from 2014 through 2023.[12] We used these data to make actuarial projections, insurance enrollment projections, and total expenditure projections for the study period.

Vermont tax data: The Vermont Department of Taxes provided three aggregated tax data sets for this project, including a summary of individual income tax returns with aggregate data by gross income percentile, a summary of the payroll tax base by firm size, and aggregate payroll and interest paid by type of business. We used these data to model three new alternative taxes to fund Dr. Dynasaur 2.0.

[12] State of Vermont, Agency of Administration, *Vermont Legislature and Administration Consensus Population Forecast*, July 21, 2016.

Cost Analysis: Projected Health Care Expenditures

Estimates of the expected expenditures given individual and insurance characteristics are fundamental to understating the consequences of Dr. Dynasaur 2.0. Our analyses used the three most recent years of data available from VHCURES, together with demographic projections supplied by the state of Vermont, to generate estimates of expected health care costs conditional on insurance status and relative reimbursement rates. We conducted additional analyses to determine the consequence of the reimbursement rates on expected expenditures, including reimbursement rates set to (1) current levels, (2) Medicare levels, (3) commercial rates, and (4) the midpoint between Medicare and commercial rates. Current reimbursement rates maintain the relative reimbursement rates of the insurance type in which the individual is actually enrolled in 2014. That is, we calculated the expected expenditures for the population based on Medicaid reimbursement rates for those in Medicaid and based on commercial rates for those in commercial insurance. Each of the other scenarios set the reimbursement rates to be the same for the entire population regardless of their actual insurance status. We chose Medicare rates as a lower bound for rates because setting rates any lower would likely make it difficult to induce enrollment from the commercially insured. We chose the higher rates to quantify the costs to the program of increasing reimbursement rates to improve access to care. We conducted the analyses on the population including all Vermont residents up to and including age 25.

Within the VHCURES data, the Medicaid and CHIP populations can be identified. In addition, the categorical eligibility for Medicaid is identified, so we were able to identify the Dr. Dynasaur subset of Medicaid. We calculated the estimated expenditures for each type of insurance coverage (Dr. Dynasaur, commercial insurance, Medicare, and other Medicaid) by appropriate age bands. The data provide individual-level claims data for the vast majority of Vermont residents, including the universe of Medicaid, Medicare, and CHIP-insured populations. A fraction of the commercially insured were not included (e.g., those in self-insured firms) as well as federal employees and the very small fraction of Vermont residents who are uninsured. Because of the breadth of coverage of the VHCURES data, and particularly because it includes the universe of CHIP and Medicaid claims, as well as the categorical eligibility classification for Medicaid, it is an excellent source via which to identify the number of individuals covered by Dr. Dynasaur 1.0 and their projected expected expenditures through the study period (2019 through 2023).

We used the three years of historical VHCURES data (2013 to 2015) to identify inflation factors, by type of insurance and type of service, and we used these inflation factors as the basis for projecting increases in the cost of services, by type of insurance and type of service. We also examined difference in costs by region and benefit design. Finally, we included estimates of costs that were incurred but not reported, and we made adjustments to ensure that benefit structures reflected the most recent state policies, the most impactful of which was the Medicaid expansion in 2014. We used the detailed claims data in VHCURES to generate relative

reimbursement rate factors for Medicaid and commercial insurance relative to Medicare, by category of service. These factors allowed us to model policies with alternative reimbursement rates and to generate estimates and projections of health care expenditures under these alternative polices.

Cost Analysis: Administrative Costs Analyses

Previous work has determined the administrative costs of the Vermont Medicaid program to be about 7 percent of program costs and the administrative costs for operating a universal primary care program to be between 7 and 15 percent.[13] The Green Mountain Care 2014 final report for building a universal health care system in Vermont estimated that the administrative costs for vision, hearing, and dental care would be 7 percent.[14] Finally, budgeted administrative costs for Dr. Dynasaur for 2017 were just over 10 percent of program costs ($58.4 million). Using these estimates as a starting point, we developed several alternative scenarios for projecting administrative costs from 2019 through 2023 under Dr. Dynasaur 2.0 and evaluated how these costs would likely change from those under Dr. Dynasaur 1.0. In addition, we developed a framework that allows us to consider those elements that are likely to be a function of the number of individuals enrolled (costs of determining program eligibility, including eligibility for Medicaid or CHIP, and costs of collecting premiums) separately from those elements that are likely to be a function of the utilization of services (prior authorization, utilization review, coordination of benefits, and call centers).

The primary assumption is that the administration of Dr. Dynasaur 1.0 can be expanded to meet the needs of Dr. Dynasaur 2.0 and that the costs of expansion will be linear with two components: (1) costs that are constant per enrollee and (2) costs that are constant per utilization. All per utilization costs are modeled based on health care expenditures (actuarial estimates). We decided that this was the most reasonable starting point because there are a number of elements that are sufficiently uncertain with no clear evidence that the costs per unit will increase or decrease. Thus, our baseline analysis simply applies the current per unit costs to the estimated total Dr. Dynasaur 2.0 population and health care expenditures. We calculated the total administrative costs under the following scenarios:

1. Baseline: 10 percent in each year

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[13] State of Vermont, Agency of Administration, Health Care Reform, *Cost Estimates for Universal Primary Care, in Accordance with Act 54 of 2015, Sections 16–19*, report to the Vermont Legislature, December 16, 2015 (http://www.leg.state.vt.us/jfo/healthcare/Health%20Reform%20Oversight%20Committee/2015%20Interim%20Reports/Universal%20Primary%20Care%20Study%20Act%2054%20Sec%2016-19%20Dec%2016%202015.pdf).

[14] State of Vermont, Agency of Administration, Health Care Reform, *Green Mountain Care: A Comprehensive Model for Building Vermont's Universal Health Care System*, December 30, 2014 (http://hcr.vermont.gov/library/gmc-report).

2. Transition: 15 percent in 2019, decreasing linearly to 10 percent in 2023
3. High cost: 15 percent in each year (2019 through 2023)
4. Low cost: 7 percent in each year (2019 through 2023).

Note, however, that these percentages are applied in 2015 only. Depending on the relative changes in enrollment over time compared with the relative expenditures over time, the actual administrative costs will vary from these specifications.

Special Issues for New Populations

1. Processing applications and integrated eligibility: We assume that **eligibility adjudication** will remain similar. Note that even though the program is nearly universal, eligibility determination regarding Medicaid and CHIP will still be important in order to determine the flow of funds from the federal government. Thus, we assume that this component will remain roughly similar per case.
2. There could be important transition costs for new populations. The expansion might substantially exceed current capacity, and there would be a question about how to expand that capacity. Our base case imposes one-time fixed transition costs, as described below. Our transition scenario is justified in part by assuming that the transition costs may be considerably higher and longer lasting than anticipated.

Potential Considerations Regarding New Methods of Collecting Premiums

Given a similar premium structure, are there any reasons to believe that the costs of collecting premiums might differ for the expansion population? First, we assume that the premium structure under Dr. Dynasaur 2.0 will be similar to that of Dr. Dynasaur 1.0. We also assume that the expansion population will have a sufficiently similar distribution of premiums that they would not change the overall average administrative costs per case. That is, the costs per case of collecting premiums will not increase because a higher percentage of expansion cases are required to pay a premium. While this assumption may not hold, the cost of increasing the infrastructure to accommodate a significantly larger workload is further justification of the transition scenario. Premium collections costs are per member, and we therefore include them in the per-member component.

How would the overall administrative costs be affected if there were no premiums to collect, or if, for example, premiums were collected through the income tax? We are not modeling these collection scenarios explicitly, so we are implicitly assuming that the costs of dramatically altering the means of collection would be similar (per case). Because of the near-universal aspect of Dr. Dynasaur 2.0 and the potential efficiency gains, it is certainly worth considering including premium collections in the state income tax. We do not address these issues here, however.

Additional assumptions include the following:

1. Cost reimbursements are currently PMPM for the vendors collecting premiums. We assume that this remains unchanged in Dr. Dynasaur 2.0.
2. We anticipate a new premium processing system to be in place by January 1, 2019.
3. The estimated costs of collecting premiums are $6.07 per family per month, among families who are required to pay premiums.[15]

Costs for Prior Approval, Utilization Review, and Coordination of Benefits

We assume that the current administration infrastructure can be expanded linearly (at constant per service rate) and that Dr. Dynasaur 2.0 will require the development of *no new* administrative tools for these purposes. We modeled the PMPM for these costs as a function of the PMPM actuarial costs (separately from the components that are a function of the number of members). Because these services are largely handled by vendors, the additional burden for the new population will be handled through expansions of these contracts, and our assumption is that the costs increase linearly (or with constant scale). Note that we do not assume that the mix and complexity of services provided to the expansion population will differ significantly from the currently enrolled population (keeping the PMPM unchanged). That is, we assume that expenditures accurately reflect the cost burden of providing these services so that we model these costs as a constant fraction of member expenditures.

Additional Detail Provided by the Department of Vermont Health Access

The following details are an enumeration of the expected administrative cost increases, including fixed one-time expenditures, expenditures that will depend on the number of enrollees, and expenditures that will depend on the amount of health care services utilized.

One-Time Costs for IT Changes

Table A.1 details expected one-time costs related to the Dr. Dynasaur 2.0 expansion. We recognize that there may be other unanticipated costs. Nevertheless, we include these costs in each of the scenarios, to be applied only in 2019. Our assumption regarding the timing of these expenditures may be incorrect. For example, in anticipation of implementation, these expenditures may occur in 2018, but because we are not modeling 2018 costs, we rolled them into 2019.

[15] Department of Vermont Health Access, communication, November 15, 2016.

Table A.1. One-Time Costs for Dr. Dynasaur 2.0

	Estimated Cost		
Change Type	**High**	**Medium**	**Low**
Application changes	$300,000	$250,000	$200,000
Oracle policy automation	$396,000	$330,000	$264,000
Premium billing adjustments	$630,000	$525,000	$420,000
Notice changes (if automated)	$300,000	$250,000	$200,000
Testing and release costs	$360,000	$300,000	$240,000
Total (high, medium, low)	**$1,986,000**	**$1,655,000**	**$1,324,000**

Variable Cost Components

The following costs are based on staffing estimates provided by the Department of Vermont Health Access.

Costs Per Member

1. Cost for vendor (eligibility determination): $25 per year
2. Premium collection: $6.07 per month

Costs Per Health Care Service Use

3. Cost for vendor (MMIS): $5 per enrollee year
4. Cost for vendor (provider services): $40.42 per enrollee per year
5. Transportation services: $1 per enrollee per year
6. MedSolutions online portal contract: $3.1 per enrollee per year
7. PBM contract: $15.817 per enrollee per year
8. MMIS core operations: $12 per enrollee per year

NOTES: MMIS = Medicaid Management Information Services; PBM = Pharmacy benefit management.

Methods for Calculating Administrative Costs

We used the per-member share of costs (about 56 percent) and the per-use share of costs (about 44 percent) to calibrate the cost components in 2014, the last year for which we have complete observable data. We used the state estimate that the total administrative costs were about 10 percent of the health care expenditure costs in 2014. From this, we calculated a mean per member cost estimate of the aggregated per member components. We held this per member per year estimate constant throughout the study period for the baseline scenario. We also calculated the administrative costs rate (consistent with 10 percent overall) of the aggregated per health care service use components (4.41 percent). We held this rate constant for the baseline scenario. Because relative enrollment to health care use may change over the study period, the total administrative cost may vary from 10 percent. We adopted a similar strategy for the low-

cost (7 percent) and high-cost (15 percent) scenarios. Our specification of a fixed overhead rate to characterize these scenarios is, therefore, a simplification, and strictly refers to a fixed overhead rate for the per-use components of the administrative costs. Because the actual estimated rates do not vary substantially from the descriptors (10 percent, 7 percent, and 15 percent), we favor the use of these labels. Finally, we used a similar strategy to calculate the transition scenario. We set the 2014 administrative rate to 15 percent, 13.75 percent, 12.5 percent, 11.25 percent, and 10 percent to calculate the projected overhead rate for 2019, 2020, 2021, 2022, and 2023, respectively.

Microsimulation Model

We adapted RAND's COMPARE microsimulation model of the U.S. health economy to be specific to Vermont (COMPARE-VT). We did this, as described below, by updating the national version of COMPARE with data from Vermont, including both the VHHIS and the VHCURES data. We then calibrated the model to current levels of health care coverage and spending, and we used the model to generate projections of the status quo (Dr. Dynasaur 1.0) from 2019 through 2023. Finally, we modified COMPARE-VT to model Dr. Dynasaur 2.0, and we generated projections of insurance coverage, health care expenditures, and changes in wages during the five-year time horizon.

The COMPARE-VT microsimulation model produces estimates of the impact of alternative health insurance laws and regulatory policies on individual behavior, firm behavior, insurance coverage, premiums, and costs. As with any model, there are assumptions and simplifications made to facilitate analysis. A detailed description of the COMPARE microsimulation model (upon which COMPARE-VT is based) can be found in previous publications.[16] At its core, the COMPARE microsimulation uses a utility maximization framework to model how individuals respond to changes in health policy. This section outlines the key assumptions and simplifications made to tailor COMPARE to be relevant to the Vermont context and proposed changes to the Dr. Dynasaur program.

COMPARE is based on a synthetic national population data set that is primarily constructed from data from several U.S. Census surveys, such as the Survey of Income and Program Participation for basic health status and coverage, the Medical Expenditure Panel Survey for health expenditure information, and the Statistics of U.S. Businesses for information about employers.

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[16] Christine Eibner, Federico Girosi, Carter C. Price, Amado Cordova, Peter S. Hussey, Alice Beckman, and Elizabeth A. McGlynn, *Establishing State Health Insurance Exchanges: Implications for Health Insurance Enrollment, Spending, and Small Businesses*, Santa Monica, Calif.: RAND Corporation, TR-825-DOL, 2010 (http://www.rand.org/pubs/technical_reports/TR825.html); Amado Cordova, Federico Girosi, Sarah Nowak, Christine Eibner, and Kenneth Finegold, "The COMPARE Microsimulation Model and the U.S. Affordable Care Act," *International Journal of Microsimulation*, Vol. 6, No. 3, Winter 2013, pp. 78–117.

To transform COMPARE into COMPARE-VT, we reweighted COMPARE's synthetic data set to match the VHHIS data on the joint distribution of a variety of characteristics: family income, gender, age, and employment status. The goal of this process was to produce a sample population representative of Vermont. Table A.2 shows a comparison between VHHIS and the population sample used in COMPARE-VT following the reweighting process. In general, the COMPARE age cells were within 8 percent of the VHHIS. The one exception was the above-81 age group, which was overestimated by COMPARE. This was not a significant problem because this age group is assumed to be entirely on Medicare and does not participate in the simulation. A similar process was followed to adjust the total and OOP health care spending weights to mirror the health care spending in Vermont. The source of this data was the VHCURES data set.

Table A.2. Comparison of VHHIS and COMPARE Weights by Age Group

Age Group	VHHIS	COMPARE	Difference	Percentage Difference
<18	136,842	131,233	–5,609	–4.1%
19–25	60,277	64,947	4,670	7.7%
26–35	72,968	71,894	–1,074	–1.5%
36–50	120,083	116,121	–3,962	–3.3%
51–65	142,641	144,633	1,992	1.4%
66–80	80,785	73,953	–6,832	–8.5%
81+	13,035	23,986	10,951	84.0%
Total	626,631	626,767	136	0.0%

Following the reweighting process, COMPARE was calibrated. This involved making adjustments until the simulated choices reflected actual experiences as observed in the VHHIS 2014 data. A summary of the results of the calibration process is shown in Table A.3. Most insurance categories were within 10 percent of their VHHIS targets. The exceptions to this were the "Other" category, which is primarily military and does not participate in the simulation, and the uninsured population. Because COMPARE-VT was accurately mirroring all of the other demographic, insurance, and financial factors in the status quo COMPARE-VT, the 11.7-percent difference was deemed sufficient by the study team.

Table A.3. Comparison of VHHIS and COMPARE Weights by Insurance Category

Insurance Status	VHHIS	COMPARE	Difference	Percentage Difference
Employer sponsored	299,887	298,058	–1,829	–0.6%
Medicaid	134,653	132,743	–1,910	–1.4%
Medicare	97,049	106,232	9,183	9.5%
Individual	39,365	41,524	2,159	5.5%
Other	32,446	22,252	–10,194	–31.4%
Uninsured	23,231	25,957	2,726	11.7%
Total	626,631	626,766	135	0.0%

COMPARE-VT takes into account the policy landscape of Vermont, such as its pre-ACA Medicaid enrollment thresholds,[17] its decision to expand Medicaid as part of the ACA, and its policies regarding the design of the Marketplace. Finally, accounting for the population characteristics and the policy landscape, we calibrated the model to match the enrollment rates and health insurance distribution found within Vermont in 2014. For future years, we used population growth estimates supplied by Vermont,[18] economic growth estimates from the Consumer Price Index (published by the Bureau of Labor Statistics),[19] and health care costs growing over time at a 3-percent rate, which is consistent with the rate of growth in Vermont's medical expenditures between 2013 and 2015 (estimated from VHCURES data).

We also made assumptions and simplifications about the Dr. Dynasaur policy changes. By assumption, everyone under the age of 26 is eligible for the Dr. Dynasaur program except the portion of the population that is assumed to be recent and undocumented immigrants. This changes the risk pools for firms that had previously covered these young employees, young spouses, or children of workers. Firms make the decision to offer or not based on a utility maximization framework that accounts for the costs of each option, the aggregate utility of their workers for each option, the tax implications, and other incentives, such as an employer mandate.

We made a variety of assumptions about how people respond to changes in their insurance status. When a firm begins to offer health insurance, the majority of the cost of the insurance premiums comes from the firm's payroll costs. Likewise, when a firm stops offering health insurance, the majority of the premium cost is passed back to the firm's payroll.[20] Because this changes an employee's take-home pay, tax revenues are affected. Our assumption is that, in the long run, changes in the costs of insurance will be fully realized in the employee's wage, leaving

[17] These thresholds are relevant for understanding the cost to the state.

[18] Data file, "Consensus0716 to 2023.xlsx," provided by Michael Costa on August 15, 2016.

[19] Bureau of Labor Statistics, "Consumer Price Index," undated, accessed October 6, 2016 (http://www.bls.gov/cpi).

[20] There would be an exception if the costs of newly offering health insurance would push wages below the minimum wage.

the total costs of compensation unchanged. While this assumption is reasonable when considering the labor market in aggregate, it is unlikely to be strictly true universally and instantaneously. That is, on average, total compensation may remain unchanged, but individual employee results may differ depending on the employee, employer, and household characteristics. Because we do not know how long it takes wages to adjust, however, we admit alternative assumptions about the extent of the wage passback during the five-year projection period. Additionally, we did not consider the marginal effect any wage passback would have on means-tested programs, such as the Supplemental Nutrition Assistance Program or Section 8 housing vouchers. The effect of this assumption is likely minimal because workers with health benefits typically earn more than the eligibility threshold for these means-tested programs.

Health care utilization and expenditures are influenced by the type of coverage (e.g., Medicaid, ESI, or uninsured), and the spending may change if a person's insurance coverage changes.[21]

Because there are features of Dr. Dynasaur 2.0 that are uncertain, we simulated several alternative scenarios under Dr. Dynasaur 2.0. For example, enrollment in Dr. Dynasaur 2.0 could be influenced by a set of incentives or a set of penalties for failure to enroll. We have opted to remain silent regarding these features and elected to simulate a baseline (full potential) scenario under which 100 percent of those eligible for Dr. Dynasaur enroll. As an alternative (lower bound), we have allowed families to consider their options and elect not to enroll in Dr. Dynasaur. Families may opt to continue ESI, particularly if they believe the cost of doing so is low (i.e., they believe the wage passback is low).

Financing Strategies

We modeled three alternative financing strategies to obtain the revenues required to cover the costs of the Dr. Dynasaur 2.0 expansion.

Common Assumptions: Revenue Requirement Assumptions

In each of the scenarios, the revenues collected are sufficient to fund the incremental cost of the Dr. Dynasaur 2.0 program expansion. Depending on the scenario, the revenues are raised by a combination of premiums, general revenues, and other sources of revenues, such as the federal government.

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[21] The exact change in the spending is determined based on an imputation that uses demographic and economic information to calculate the likely costs for an individual under different insurance coverage types. This imputation is described in Christine Eibner, Federico Girosi, Carter C. Price, Amado Cordova, Peter S. Hussey, Alice Beckman, and Elizabeth A. McGlynn, *Establishing State Health Insurance Exchanges: Implications for Health Insurance Enrollment, Spending, and Small Businesses*, Santa Monica, Calif.: RAND Corporation, TR-825-DOL, 2010 (http://www.rand.org/pubs/technical_reports/TR825.html).

Strategy 1: Income Tax

The COMPARE-VT model uses the VHHIS data to model Vermont's population of individuals and families. These data include information on family structure, family income (including FPL level), and insurance status. They do not include any information on federal or state taxable income or taxes paid. To address this, we supplemented the VHHIS data with state tax data provided by the Vermont Department of Taxation. The tax data were organized by gross income percentile, including the number of reporting units, gross income, taxable income, and taxes paid, by the number of dependents declared. Thus, the data provided 100 points of support for the effective tax rates across the income distribution. We identified income percentiles in the VHHIS and merged the aggregated tax data by income percentile to create measures of the mean taxable income and mean taxes paid for each of the 100 income percentiles. Because VHHIS and the tax data sets are very different in nature (self-reported income data in an anonymous survey versus income reported to the state with supporting documentation), we examined the data to verify that the income thresholds that defined the percentiles were similar in the two data sources. The resulting data set provides sufficient information to replicate the Vermont income tax schedule (effective tax rates) across the income distribution. Finally, we reweighted the data proportionally so that the estimated Vermont income tax revenues (2014) matched the actual revenues collected. Because the COMPARE-VT simulations produce changes in family income (FPL) depending on insurance choices, and because the introduction of Dr. Dynasaur 2.0 is likely to affect taxable wages through the insurance premium passback, our method allows us to quantify the effect of wage changes on Vermont tax revenues.

We used this normalized merged data set to calculate the "new" tax revenues that would be obtained by the state under several alternative scenarios, including

- an additive tax rate increase, excluding families who paid no taxes or who received payments through the negative income tax
- a proportional tax rate increase, excluding families who paid no taxes or who received payments through the negative income tax
- a hybrid additional tax that imposed the greater of a minimum tax and a proportional tax increase, not to exceed a maximum tax for any family.

The additive tax rate increase requires a single parameter (α) to increase the effective tax rate by the same amount for every family. If the effective tax rate had been τ, it became $\tau + \alpha$. The proportional tax rate increase can also be characterized by a single parameter (β) such that the new tax becomes $\tau\,(1 + \beta)$. The advantage of the proportional tax increase is that it shifts the entire tax schedule proportionally, preserving the progressive structure of the Vermont income tax. The hybrid imposes a minimum tax on all families to ensure that each family has some stake in the outcome, and it imposes a maximum tax on any family so that no family pays an additional tax that is significantly greater than the cost of health insurance for a typical family.

Strategy 2: Payroll Tax

In this scenario, we impose an additional (additive) payroll tax. The new tax is a fixed increment to the current rate, and it is set to obtain the revenues necessary to meet program needs.

- The tax is formally paid by the employer, not the employee.
- The approach mimics the invisibility of the current employer-based system.
    - The approach maintains federal tax value (the tax can be written off by employers the way they can write off insurance).
- Specifics:
    - The tax is assessed on every eligible employee (fixed percentage).
    - Note that there may be equilibrium effects (slowing of long-run wage growth to bring total compensation back down).
    - The tax applies to all Vermont payrolls.
        - We allow for no exemption based on business size.
        - There is no exemption for LLCs and sole proprietors.
    - Rate
        - The rate is determined by the revenues needed to finance Dr. Dynasaur 2.0.
    - Payroll data were provided by the office of Policy, Outreach, and Legislative Affairs, Vermont Department of Taxes.

Strategy 3: Business Enterprise Tax

In the third scenario, we impose a BET. The BET assesses businesses based on total compensation, dividends paid, and interest paid or accrued. It has an advantage over a payroll tax in that the tax base is larger, resulting in lower tax rates, which might reduce the behavioral response of employers to the tax (i.e., wage and employment effects generated by the additional cost of worker compensation). We set the BET such that program revenue needs are met. Specifics include the following:

- We modeled the BET after the New Hampshire BET, using data from New Hampshire.
- The BET will be similar to the payroll tax, but it will be based on the following types of compensation rather than payroll (a "payroll plus" tax):
    - all compensation paid or accrued
    - dividends paid by enterprise
    - interest paid or accrued.
- The tax is paid by the employer, not the employee.
    - As with the payroll tax, this mimics the invisibility of the current employer-based system, maintaining federal tax value.
    - The tax applies to all businesses regardless of business organization type or size, with no exemptions or credits.
    - The tax rate (as above) is determined to obtain the revenue needed.

We made several key assumptions in order to generate estimates of the tax base. First, we apportioned interest paid based on the standard Vermont apportionment of compensation. This is justified if the investments are related to the location of staff (based on compensation). Because of the mobility and uses of capital, however, this assumption might not be valid. Second, we found no sound way to estimate dividends paid. We, therefore, used data from the New Hampshire BET experience to estimate the ratio of dividends to interest and compensation paid, by type of establishment. We applied these ratios to generate estimates of dividends paid in Vermont, by type of establishment. This is another source of potential error in our estimate of the revenues that would be generated by a Vermont BET. All data were provided by the office of Policy, Outreach, and Legislative Affairs, Vermont Department of Taxes.