

Appendix: Improving the Prognosis of Healthcare in the United States

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Single-payer Healthcare Interactive Financing Tool (SHIFT): Calculations and sources

The Single-payer Healthcare Interactive Financing Tool (SHIFT, <http://shift.cidma.us>) is a user-friendly interface which allows adjustment of parameter values that determine the national healthcare budget associated with implementation of the Medicare for All Act (MAA).¹ The interface also allows users to select from a menu of financing options that have been proposed by congressional sponsors of the MAA.² Through incorporation of these user inputs, SHIFT generates the overall national health expenditure and revenue according to the calculations detailed below. The calculations are illustrated here for a base case parameter set supported by economic, medical, and healthcare systems studies. The default settings of the SHIFT interface correspond to the base case parameters and all costs are in 2017 US dollars, using 2017 health expenditure data and corresponding tax code.

Expenditure

Our projections of the national health expenditure following enactment of the MAA take into account expansion of coverage to the 38 million Americans who are currently uninsured,³⁻⁵ as well as increased healthcare utilization for the 41 million who are underinsured.⁶ We also incorporate anticipated savings, including those related to overhead, provider fees and pharmaceutical costs.

The 2017 federal report of national healthcare spending conducted by the Centers for Medicare and Medicaid Services (CMS) estimated that the country spends \$3.492 trillion on healthcare (Σ_{t0}) (Appendix Table 1).⁷

$$\Sigma_{t0} = \$3492 \text{ billion}$$

We calculated the impact of the MAA on each expenditure category as defined by the CMS: service provision, overhead, pharmaceuticals, durable medical equipment, non-durable medical products, public health, and investment. Each step of our calculations is detailed below, with numerical headings corresponding to the columns of Appendix Table 2 and to numerical subscripts throughout.

(1) Consolidating pharmaceutical spending

Given that the MAA would be implemented independently of the Department of Veterans Affairs (VA) and the Indian Health Service (IHS), we separated out the expenditures for these entities from their respective CMS categories. We also consolidated pharmaceutical spending into a single category, including the \$143 billion in pharmaceuticals that are administered as a component of service provision.⁸

(2) Eliminating uncompensated hospitalization fees

An annual \$38.3 billion in hospitalization fees are uncollected, equivalent to 3.6% of the national expenditure for hospital care.⁹ Given that the MAA would reimburse all legitimate healthcare, the national expenditure for hospital services would increase commensurately, and the budget subtotal becomes:

$$\begin{aligned}\Sigma_{h2} &= \Sigma_{h1} + \$38.3 \text{ billion} \\ \Sigma_{t2} &= \$3530 \text{ billion}\end{aligned}$$

Savings

(3) Eliminating avoidable emergency room visits and hospitalizations

Avoidable emergency room visits and hospitalizations can be averted through improved access to primary care. It has been estimated that by providing primary care to people who are currently uninsured, \$7.81 billion in emergency room expenses¹⁰ and \$70.4 billion in hospitalization costs,¹¹ together totalling \$78.21 billion, could be saved.

$$\begin{aligned}\Sigma_{h3} &= \Sigma_{h2} - \$78.21 \text{ billion} \\ \Sigma_{t3} &= \$3452 \text{ billion}\end{aligned}$$

(4) Reducing reimbursement rates for hospitals, physician/clinical services

4.1 Reimbursement of hospital fees

The MAA is expected to establish reimbursement rates for hospital fees comparable to those currently paid by Medicare, which are 22%¹² lower than private insurance but 30% higher than Medicaid.^{12,13} In our base case, we applied Medicare rates to all hospital reimbursements, which yields a rate that is 5.54% lower than the weighted average of current Medicaid, Medicare, and private rates (Appendix Table 3). In sensitivity analyses, we considered fee reductions down to the level of Medicaid rates, which would correspond to an overall reduction of 18.74%. Given that hospital services constitute 34.1% of all healthcare expenditure in the US,¹⁴ these rates substantially impact budget projections (Figure 1A).

4.2 Reimbursement of physician/clinical fees

Similarly, Medicare reimbursements for physician and clinical services are 22% lower than those for private insurance,¹² but 20% higher than those for Medicaid.^{13,7} If all physician and clinical services were reimbursed at Medicare rates, the fees would overall be 7.38% lower than the current average (Appendix Table 3). This assumption that the MAA would result in physicians being reimbursed at Medicare rates was shared by Pollin et al. and Blahous^{15,16}, while other

studies assumed that payment rates would increase by 5 to 9% under the MAA.^{17–20} Alternatively, by applying Medicaid rates, fees for physician and clinical services would be reduced by 19.23% (Figure 1A).

4.3 Base case parameterization.

Fee reductions for hospital (I_h) and physician and clinical (I_c) services are adjustable in the SHIFT interface from 0 to 18.7% and 0 to 19.2%, respectively. Our base case application of Medicare rates to all fees for hospital and for physician and clinical services yields a budget subtotal of:

$$I_h = 0.0554$$

$$I_c = 0.0738$$

$$\Sigma_{h4} = \Sigma_{h3} (1 - I_h)$$

$$\Sigma_{c4} = \Sigma_{c3} (1 - I_c)$$

$$\Sigma_{t4} = \$3352 \text{ billion}$$

(5) Reducing pharmaceutical prices via negotiation

The US spends \$469 billion on pharmaceuticals (Σ_{p1}), equivalent to 14.1% of its national healthcare expenditure.⁷ Legislative prohibitions on pharmaceutical price negotiations have led to prices in the US that are higher than in any other country.²¹ As an exception, the VA has the authority to negotiate prices in accordance with therapeutic value, achieving prices that are 40% lower than those paid by Medicare.²² The VA approach could reasonably realize comparable reductions nationwide given that price negotiations would be permitted by the MAA. Therefore, we apply a 40% reduction for our base case, similar to Senator Elizabeth Warren,²³ Pollin *et al*¹⁵ and Friedman.²⁰ Other studies have included smaller reductions.^{16–20} In the SHIFT interface, user input (I_n) allows specification of the expected reduction in pharmaceutical spending achievable through price negotiation (Figure 1B), from 0 to 60%. If negotiations could lower prices to those paid by the VA, and thereby achieve a 40% reduction, the budget subtotal becomes:

$$I_n = 0.4$$

$$\Sigma_{p5} = \Sigma_{p4} (1 - I_n)$$

$$\Sigma_{t5} = \$3164 \text{ billion}$$

(6) Reducing overhead expenditure

Insurance overhead currently ranges from 2.2% under Medicare to 12.4% within the private sector,²⁴ and overall represents 7.9% of national healthcare spending. Transitioning to universal enrollment in Medicare could reduce overhead substantially (Figure 1B). User input (I_o) allows specification of the expected overhead rate across the range of 2.2% to 12.4%. If the MAA achieves the current Medicare overhead rate of 2.2% on all categories excluding non-durable medical products, investment, public health, and VA/IHS, the budget subtotal becomes:

$$I_o = 0.022$$

$$\Sigma_{o6} = I_o (\Sigma_{t5} - \Sigma_{o5} - \Sigma_{n5} - \Sigma_{m5} - \Sigma_{p5} - \Sigma_{v5})$$

$$\Sigma_{t6} = \$2945 \text{ billion}$$

(7) Improving fraud detection

In addition to reducing overhead, the unified billing system generated for a single-payer system would facilitate fraud detection. It has been estimated that 5% of healthcare expenditure could be eliminated through fraud detection within the first two years of implementing a single-payer system.²⁵ In Taiwan, consolidation of provider claims via a single-payer system, which made fraud and abuse detection possible, resulted in an 8% reduction in national healthcare spending.²⁶ We conservatively assume half of the reduction in national health expenditure realized in Taiwan as a result of improved fraud detection: 4%. Furthermore, the SHIFT interface allows the user to adjust fraud detection from 0 to 10%. User input (I_f) allows specification of the expected fraud reduction from 0 to 10%. With 4% savings applied to all categories excluding non-durable medical products, investment, public health, and VA/IHS, the budget subtotal becomes:

$$I_f = 0.04$$

$$\Sigma_{t7} = (1 - I_f)(\Sigma_{t6} - \Sigma_{n6} - \Sigma_{m6} - \Sigma_{p6} - \Sigma_{v6})$$

$$\Sigma_{t7} = \$2843 \text{ billion}$$

Consumption

(8) Insurance expansion

In 2018, 38.0 million Americans (11.7% of the country, P_w)⁵ were uninsured. An additional 41 million adults were underinsured (12.6%, P_u).⁶ Healthcare spending among uninsured people is 50.1% of that among their insured counterparts (S_w),²⁷ while spending among underinsured people is approximately 86.0% of that spent by those who are adequately insured (S_u).²⁸ SHIFT inputs specify the expected increase in healthcare use for the uninsured or underinsured (I_w and I_u , respectively), compared to current health-care use for the adequately insured. F , the factor by which overall health-care use increases, is calculated to be 1.08 with our base case inputs. The RAND study projected an 8% increase, despite different underlying calculations.¹⁹ F is applied to all expenditure categories excluding dental, non-durable medical products, investment, public health, and VA/IHS:

$$S_w = 0.501$$

$$S_u = 0.860$$

$$I_w = 1$$

$$I_u = 1$$

$$P_w = 0.117$$

$$P_u = 0.126$$

$$F = \frac{(1 - P_w - P_u) + P_w I_w + P_u I_u}{(1 - P_w - P_u) + P_w S_w + P_u S_u} = 1.08$$

$$\Sigma_{h8} = F (\Sigma_{h7})$$

$$\Sigma_{c8} = F (\Sigma_{c7})$$

$$\begin{aligned}\Sigma_{j8} &= F(\Sigma_{j7}) \\ \Sigma_{a8} &= F(\Sigma_{a7}) \\ \Sigma_{k8} &= F(\Sigma_{k7}) \\ \Sigma_{r8} &= F(\Sigma_{r7}) \\ \Sigma_{o8} &= F(\Sigma_{o7}) \\ \Sigma_{p8} &= F(\Sigma_{p7}) \\ \Sigma_{e8} &= F(\Sigma_{e7})\end{aligned}$$

Altogether, the total projected expenditure is:

$$\Sigma_{t8} = \$3034 \text{ billion}$$

Thus, the implementation of the MAA is expected to result in cost savings of \$458 billion, corresponding to a 13.1% reduction in national health expenditure.

Revenue

Existing sources of revenue

The federal government directed \$982 billion toward healthcare expenditures in 2017.²⁹ This spending includes Medicare payments towards care for seniors, the federal portion of Medicaid payments, marketplace tax credits and subsidies, and federal health programs such as the VA and IHS. The revenue streams which supports this expenditure are expected to remain intact, including current Medicare taxes, with one exception: as the Medicare Trust Fund distributed \$5 billion more than it received in income, we exclude this unsustainable revenue source and thereby also resolve the Medicare Trust Fund shortfall. Conversely, the MAA would render tax exemptions for employer-based healthcare premiums obsolete, thereby adding \$332 billion in revenue.⁷

In addition to federal government spending, state and local governments currently contribute another \$596 billion, directed primarily to Medicaid.³⁰ Either these revenue lines would be maintained or state/local taxes would be substantially reduced; we assume the latter. We also assume that employer spending on workers' compensation and worksite health would continue, constituting \$46 billion and \$7 billion, respectively. Furthermore, the \$239 billion contributed by philanthropic and other private sources would also continue. As above, the \$64 billion spent out-of-pocket on non-durable medical goods, such as bandages and over the counter medications, is expected to be unaffected. Existing sources of revenue therefore constitute:

$$R_e = \$2261 \text{ billion}$$

To close the gap between existing federal revenue and projected expenditure, current spending by employers and individuals on private insurance would be rerouted into the single-payer system through taxation. Two candidates for the Democratic presidential nomination, Senator

Bernie Sanders² and Senator Elizabeth Warren,²³ have each outlined a suite of tax-based revenue options that would generate more than the required funding for the MAA. Moreover, the range of employer and household tax increases under consideration would be less than the average savings realized by the elimination of health insurance premiums paid by employers and households, respectively. We adjust the suggested 10-year yield of each option at the 3.84% annual growth in GDP projected by the Congressional Budget Office to find the expected revenue in the first year of implementation, and convert to 2017 US dollars.^{23,31} Within SHIFT, the user is able to select and calibrate these options to match the expenditure projection.

Payroll tax

American employers collectively spend \$697 billion annually on healthcare. Of this, employers pay \$536 billion towards healthcare premiums for their employees.⁷ Thus, any MAA payroll tax which collects revenue below this sum would, on average, yield savings for employers. Conservatively, this assumption does not take into account the administrative expense of selecting, negotiating and managing healthcare plans for employees.⁷

A 10% tax on company payroll above \$2 million has been calculated to yield \$3.9 trillion over 10 years,² and therefore \$436 billion in the first year. The \$536 billion currently spent by employers on healthcare premiums⁷ would therefore be equivalent to a 12.29% payroll tax. User input (I_p) allows specification of the payroll tax within the range 0 to 12.29%. For the base case, we assume a payroll tax of 10%, yielding:

$$I_p = 0.1$$
$$R_p = \$436 \text{ billion}$$

Household income tax

Nationally, households pay \$372 billion towards premiums or other health insurance.⁷ Out-of-pocket expenditures also constitute \$366 billion, which would drop to \$64 billion when co-pays and premiums are eliminated.⁷ The overall \$674 billion sum that would be saved by households could be replaced by a household income tax to fund the MAA. A 4% tax on household income (beyond \$29,000)² has been calculated to yield \$3.5 trillion over 10 years,² and therefore a 5% tax would yield \$375 billion in the first year. Given 126.2 million households in the United States,³² the average household contribution from this tax would be \$2971. Average out-of-pocket spending would drop to \$507 annually, for combined average annual household savings of \$2369.

The \$674 billion in relief from premiums and out-of-pocket spending would be equivalent to a 9% income tax. Therefore, user input (I_i) allows specification of the household income tax rate from 0 to 9%. As above, a 5% household income tax would yield:

$$I_i = 0.05$$
$$R_i = \$375 \text{ billion}$$

With base case settings, the total yield from these two taxes and existing revenue would be:

$$R_t = R_e + R_p + R_i$$
$$R_t = \$3072 \text{ billion}$$

This yield exceeds the budget expectation by \$38 billion. This revenue excess could serve as a cushion and guard against year to year fluctuations.

Alternative Revenue Options

Alternative revenue options have also been proposed to finance MAA.² Inclusion of these options would allow the tax rates specified above to be reduced, improving savings for employers or households. The following options are disabled by default in the interface, but can be enabled by the user.

Reforms to Tax Code:

Eliminate accelerated cost recovery for large corporations

Eliminating the ability of large corporations to deduct the cost of their assets more quickly than actual depreciation would generate \$1.25 trillion over 10 years,²³ or \$98 billion in the first year.

Modify the estate tax

By returning the estate tax to levels from 2009, the existing 40% estate tax would be replaced by progressive rates. These rates exempt the first \$3.5 million of a single person's estate and the first \$7 million of a married couple's estate. Estates valued between \$3.5 and \$10 million would be taxed at 45%, those valued between \$10 and \$50 million would be taxed at 50%, and those exceeding \$50 million in value would be taxed at 55%. A 10% surtax would also be applied to estates valued above \$500 million and \$1 billion, for single and married people respectively. The reinstatement of this estate tax would raise \$21 billion in the first year.

Eliminate Gingrich-Edwards provision

The Gingrich-Edwards provision permits self-employed individuals who have S-Corporations to pay less tax for Social Security and Medicare, by reporting some of their income as business profit rather than salary. By eliminating this loophole, all income would be subject to the 3.8% tax for funding Medicare, which would raise \$21 billion in the first year.

Eliminate Last-In-First-Out (LIFO) accounting rule

The LIFO inventory method assumes that the last purchased inventory item was the first one sold. Under the assumption that the cost of inventory increases over time as a result of inflation, the newest inventory will have higher costs than older inventory. By using this rule, reported profits, and thus taxes, are reduced. While this practice is banned internationally, it is still permitted in the US tax code.^{33,34} Banning this accounting practice would generate \$9.5 billion in the first year.

Establish minimum rate for foreign-earning taxes

Additionally, enacting a foreign-earning tax minimum of 35% would generate \$1.65 trillion.²³, or \$130 billion in the first year.

Elimination of the Overseas Contingency Operations Fund

Defunding the Overseas and Contingency Operations Fund is projected to save \$800 billion over 10 years,²³ corresponding to \$62.9 billion in the first year.

Removal of preferential tax rates on capital gains

A tax rate on capital gains and dividends for the wealthiest 1% of households that matches the rate for labor-generated income would generate \$2 trillion over 10 years,²³ or \$157.6 billion in the first year.

Additional Tax Options:

Sanders net worth tax

A 1% tax on household net worth above \$21 million, applied to 0.1% of all households, would yield \$1.3 trillion over 10 years,² and \$109 billion in the first year of implementation. User input (I_w) allows specification of the tax rate to range from 0% to 2%.

Warren net worth tax

A 2% tax on net worth over \$50 million with a 1% surtax on net worth above \$1 billion is estimated to generate \$1 trillion over 10 years,²³ corresponding to \$78.8 billion in the first year.

Sanders Fee on large financial institutions

Imposing a 0.7% fee on the covered liabilities of financial institutions with assets exceeding \$50 billion, as proposed by the previous administration, would yield \$9.8 billion in the first year.

Warren Fee on large financial institutions

Instituting 0.1% taxes on the purchase of most securities as well as transactions that involve derivatives is estimated to generate \$800 billion in revenue over 10 years²³, or \$62.9 billion in revenue in the first year.

Life-saving potential of the MAA

Regardless of the cost structure selected, we estimated that implementing the MAA would save the lives of 68,531 Americans annually, totaling 1,734,029 years of life saved.

First, by taking the product of age-specific uninsurance rates^{3,35} and the population within each age class,⁵ we calculated the number of uninsured people in each age class, collectively totaling 37,977,297 Americans. Adults aged 25 to 35 are disproportionately represented in this distribution, accounting for over 9 million of the uninsured. Given that uninsured individuals experience a 40% elevation in mortality risk compared with insured individuals of the same

age,³⁶ we calculated mortality rates specific to age and insurance status. We then translated these rates into the expected number of deaths if all Americans had been insured, dividing the actual number of age-specific deaths that were reported³⁷ by the product of these mortality rates and the age-specific proportions of the population that are insured and uninsured, respectively. By subtracting the number of expected deaths in each age group under universal insurance coverage from the number of actual deaths that occurred,³⁷ we estimated that on an annual basis, universal coverage would have saved the lives of 68,531 Americans. These are predominantly lives of relatively young people, given that the vast majority of individuals older than 64 years are already covered under Medicare. Based on the age distribution of these premature deaths that would be averted and their corresponding life expectancies, we calculated that universal coverage would save 1.73 million life-years annually.

Table 1. Model parameters. Parameters that are modifiable by users have a base case value provided in addition to the range of possible modification in the SHIFT interface.

Parameter	Symbol	Value or Basecase Value [Range]	Source
<i>National Health Expenditure Budget Category (\$US 2017, billions)</i>			⁷ [Table 19]
Services	Σ_{s0}	$\Sigma_{h0} + \Sigma_{c0} + \Sigma_{j0} + \Sigma_{d0} + \Sigma_{a0} + \Sigma_{k0} + \Sigma_{r0}$	
Hospital Care	Σ_{h0}	1142.59	
Physician and Clinical Services	Σ_{c0}	694.30	
Other Professional Services	Σ_{j0}	96.63	
Dental Services	Σ_{d0}	129.10	
Other Health, Residential, and Personal Care Services	Σ_{a0}	183.12	
Home Health Care	Σ_{k0}	97.04	
Nursing Care Facilities and Continuing Care Retirement Communities	Σ_{r0}	166.30	
Overhead	Σ_{o0}	274.52	
Prescription Drugs	Σ_{p0}	333.44	
Durable Medical Equipment	Σ_{e0}	54.42	
Other Non-durable Medical Products	Σ_{n0}	64.07	
Investment	Σ_{m0}	167.62	
Public Health	Σ_{u0}	88.93	
Veterans Affairs and Indian Health Services	Σ_{v0}	0	
Total National Health Expenditure (\$, billions)	Σ_{t0}	3492.08	⁷ [Table 19]
Uncompensated hospitalization fees (\$, billions)	H	38.3	⁹
<i>Cost reduction due to:</i>			
Reduced reimbursement for hospital services	I_h	0.0554 [0–0.187]	See Appendix Table 3
Reduced reimbursement for physician and clinic services	I_c	0.0738 [0–19.20]	See Appendix Table 3
Pharmaceutical price negotiation	I_n	0.40 [0–0.60]	²²

Reduced overhead	I_o	0.022 [0.022–0.124]	24
Improved fraud detection	I_f	0.04 [0–0.10]	25,26
<i>Proportion of population:</i>			
Uninsured	P_w	0.117	3,5,35
Underinsured	P_u	0.126	5,6
<i>Healthcare spending as a proportion of those insured or adequately insured, by:</i>			
Uninsured	S_w	0.501	27
Underinsured	S_u	0.86	28
Factor increase in healthcare spending for the total population	F	$\frac{(1-P_w-P_u+P_w(I_w)+P_u(I_u))}{1-P_w(1-F_w)-P_u(1-F_u)} = 1.08$	Calculated
<i>Compared to current spending by adequately insured, future spending by:</i>			
Uninsured	I_w	1 [0.501–1]	27
Underinsured	I_u	1 [0.86–1]	28
Existing sources of revenue (\$, billions)	R_e	2261	⁷ [Table 5]
<i>Revenue from new tax categories (\$, billions):</i>			
Payroll	R_p	436	2
Household income	R_i	375	2
Total Revenue (\$, billions)	R_t	$R_e+R_p+R_i=$ 3072	Calculated
<i>Proposed tax rates by category</i>			
Payroll	I_p	0.10 [0–0.1229]	2,7
Household income	I_i	0.05 [0–0.09]	2

Table 2. National Health Expenditure Budget by Category (\$US 2017, billions) upon adoption of the Medicare for All Act (MAA). The budget is shown for each category as aspects of the MAA are implemented, step-by-step, as outlined by our explanation of the SHIFT interface. Budget subtotals due to the savings accrued by adopting the MAA are denoted by Σ_{t1} through Σ_{t8} , with the final budget denoted Σ_{t8} .

	Step in calculation of National Health Expenditure Budget by category upon adoption of the MAA (\$US 2017, billions)^a							
Budget Category^b	1	2	3	4	5	6	7	8
Hospital (Σ_{hi})	1054.5	1092.8	1014.6	958.4	958.4	958.4	920.1	995.5
Clinical (Σ_{ci})	601.1	601.1	601.1	556.7	556.7	556.7	534.4	578.3
Other Prof. (Σ_{ji})	96.6	96.6	96.6	96.6	96.6	96.6	92.8	100.4
Dental (Σ_{di})	128.7	128.7	128.7	128.7	128.7	128.7	123.5	123.5
Other Serv. (Σ_{ai})	181.7	181.7	181.7	181.7	181.7	181.7	174.4	188.7
Home Care (Σ_{ki})	92.1	92.1	92.1	92.1	92.1	92.1	88.4	95.7
Nursing Care (Σ_{ri})	143.8	143.8	143.8	143.8	143.8	143.8	138.0	149.4
Overhead (Σ_{oi})	273.7	273.7	273.7	273.7	273.7	54.9	52.7	57.0
Prescriptions (Σ_{pi})	468.8	468.8	468.8	468.8	281.3	281.3	270.0	292.2
Durable Med. (Σ_{ei})	54.4	54.4	54.4	54.4	54.4	54.4	52.2	56.5
Non-Durable (Σ_{ni})	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1
Investment (Σ_{mi})	167.6	167.6	167.6	167.6	167.6	167.6	167.6	167.6
Public Health (Σ_{ui})	88.9	88.9	88.9	88.9	88.9	88.9	88.9	88.9
VA & IHS (Σ_{vi})	76.1	76.1	76.1	76.1	76.1	76.1	76.1	76.1
Services (Σ_{si})	2298.4	2336.7	2258.5	2158.0	2158.0	2158.0	2071.6	2231.4
Total (Σ_{ti})	3492.1	3530.4	3452.2	3351.6	3164.1	2945.3	2843.3	3033.8

^a In order, the steps in the calculation of National Health Expenditure Budget by category are: (1) Consolidating pharmaceutical spending, (2) Eliminating uncompensated hospitalization fees, (3) Eliminating avoidable emergency room visits and hospitalizations, (4) Reducing reimbursement rates for hospitals, physician, and clinical services, (5) Reducing pharmaceutical prices, (6) Reducing overhead expenditure, (7) Improving fraud detection, and (8) Insurance expansion

^b In order, the budget categories are: Hospital Care, Physician and Clinical Services, Other Professional Services, Dental Services, Other Health, Residential, and Personal Care Services, Home Health Care, Nursing Care Facilities and Continuing Care Retirement Communities, Overhead, Prescription Drugs, Durable Medical Equipment, Other Non-durable Medical Products, Investment, Public Health, Veterans Affairs and Indian Health Services, All Services, and the Total National Health Expenditure.

Table 3. Calculation for percent reduction in spending by funding source upon application of Medicare rates under the Medicare for All Act for both Hospitals and Physician & Clinical services.

	Share of National Health Expenditures by Funding Source (%) ⁷	Applying Medicare Spending Rates to Share of Expenditure by Funding Source (%) ^{7,12,27}	Current Spending (\$, billions) ⁷	Spending after applying Medicare rates (\$, billions) ^{7,12,27}	Percent Reduction (%)
Physician and Clinical Services					
<i>Private insurance</i>	43.2%	33.7%	300.87	234.68	
<i>Medicare</i>	22.6%	22.6%	159.03	159.03	
<i>Medicaid, CHIP, and Indian Health</i>	11.9%	14.3%	79.64	95.56	
<i>Other Payment</i>	22.3%	22.3%	141.76	141.76	
		Total:	681.30	631.03	7.38%
Hospitals					
<i>Private insurance</i>	39.4%	30.7%	455.33	355.16	
<i>Medicare</i>	24.7%	24.7%	282.94	282.94	
<i>Medicaid, CHIP, and Indian Health</i>	18.5%	22.2%	198.57	238.29	
<i>Other Payment</i>	17.3%	17.3%	155.35	155.35	
		Total:	1092.19	1031.73	5.54%

References

- 1 Sanders B. To establish a Medicare-for-all national health insurance program. 2017 <https://www.sanders.senate.gov/download/medicare-for-all-act?id=6CA2351C-6EAE-4A11-BBE4-CE07984813C8&download=1&inline=file>.
- 2 Sanders B. Options to Finance Medicare for All. 2017 <https://www.sanders.senate.gov/download/options-to-finance-medicare-for-all?inline=file>.
- 3 Berchick ER, Hood E, Barnet JC. Health Insurance Coverage in the United States: 2017. U.S. Department of Commerce Economics and Statistics Administration; U.S. Census Bureau, 2018 <https://www.census.gov/content/dam/Census/library/publications/2018/demo/p60-264.pdf>.
- 4 Auter Z. U.S. Uninsured Rate Steady at 12.2% in Fourth Quarter of 2017. Gallup. 2018; published online Jan 16. <https://news.gallup.com/poll/225383/uninsured-rate-steady-fourth-quarter-2017.aspx> (accessed July 3, 2018).
- 5 United States Census Bureau. Annual Estimates of the Resident Population for Selected Age Groups by Sex for the United States, States, Counties, and Puerto Rico Commonwealth and Municipios: April 1, 2010 to July 1, 2017 more information 2017 Population Estimates. American FactFinder. 2018; published online June. <https://factfinder.census.gov/bkmk/table/1.0/en/PEP/2017/PEPAGESEX> (accessed July 3, 2018).
- 6 Collins SR, Gunja MZ, Doty MM. How Well Does Health Coverage Protect Consumers from Costs? Findings from the Commonwealth Fund Biennial Health Insurance Survey, 2016. The Commonwealth Fund, 2017 http://www.commonwealthfund.org/~media/files/publications/issue-brief/2017/oct/collins_uninsured_biennial_ib.pdf.
- 7 Centers for Medicare and Medicaid Services. Historical National Expenditure Accounts. CMS.gov. 2018; published online Jan 8. <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsHistorical.html> (accessed Aug 13, 2018).
- 8 Projections of the Prescription Drug Share of National Health Expenditures Including Non-Retail. Altarum. 2018; published online June 28. <https://altarum.org/publications/projections-of-the-prescription-drug-share-of-national-health-expenditures-including-non-retail> (accessed July 17, 2018).
- 9 American Hospital Association. Uncompensated Hospital Care Cost Fact Sheet. AHA, 2017 <https://www.aha.org/system/files/2018-01/2017-uncompensated-care-factsheet.pdf>.
- 10 Weinick RM, Burns RM, Mehrotra A. Many emergency department visits could be managed at urgent care centers and retail clinics. *Health Aff* 2010; **29**: 1630–6.
- 11 Institute of Medicine. The Healthcare Imperative: Lowering Costs and Improving Outcomes:

Workshop Series Summary. Washington, DC: The National Academies Press, 2010.

- 12 Medicare Payment Advisory Commission. Report to the Congress: Medicare Payment Policy. MEDPAC, 2017
http://medpac.gov/docs/default-source/reports/mar17_entirereport.pdf.
- 13 U.S. Government Accountability Office. Medicaid Payment: Comparisons of Selected Services Under Fee-for-service, Managed Care, and Private Insurance. GAO, 2017
<https://www.gao.gov/assets/670/664782.pdf>.
- 14 Cuckler GA, Sisko AM, Poisal JA, *et al*. National Health Expenditure Projections, 2017-26: Despite Uncertainty, Fundamentals Primarily Drive Spending Growth. *Health Aff* 2018; **37**: 482–92.
- 15 Pollin R, Heintz J, Arno P, Wicks-Lim J, Ash M. Economic Analysis of Medicare for All. Political Economy Research Institute at the University of Massachusetts Amherst. 2018; published online Nov 30.
<https://www.peri.umass.edu/publication/item/1127-economic-analysis-of-medicare-for-all> (accessed Dec 5, 2019).
- 16 Blahous C. The Costs of a National Single-Payer Healthcare System. 2018; published online July 30. DOI:10.2139/ssrn.3232864.
- 17 Thorpe KE. An Analysis of Senator Sanders Single Payer Plan. Emory University, 2016
<https://www.healthcare-now.org/296831690-Kenneth-Thorpe-s-analysis-of-Bernie-Sanders-s-single-payer-proposal.pdf>.
- 18 Holahan J, Clemans-Cope L, Buettgens M, Favreault M, Blumberg LJ, Ndwandwe S. The Sanders single-payer health care plan. *Urban Institute* 2016.
https://www.researchgate.net/profile/Linda_Blumberg/publication/303826315_The_Sanders_Single-Payer_Health_Care_Plan_The_Effect_on_National_Health_Expenditures_and_Federal_and_Private_Spending/links/5756bb2e08ae5c654903d59b/The-Sanders-Single-Payer-Health-Care-Plan-The-Effect-on-National-Health-Expenditures-and-Federal-and-Private-Spending.pdf.
- 19 Liu JL, Eibner C. National Health Spending Estimates Under Medicare for All. 2019.
https://www.rand.org/pubs/research_reports/RR3106.html.
- 20 Friedman G. Yes, We Can Have Improved Medicare for All. The Hopbrook Institute, 2018
https://f411bec1-69cf-4acb-bb86-370f4ddb5cba.filesusr.com/ugd/698411_9144a6d2d0374ec1a183b30e8369738b.pdf.
- 21 International Federation of Health Plans. 2015 Comparative Price Report: Variation in Medical and Hospital Prices by Country. iFHP, 2016
<https://fortunetodotcom.files.wordpress.com/2018/04/66c7d-2015comparativepricereport09-09-16.pdf>.
- 22 Frakt AB, Pizer SD, Feldman R. Should Medicare adopt the Veterans Health Administration formulary? *Health Econ* 2012; **21**: 485–95.

- 23 Berwick DM, Johnson S. Medicare for All Cost Letter. Senator Elizabeth Sanders, 2019 https://assets.cffassets.net/4ubxbgy9463z/2Tg9oB55lCu2vtYBaKKcVr/d124e0eeb128ad3a8d8ab8a6ccae44c0/20191031_Medicare_for_All_Cost_Letter___Appendices_FINAL.pdf#page=2.
- 24 Woolhandler S, Himmelstein DU. Single-Payer Reform: The Only Way to Fulfill the President's Pledge of More Coverage, Better Benefits, and Lower Costs. *Ann Intern Med* 2017; **166**: 587–8.
- 25 Hsiao WC, Knight AG, Kappel S, Done N. What Other States Can Learn From Vermont's Bold Experiment: Embracing A Single-Payer Health Care Financing System. *Health Aff* 2011; **30**: 1232–41.
- 26 Lu J-FR, Hsiao WC. Does universal health insurance make health care unaffordable? Lessons from Taiwan. *Health Aff* 2003; **22**: 77–88.
- 27 Coughlin TA. Uncompensated care for the uninsured in 2013: A detailed examination. 2014. <https://www.kff.org/uninsured/report/uncompensated-care-for-the-uninsured-in-2013-a-detailed-examination/>.
- 28 Brot-Goldberg ZC, Chandra A, Handel BR, Kolstad JT. What does a Deductible Do? The Impact of Cost-Sharing on Health Care Prices, Quantities, and Spending Dynamics. *Q J Econ* 2017; **132**: 1261–318.
- 29 Centers for Medicare & Medicaid Services. National Health Expenditure Accounts: Methodology Paper, 2017. CMS.gov, 2017 <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/downloads/dsm-17.pdf>.
- 30 CMS. National Health Expenditures 2016 Highlights. U.S. Centers for Medicare & Medicaid Services. 2016. <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/downloads/highlights.pdf> (accessed June 25, 2018).
- 31 Congress of the United States Congressional Budget Office. The Budget and Economic Outlook: 2019 to 2029. 2019 <https://www.cbo.gov/system/files/2019-03/54918-Outlook-3.pdf>.
- 32 US Census Bureau. America's Families and Living Arrangements: 2017, Average number of people (AVG table series). United States Census Bureau. <https://www2.census.gov/programs-surveys/demo/tables/families/2017/cps-2017/tabavg1.xls> (accessed July 18, 2018).
- 33 IFRS. IAS 2 Inventories. International Financial Reporting Standards Foundation. <https://www.ifrs.org/issued-standards/list-of-standards/ias-2-inventories/> (accessed Feb 25, 2019).
- 34 Legal Information Institute. 26 U.S. Code Section 472 Last-in, first-out inventories. Legal Information Institute Cornell Law School. 2019.

<https://www.law.cornell.edu/uscode/text/26/472> (accessed Feb 26, 2019).

- 35 Witters D. U.S. Uninsured Rate Rises to Four-Year High. Gallup National Health and Well-Being Index. 2019; published online Jan 23.
<https://news.gallup.com/poll/246134/uninsured-rate-rises-four-year-high.aspx> (accessed Jan 23, 2019).
- 36 Wilper AP, Woolhandler S, Lasser KE, McCormick D, Bor DH, Himmelstein DU. Health insurance and mortality in US adults. *Am J Public Health* 2009; **99**: 2289–95.
- 37 Xu J, Murphy SL, Kochanek KD, Bastian B, Arias E. Deaths: Final Data for 2016. *Natl Vital Stat Rep* 2018; **67**: 1–76.