


Reducing the Cost of Medicaid: A Multistate Simulation

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ABSTRACT: According to some estimates, the United States wastes as much as 30% of health care dollars. Some of that waste can be mitigated by reducing certain costs associated with Medicaid. We chose 5 areas of savings applicable to Medicaid: (1) modification of physician payment models to reduce unnecessary care, (2) development of a medication adherence program for patients dually eligible for Medicaid and Medicare support (“dual eligibles”), (3) improvement in unnecessary admissions and readmissions for dual eligibles, (4) reduction in emergency department visits among children in Medicaid and dual-eligible beneficiaries, and (5) improvement in adoption of end-of-life advance directives. We chose the states from both ends of the spending spectrum: the 5 with the lowest annual Medicaid expenditures: Wyoming, South Dakota, Montana, Vermont, and Alaska, and those with the highest: California, New York, Texas, Pennsylvania, and Florida. This spectrum demonstrates the range of potential cost-saving measures, from US \$23.6 million in Wyoming to US \$3.4 billion in California. We conclude that there are a number of ways to reduce Medicaid spending and improve quality. To the extent that states have already adopted programs addressing the same problems, our approach may be supplementary but the total savings may be achieved with a combination of current initiative and those described here. As Medicaid creates savings, physician payment could be increased to attract more physicians into caring for Medicaid patients.

KEYWORDS: Medicaid, dual-eligible beneficiaries, hospital readmissions

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Introduction

According to the Institute of Medicine, 30% of dollars spent on health care is waste in the American medical system.¹ Berwick and Hackbarth² conducted additional analysis and placed a midpoint estimate of waste at 34% of national health spending. Although Medicaid programs operate with extremely low margins, and prospective savings will not approach 30%, savings are possible. Medicaid in the state of Texas, for example, represents just over 30% of the state budget and covers 4.4 million people. In 2016, Texas spent US \$18 billion on Medicaid; with the Federal Medical Assistance Percentage (FMAP) at 57.13%, the federal government paid US \$20.5 billion, for the total state + federal shares at US \$38.5 billion.³ Even with only a 5% reduction, annual savings could equal well over US \$1 billion, which could be used to improve care and potentially redistribute funding to chronically underfunded areas, such as payments to physicians. In Alaska, where the FMAP is 50%, the total spending on Medicaid (including state and federal contributions) in 2016 was US \$1.42 billion³; Alaska's portion of this payment is \$710 million. Applying a 5% savings would yield US \$35.5 million for other state programs and priorities.

This article adds to current work on Medicaid reform by exploring specific pathways to find and estimate savings that, at the same time, maintain or improve quality of care. These results should be applicable to Medicaid programs across the states, as well as to other parts of the US health care system. We use the “Wedges Model” for examining proposed reductions in health

care spending, a framework Berwick and Hackbarth² refined to examine a variety of cost-saving initiatives to target wasteful spending in key areas such as failures in care coordination/delivery and overtreatment. The key areas identified in the Wedges Model led us to identify 5 approaches to savings, which could contribute to stabilizing health care spending through streamlining and strengthening care coordination and minimizing unnecessary treatment. The innovative initiatives highlighted are adaptable, relatively low-cost investments, yielding meaningful savings to Medicaid. The programs also aid vulnerable and costly health care populations. The proposed initiatives, applied to the 10-state sample to represent the full range of potential cost savings, include reduction in unnecessary care, improved medication adherence in dual-eligible beneficiaries, improved care for dual-eligible beneficiaries to reduce hospital readmissions, reduction in emergency department (ED) visits among children in Medicaid and dual-eligible beneficiaries, and improved coordination for end-of-life care.

Pathways to Savings

Health workforce initiatives

To reduce overutilization of EDs. The overuse of EDs is a large drain of health care dollars. Routine care provided in an ED setting can be 2 to 5 times more expensive than the same care provided in an alternate setting such as an urgent care clinic.⁴ A Health Partners study discovered charges for treating strep



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throat in the ED to be US \$328, US \$130 at an urgent care center, and US \$122 in a primary care office.⁵ Clearly, based on these figures, it is critical to find ways to treat as many patients as possible outside of an ED due to the 261% price premium that ED care costs.

Massachusetts conducted an in-depth analysis of their ED usage and the emergent status of patient's health when visiting the ED. Of all ED visits, 42% were classified as avoidable.⁶ If we extrapolated this percentage to California, this would translate to 5 749 000 avoidable ED visits per year, and in South Dakota, this percentage would translate to 114 000 annual avoidable ED visits.⁷ The Massachusetts report also highlighted disparities between incomes: the residents in the lowest income quartile, after adjusting for age and sex, had greater than 3 times the avoidable ED rate than residents in the highest income quartile. The lowest income quartile would represent uninsured and Medicaid populations.

The most beneficial program to reduce ED usage is one that prevents unnecessary trips to the ED. This can involve enhancing programs such as "Grand-Aides" to assist patients in health care management and reduce their perceived need for ED treatment. Grand-Aides are nurse aides who are closely supervised by nurses and foster relationships with patients and family with the goal of appropriate use of the ED. Calculations indicate Grand-Aides could potentially reduce Medicaid ED visits by 74% in Medicaid children and patients dually eligible for Medicaid and Medicare support ("dual eligibles").⁸

To improve medication adherence among dual eligibles. About 50% of patients with chronic diseases take their medications appropriately.⁹ Medication nonadherence among the other 50% generates a significant cost burden. Dual eligibles represent 15% of the national Medicaid population but require 33% of Medicaid spending.¹⁰ This high level of spending can be partially attributed to the dual-eligible population's vulnerability and complicated chronic health conditions. Significantly, the Grand-Aides program has achieved a 91% medication adherence in patients with heart failure 1 month after discharge.¹¹

To reduce avoidable hospitalization among dual eligibles. Dual-eligible beneficiaries are at a higher risk for potentially avoidable hospitalizations—admissions and readmissions. Among hospital visits in this population, just over one quarter (26%) of hospitalizations have been determined to be unnecessary, many due to readmissions.¹² The Grand-Aides program is one initiative achieving the aim of reducing readmissions with a demonstrated ability to reduce hospital readmissions by 58%.¹¹

Payment Initiatives

To reduce unnecessary care

Most physicians are still predominately paid on a fee-for-service (FFS) basis. Medicaid programs could propose new

payment methods. For physicians who are already part of hospital systems or Accountable Care Organizations (ACOs) it would be reasonable to convert to a salaried system (at their current yearly income), with a relatively modest bonus (ie, 5%-10%) for quality. Physician income does not need to decrease with these changes. As Medicaid generates savings in this and other areas, physician payment should increase to attract more physicians into caring for Medicaid patients. Salary + bonus would be the dominant method of payment. For physicians not in systems, Medicaid could test the resultant effect on patient care of paying a certain amount per patient with a bonus for quality. It could also change to FFS payment with not only incentives for quality but also disincentives for doing what physicians' own specialty societies determine in their guidelines to be unnecessary or harmful. The Centers for Medicare and Medicaid Services (CMS) has announced that by the end of 2018, more than half of Medicare dollars will be paid via alternative payment models that focus on reducing the negative incentives associated with paying physicians based on FFS. Of note, the health care systems in the United States that are routinely ranked the highest for quality (eg, Mayo Clinic, Cleveland Clinic, and Kaiser Permanente) have salaried physicians, some with and some without a bonus. Such systems have demonstrated savings between 20% and 46% due to a decrease in tests ordered and procedures performed.^{13,14} For the purposes of this analysis, we assume 15% savings.

Advance directives

To improve end-of-life care. Approximately US \$205 billion is spent in the United States on patients in the last year of life or 13% of the annual total spending on health care.¹⁵ A number of strategies are incorporated to improve the quality of a person's last days. These approaches must be exquisitely sensitive to improving the quality of life of the patient and loved ones address the mislabeled "death panels" from the past. The most successful approach involves recording the wishes of the individual patient and family, broadly called "advance directives," which fall into 3 categories: living wills, power of attorney and health care proxy. One calculation places the savings through advance directives at US \$5585 per patient.¹⁶ This figure was the most recent study reported from a 2016 systematic review of advanced care planning cost savings. Estimates in the review varied widely from US \$1041 to US \$64 830 per patient, based on the length of the study and the method for measuring cost.¹⁷

These savings are realized by reduced usage of EDs and reductions of extraordinary life-saving measures while honoring the patient's and their family's wishes. Only 65% of nursing home patients have an advance directive.¹⁸ There is a great opportunity, as up to 90% of nursing home patients and families will complete advanced directives if a physician initiates the

discussion.¹⁹ The percentage of patients aged 65 and older with recorded advance care plans or surrogate decision makers designated in their medical records is a quality communication and care coordination process measure in the Merit-Based Incentive Payment System for many disciplines.

Methods

Using Urban Institute calculations as of January 2017, based on CMS Form 64, the 5 lowest total Medicaid expenditure states (Wyoming, South Dakota, Montana, Vermont, and Alaska) and the 5 highest Medicaid expenditure states (Florida, Pennsylvania, Texas, New York, and California), were selected for evaluation. Note that North Dakota and Idaho were likely among the lowest Medicaid expenditure states, but they did not have complete reporting to generate adequate data for equal comparisons; therefore, these states were not used in this analysis. Enrollment figures for Medicaid, full dual-eligible beneficiaries, and children enrolled in Medicaid were obtained from the December 2016 MACPAC Databook for various calculations.²⁰ The FY17 FMAP was applied to reflect the state share of Medicaid savings. Each approach to savings was applied to the 10-state sample to evaluate potential cost savings. If all programs are implemented, the total financial benefit to states ranges from US \$11.8 million in Wyoming to US \$1.7 billion in California (Table 1).

Results

This research explored the states from both ends of the spending spectrum: the 5 with the lowest annual Medicaid expenditures—Wyoming, South Dakota, Montana, Vermont, and Alaska—and those with the highest—California, New York, Texas, Pennsylvania, and Florida. This spectrum demonstrates the range of potential cost-saving measures, from US \$23.6 million in Wyoming to US \$3.4 billion in California.

Reduction in Overutilization of EDs

Using a statistic of 24.8% of Medicaid children²¹ and 44% of dual-eligible beneficiaries,²² ED visits are calculated for each state for these populations. Next, 50% of the maximum possible reduction from the Grand-Aides program is applied, which is a 37% reduction. The savings applied include the cost of the Grand-Aides program. If the Grand-Aides program were implemented to assist these key populations (assuming 50% of the possible benefit = 37% reduction), it could result in Medicaid savings of US \$243 million in this 10-state sample, with state savings ranging from US \$409 000 in Wyoming to US \$42 million in California (Table 2).

Improved Medication Adherence

Improved adherence was calculated from 50% to 75% for 4 chronic conditions: hypertension, diabetes, heart failure, and dyslipidemia.²³ State populations for each chronic condition were estimated using data from the CMS Chronic Conditions

Table 1. Overall proposed cost savings.

	5 STATES WITH LOWEST MEDICAID EXPENDITURES					5 STATES WITH HIGHEST MEDICAID EXPENDITURES				
	WY, US \$	SD, US \$	MT, US \$	VT, US \$	AK, US \$	FL, US \$	PA, US \$	TX, US \$	NY, US \$	CA, US \$
Salaried physicians for reduction in unnecessary care	6858000	10043000	14 245 000	373000	24 337 000	69 995 000	12 053 000	67 414 000	95 008 000	1 662 130 000
Dual-eligible medication adherence program	10499000	20998000	25 498 000	43 492 000	22 498 000	60 294 500	577 447 000	673 438 000	1 133 896 000	2 078 809 000
End-of-life coordination of care	2052000	4 105 000	4 985 000	8500 000	4 398 000	11 787 100	112 887 000	131 652 000	221 669 000	406 393 000
Reduction in avoidable dual-eligible hospital readmissions	3453000	6 914 000	8 397 000	14 313 000	7 406 000	19 848 500	190 094 000	221 689 000	373 275 000	684 338 000
Emergency department visit reduction	818 000	1 273 000	1 380 000	1 587 000	1 270 000	35 378 000	23 154 000	49 099 000	45 760 000	84 075 000
Total cost savings to Medicaid	23 680 000	43 333 000	54 505 000	68 265 000	59 909 000	1 024 674 000	915 635 000	1 143 292 000	1 869 608 000	3 419 828 000

Abbreviations: AK, Alaska; CA, California; FL, Florida; MT, Montana; NY, New York; PA, Pennsylvania; SD, South Dakota; TX, Texas; VT, Vermont; WY, Wyoming.

Table 2. Savings calculations for reduction in emergency department use for children and dual eligibles in Medicaid.

	5 STATES WITH LOWEST MEDICAID EXPENDITURES					5 STATES WITH HIGHEST MEDICAID EXPENDITURES				
	WY	SD	MT	VT	AK	FL	PA	TX	NY	CA
Total Medicaid Pop (FY13, average monthly enrollment), n	68000	107000	114000	170000	111000	3386000	2159000	4081000	5115000	9307000
Children as % of Medicaid population	65	59	57	34	55	51	42	63	35	36
Children on Medicaid, n	44000	63000	65000	58000	61000	1727000	914000	2590000	1815000	3340000
Average ED use for Medicaid children 24.8%, n	10912	15624	16120	14384	15128	428296	226672	642320	450120	828320
Grand-Aides reduces ED visits by 37% (assume 50% of opportunity of 74%), n	4037	5780	5964	5322	5597	158469	83868	237658	166544	306478
Grand-Aides US \$158 savings per ED visit, including cost of program, US \$	637846	913240	942312	840876	884326	25038102	13251144	37549964	26313952	48423524
Dual-eligible population, n	7000	14000	17000	29000	15000	402000	385000	449000	756000	1386000
Average ED usage for dual-eligible population 44%, n	3080	6160	7480	12760	6600	176880	169400	197560	332640	609840
Grand-Aides reduces ED visits by 37% (assume 50% of opportunity of 74%), n	1139	2279	2767	4721	2442	65445	62678	73097	123076	225640
Grand-Aides US \$158 savings per ED visit, US \$	180057	360113	437280	745918	385836	10340310	9903124	11549357	19446134	35651246
Total Medicaid savings through reduction in ED visits, US \$	817903	1273353	1379592	1586794	1270162	35378412	23154268	49099321	45760086	84074770
State share, %	50	45	34	45.54	50	38.9	48	43.82	50	50
State savings, US \$	408951	573772	475131	722625	635081	13762202	11164988	21515322	22880043	42037385

Abbreviations: AK, Alaska; CA, California; FL, Florida; MT, Montana; NY, New York; PA, Pennsylvania; SD, South Dakota; TX, Texas; VT, Vermont; WY, Wyoming.
 Data obtained from Garson et al¹⁸; MACPAC²⁰; Cubanski et al²²; and Gindi and Jones.²¹

Chartbook.²⁴ Assuming that 50% of patients take their medication appropriately, an improvement to 75% adherence would produce savings displayed in Table 3. These significant savings also incorporate increased drug cost as a result of drug adherence. Importantly, those expenses are offset due to overall reductions in health care expenditures for costly services such as ED visits, hospital admissions, additional diagnostic testing, and increased pharmacy expenses related to treatment. For patients with hypertension, potential savings in the 10-state sample equal US \$2 billion; for heart failure, total savings equal US \$1.55 billion; for diabetes, US \$1.17 billion; and for dyslipidemia, US \$260 million. The potential cost savings for state Medicaid range from US \$5.2 million in Wyoming to US \$1 billion in California.

Reduction in Avoidable Hospitalizations

Assuming the Grand-Aides program would achieve 50% reduction in hospital admissions, and calculating the cost of a readmission based on US \$15,435,²⁵ the net savings to the Medicaid program could range from US \$3.4 million in Wyoming to US \$684 million in California, including the expense of operating the Grand-Aides program (Table 4).^{26]}

Reduction in Unnecessary Procedures

Assuming that paying physicians a salary plus bonus could result in a 15% reduction in tests and procedures; in the 10-state sample (based on the 2016 Medicaid expenditure data),²⁷ these measures result in state savings ranging from US \$3.4 million in Wyoming to US \$83.1 million in California (Table 5). Vermont classifies most of the Medicaid expenditures as “other services” so the state savings for this innovation are small, US \$170 000.

Improved End-of-Life Care

About 21% of dual-eligible beneficiaries are in long-term services and supportive living according to the 2017 MedPAC Databook.¹⁰ End-of-life care cost savings were estimated for each state by applying a 25% increase in advance directives among this population with the estimated saving of US \$5585 per directive. This results in state savings ranging from US \$1 million in Wyoming to US \$203 million in California (Table 6).

Discussion and Conclusions

Several caveats are important related to the estimated improved adherence calculations: first, the savings are in the short term (ie, hospital admissions over several years) and do not take into account the cost of future disease if the current disease is well-controlled (eg, hypertension is well-controlled and a stroke is avoided, only to have the patient get cancer). Second, there is clear overlap in the patient diagnoses (ie, many patients with diabetes have heart disease). Improvement (and medication adherence) in one of these diagnoses will likely have a positive effect on the other diseases in the patient and therefore these are, again, maximal numbers. Personal reinforcement and teaching are among the most promising approaches to

improving medication adherence, as the American Diabetes Association recognizes and recommends.²⁸ Programs such as Grand-Aides with a 91% medication adherence could be extremely beneficial.

Physician Payments

Although combining alternative physician payment models are the basis for part of Medicare Access and CHIP Reauthorization Act of 2015 (MACRA), it is unwieldy. In addition, there will be added expenses as managed care companies and physicians switch to a value-based payment system because the data infrastructure to track these metrics must be in place. These expenses must be netted against potential savings (ie, paid to systems and physicians) as the requirements for financial outlays are real. This issue should be addressed through more sophisticated and interoperable Electronic Health Record (EHR) systems, which are, unfortunately, likely a decade away.

An alternative method to reduce unnecessary care would be to examine the 20 most expensive procedures and tests (because of high volume, high price, or both) and compare the indications for the tests or procedures reported by the ordering physician to national guidelines produced by the physician's specialty society. A recent such analysis revealed that 34% of echocardiograms performed on preoperative patients were unnecessary and were outside the recommended practice guidelines.²⁹ We are recommending the physician payment change because it could be achieved more simply (eg, the MACRA regulations could provide an incentive for programs in which at least 50% of their physicians are salaried).

These estimates do not take into account existing state programs that could have already achieved some of the savings. The program overlap poses a significant limitation (ie, the same savings may be attributed to more than one program), as well. The data are likely to be correct within an order of magnitude; rather than focusing on the exact amounts, we suggest that “large (say, 10%), medium (5%) and small (2.5%)” be attached to the possible program savings and be made available as a potential supplement to the cost-saving work already being done by the state Medicaid programs.

We have examined a number of possible approaches to reducing the expense of Medicaid. These savings should remain in the Medicaid program and, for example, help to cover more people and increase physician reimbursement. Increased reimbursements will enhance the number of physicians seeing Medicaid patients, thus improving access for the underserved. If all programs are implemented, the total financial benefit to states ranges from US \$11.8 million in Wyoming to US \$1.7 billion in California, as illustrated in Table 1. These 5 initiatives also could be applied to commercially insured patients or those covered by Medicare, resulting in major savings across the United States. Realizing these savings in achievable ways suggested in this article could make a major dent in the rising cost of health care.

Table 3. Savings calculations for improvement in drug adherence by dual eligibles, by disease category.

	5 STATES WITH LOWEST MEDICAID EXPENDITURES					5 STATES WITH HIGHEST MEDICAID EXPENDITURES				
	WY	SD	MT	VT	AK	FL	PA	TX	NY	CA
Total dual-eligible population	7000	14000	17000	29000	15000	402000	385000	449000	756000	1386000
Hypertension										
60% of pop, n	4200	8400	10200	17400	9000	241200	231000	269400	453600	831600
50% nonadherence, n	2100	4200	5100	8700	4500	120600	115500	134700	226800	415800
Savings with 75% adherence at US \$3908/patient, US \$	4103400	8206800	9965400	16999800	8793000	235652400	225687000	263203800	443167200	812473200
Heart failure										
23% of pop, n	1610	3220	3910	6670	3450	92460	88550	103270	173880	318780
50% nonadherence, n	805	1610	1955	3335	1725	46230	44275	51635	86940	159390
Savings with 75% adherence at US \$7823 per patient, US \$	3148757	6297515	7646982	13040941	6747337	180828645	173181662	201970302	340065810	623453985
Diabetes										
36% of pop, n	2520	5040	6120	10440	5400	144720	138600	161640	272160	498960
50% nonadherence, n	1260	2520	3060	5220	2700	72360	69300	80820	136080	249480
Savings with 75% adherence at US \$3756 per patient, US \$	2366280	4732560	5746680	9803160	5070600	135892080	130145400	151779960	255558240	468523440
Dyslipidemia										
40% of pop, n	2800	5600	6800	11600	6000	160800	154000	179600	302400	554400
50% nonadherence, n	1400	2800	3400	5800	3000	80400	77000	89800	151200	277200
Savings with 75% adherence at US \$1258 per patient, US \$	800600	1761200	2138600	3648200	1887000	50571600	48433000	56484200	95104800	174358800
Total savings	10499037	20998075	25497662	43492101	22497937	602944725	577447062	673438262	1133896050	2078809425
State share, %	50	45.06	34.44	45.54	50	38.9	48.22	43.82	50	50
State savings—FMAP 2017 contributions applied, US \$	5249519	9461733	8781395	19806302	11248969	234545498	278444973	295100646	566948025	1039404712

Abbreviations: AK, Alaska; CA, California; FL, Florida; MT, Montana; NY, New York; PA, Pennsylvania; SD, South Dakota; TX, Texas; VT, Vermont; WY, Wyoming.
 Data drawn from Roebuck et al.²³ and Centers for Medicare and Medicaid Services.²⁴

Table 4. Savings calculations for reduction in hospital readmission costs for dual eligibles.

	5 STATES WITH LOWEST MEDICAID EXPENDITURES					5 STATES WITH HIGHEST MEDICAID EXPENDITURES				
	WY	SD	MT	VT	AK	FL	PA	TX	NY	CA
Full dual-eligible population, n	7000	14 000	17 000	29 000	15 000	402 000	385 000	449 000	756 000	1 386 000
Dual-eligible hospitalization (27%), n	1890	3780	4590	7830	4050	108 540	103 950	121 230	204 120	374 220
Avoidable hospitalizations (26%), n	491	983	1193	2035	1053	28 220	27 027	31 519	53 071	97 297
Expense to Medicaid calculated at US \$15 667 per readmission, US \$	7 692 497	15 400 661	18 702 661	31 882 345	16 497 351	442 122 740	423 432 009	493 808 173	831 463 357	1 524 352 099
Grand-Aides could reduce readmissions by 50%, US \$	3 846 248	7 700 330	9 351 330	15 941 172	8 248 675	221 061 370	211 716 004	246 904 086	415 731 678	762 176 049
Grand-Aides cost US \$800 per individual per year, applied to 26% preventable hospital population, US \$	392 800	786 400	954 400	1 628 000	842 400	22 576 000	21 621 600	25 215 200	42 456 800	77 837 600
Calculated Medicaid savings, US \$	3 453 448	6 913 930	8 396 930	14 313 172	7 406 275	198 485 370	190 094 404	221 688 886	373 274 878	684 338 449
State share, %	50	45.06	34.44	45.54	50	38.9	48.22	43.82	50	50
State savings, US \$	1 726 724	3 116 799	2 891 902	6 518 218	3 703 137	77 210 808	91 663 521	97 144 069	186 637 439	342 169 224

Abbreviations: AK, Alaska; CA, California; FL, Florida; MT, Montana; NY, New York; PA, Pennsylvania; SD, South Dakota; TX, Texas; VT, Vermont; WY, Wyoming.
Data drawn from Segal¹², Garson²⁶, and Fitch et al.²⁵

Table 5. Savings calculations for reduction in unnecessary care with salaried physicians.

	5 STATES WITH LOWEST MEDICAID EXPENDITURES					5 STATES WITH HIGHEST MEDICAID EXPENDITURES				
	WY, US \$	SD, US \$	MT, US \$	VT, US \$	AK, US \$	FL, US \$	PA, US \$	TX, US \$	NY, US \$	CA, US \$
Medicaid physician, lab, and X-ray, US \$	45722882	66956387	94969409	2488213	162246654	466630080	80351103	449423819	633387993	1108088171
15% savings	6858432	10043458	14245411	373232	24336998	69994512	12052665	67413572	95008198	166213225
State share, %	50	45.06	34.44	45.54	50	38.9	48.22	43.82	50	50
State savings, US \$	3429216	4525582	4906119	170011	12168499	27227865	5811795	29540627	47504099	83106612

Abbreviations: AK, Alaska; CA, California; FL, Florida; MT, Montana; NY, New York; PA, Pennsylvania; SD, South Dakota; TX, Texas; VT, Vermont; WY, Wyoming.
Data obtained from KFF as of January 2017. The structure of Vermont's Medicaid program formulates most of the state's Medicaid expenditures in the category of "Other Services."

Table 6. Savings calculations for coordination of end-of-life care.


	5 STATES WITH LOWEST MEDICAID EXPENDITURES					5 STATES WITH HIGHEST MEDICAID EXPENDITURES				
	WY	SD	MT	VT	AK	FL	PA	TX	NY	CA
Full dual-eligible population, n	7000	14000	17000	29000	15000	402000	385000	449000	756000	1386000
21% in long-term services and support, n	1470	2940	3570	6090	3150	84420	80850	94290	158760	291060
With 25% increase in advance directives at US \$585 per patient, US \$	2052487	4104975	4984612	8500370	4398187	117871425	112886812	131652412	221668650	406392525
State share, %	50	45.06	34.44	45.54	50	38.9	48.22	43.82	50	50
State savings, US \$	1026243	1849701	1714706	3871068	2199093	45851984	54434020	57690086	110834325	203196262

Abbreviations: AK, Alaska; CA, California; FL, Florida; ID, Idaho; MT, Montana; NY, New York; PA, Pennsylvania; SD, South Dakota; TX, Texas; VT, Vermont; WY, Wyoming.
Data obtained from Nicholas et al¹⁶ and The Medicare Payment Advisory Commission and the Medicaid and CHIP Payment and Access Commission.¹⁰

Author Contributions

AG, original concept, design and intervention sections. KF, data sampling and simulation method. KA, expanded data gathering, analysis, results section. SHL, overall organization, integration, discussion and conclusions.

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REFERENCES

- McGinnis JM, Stuckhardt L, Saunders R, Smith M. *Best Care at Lower Cost: The Path to Continuously Learning Health Care in America*. Washington, DC: National Academies Press; 2013.
- Berwick DM, Hackbarth AD. Eliminating waste in us health care. *JAMA*. 2012;307:1513–1516.
- The Henry J. Kaiser Family Foundation. Total Medicaid spending. <https://www.kff.org/medicaid/state-indicator/total-medicaid-spending/>. Updated December 2016. Accessed March 19, 2017.
- Montalbano A, Rodean J, Kangas J, Lee B, Hall M. Urgent care and emergency department visits in the pediatric Medicaid population. *Pediatrics*. 2016;137:e20153100.
- Weinick RM, Betancourt RM. *No Appointment Needed: The Resurgence of Urgent Care Centers in the United States*. Oakland, CA: California Healthcare Foundation; 2007.
- Health Policy Commission. *Commonwealth of Massachusetts Health Policy Commission 2015 Cost Trends Report*. 2016. <https://www.mass.gov/service-details/annual-cost-trends-report>. Accessed November 10, 2018.
- The Henry J. Kaiser Family Foundation. Hospital emergency room visits per 1,000 population by ownership type. <https://www.kff.org/other/state-indicator/emergency-room-visits-by-ownership/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>. Updated 2015.
- Garson A Jr, Green DM, Rodriguez L, Beech R, Nye C. A new corps of trained Grand-Aides has the potential to extend reach of primary care workforce and save money. *Health Aff (Millwood)*. 2012;31:1016–1021. doi:10.1377/hlthaff.2011.0859.
- Brown MT, Bussell JK. Medication adherence: WHO cares? *Mayo Clin Proc*. 2011;86:304–314.
- The Medicare Payment Advisory Commission and the Medicaid and CHIP Payment Access Commission, eds. *Data Book: Beneficiaries Dually Eligible for Medicare and Medicaid*. Washington, DC: Medicaid and CHIP Payment and Access Commission, January 2017. <https://www.macpac.gov/publication/data-book-beneficiaries-dually-eligible-for-medicare-and-medicaid-3/>. Accessed April 25, 2017.
- Garson A. Grand-Aides and health policy: reducing readmissions cost-effectively. *Health Affairs Blog*, 2014. <http://healthaffairs.org/blog/2014/10/29/grand-aides-and-health-policy-reducing-readmissions-cost-effectively>. Accessed November 10, 2018.
- Segal M. Dual eligible beneficiaries and potentially avoidable hospitalizations. *CMS Policy Insight Brief*, 2011. <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Insight-Briefs/Downloads/PAHInsightBrief.pdf>. Accessed April 25, 2017.
- Gosden T, Forland F, Kristiansen IS, et al. Capitation, salary, fee-for-service and mixed systems of payment: effects on the behaviour of primary care physicians. *Cochrane Database Syst Rev*. 2000;3:CD002215.
- Miller TD, Askeew JW. The first decade of appropriate use criteria: is the glass half empty or half full? *J Am Coll Cardiol*. 2015;65:774–776.
- Aldridge MD, Kelley AS. The myth regarding the high cost of end-of-life care. *Am J Public Health*. 2015;105:2411–2415.
- Nicholas LH, Langa KM, Lwashyna TJ, Weir DR. Regional variation in the association between advance directives and end-of-life Medicare expenditures. *JAMA*. 2011;306:1447–1453.
- Klingler C, in der Schmiten J, Marckmann G. Does facilitated advance care planning reduce the costs of care near the end of life? systematic review and ethical considerations. *Palliat Med*. 2016;30:423–433.
- Jones AL, Moss AJ, Harris-Kojetin LD. Use of advance directives in long-term care populations. *NCHS Data Brief*. 2011;54:1–8.
- Wissow LS, Belote A, Kramer W, Compton-Phillips A, Kritzer R, Weiner JP. Promoting advance directives among elderly primary care patients. *J Gen Intern Med*. 2004;19:944–951.
- MACPAC. MACStats: Medicaid and CHIP data book, 2016. <https://www.macpac.gov/publication/macstats-medicaid-and-chip-data-book-2/>. Accessed April 25, 2017.
- Gindi R, Jones L. Reasons for emergency room use among U.S. children: National Health Interview Survey, 2012. NCHS Data Brief No. 160, 2014. <https://www.cdc.gov/nchs/data/databriefs/db160.htm>. Accessed April 20, 2017.
- Cubanski J, Swoope C, Boccuti C, et al. A primer on Medicare. *KFF*, 2015. <http://files.kff.org/attachment/report-a-primer-on-medicare-key-facts-about-the-medicare-program-and-the-people-it-covers>. Accessed May, 20, 2017.
- Roebuck MC, Liberman JN, Gemmill-Toyama M, Brennan TA. Medication adherence leads to lower health care use and costs despite increased drug spending. *Health Aff (Millwood)*. 2011;30:91–99.
- Centers for Medicare Medicaid Services. Chronic conditions among Medicare beneficiaries (Chartbook), 2012 ed. <http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Chronic-Conditions/Downloads/2012Chartbook.pdf>. Updated 2012. Accessed April 2, 2017.
- Fitch K, Pelizzari P, Pyenson B. The high cost of heart failure for the Medicare population: an actuarial cost analysis. <http://us.milliman.com/uploadedFiles/insight/2015/heart-failure-cost-medicare-analysis.pdf>. Updated 2015. Accessed April 19, 2017.
- Garson A. Grand-aides: leveraging the workforce for more effective and less expensive care. In: Phillips R, ed. *America's Healthcare Transformation: Strategies and Innovations*. New Brunswick, NJ: Rutgers University Press; 2016: 178–198.
- The Henry J. Kaiser Family Foundation. Distribution of fee-for-service Medicaid spending on acute care. <https://www.kff.org/medicaid/state-indicator/spending-on-acute-care/>. Updated 2016. Accessed April 20, 2017.
- American Diabetes Association. Standards of medical care in diabetes-2017: summary of revisions. *Diabetes Care*. 2017;40:S4–S5.
- Adair C, Swart E, Seymour R, Patt J, Karunakar MA. Clinical practice guidelines decrease unnecessary echocardiograms before hip fracture surgery. *J Bone Joint Surg Am*. 2017;99:676–680.