6/14/2023

PROJECTIONS OF NATIONAL HEALTH EXPENDITURES AND HEALTH INSURANCE ENROLLMENT: METHODOLOGY AND MODEL SPECIFICATION

The Office of the Actuary (OACT) in the Centers for Medicare & Medicaid Services (CMS) produces short-term (10-year) projections of health care spending and enrollment for categories in the National Health Expenditure Accounts (NHEA) on an annual basis.

The National Health Expenditure (NHE) projections consist of time series for all of the major spending categories in the NHEA. These categories include trends in aggregate medical spending, medical goods and services consumed, sources of payment, and sources of financing. Detailed tables and documentation are available online.[1] In addition, an article describing these results is published annually in the journal *Health Affairs*.[2]

The NHE projections are inherently subject to uncertainty and are best viewed with this caveat. The models used to project trends in health care spending are estimated based on historical relationships within the health sector, and between the health sector and macroeconomic variables. Accordingly, the spending projections assume that these relationships will remain consistent with history, except in those cases in which adjustments are explicitly specified. The NHE Projections are constructed using a current-law framework, thus the projections do not assume any potential legislative changes over the projection period, nor do they attempt to speculate on possible deviations from current law. These projections also rely on assumptions about future trends in exogenous inputs to the model, such as macroeconomic conditions. The degree of uncertainty associated with the projections increases with the projection horizon. Given the unprecedented impact of the COVID-19 pandemic and public health emergency on health spending, enrollment, and macroeconomic conditions, these projections reflect larger adjustments for special one-time effects and are subject to a higher level of uncertainty than under more typical conditions.

The process for deriving these projections is based on accepted econometric and actuarial projection techniques. However, we frequently review the accuracy of our work and strive to make improvements in the methodology.[3] Please e-mail DNHS@cms.hhs.gov with any comments or feedback.

[1] Centers for Medicare & Medicaid Services. National Health Expenditure Data: Projected. Available at https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsProjected.

[2] Keehan, Sean, et al. "National Health Expenditure Projections, 2022-31." Health Affairs, 42, no.7 (2023). (Published online 14 Jun 2023.)

[3] Centers for Medicare & Medicaid Services. Accuracy Analysis of the Short-Term (10-Year) National Health Expenditure Projections. Available at https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/Downloads/ProjectionAccuracy.pdf

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1) OVERVIEW OF THE NHE PROJECTIONS MODEL

The NHE Projections are based on a system of more than 100 econometric models, which reflect relationships in historical time-series data. The primary focus of the NHE Projections Model is to produce projections of future health care spending by private health insurers, consumer spending on an out-of-pocket basis, and other private revenues. Projections based on this model are conditional on exogenous projections for Medicare, Medicaid, the Children's Health Insurance Program (CHIP), Health Insurance Marketplaces, and key macroeconomic variables. As a final step in the process, legislative impacts and the effects of the COVID-19 pandemic are projected separately and added onto the NHE Projections Model estimates. Combined, these modeling approaches produce comprehensive projections for the health system as a whole.

Sections 2-3 of this methodology paper present the inputs and structure of the NHE Projections Model, with discussion of the data, assumptions, and model specifications used to produce the forecasts.

2) DATA SOURCES AND EXOGENOUS INPUTS TO THE NHE PROJECTIONS MODEL

a. Historical data sources

i. NHEA data

Historical NHEA estimates, compiled by OACT, are the source of the historical time series for health expenditures. These estimates provide a national level matrix of health spending data by type of service, source of funding, and sponsor of health care.[4]

Classification of spending by type of service, source of funding, and sponsor projected in our model is consistent with NHEA classification and is presented in Exhibits 1-3.[5] Payer categories track the source of direct payment for health care consumption, such as Medicare or private health insurance (PHI), but do not consider who is ultimately paying for (or sponsoring) each form of coverage—whether payment is made via taxes or premium payments, for example. Health spending by sponsor is defined as the underlying source of financing and can include: businesses, households, and governments.[6]

The payer versus sponsor distinction has become more important with the onset of public subsidies for the purchase of private health insurance plans under the Affordable Care Act (ACA); NHEA classification by payer defines such subsidies as private spending, while classification by sponsor of spending allocates portions of these payments to government sources.

[4] Information on the methodology used in producing the historical NHEA estimates can be found in our NHEA methodology paper, available at https://www.cms.gov/files/document/definitions-sources-and-methods.pdf.
[5] Ibid.
[6] Ibid.

EXHIBIT 1: NHE CLASSIFICATION BY TYPE OF EXPENDITURE

National Health Expenditures

- Health Consumption Expenditures
  - Personal Health Care
    - Hospital Care
    - Professional Services
      - Physician and Clinical Services
      - Other Professional Services
      - Dental Services
    - Other Health, Residential, and Personal Care
    - Nursing Care Facilities and Continuing Care Retirement Communities and Home Health Care
      - Nursing Care Facilities and Continuing Care Retirement Communities
      - Home Health Care
    - Retail Outlet Sales of Medical Products
      - Retail Prescription Drugs
      - Durable Medical Equipment
      - Other Non-Durable Medical Products
  - Government Administration
  - Net Cost of Private Health Insurance
  - Government Public Health Activities
- Investment
  - Structures
  - Equipment
  - Research

EXHIBIT 2: NHE CLASSIFICATION BY SOURCE OF FUNDING/PAYER

National Health Expenditures

- Out-of-Pocket
- Health Insurance
  - Private Health Insurance
  - Medicare
  - Medicaid
  - Children's Health Insurance Program (CHIP)
  - Department of Defense
  - Department of Veterans Affairs
- Other Third-Party Payers and Programs
  - Other Federal Programs
  - Other State and Local Programs
  - Other Private Revenues

EXHIBIT 3: NHE CLASSIFICATION BY SPONSORS OF PAYMENT

National Health Expenditures

- Businesses, Households, and Other Private
  - Private businesses
    - Employer contributions to private health insurance premiums
    - Other
  - Household
    - Household private health insurance premiums
    - Medicare payroll taxes and premiums
    - Out-of-pocket health spending
  - Other private revenues
- Governments
  - Federal government
    - Employer contributions to private health insurance premiums
    - Employer payroll taxes paid to Medicare hospital insurance trust fund
    - Medicare
    - Medicaid
    - Other programs
  - State and local governments
    - Employer contributions to private health insurance premiums
    - Employer payroll taxes paid to Medicare hospital insurance trust fund
    - Medicaid
    - Other programs

ii. Medical price indexes

Projections of the NHE price deflator, as well as the PHC price deflator, are developed as part of the NHE projections. For the historical estimates of the PHC price index, the Producer Price Indexes (PPIs) and Consumer Price Indexes (CPIs) published by the Bureau of Labor Statistics (BLS) are the primary data sources for medical price indexes. Our price measure for total PHC spending is a chain-weighted deflator based on the indexes in Exhibit 4 below, with the weight set equal to the share of PHC spending accounted for by that type of service. [7] PPIs account for the largest share of the PHC deflator. The use of PPI versus CPI indexes as price indicators is largely determined by the relative importance of third-party payment relative to direct consumer spending as a share of total expenditures. Because PPIs capture variation in prices based on transactions for all payers, for most services they are preferable to CPIs, which track the prices paid by consumers.

To develop a price measure for overall NHE, additional composite price measures were estimated for each of the non-personal health care categories of spending (government administration, net cost of private health insurance, government public health activity, research, structures, and equipment expenditures). Because of the unique nature of the non-PHC categories, alternative data sources are used to identify the contribution from key underlying inputs used in their production, such as compensation or capital costs, and then publicly available price series are used to deflate those input costs. Descriptions of the composite indexes used for the development of the NHE deflator and the weights for each sector set equal to the share of NHE spending accounted for by that type of service are shown in Exhibit 4 below.

[7] Information on the methodology used in producing the historical NHEA estimates can be found in our NHEA methodology paper, available at https://www.cms.gov/files/document/definitions-sources-and-methods.pdf.

EXHIBIT 4: COMPONENTS OF NHE AND PHC EXPENDITURE ANNUAL-WEIGHTED PRICE INDEXES

Industry/Commodity or Service	Price proxy	2021 weight	
		NHE Weight	PHC Weight
National Health Expenditures		**100.0%**	**NA**
Non-Personal Health Care		**16.5%**	**NA**
Government Administration	Composite index of wages, benefits, professional fees, claims processing, financial intermediaries, office rent, and other expenses for six government programs	1.2	NA
Net Cost of Private Health Insurance	Composite index of compensation, capital, taxes and fees, reserves/gains/losses, and other expenses for four classes of insurance	6.0	NA
Government Public Health Activities	Composite index of federal, state, and local government consumption	4.4	NA
Research	NIH Biomedical Research and Development Price Index	1.4	NA
Structures & Equipment	Composite Index of BEA Price indexes for private fixed investment in structures by type and private fixed investment in equipment and software by type	3.4	NA
Personal Health Care		**83.5%**	**100.0%**
Hospital Care	PPI hospitals[1]	31.1	37.3
Physician and Clinical Services	Composite Index: PPI for Office of Physicians[2] and PPI for medical & diagnostic laboratories	20.3	24.3
Other Professional Services	CPI services by other medical professionals	3.1	3.7
Dental Services	CPI dental services	3.8	4.6
Home Health Care	PPI home health care services	2.9	3.5
Other Health, Residential, and Personal Care:		5.3	6.3
Other (School Health, Worksite Health Care, Other Federal, Other State & Local, etc.)	CPI physicians' services		
Home and Community-Based Waivers (HCBW)	CPI care of invalids & elderly at home		
Ambulance	CPI-U All Items		
Residential Mental Health & Substance Abuse Facilities	PPI residential mental retardation facilities		
Nursing Care Facilities and Continuing Care Retirement Communities	PPI nursing care facilities	4.3	5.1
Prescription Drugs	CPI prescription drugs	8.9	10.6
Other Non-Durable Medical Products	CPI internal & respiratory over-the-counter drugs	2.3	2.7
Durable Medical Equipment	Composite Index: CPI for eyeglasses and eye care and CPI nonprescription medical equipment and supplies	1.6	1.9

Notes: The underlying PPI and CPI indexes used are at times adjusted for unique factors where the trends in the index do not match the definition/scope or trends in the expenditure categories that are being deflated.

[1]PPIfor hospitals, U.S. Department of Labor, Bureau of Labor Statistics. Used beginning in 1994. Indexes for 1960-93 are based on a CMS-developed output or transaction price index.

[2] PPI for Office of Physicians, U.S. Department of Labor, Bureau of Labor Statistics, was adjusted in 2021 and 2022 to account for differences in estimates of underlying prices in public programs, specifically for differences between estimates of Medicare prices from the Bureau of Labor Statistics with price updates based on internal analysis of the Medicare Physician Fee Schedule.

iii. Insurance coverage data

As with spending, historical enrollment estimates are drawn from historical NHEA data. The estimates cover total PHI, which is comprised of employer-sponsored and individually purchased plans, public insurance programs (including, but not limited to Medicare and Medicaid), and the uninsured. Estimates of total PHI enrollment are available from 1960 forward. Medicare and Medicaid enrollment estimates are available from 1966 forward; however, all other enrollment categories (including the more detailed estimates for employer-sponsored and individually purchased insurance) are only available from 1987 forward.[8]

b. Exogenous inputs to the NHE Projections Model

Exogenous inputs into the NHE projections include macroeconomic assumptions for projections of real Gross Domestic Product (GDP) growth, economy-wide inflation, labor market indicators, input price indexes for medical care, and demographic projections of the population by age and gender. Projections for macroeconomic and demographic assumptions are based on the annual projections of the Board of Trustees for Federal Old-Age, Survivors, and Disability Insurance (OASDI), which are produced annually by the Social Security Administration (SSA).[9] The projections are updated to reflect recent additional macroeconomic data and research.[10]

Projections for personal income and disposable personal income are defined for consistency with the economic assumptions from the 2023 Medicare Trustees Report and are generated using the University of Maryland Long Term Interindustry Forecasting Tool (LIFT).[11]

The Boards of Trustees for Medicare report annually to Congress on the actuarial status of the Hospital Insurance and Supplementary Medical Insurance trust funds.[12] Projections of Medicare spending used in the NHE projections were generated for the most recent Trustees Report, are produced by OACT, and are also consistent with macroeconomic and demographic assumptions included in the OASDI Trustees Report. The NHE projections also incorporate the latest Medicaid and CHIP projections prepared by OACT, which utilize assumptions consistent with the Medicare Trustees Report.

Projections for input price indexes in each sector are based on projections from IHS Markit, which rely on macroeconomic assumptions for aggregate wage and price growth that can differ from those incorporated in the OASDI Trustees Report. Accordingly, price and wage proxies included in these indexes are adjusted for consistency with OASDI macroeconomic assumptions on economy-wide wage and price inflation.

i. Exogenous estimates of the effects of legislation

Exogenous estimates on the future impact of legislation are primarily built into the projections through actuarial projections of spending and enrollment for Medicare, Medicaid, CHIP, as well as in projections of

[8] Ibid.

[9] Board of Trustees, Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds. *The 2023 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds,* 31 March 2023. Available at: https://www.ssa.gov/OACT/TR/2023/

[10] The updated macroeconomic forecast is derived from the February 2023 publication of the Blue Chip Economic Indicators, a survey of 50 of the top forecasts by different private companies and academic institutions. More information on this report can be found at https://www.wolterskluwer.com/en/solutions/blue-chip-publications.

[11] Projections of personal income and gross domestic product are available from Table 1 of the CMS projected NHE data (Downloads, "NHE Projections – Tables"). Available at https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsProjected.

[12] Boards of Trustees, Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds. *The 2023 Annual Report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds,* 31 March 2023. Available at https://www.cms.gov/oact/tr/2023

enrollment for the ACA Marketplaces.

Where legislation is expected to influence the path of the NHE Projections Model's variables (such as private health insurance spending, out-of-pocket spending, as well as counts of the insured and uninsured populations), these additional impacts are built in through adjustments to the output of the econometric models. The most important effects of policy changes that are currently built into the NHE Projections Model affect trends in enrollment in private health insurance coverage, the composition of this enrollment between employer-sponsored and individual coverage, and short-term fluctuations in the net costs of private health insurance. Anticipated effects on growth in spending on personal health care are relatively smaller.

ii. Legislative and regulatory impacts on spending and enrollment projections

A 2019 rule allowing employers to subsidize employee premiums in the individual market (including the Health Insurance Marketplace) is expected to result in modest shifts in enrollment from traditional employer sponsored insurance to individually purchased plans.[13, 14] The impact of the rule change is projected to result in an incremental, small shift in coverage (roughly 3 percent of the population with employer-sponsored insurance by 2031) from employer-sponsored-insurance to the Health Insurance Marketplace. The net effect of the rule is a very slight increase in total private health insurance coverage and corresponding decrease in the uninsured population.

Though much of the spending on COVID-19 pandemic-related relief programs is now accounted for in the current historical NHEA data (1960-2021), these projections continue to take into account estimated remaining spending in a manner consistent with the National Health Expenditure Accounts classification and methodology.[15] The estimates are informed by government budget and program data, and legislative text, where applicable. Estimates inclusive of additional Federal funding provided by the coronavirus relief legislation for health care spending by the Department of Veteran's Affairs, government public health activity and non-commercial research (consistent with the Federal funds included in the category according to the NHEA) were based on analysis of fiscal year 2024 President's Budget outlay data and projections for applicable Federal agencies/programs.[16]

3) NHE PROJECTIONS MODEL SPECIFICATION

The NHE Projections Model is composed of a system of econometric equations for personal health care (PHC), which encompasses all medical care provided to individuals, and a supplementary set of equations for other, non-PHC spending (including Government Administration, Net Cost of Private Health Insurance, Government Public Health Activities, Research, Structures and Equipment). The specifications of these models draw on standard economic theory and the health economics literature.

The equations in the model are re-estimated annually following the release of updated historical NHEA data,

[13] Health Reimbursement Arrangements and Other Account-Based Group Health Plans: A Rule by the Internal Revenue Service, the Employee Benefits Security Administration, and the Health and Human Services Department on 06/20/2019. Available at: https://www.federalregister.gov/documents/2019/06/20/2019-12571/health-reimbursement -arrangements-and-other-account-based-group-health-plans

[14] Enrollment in Health Reimbursement Arrangements in Health Insurance Marketplace Plans is projected to have begun in 2022.

[15] Centers for Medicare and Medicaid Services. Accounting for Federal COVID Expenditures in the National Health Expenditure Accounts [Internet]. Baltimore (MD): CMS; [cited 2023 Apr 19]. Available from: https://www.cms.gov/files/document/accounting-federal-covid-expenditures-national-health-expenditure-accounts.pdf.

[16] Fiscal Year 2024 President's Budget data, see The White House, Office of Management and Budget. Outlays XLSX [Internet]. Washington (DC): The White House [cited 2023 Apr 19]. Available for download at: https://www.whitehouse.gov/omb/supplemental-materials/.

and the fit and appropriateness of model specifications are reviewed and revised at that time. However, the most recent years of data (2020-21) are strongly influenced by large and unique effects associated with the COVID-19 pandemic that are not representative of relationships that would apply to other periods. These data have therefore been excluded from model re-estimation. Current models reflect data through 2019, including revisions, but are not influenced by effects specific to the pandemic. Effects of the pandemic, are evaluated outside of the context of the model, and applied to projections separately.

a. Aggregate model for private personal health care (PHC) spending

i. Overview

Spending for PHC accounted for about 84 percent of total national health spending in 2019. The drivers of growth in spending for different types of PHC goods and services tend to be broadly similar, since these are all forms of medical care provided to patients by medical providers in the context of treatment.

Econometric models are used to generate projections for total private PHC spending. The aggregate private PHC model defines the relationship of trends in spending growth for private PHC sources of funding[17] relative to the exogenous inputs to the model, that include macroeconomic variables, projections for Medicare, Medicaid, and CHIP spending, and additional health-care-specific assumptions. The basic structure of the model involves separate projections for growth in a measure of quantity (real per capita growth in PHC) and in relative price. Nominal spending growth for PHC is then based on growth in both relative price and quantity. Separate models for spending by each type of service within PHC are constrained to sum to aggregate PHC. Separately, econometric models for aggregate PHC and for individual goods and services also incorporate equations for minor public spending programs for which exogenous projections are not available.

The key dynamic in econometric models for PHC spending is the relationship between private health spending growth and macroeconomic variables and their relationship with exogenous projections of spending for the major public payers (Medicare and Medicaid). Spending growth for private PHC exhibits a strong relationship to the macroeconomic business cycle, but it occurs with a substantial lag and can last for a decade or more. The causal link between private PHC spending and macroeconomic growth is defined by the relationship to disposable personal income (specifically, real per capita disposable personal income). The lag masks this relationship when looking at growth in health care spending relative to growth in GDP, so it is necessary to incorporate the lag in aggregate income effects in the model specification and to control for the short-term (less than 10 years) negative relationship to public spending growth, which captures shifts in enrollment between private insurance and public programs and vice versa in response to economic conditions.

In contrast, the long-term trend in real per capita spending growth is dominated by supply-side drivers that determine the nature and cost of providing medical care, such as changes in medical technology and professional standards for treatment, together with market prices for provider inputs. Since these factors apply to spending trends by both private and public payers, this implies that a positive correlation between public and private spending trends is anticipated over the long-term.

The causal link between aggregate income growth and private health care spending, characterized by long cyclical movements, is also an important driver of the long-term trend. One implication of this dynamic is that

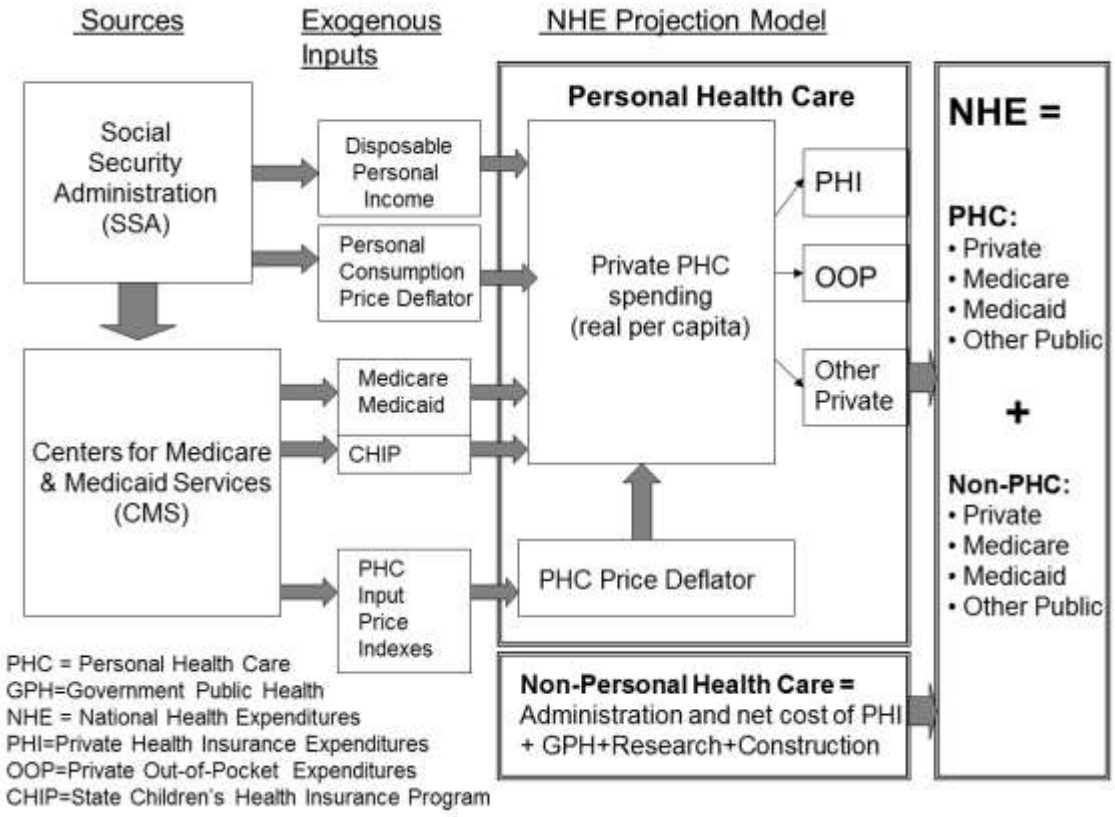
[17] It should be noted that "private sources of funding" in this context include all private health insurance spending, which in turn, includes government subsidies for Marketplace premiums. As such, this spending is defined as private from the perspective of direct payment for care (a 'Payer' basis), rather than on the ultimate source of funding for coverage (a 'Sponsor-of-payment' basis). For purposes of econometric modeling and discussion in this paper, all private health insurance spending, out-of-pocket spending, and other private revenues are grouped together as "private spending." To obtain sponsor-based delineations of public and private spending, we incorporate models that reallocate spending from direct payer basis to sponsor-based categories (discussed later in this paper).

trends in growth in health care spending over periods covering less than two decades must be placed in this cyclical context in order to be correctly interpreted. Viewing the pattern of growth without this context – and particularly any attempt to extrapolate growth in spending based on short-term trends – may generate conclusions for growth in private health care spending that are inconsistent with sustainable long-term relationships. In contrast, variation in spending growth for the Medicare and Medicaid programs is most strongly influenced by administrative actions and policy effects rather than macroeconomic effects, and thus does not usually track the timing of the cycle for private PHC spending.

The explanatory power of lagged income growth for aggregate health spending has historically been very strong. However, this relationship is substantially weaker in post-COVID data due to a combination of large effects of the pandemic on both health care delivery and on macroeconomic trends, reflecting the large-scale governmental response to the pandemic both within the health system and more generally.

Exhibit 5 below provides a schematic view of the aggregate health sector within the NHE Projections Model and shows the linkages among the data sources, exogenous data, the PHC model, the non-PHC output, and the aggregate NHE projection.

Exhibit 5: Illustration of the Structure of the Private PHC Model*



*Private real per capita PHC spending is adjusted to hold constant the effects of demographic shifts in the population across age, sex, and time-to-death (TTD) cohorts

The NHE Projections Model can be characterized as a *top-down, reduced-form* model. It is a reduced-form model in that both supply and demand factors are incorporated in model equations, but without an explicit theoretical model framework. Thus, the coefficients in the model capture the relationships between health sector variables and macroeconomic variables as they occur in equilibrium without attempting to identify the underlying parameters that characterize the dynamics of supply and demand.

It is a top-down model in that spending and pricing trends are modeled at the aggregate PHC level, with underlying trends by sector constrained to aggregate PHC for consistency with the broader picture. Thus, spending projections for all subcategories—types of medical care by sector, direct sources of funding for medical care, and all sponsors of payment—are constrained to equal aggregate projections. Though the ultimate projections for all the subcategories are constrained to add up to the aggregate projection, models for spending by sector, source of funds, and sponsor are also estimated individually—both to maintain any distinctive trends relative to the aggregate trend and also to maintain consistency with exogenous projections of macroeconomic variables, actuarial projections of spending for the Medicare and Medicaid programs, and additional assumptions specific to the health sector.

This approach of top-down modeling is due to the fact that private PHC spending at the aggregate level is more predictable than is spending for each individual type of service (such as hospital or physician and clinical services). This greater predictability at the aggregate level reflects the difficulty in capturing the dynamics of interrelationships in spending growth across types of care that often act as substitutes or complements. In particular, it is critical to account for the net effects on aggregate PHC spending of shifts across settings for health care delivery. Such shifts often occur in response to changes in government policy or health insurance coverage, which can be difficult to model at the sector-specific level.

The core of our aggregate model of private PHC spending consists of two equations:

1) Real per capita private PHC spending (adjusted to hold demographics constant)[18]

2) Relative PHC price inflation

Equation (1) represents a measure of the quantity of medical care, while Equation (2) represents the price of medical care relative to economywide inflation (in particular, the economy-wide GDP deflator). Nominal spending growth is based on the product of relative PHC price and real per capita PHC spending based on these models, and economy-wide price inflation and population.

All variables are expressed as log differences (growth rates). Our focus on relationships in terms of growth rates (rather than levels) reflects the relatively short forecast horizon of these projections. Models that are estimated on the basis of growth rates are concerned primarily with short-term dynamics and effectively assume that there will be no unsustainable divergences from long-term relationships in levels terms. While underlying relationships in terms of levels are not expected to change very much within the single decade that our projections cover, these relationships do ultimately have an effect on the long-term trend in growth rates (particularly in periods when growth is rapid). While our projections are primarily based on growth rates, we also monitor relationships across variables and over time in terms of levels and adjust model projections to maintain consistency with historical patterns in levels and with projections assumptions as necessary.

The aggregate model for growth in PHC spending incorporates factors that influence both the supply and demand for medical care. Real per capita private PHC is a measure of quantity that reflects both the utilization and "intensity" of medical care purchased by private payers.[19] The "intensity" of medical care refers to a measure of the average cost of care per patient that implicitly captures the complexity of treatment received by the average patient, as well as the severity of underlying illnesses that the patient is being treated for. In this model, growth in quantity and intensity of care is driven primarily by factors that influence aggregate consumer demand; the effects of changes in aggregate income and the relative price of medical care. Growth in real per

[18] This dependent variable is divided by a demographic index to control for the effects on spending of shifts in the composition of the population across age, sex, and proximity to death cohorts.

[19] The accuracy of real per capita spending as a measure of quantity is dependent on the accuracy of the medical price indexes that are used as deflators.

capita public PHC spending is included as a variable in this model to capture the effects of shifts in insurance coverage between private insurers and public programs and effects of changing relative medical price across payers.

In addition, the model controls for the effects of shifts in the demographic composition of the population on spending growth. These effects are estimated based on an index that is defined to capture the change in spending that is implied by a change in the composition of the population across age, sex, and proximity to death (time-to-death, or TTD) cohorts. Effects of demographic change on spending trends are gradual and can be difficult to estimate econometrically; for this reason, this effect is incorporated in the dependent variable, which can be interpreted as the growth in real per capita private spending that would be observed given constant composition of the population across age, sex, and TTD cohorts.

Our model for relative medical price inflation is primarily a supply-side model; relative medical price inflation is assumed to be primarily a function of the input price inflation (or the costs to provide care), with this effect occurring with a lag as medical providers set prices for private payers to reflect their recent changes in input prices. In addition, we include variables for the share of spending that is paid on an out-of-pocket basis by consumers, and prices for Medicare fee-for-service beneficiaries (which are set administratively).

ii. Model Equation: Real per capita private PHC spending

The dependent variable in the aggregate model of real per capita private spending is growth in real per capita private PHC spending (the price deflator is the chain-weighted price deflator for PHC) divided by a demographic index defined to control for variation in the demographic composition of the population.

The demographic index for PHC spending is defined as the share of population by each age, sex, and proximity to death (referred to as the "time-to-death" or TTD) cohort, multiplied by the base year spending for that cohort.[20] This index will capture variation in spending growth that is specifically attributable to changes in the composition of the population across these dimensions. The demographically-adjusted dependent variable represents the growth in private real per capita PHC spending growth that we would expect to see for a population with a constant distribution of population across age and sex cohorts.

The independent variables in the model are as follows:

(1) Disposable personal income (current and lagged growth in real per capita disposable personal income less Medicare and Medicaid)
(2) Lagged health share of Gross Domestic Product (PHC spending for all sources of funds as a share of Gross Domestic Product)
(3) Relative medical price inflation (PHC)
(4) Public personal health care spending (PHC, real per capita spending growth)
(5) ACA coverage expansion variables (dummy variables for 2014, 2015, 2016)

[20] Centers for Medicare and Medicaid Services. Memo: Demographic Factors Used to Project Medicare Expenditures—Incorporation of Time-to-Death to Account for Increasing Longevity on the Age-Sex Distribution of Spending [Internet]. Baltimore (MD): CMS; 2020 Apr 22 [cited 2023 Feb 2]. Available from: https://www.cms.gov/files/document/incorporation-time-death-medicare-demographic-assumptions.pdf.

Exhibit 6: Model equation: Real per capita private Personal Health Care (PHC) spending

$$\Delta \ln\left(h_{\mathrm{pr,t}} / p_{h,t} / n_t / d_t\right) = \alpha + \sum_{x=0}^{-6} \beta_{y,x}\, \Delta \ln(y_{dpi,t-x} / p_{y,t-x} / n_{t-x}) + \beta_p\, \Delta \ln(p_{h,t} / p_{y,t})$$

$$+ \beta_h\, h_{t-1} / y_{gdp,t-1} + \beta_{pu}\, \Delta \ln\left(h_{pu,t} / p_{h,t} / n_t\right) + \beta_{2014} D_{2014} + \beta_{2015} D_{2015} + \beta_{2016} D_{2016} + \varepsilon_t$$

Model variables and parameters (t subscript represents time period):

$h_{pr,t}$	=	private PHC health spending
$h_{pu,t}$	=	public PHC health spending
h_t	=	total PHC health spending
d_t	=	demographic index (age-sex-TTD)
n_t	=	population
$y_{dpi,t-x}$	=	real disposable personal income per capita, time=t-x (x=years lagged)
$y_{gdp,t}$	=	real gross domestic product
$p_{h,t}$	=	PHC price deflator
$p_{y,t}$	=	GDP price deflator
D_{yyyy}	=	dummy variable for years yyyy=2014, 2015, 2016
α	=	model constant
β_x	=	model coefficients
ε_t	=	error term

All variables are included in the model as log differences. Δ indicates that variables are first differences (i.e., $\Delta h_t = h_t - h_{t-1}$). The coefficients of each lagged value of real per capita disposable personal income ($y_{dpi,t} / p_{y,t} / n_t$) are fitted based on a polynomial-distributed-lag (coefficients across lagged values are constrained to fit along a second degree polynomial).

We discuss each of the model variables in turn below.

(1) Disposable personal income

For purposes of this model, income is defined as real per capita DPI excluding Medicaid and Medicare payments. The exclusion of Medicaid and Medicare spending reflects the fact that these programs are effectively "in-kind" income (income paid in the form of health care benefits) that accrues to those individuals with public coverage. Since we want to approximate income growth for those with private coverage, we exclude this income from our measure.

Growth in income is an important explanatory variable for growth in health care spending. In the model of real per capita private personal health care spending, income has a lagged effect on health spending. To capture the timing of these lags, the income term in our model of PHC spending is incorporated as a polynomial-distributed lag estimated over 7 years (extending from 6 previous years through the current period). This structure allows for differing effects for each of the lagged years with the largest effects estimated for the second and third lagged years. Coefficients on model variables can be interpreted as price and income elasticities, which are assumed to be constant over time. The income elasticity is equal to the sum of coefficients across all lagged values.

Our estimates are based on time-series data for the United States and include spending only by private payers. However, the importance of real per capita DPI for growth in spending on PHC in our model (as captured by its estimated coefficient) is consistent with a large body of literature examining the empirical relationship

between national income and health spending. A number of studies based on time-series cross-country data for the Organization of Economic Cooperation and Development (OECD) economies confirm the importance of the link between health spending and income.[21]

Though fluctuations in growth in aggregate income have some immediate effects on growth in private PHC spending, these initial impacts are fairly small relative to the elasticity across all lagged periods. The current-period income elasticity in the NHE Projections Model estimate is 0.23, which means that the change in growth for health spending in response to a change in income growth in the same period will be 23 percent as large as growth in income. The sum of coefficients across all lagged periods implies the long-term income elasticity of private PHC spending, which is 1.56. The magnitude of this estimated income elasticity is at the upper end of estimates for macro-level elasticities of approximately 0.8 to 1.6 in the empirical literature.[22] This relatively higher elasticity reflects the characteristics of our model specification, which is focused on private health care spending (rather than total health care spending) and estimation based on time-series variation for the United States alone (in comparison with estimates based on both time-series and cross-country variation that rely on international data).

The long lags that are captured within this model reflect important characteristics of markets for health services. In particular, since private insurers or public payers account for the large majority of health expenditures, this spending is largely insulated from contemporaneous changes in household income. Furthermore, since consumers generally do not pay for most medical expenses directly at the point of purchase, the choice of most medical care by insured patients is not immediately affected by changes in their own household income. However, some immediate effects can be expected in response to cost sharing requirements in PHI plans or the loss of employment with the associated loss of employer-sponsored health insurance.

The long lags in the income effect reflect the role of multiple intermediaries between consumers and medical providers. Example of key intermediaries are employers or unions (who negotiate on behalf of pools of employees), and governments at the Federal and state level (which determine the nature of coverage, regulations that constrain private employers and insurers, and methods of payment and price updates for Medicare and Medicaid). Actions of intermediary institutions' influence the nature of insurance coverage and methods of payment, which then affect medical providers' decisions on behalf of individual patients. Many of such decisions are determined contractually or via regulation, which take time to develop and implement. Consequently, substantial delays may be required to implement any response to changes in underlying consumer preferences, both to negotiate any changes to contracts and regulations, and to implement such changes in a way that would influence choices of medical treatment in practice.

In addition, in response to any modifications in the design of their health plans, employees may take time to respond to changes in incentives under the conditions of insurance coverage by gradually changing their patterns of health care consumption over time. Furthermore, doctors and other medical providers may also respond gradually to changes put in place by payers. In the long run, responses could include altering treatment protocols in response to the incentives inherent in methods of payment for care and in response to constraints on coverage imposed by insurers, and effects on the investment in capital equipment by medical providers. These complex interactions among intermediaries, consumers, and providers imply that the response of the system to changes in income growth will extend over a period of years.

(2) Lagged health share of Gross Domestic Product

This lagged health share of Gross Domestic Product (GDP) is intended to capture the effect on growth in health

[21] Chernew, Michael E., and Newhouse, Joseph P. "Health Care Spending Growth." In *Handbook of Health Economics*, vol. 2 (2012). Eds. Pauly, Mark V., McGuire, Thomas G., and Barros, Pedro P. Amsterdam (NLD). Elsevier, Pages 1-43.
[22] Ibid.

care spending of long-term changes in the relationship of the level of health care consumption relative to aggregate income. As discussed previously, the aggregate model for private personal health care spending is defined in terms of growth rates. However, over the long-term, growth in private PHC spending is not independent of spending *levels*; the relationship between current growth in private PHC spending and aggregate DPI growth can be expected to change gradually over time as health spending accounts for a rising share of consumption. As the aggregate health spending share of consumption increases, demand will tend to become more responsive to rising relative medical prices. The income elasticity of demand for health care must ultimately decline towards a value of one over the long run, where health spending grows at the same pace as income.

As this adjustment in consumer preferences occurs, the rate of increase in the share of income allocated to health care can be expected to slow compared to other goods and services. To capture this effect, the model specification includes a variable intended to capture the impact of the rising health share of consumption on the long-term relationship between health care spending growth and its determinants. This variable is defined as the ratio of total PHC spending to GDP, lagged by one year. Its estimated impact is negative and significant, but fairly small in magnitude compared with the year-to-year variation in real per capita private PHC spending.

In defining this variable, we use aggregate spending on medical care by all payers (not solely private payers), and we use GDP in the denominator (rather than income or consumption) for this measure. This definition reflects the theoretical basis for the effect.[23] Like any other form of consumption, health spending is fundamentally subject to a budget constraint, but in cases in which insurance coverage severs the connection between individual decision-making and individual income, the budget constraint for health spending is binding at the level of the insurance pool. Because of the important role of the Federal government in structuring coverage for public insurance programs and in defining the constraints that influence private insurers, this constraint is best seen as operating at the national level.

(3) Relative medical price inflation

Growth in real per capita private PHC is a function of growth in relative medical price. Faster relative medical price inflation implies slower growth in demand for medical care (and vice versa), thus the coefficient on this variable is predicted to be negative. Within the model for private real per capita PHC, relative medical price inflation has a negative coefficient that implies a price elasticity of demand for private PHC of −0.3.

The price elasticity in this model is slightly higher than micro-level estimates of price elasticity of demand for medical care (−0.1 to −0.2 based on the RAND Health Insurance Experiment).[24] This difference reflects the use of individual-level data in micro-based studies to analyze the relationship between an individual's out-of-pocket spending and effective prices paid for services (accounting for coinsurance rates), compared to our use of macro-level national health spending data and price indexes from the Bureau of Labor Statistics. The difference also reflects the relatively short time frame used in micro-level studies as compared to our analysis, which spans more than five decades. Economic theory predicts that consumers adjust their spending on different goods and services in response to variations in the relative price of these alternatives. However, the existence of third-party payers for medical care complicates the response of demand to relative price variation. Consumers bear only a fraction of the actual price of medical services at the time of purchase. In consumption decisions at the point of purchase, consumers respond to the out-of-pocket price at

[23] Getzen, Thomas E. "Health Care Is an Individual Necessity and a National Luxury: Applying Multilevel Decision Models to the Analysis of Health Care Expenditures." *Journal of Health Economics*, 19, no. 2 (2000): 259-270.
[24] Manning, Willard G., et al. "Health Insurance and the Demand for Medical Care: Evidence from a Randomized Experiment." American Economic Review, 77, no. 3 (1987): 251-277.

the point of purchase – which is determined by several factors, such as deductibles, cost-sharing requirements, and out-of-pocket maximums as defined in insurance coverage.[25]

The effect of out-of-pocket prices on consumer choices is only one potential avenue for price effects in health care markets; medical prices may also influence demand for care through other channels. The price of health insurance is effectively the price of the average bundle of medical goods and services an enrollee is expected to consume (plus administrative costs and profits). Consumers' decisions to purchase private health insurance and the generosity of the coverage selected, will be influenced by the relative price of medical care through their choice of insurance coverage. In addition, the relative price of care influences the demand for services through the selection of medical provider covered networks by insurers based on pricing; insurance plans may choose to cover broad or narrow provider networks as a function of prices charged by these medical providers. Price effects may also be encouraged through the design of cost-sharing requirements that create incentive effects for consumers (e.g. tiered copays).

(4) Public personal health care spending

Growth in real per capita public PHC spending is an independent variable in the model for private real per capita PHC spending. This variable captures a negative short-term relationship between private and public PHC spending growth. This negative relationship reflects shifts in enrollment per capita between private and public insurance coverage, and may also capture short-term fluctuations in price inflation by payer that influence growth in PHC spending per enrollee in private and public coverage. Projections of growth in public PHC spending are primarily exogenous to the model; determined by actuarial projections of Medicare, Medicaid, and CHIP spending. However, a small share of public spending (other than Medicare, Medicaid, or CHIP spending) is projected endogenously based on actuarial analysis and relationships to macroeconomic variables combined with historical extrapolation of trends in growth.

(5) ACA coverage expansion variables

Dummy variables are included in the model to capture the effects of the ACA for the years 2014, 2015, and 2016. The expansion of private health insurance coverage under the ACA corresponds to an increase in private PHC spending growth.

iii. Model Equation: Relative personal health care price inflation

Relative PHC price inflation is the second key endogenous variable in the model for PHC spending growth. The dependent variable in this model equation is growth in relative PHC prices, defined as the ratio of OACT's chain-weighted,[26] price deflator for PHC spending to the economy-wide consumer price deflator.

The model for relative medical price inflation includes three independent variables: 1) relative input price inflation for medical goods and services (a measure of the wages and prices paid by providers of medical care

[25] The price to consumers can be roughly approximated by the fraction of total costs paid out-of-pocket multiplied by the actual price. This approximation is flawed; for decision-making purposes, the important question is the marginal price, which is the amount that the consumer pays for an additional dollar of medical care. Because of the broad use of copayments, deductibles, and out-of-pocket maximums, combined with the fact that a large share of health care consumption is accounted for by high-cost cases, the marginal price paid by consumers is often zero.

[26] Chain-weighting is a method that accounts for changes to health spending patterns over time among different types of medical providers to provide an inflation measure that more accurately captures aggregated prices associated with such shifts in medical spending.

for costs)[27], 2) a variable based on the chain-weighted index of price updates for Medicare fee-for-service (FFS) beneficiaries, and 3) out-of-pocket share of private health spending. Of these variables, the most important relationship in the model is the supply-side relationship between relative PHC price inflation and relative input-price inflation (the price of inputs used by medical providers).

Exhibit 7: Model equation: Relative PHC Price Inflation

$$\Delta \ln (p_{h,t}/p_{c,t}) = \alpha + \beta_{ipi}\, \Delta \ln \left(\frac{\sum_{x=0}^{-1} (ipi_{t-x} / p_{y,t-x})}{2} \right) + \Delta \ln (p_{mcr,t}/p_{c,t}) + \beta_{oop}\, \Delta \ln (h_{proop,t} / h_t) + \varepsilon_t$$

$p_{h,t}$	=	chain-weighted PHC price deflator, all payers
$p_{mcr,t}$	=	residual Medicare fee-for-service price update, chain-weighted, PHC
$p_{c,t}$	=	personal consumption price deflator
$p_{y,t}$	=	gross domestic product price deflator
$ipi_{h,t}$	=	input price index for medical providers
$h_{proop,t}$	=	out-of-pocket PHC health spending
h_t	=	total private PHC health spending
α	=	model constant
β_x	=	model coefficients
ε_t	=	error term

All variables are included in the relative PHC price model as log differences. Δ indicates that variables are first differences (i.e., $\Delta h_t = h_t - h_{t-1}$). Growth in input prices for medical providers is estimated based on an index composed of input costs, with each major input to production of medical care represented by a price index (or proxy).

The measure of input price inflation included in the model for relative medical price inflation is a chain-weighted index of input price indexes for each type of medical provider (e.g. hospital, physician, etc.). Within input price indexes for each provider the price for each component of provider costs is represented by a proxy price series for that service or commodity, and the index weights are based on the share of provider costs for that input.[28]

We control for the effect of Medicare fee-for-service (FFS) price updates on overall PHC price inflation based on a two-stage estimation process. The variable in the relative PHC price model is the residual from a first stage estimation of the relationship between growth in Medicare FFS price updates as a function of our input price index. This two-stage estimate is necessary because input price inflation is an input to Medicare FFS price updates, so that he two series are interrelated. The residual included as a variable in this model captures variation in Medicare FFS price updates that is independent of variation in input price inflation. The positive coefficient on this variable implies that Medicare FFS price updates increase overall personal health care price inflation.

[27] The input price index used for personal health care is a weighted average of OACT's input price indexes for hospital services, physician services, home health services, nursing home services, and pharmaceuticals.

[28] Due to data limitations, input price indexes have historically omitted compensation for self-employed workers in some sectors. A substantial fraction of these self-employed workers are physicians or other medical professionals. Accordingly, input price inflation measurement may be influenced by this omission as a function of the differential in growth between compensation for employed workers and that for self-employed workers.

Finally, out-of-pocket share of private PHC spending is intended to capture the incentive effects for medical providers in price setting in response to increasing price sensitivity by consumers as a function of out-of-pocket costs.

b. Models for Non-PHC health care spending

Non-PHC health care spending accounts for the remaining 16 percent of national health spending after PHC in 2019. Models are estimated for each of four categories: (1) government administration and the net cost of private health insurance, (2) non-commercial research, (3) government public health, and (4) structures and equipment. These categories are heterogeneous in nature and tend to be more volatile and unpredictable than that for personal health care. In addition, the drivers of growth for the non-PHC categories are quite different from those for PHC. As a result, projections for the non-PHC categories are based on separate models with varying specifications depending on their nature.

As stated earlier, projections of the NHE deflator and the non-PHC sectors were first introduced with the NHE 2021-30 projections release and updated for the current projections. These updated projections are based on econometric models for price indexes for non-personal health care categories of spending. The PHC and non-PHC price projections and the projected spending by sector for NHE are combined to generate the chain-weighted NHE deflator.

Several of the non-PHC sector spending projections were impacted by additional Federal funding in response to the COVID-19 pandemic. Estimates of the impact of this additional funding was primarily estimated separately (also discussed earlier in this document) and added on to the projections described below where indicated.

i. Government administration and the net cost of private health insurance

Administrative costs include government administrative costs and the net cost of private health insurance. These two categories are projected separately. Government administration spending (i.e., salaries and expenses related to the management of health insurance) is projected based on available budgetary information, with trend-based econometric models for the remaining categories.

The net cost of private health insurance is a category of spending that is composed of the costs associated with administering health insurance and the profit margins that accrue to private health insurers. Net costs for all health insurance plans are included in the category. The net cost of insurance for Medicare Advantage plans, as well as Medicaid and CHIP managed care plans is estimated primarily using actuarial methods and is exogenous, as with spending and enrollment projections for these payers.

The share of spending on net costs solely associated with private health insurers (excluding Medicare, Medicaid, CHIP, etc.) is projected based on an econometric model that essentially extrapolates those plans' historical trends in the ratio of their spending on the net cost of insurance relative to their total spending (or PHC plus net costs). Expectations for growth in this spending for the first few years of the projection period are primarily based on exogenous data and estimates of the impact of recent legislation, where relevant. Such estimates include the projected net costs of individual policies purchased through the ACA Marketplace, the mix of employer-sponsored and individual policies, and the anticipated effects of legislation on insurer premiums. The COVID-19 pandemic had a substantial effect on the variation in the net cost of private health insurance in historical data for 2020-21 and is expected to continue to have substantial effects for the near term of the projection period through 2024.

The projection for the net cost of health insurance (excluding Medicare, Medicaid, and CHIP) in the second half of the projection period assumes that the ratio of net costs for those plans will converge to its historical mean for the most recent decade prior to the COVID-19 pandemic. The mean of this ratio has historically been stationary over the long-term, with cyclical deviations relative to this mean. The administrative costs

portion of the category is generally fairly stable with most of the historical time-series variation in this ratio being attributable to profit margins, which have tended to move in cyclical patterns around a stable long-term trend. The amplitude of this cyclical pattern (the underwriting cycle) has diminished in recent years as information technology has improved the ability of insurers to track medical claims in real time and as the consolidation of the industry has reduced variation in premiums due to insurers' entry into and exit from markets. In addition, as a result of the passage of the ACA and the establishment of the minimum medical loss ratio requirements[29], the importance of this cycle is ultimately anticipated to diminish further.

Finally, some variation is expected to be generated by shifts in enrollment to the relatively smaller market for individually-purchased private coverage, which is subject to a relatively higher proportion of net costs than is the case in the large group market. Changes in the individual insurance market reflect the combined impacts of the continued effects of the implementation of the Marketplaces under the ACA, as well as other regulatory changes that have since occurred.[30]

ii. Non-commercial research

Non-commercial research spending growth is projected based on relationships to economic growth as represented by a 4-year lagged moving average of growth in real per capita GDP. Specific adjustments are made in cases in which Federal budgetary information is available, which would be inclusive of estimated remaining spending for COVID-19 pandemic related funds and programs[31].

iii. Government public health

Government public health spending growth is extrapolated based on historical trends, with specific adjustments made in cases in which budgetary information is available, which would be inclusive of estimated remaining spending for COVID-19 pandemic related funds and programs [32].

iv. Structures and equipment

Spending on health system structures is dominated by hospital construction and is therefore projected as a function of growth in hospital spending. Any additional information that becomes available (such as surveys of hospital construction)[33] is incorporated via adjustments into the projection. Equipment purchases are projected as a function of spending on health system structures to capture concurrent equipment spending that occurs with medical real estate investments and as a function of relative prices of new equipment purchases

[29] The minimum medical loss ratio requirement under the ACA states that health insurers must spend a minimum share of premium revenues on health care benefits and quality improvements (80 percent in the individual and small group coverage and 85 percent in the large group coverage).

[30] In addition to those changes described in the legislative and regulatory impact section of this paper, prior regulatory changes included: the health tax provisions of the continuing resolution legislation passed January 22, 2018 (the insurer fees associated with the ACA were deferred in 2019) and the cancellation of the cost-sharing reduction payments (previously mandated under the ACA to insurers from the federal government) from 2018 forward, in accordance with the October 12, 2017, executive order.

[31] Fiscal Year 2024 President's Budget data, see The White House, Office of Management and Budget. Outlays XLSX [Internet]. Washington (DC): The White House [cited 2023 Apr 19]. Available for download at: https://www.whitehouse.gov/omb/supplemental-materials/

[32] Ibid.

[33] Surveys include 1) US Census Bureau Value of Construction Put in Place Survey (VIP). Available at: https://www.census.gov/construction/c30/c30index.html and 2) ASHE Health Facilities Management Magazine. 2021 Hospital Construction Survey. Available at: https://www.hfmmagazine.com/articles/4423-hospital-construction-survey

compared with other health care prices. (See also section 2b (ii) of this paper for a discussion specific to COVID-19 related funding).

c. Submodels for sectors, sources of funds, and sponsors of payment

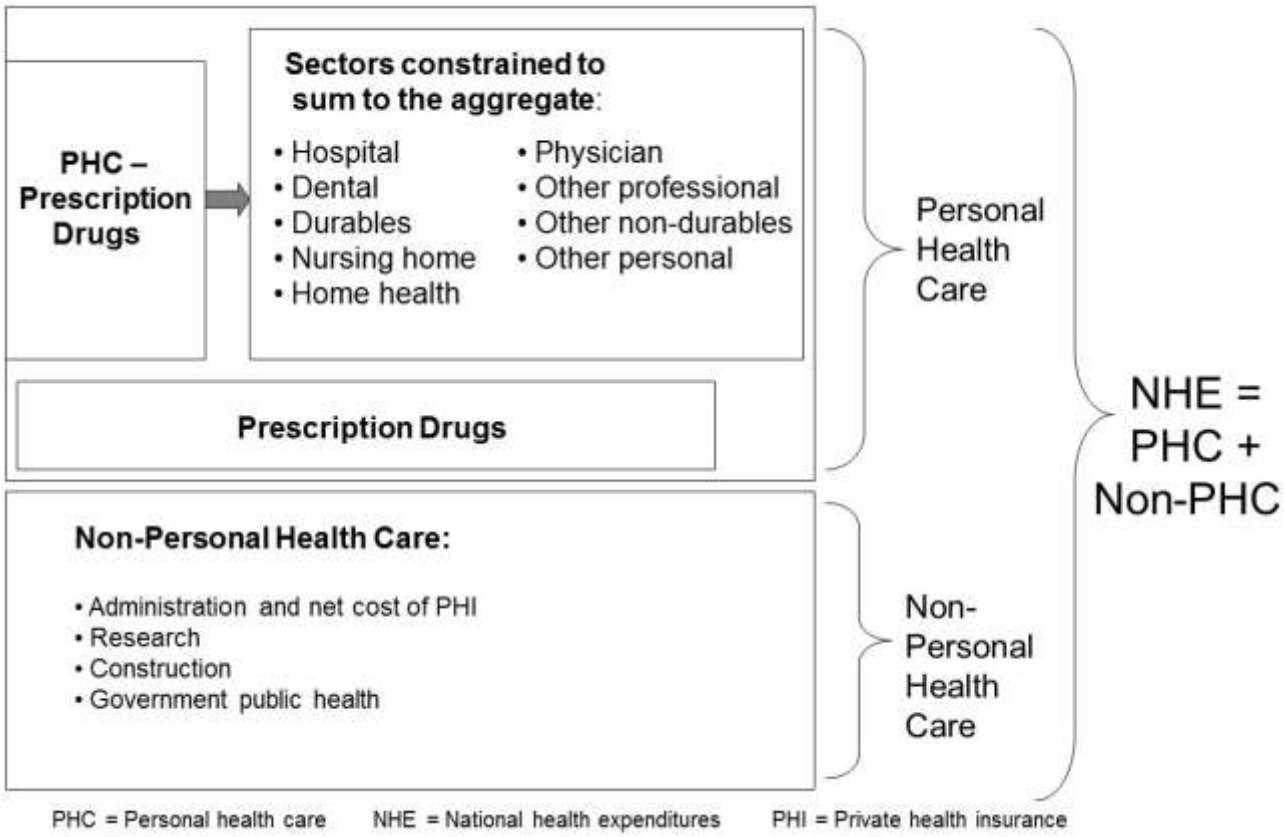
Spending projections are estimated for three underlying subcategories of health care spending:

(1) Type of service (sector)
(2) Source of funds (direct payer)
(3) Sponsor of payment (ultimate payer)

i. Models for health care spending by type of service

Models for real per capita private spending growth and price inflation for individual types of medical services are similar in specification to the aggregate model.

Exhibit 8: Illustration of NHE Projections Models by Type of Expenditure



Projected spending levels for all types of care within PHC (excluding prescription drugs) is normalized to sum to aggregate projections for PHC. In practice this means that spending by type of service is multiplied by an adjustment factor that constrains aggregate spending levels across the sectors to sum to the aggregate

spending projection for total PHC (excluding prescription drugs).[34]

For the most part, key variables in the sector models follow a template specification similar to that used for the aggregate model for PHC spending growth. Major variables in the sector models include the following:

- Disposable personal income (excluding Medicare and Medicaid, real per capita)
- Relative medical price inflation
- Public spending growth (real per capita)
- Dummy variables for legislation, policy, and event driven effects

The parallel structure of the sectors within PHC allows income and price elasticities, and sensitivity to variation in public spending growth, to vary relative to the aggregate model, with the constraint that the sum across all sectors must be equal to the projection generated by the aggregate model. Dissimilarities across the models for different types of services include varying lag structures for the income effect, the relative importance of the three variables, and the inclusion of dummy variables to capture phenomena specific to each sector. In a few cases in which relevant data are available, additional independent variables are included that are specific to the individual sector.

For each type of service, the lag on the income term in the models generally tends to vary with the share of spending that is accounted for by consumers' out-of-pocket expenses; that is, the greater the out-of-pocket share, the shorter the lag, as consumer demand responds more quickly to changes in their income.

Exhibit 9 summarizes the independent variables used to model real per capita private spending growth for each of the PHC sectors. We have provided additional descriptive information about the models for those sectors that represent the greatest shares of health spending.

[34] Prescription drug spending is excluded from the normalization process because of its historic volatility and its lack of correlation with spending in other sectors.

EXHIBIT 9: MODELS BY TYPE OF SERVICE OR GOOD

SECTOR	DEPENDENT VARIABLE	INDEPENDENT VARIABLES*
Hospital services	Real private hospital services per capita, age-sex-TTD adjusted	Real disposable personal income (PDL, 7 years) (+) Relative price (−) Real per capita public spending growth (−) Dummy, 1984- (−) Dummy, 1984- * log of time trend (+) Log of Time trend (−) Dummy, 2015 (+) Dummy, 2016 (+)
Physician and Clinical services	Real private physician services per capita, age-sex-TTD adjusted	Real disposable personal income (moving average of lags, 4 years) (+) Real per capita public spending growth (−) Relative price (−) Dummy, 1983-85 (+) Dummy, 1960-92*time trend (+) Dummy, 2015 (+) Dummy, 2016 (+)
Prescription Drugs**	Real aggregate drug spending per capita, age-sex-TTD adjusted*	Real disposable personal income (3-year moving average) (+) Relative drug price*Share paid out-of-pocket (3-year moving average) (−) New drug introductions (+) Generic dispensing rate (−)
Dental services	Real private dental services per capita, age-sex-TTD adjusted	Real disposable personal income (PDL, 3 years) (+) Relative price (−) Real per capita Medicaid and CHIP spending growth (3-year moving average of lags) (+) Dummy, 1981 (+) Dummy, 1960-1992 (+)
Nursing Care Facilities and Continuing Care Retirement Communities	Real private nursing home services per capita, age-sex-TTD adjusted	Real disposable personal income (moving average, 6 years) (+) Real per capita public spending (−) Relative price (−) Dummy, 1990 (+) Dummy, pre-Balanced Budget Act of 1997 (+) Share of population aged 85+ years (+)
Other Professional services	Real private other professional services per capita, age-sex-TTD adjusted	Real disposable personal income (+) Real per capita public spending growth (−) Relative price (+) Dummy, 1977 (+) Dummy, 1989 (−) Dummy, 1992- (−) Dummy, 1992- *Real disposable personal income (−) Dummy, 1992- *Real per capita public spending growth (+) Dummy, 1992- *Relative Price (-)
Over-the-Counter Drugs and Other Nondurables	Real private other nondurables spending per capita, age-sex-TTD adjusted	Real disposable personal income (2-year moving average) (+) Relative price (−) Lagged dependent variable (+)
Durables	Real private durables spending per capita, age-sex-TTD adjusted	Real disposable personal income (PDL, 2 years) (+) Relative price (−) Public spending growth (−)
Home Health services	Real private home health services per capita, age-sex-TTD adjusted	Relative price (−) Real per capita Medicaid spending growth (−)

*Independent variables in the form of a "dummy" followed by a dash denote that the variable effect starts at the specified year and continues through the projection period. **The prescription drug model is based on aggregate expenditures rather than private expenditures, due to complications in projecting shifts in payments associated with the introduction of Medicare Part D prescription drug coverage. See the Prescription Drug section below.

ii. Sector model: hospital services

Real per capita growth in private hospital spending (inclusive of care in both inpatient and outpatient settings) is well explained by the variables in our template model specification. Because hospital services represent the largest share of personal health care spending among the services, we would expect to find a similar relationship between household income and hospital services spending as we observed between household income and overall personal health care spending. In addition, given the low out-of-pocket spending share relative to other payers for hospital services, we anticipate a longer lag between a change in household income and the time of impact on hospital spending. Our results are consistent with these expectations; we estimate coefficients on lagged income growth with a polynomial distributed lag estimated for the current period and 7 previous years, one year longer than the lag structure for disposable personal income in the aggregate model for private personal health care spending. Additionally, the peak effect of income fluctuations occurs with a lag of 3 to 4 years, slightly longer than the aggregate model. As expected, public real per capita spending has a negative coefficient, capturing shifts in enrollment between private and public coverage as well as any possible short-term cost-shifting effects between private and public payers.

For this sector, the combined effects of managed care expansion and the introduction of the Medicare prospective payment system (PPS) are represented in the current model as a structural change in the relationship of growth to price and income that is largely one-time in nature, beginning in 1984 after the PPS was introduced. The alterations in provider incentives associated with the PPS, coupled with similar pressures from the expansion of managed care in the late 1980s through the 1990s, produced an initial reduction in growth that gradually tapers off. This tapering of the impact of PPS and managed care reflects the diminishing potential for reduced inpatient utilization over time as it becomes more difficult to find additional efficiencies at the margin. Similarly, the one-time effect of the ACA's coverage expansion implementation on real per capita hospital spending in 2015 and 2016 is captured through dummy variables, an approach consistent with that previously discussed for the aggregate model.[35] Likewise, consistent with the method discussed for the aggregate model, the estimated impacts of the COVID-19 pandemic on hospital spending are added on to a projection generated using the above model that uses historical data through 2019.

iii. Sector model: physician and clinical services

In the physician model, the estimated effect of the lag of disposable personal income (DPI) extends 4 years. The coefficient of relative price inflation is negative, as expected. Growth in real per capita public spending on physician services has a smaller estimated negative effect than the magnitude estimated in the aggregate model.

In general, our template specification fits real per capita growth in physician spending somewhat less well than it accommodates hospital spending. This reduction in model fit primarily reflects two distinctive periods of growth—1983-1985 and 1960-1992—that are not well predicted by the model. To capture the period of rapid growth from 1983 through 1985, we have included a dummy variable for these years. Our interpretation of this variable is that it captures a non-recurring substitution effect of professional services for inpatient care. The 1983-1985 period saw a major shift in provider incentives associated with the introduction of the Medicare PPS and the initial surge in managed care enrollments (as described earlier).

Despite substantial volatility, real per capita growth rates exhibit a slight upward trend during the period from 1960 through 1992. We have included a trend variable for these years to capture this effect. We interpret this variable as capturing the period of faster growth prior to the dampening effects of constraints from managed care organizations on use and intensity of care for privately insured individuals enrolled in these organizations.

[35] A dummy variable for 2014 was also tested as part of the model specification but was found to be not statistically significant.

Even as the effects of these more stringent utilization constraints diminished in the late 1990s, real per capita growth over 1992-2014 rarely peaked above 4 percent (compared to the period from the 1970s through 1992, when growth was above 4 percent for roughly half of the years). The result of the inclusion of this variable is that the effects of the rapid growth prior to 1992 are removed from the other estimated coefficients, thereby moderating projected growth after 1992 in a manner that is more consistent with the recent history.

Mainly due to the major coverage expansions implemented in 2014 under the ACA, there was a notable acceleration in real per capita private spending growth that occurred in 2015 and 2016 for physician and clinical services. Given that these growth rates are largely influenced by exogenous legislative effects, we have included dummy variables for 2015 and 2016 to capture the effects of these major coverage expansions (similar to the handling previously discussed for the aggregate model for PHC). For the physician and clinical services model, only dummy variables for the years 2015 and 2016 were statistically significant, while the dummy variable for 2014 was not and was thus excluded from the final model.

The model for this service was estimated through 2019, which excluded the extraordinary impacts from the COVID-19 pandemic on the use of health care services in 2020 and 2021. Because the effects of the pandemic were so unique relative to the historical period, these effects were estimated separately (as discussed previously) and added onto the econometric projections for 2022 forward.

iv. Sector model: prescription drugs

Prescription drugs differ in important ways from other types of medical care. First, since prescription drugs are a product, not a service, the cost structure of the industry differs substantially from that of other sectors (such as hospital, physician, or nursing home), for which labor costs play a critical role in driving price. In contrast, the cost structure of production for prescription drugs is highly capital-intensive, with relatively low marginal costs and a relatively larger role for the introduction of new products. Second, prescription drug spending has had a larger consumer out-of-pocket share than other types of medical care, so that demand tends to be more sensitive to price. Third, we have access to additional information on supply and demand factors for this sector, in the form of data on new drug introductions, generic dispensing rates, research spending, patent expirations, and direct-to-consumer advertising. As a result, our model for prescription drugs is somewhat different from the models developed for other sectors.

As opposed to the other health sectors, the dependent variable in the prescription drug model is real aggregate per capita drug spending (not private only). This decision was made because the start of Medicare drug coverage in 2006 produced a massive shift in the source of payments for drugs, which resulted in a sharp decrease in private drug spending growth in 2006, though it had little estimated effect on overall growth in drug spending. Accordingly, our model projects total prescription drug spending without simulating an explicit effect for Part D. The income variable within the prescription drug model fits with a shorter lag than in our aggregate model; this is the expected result based on the larger share paid on an out-of-pocket basis historically. Relative price inflation has a strong fit. The price variable is defined as the product of the out-of-pocket prescription drug share and the prescription drug price index—a definition that accounts for the trend in consumers' steadily declining out-of-pocket share over the last 20 years. However, available data do not distinguish out-of-pocket spending by the uninsured and by Medicare beneficiaries from the fixed co-payments that are often required within managed care, and thus our ability to capture this declining share is limited. The prescription drug price index is estimated historically and projected net of rebates received. Public spending growth is not included as a variable in this model due to its relatively minor role in the historical period (prior to 2006) and because the dependent variable is overall drug spending and not private drug spending.

Patterns of growth over the most recent 15 to 20 years of data are difficult to explain, as the effects of several different factors must be disentangled. The out-of-pocket share of spending by consumers dropped sharply as privately insured patients moved into managed care plans that generally have lower co-payments. For Medicare

beneficiaries, they pay a relatively large share of drug costs out-of-pocket; however, this has been substantially reduced in recent years with the closing of Part D coverage gap[36]. Also, changes to regulations in 1997 eliminated some of the earlier restrictions on television advertising for prescription drugs. In addition to income and relative price terms, our model for real per capita drug spending includes a 4-year moving average of the number of new prescription drugs introduced, as well as the rising generic dispensing rate, which has played an increasing role in depressing growth in prescription drug spending in recent years. In 2014, drug spending growth spiked up partly as a result of the use of new, expensive specialty drugs that were curative treatments for Hepatitis C (growth also increased because of the first year of the ACA major coverage expansion). However, in 2016 and 2017, the growth rate of prescription drug spending decelerated significantly and one major factor driving the slower growth was the decline in the use of these expensive Hepatitis C drugs. Another factor keeping drug spending growth relatively low from 2016-2020 was an increase in drug rebates, which resulted in the net growth of drug prices to be negative from 2018 to 2020. The impact of the Inflation Reduction Act is consistent with what was assumed in the 2023 Medicare Trustees Report, which is lower gross drug prices (as they are expected to be reduced from what they otherwise would have been) because of drug price negotiations and inflation rebate provisions from the law. However, the impact on net prices is anticipated to be mitigated compared to that of gross prices because drug manufacturers are assumed to reduce the amount of manufacturer rebates offered.

v. Models for health care spending by source of funds (direct payer)

Our core econometric models project direct payments (spending) by all private sector payers. This total spending by private payer can be disaggregated to sources of payment at a more detailed level. The major types of private payers are private health insurers, direct payment by consumers on an out-of-pocket basis (OOP), and other private revenues.[37]

In contrast to our method for modeling total private spending for each of the sectors within PHC relative to aggregate PHC, our model for health care spending by private payer is "bottom-up" in nature; in other words, the private payer trends are projected at the level of individual sectors (hospital, physician, drugs, etc.) and then aggregated together. This approach reflects the fact that the nature of patient cost-sharing differs greatly depending on the setting in which services are provided and the type of service. It also allows us to consider the implications of sector-specific research and sector-level trends. For example, prescription drugs, physician services, nursing home care, and dental services account for roughly three-fifths of OOP spending; each of these sectors is influenced by a different mix of factors. As has been discussed throughout the paper, shifts in the composition of PHC spending across sectors have important effects on aggregate trends.

The projections for relative growth in PHI, OOP, and all other private spending for each individual sector are then added up and used to generate the projections for the shares of total private spending for the detailed private payer categories at the aggregate level. This process requires an adjustment procedure (iterative

[36] National Council on Aging, "Donut Hole: Who Pays What in Part D," 30 Sep 2022, https://www.ncoa.org/article/donut-hole-part-d

[37] The other private revenues source of funds category is comprised of the medical portion of property and casualty insurance and philanthropy. Philanthropic support may be obtained directly from individuals, through philanthropic fund-raising organizations, or from foundations or corporations. For institutions such as hospitals and nursing homes, other private funds also include income from the operation of gift shops, cafeterias, parking lots, and educational programs, as well as investment income.

proportional fitting[38]) to ensure 1) the sum of spending for all private sources of funds by sector equals total private spending for all sources of funding and 2) the sum of spending for private health insurance, out-of-pocket, and other private spending across all types of services must equal the aggregate spending for total private spending.

In addition to private sources of funds, we also project public sources of funds other than Medicare and Medicaid. [39] These other sources account for just under 20 percent of total public spending on PHC. The largest of these payers are the Department of Veterans Affairs (VA) and the Department of Defense (DoD), with the methodology we use for these programs discussed below. Residual Federal and other state and local spending for smaller government programs is projected based on econometric models similar to those used to project real per capita private spending.

vi. Spending projections for Department of Defense (DOD) and Department of Veterans Affairs (VA) health insurance programs

The NHE projection model includes the separate econometric type of service equations for both the Department of Defense and Department of Veterans Affairs health care systems. Projections based on these models are then adjusted using data from published Federal budget requests for the upcoming fiscal year and data projections of the veteran population from the current VA Office of the Actuary's Veteran Population Projection Model (or "VetPop" Model). [40]

Expenditures for both the DOD and VA are driven mainly by fiscal policy, demographics, and economic conditions and, to a lesser extent, by overseas military operations. VA spending is expected to exhibit countercyclical elements, as eligibility is determined in part by income and the presence of other insurance coverage along with a myriad of other factors. Consistent with actuarial projections from the VA, it is expected that the number of veterans and active duty military personal will decrease over the forecast period. Specific adjustments are made in cases in which Federal budgetary information is available.

vii. Models for spending by sponsor of payment

Sponsor of payment categories define which groups hold the ultimate responsibility for financing or supplying the funds needed to support health care spending by direct payers. Thus, our focus is on the relative spending for governments, households, and businesses that support payment for insurance coverage. For example, NHE spending by payer for PHI contains premiums paid to insurance companies financed through multiple sources, including contributions from employers (both public and private) and households and from governments

[38] According to Terry P. Speed, "Iterative proportional fitting, also known as iterative proportional scaling, is an algorithm for constructing tables of numbers satisfying certain constraints." "Iterative Proportional Fitting." Speed, T.P. (2005). Iterative Proportional Fitting. In Encyclopedia of Biostatistics (eds P. Armitage and T. Colton). https://doi.org/10.1002/0470011815.b2a10027

[39] Specifically, we model the Department of Defense and Department of Veterans' Affairs portion of spending within spending classified as "Other Health Insurance Programs." We also model spending trends for worksite health care, Indian Health Service, workers' compensation, general assistance, maternal and child health, vocational rehabilitation, other federal programs, Substance Abuse and Mental Health Services Administration, other state and local programs, and school health, all of which are included within "Other Third Party Payers." For further details on specific programs included in "Other Health Insurance Programs" or "Other Third Party Payers," please see the accounting identities for these categories in our NHEA methodology paper, available at https://www.cms.gov/files/document/definitions-sources-and-methods.pdf.

[40] US Department of Veterans Affairs. National Center for Veterans Analysis and Statistics, The Veteran Population Projection Model 2020 [Internet]. Washington (DC): VA; 2022 Sep 7 [cited 2023 Mar 2]. Available from: https://www.va.gov/vetdata/veteran_population.asp.

through premium subsidies. Similarly, financing for Medicare consists of dedicated tax revenue from employers and employees, premium and interest income, and intergovernmental transfers.[41]

We project premiums for PHI plans, including their underlying components, employer-sponsored insurance (ESI) and other private health insurance for households and employers by types of insurance (group and individual) and sector of employment (public or private). Though PHI consists of ESI, Medicare supplemental insurance, and individually purchased plans, ESI premiums comprise the majority of PHI premiums (approximately 89% in 2019); consequently, the factors described previously that influence the PHI share of our aggregate projection of private PHC spending, combined with growth in the net cost of PHI, explain nearly all the variation in ESI premium growth.

Because premiums for Medicare supplemental insurance and other individually purchased plans grow differently than ESI premiums, we remove each type of spending from total PHI and project them separately. Our projections of per enrollee Medicare supplemental premium growth incorporate assumptions from the most recent Medicare Trustees Report regarding beneficiary trends in benefits and cost-sharing. For other individually purchased plans, we use their historical relationship with overall PHI to develop a projection of spending per enrollee. We then multiply projected enrollment in both Medicare supplemental plans and other individually purchased plans by their respective per enrollee premium projection to obtain an overall premium projection. (See further details on enrollment below.)

To maintain consistency within total expenditures across sponsor and payer estimates, we utilize iterative proportional fitting to adjust the matrix of spending for each cell relative to totals. For example, projections of components of PHI premiums, described above, for households and employers by types of insurance (group and individual) and sector of employment (public or private) must be adjusted to sum to total PHI spending. Additionally, we project payments by employers to state and local governments for workers' compensation and temporary disability insurance econometrically using macroeconomic trends. Conversely, a number of categories of spending are exogenous projections, based on the financing assumptions for both Medicare and Medicaid contained in the most recent Medicare Trustees Report. These categories include the following:

- Worker contributions to Hospital Insurance trust fund and taxation of benefits
- Employer contributions to Hospital Insurance trust fund
- Supplemental Medical Insurance Part B and Part D premium revenues
- Medicaid buy-ins for Medicare premiums
- State Medicaid phase-down payments

d. Private health insurance enrollment and uninsured population models

Projections for insurance enrollment by source of coverage are generated separately from projections for spending by payer. However, both enrollment and spending are modelled as a function of similar macroeconomic and public sector trends, and the implications of the two models for trends in spending per enrollee are evaluated as part of the adjustment process involved in generating the final projections.

As with spending models, enrollment models primarily focus on projecting private sector insurance enrollment, taking projections for enrollment in public sector programs as exogenous inputs to the model to capture shifts in enrollment across sources of coverage. Projections for private health insurance are projected as a function of macroeconomic trends (including growth in employment and real GDP), demographic trends, as well as

[41] Classification of spending by sponsor in the NHE projections is consistent with overall NHEA classification. A detailed description of how spending by source of funding maps to sponsor categories and associated sponsor accounting identities can be found in our most recent NHEA Data, Sources, and Methods paper. Available at https://www.cms.gov/files/document/definitions-sources-and-methods.pdf.

exogenous projections of enrollment in Medicare, Medicaid and other public sources of coverage.

In order to project private health insurance enrollment, we incorporate exogenous projections of enrollment for several public programs, such as Medicare, Medicaid, and CHIP. Current projections of enrollment for these programs are based on the most recent Medicare Trustees Report and the latest available Medicaid projections from the Office of the Actuary. PHI enrollment consists of three components, which are (1) employer-sponsored insurance, (2) individually purchased insurance (excluding Medicare supplemental insurance), and (3) individually purchased supplemental coverage for Medicare enrollees (Medicare supplemental insurance or Medigap).

The uninsured population is effectively projected as a residual implied by projections of population, together with enrollment from all sources of coverage and assumptions on variations in overlap across those sources of coverage.

i. Employer-sponsored insurance

Employer-sponsored insurance (ESI) enrollment is projected based primarily on projected trends in employment. Specifically, we model growth in ESI enrollment per capita primarily as a function of growth in employment. Growth in employment is projected for consistency with exogenous projections generated in the most recent Trustees Report. The responsiveness of ESI enrollment to growth in employment is driven in part by the employers' offer rate for coverage and the terms under which it is offered (share of premium paid by employee). Another factor influencing the ESI enrollment rate is that not all employees accept coverage when offered (thus not all employees "take-up" coverage). Over time, employer offer rates of coverage and employee take-up rates of coverage both gradually decline, with ESI enrollment growing slightly more slowly than employment. Finally, a number of those enrolled in ESI are not current employees, because retirees and dependents of employees may also have coverage. For these groups, rates of coverage are determined by access to family or retiree coverage and the terms on which it is available.

The model of ESI enrollment includes the following independent variables:

- *Growth in total employment.* This variable has a coefficient less than 1.0, implying that ESI enrollment grows at a pace that is slightly less than proportional to employment growth, and less responsive to business cycle fluctuations than employment.
- *Growth in enrollment in individual PHI and Medicaid coverage.* This captures the small substitution effect between ESI coverage and individually purchased plans (individually purchased insurance excluding Medigap plans, purchased both on and off of the ACA Health Insurance Marketplace) and Medicaid coverage.

Though the ratio of ESI enrollment to overall employment has exhibited a largely consistent declining trend over the historical period through 2019, this relationship was significantly altered by the COVID-19 pandemic. There was a substantially smaller decline in ESI enrollment than in employment in 2020, reflecting the unusually high volume of temporary unemployment and legislative provisions intended to encourage employers to maintain coverage for their prior employees during the pandemic. This atypical pattern of growth influenced the near-term projection for growth in ESI enrollment relative to expected growth in employment in 2021. The continued normalization of the relationship between ESI enrollment and employment is expected to have smaller effects of growth in ESI enrollment relative to employment trends in this year's projections for 2022 and 2023, and to stabilize in accordance with historical patterns of growth from 2024 forward.

ii. Individually purchased insurance (excluding Medicare supplemental insurance)

Individually purchased insurance for non-Medicare enrollees includes coverage purchased both on and off of the ACA Health Insurance Marketplace; however, Marketplace enrollment accounts for the largest share of

this enrollment. Marketplace enrollment is projected exogenously based on actuarial methods and includes the effects of legislation providing additional resources to individuals to enroll in this coverage in response to the economic effects of the COVID-19 pandemic. Off-Marketplace coverage (sold outside of the ACA Marketplace) is not eligible for subsidies. Current projections assume that off-Marketplace individual insurance enrollment will continue to account for a small share of the individual market.

iii. Medicare supplemental insurance

We model private secondary Medigap coverage for Medicare enrollees as a share of overall Medicare enrollment. An additional variable in this model is Medicare Advantage enrollment (exogenous projection based on the most recent Medicare Trustees Report) to capture the substitution of Medicare Advantage coverage for privately purchased Medigap plans.

iv. Uninsured population

We expect growth in the uninsured population to generally be consistent with growth in enrollment from all sources of coverage together with population growth. In our model, the growth in the uninsured population is projected based on the "population residual," which is defined as the total population minus the sum of enrollment in insurance across all sources of coverage (assuming constant overlap across enrollment categories). Historically, the rates of growth in the uninsured population and in the population residual have tracked each other fairly closely. However, some persons may be enrolled in more than one type of coverage at a time (a coverage "overlap"), which, in addition to any measurement issues in the source data, may cause differences between the number of uninsured and the population residual. As a result, we monitor and maintain consistency in the relationship between the change in the uninsured population and all projections for enrollment and population. Currently, this relationship reflects a trend toward a rising share of insured persons with overlapping coverage from more than one source.

The period surrounding the COVID-19 pandemic has exhibited large differences in growth between the uninsured population and the population residual. Projections for the uninsured population in the post-COVID-19 era have been influenced by larger fluctuations in overlap across sources of coverage, in response to flux in employment conditions and to large effects on access to coverage through the Federal government's response to the COVID-19 pandemic, which substantially decreased the rate of the uninsured population, particularly in the near term of the projection. This reduction in the uninsured rate is largely due to higher Medicaid enrollment and higher enrollment in Marketplace plans (primarily related to the American Rescue Plan Act's expanded eligibility for subsidized premiums). Medicaid enrollment is projected to increase in 2022 of the projection because of the newly enrolled, as well as the continuous enrollment requirement of the Families First Coronavirus Relief Act (FFCRA), which encouraged states to refrain from initiating disenrollments by paying a larger Federal medical assistance percentage for their enrollees. This continuous enrollment requirement led to implied increases in overlaps of coverage between the Medicaid program and ESI over 2020-21 and influenced the projected relationship between the uninsured population and the population residual. In 2022, projections for the uninsured population relative to the population residual are influenced by growth in Medicaid enrollment (with the associated increase in coverage overlap). Over 2023-24, projections of the uninsured are mainly driven by the ending of the public health emergency which discontinues the FFCRA continuous enrollment requirement, and is associated with decreases in enrollment and coverage overlap as states are expected to begin disenrollments over this period.

4) APPENDIX: LIST OF ACRONYMS

ACA	Affordable Care Act
BLS	Bureau of Labor Statistics
CHIP	Children's Health Insurance Program
CMS	Centers for Medicare & Medicaid Services
CPI	Consumer Price Index
DoD	Department of Defense
DPI	Disposable Personal Income
ESI	Employer Sponsored Insurance
GDP	Gross Domestic Product
HCBW	Home and Community-Based Waivers
LIFT	Maryland Long Term Interindustry Forecasting
NAIC	National Association of Insurance Commissioners
NHE	National Health Expenditure
OACT	Office of the Actuary
OASDI	Old-Age, Survivors, and Disability Insurance
PHC	Personal Health Care
PHI	Private Health Insurance
PI	Personal Income
PPI	Producer Price Index
VA	Department of Veterans Affairs