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RESEARCH ARTICLE

A Multi-State Analysis of the Fiscal Impact of Commercial Insurance Coverage for General-Use & Activity-Specific Prosthetic & Orthotic Devices in the United States

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ABSTRACT

Prosthetic and orthotic devices are assistive devices utilized by individuals with limb loss, limb difference, and mobility impairment. Research has shown these devices improve mobility and functionality, independence, and overall quality of life for individuals with disabilities who depend on them. This report focuses on two use types of prosthetic and orthotic devices: general-use and activity-specific. General-use prostheses and orthoses are designed to achieve the basic needs of ambulation and upper-limb functionality. In contrast, activity-specific devices are designed to support higher-intensity physical activities and recreation.

Currently, 29 states do not require insurance coverage for general-use prosthetic and orthotic devices, and 45 states do not require insurance coverage for activity-specific devices, hindering individuals with limb loss, limb difference, and mobility impairment from essential life functions, including regular exercise required to prevent chronic illnesses.

This study analyzes proposed legislation in 11 states, aiming to expand state-regulated coverage for prosthetic and orthotic devices for the purpose of improving quality of life and longevity of health, including chronic illness prevention. The methodology includes estimating the per member per month (PMPM) and net cost variations per state based on U.S. Census populations, Center of Medicare and Medicaid Services (CMS) Public Use Data Files and state-specific Medicaid fee schedules. The authors hypothesize that expanded insurance coverage could yield long-term social and fiscal benefits to the patient and healthcare systems.

Results show PMPM estimates for states pursuing various levels of coverage, encompassing both general-use and activity-specific devices. The analysis conservatively estimates small PMPM increases based on assumptions related to device coverage costs and utilization. The results further emphasize potential overall healthcare savings from insurance coverage for these devices with the implementation of the 11 legislative initiatives, from improved health outcomes, with minimal fiscal impact.

States with prior enacted legislation covering insurance fairness and pursuing 2024 legislation covering prosthetic and orthotic devices for both activity-specific insurance coverage only:

- Maryland (SB0614/HB0865): \$0.01 - \$0.25 PMPM
- Massachusetts (bill number H4096): \$0.01 - \$0.28 PMPM
- New Hampshire (bill number SB 177): \$0.01 - \$0.05 PMPM
- New Jersey (bill number not yet assigned): \$0.01 - \$0.37 PMPM
- Oregon (bill number not yet assigned): \$0.01 - \$0.17 PMPM

States pursuing 2024 legislation covering prosthetic and orthotic devices for both activity-specific and general use (fairness) insurance coverage:

- Idaho (bill number not yet assigned): \$0.01 - \$0.14 PMPM
- Kentucky (bill number not yet assigned): \$0.01 - \$0.32 PMPM
- Minnesota (bill numbers HF 3339/SF3351): \$0.01 - \$0.39 PMPM
- Ohio (bill number not yet assigned): \$0.01 - \$0.82 PMPM
- Pennsylvania (bill number not yet assigned): \$0.01 - \$0.89 PMPM
- Tennessee (bill number not yet assigned): \$0.01 - \$0.50 PMPM

This review found the net fiscal and social benefit of these states' proposed legislation is expected to outweigh the associated costs. The fiscal impact on total healthcare costs is relatively small compared to the potential positive benefits for patients and healthcare systems.

Introduction

According to the Kaiser Family Foundation¹, the United States (U.S.) leads global healthcare spending, investing around \$12.9K per capita annually. Despite this substantial investment, the U.S. has the lowest life expectancy among industrialized nations. Additionally, as indicated by the Centers for Disease Control (CDC)², the country has seen a concerning decline in life expectancy for the second consecutive year, with a reduction of 2.7 years since 2020—the first decline since 1923. The primary cause of death in the United States is heart disease, often linked to chronic conditions like unhealthy blood cholesterol levels, diabetes mellitus, and obesity. Also according to the CDC³, these diseases are preventable through exercise and a healthy diet. Furthermore, a study published by the American Heart Association⁴ by Wang et al found meeting the national exercise guidelines results in an average annual savings of \$2,500 per patient in healthcare costs when compared with those who do not meet the guidelines. For the purposes of this analysis, individuals receiving a device are assumed to recreate with increased ability to meet the national guideline of walking and/or movement for 30 minutes per day, five days per week.

The gap between significant healthcare spending and decreasing life expectancy indicates a need to reassess the current insurance coverage landscape, especially concerning preventative health services. Exploring the inclusion of preventive measures within insurance coverage could address this disparity, offering potential improvements in both short- and long-term physical and behavioral health outcomes and broader healthcare systematic impacts. Thus, understanding opportunities for populations

at risk for the leading cause of death to exercise regularly is the hypothesized approach to decreasing healthcare costs and improving life expectancy.

Currently, 29 states in the U.S. do not require coverage of general-use prosthetic and orthotic devices, and 45 states do not require coverage of activity-specific devices⁵. Prosthetic and orthotic devices are assistive devices utilized by individuals with limb loss, limb difference, and mobility impairment. Research has shown these devices improve mobility and functionality, independence, and overall quality of life for individuals with disabilities who depend on them^{6,7}. Thus, the lack of coverage creates a health access barrier and health equity concern for those experiencing limb loss, limb difference, or mobility impairment.

This study analyzes potential coverage for two types of device use. First, general-use devices are defined as prosthetic and orthotic devices designed to achieve the basic needs of ambulation and upper-limb functionality. Second, activity-specific devices are defined as prosthetic and orthotic devices designed to support higher-intensity physical activities and recreation. Without these devices, individuals living with limb loss, limb difference, or mobility impairment are highly restricted in their ability to perform essential life functions, including exercise, to prevent chronic illness and heart disease⁸.

To expand on the correlation between the cost of healthcare and this population, a recent study found the average cost per hospital stay accumulated to \$11,700, making hospitalization one of the most expensive categories of healthcare costs⁹. When considering the average cost of an amputation

(a subcategory of hospitalization costs), a recent study by Al-Thani et al¹⁰ focused on patient cost per amputation found that the overall per-patient cost for amputation was U.S. \$89,808. Therefore, the cost of amputation can be presumed to be one of the most expensive types of healthcare utilization and should be addressed accordingly. Furthermore, 55% of individuals who have undergone amputation as a complication of diabetes will require an amputation of the second leg within 2-3 years¹¹. A solution could be hypothesized as providing insurance coverage for preventative health measures to decrease the prevalence of amputation and subsequent related costs.

Recent studies analyzed activity-specific prostheses' social and fiscal impact in Maine, Colorado, Connecticut, and Illinois^{12,13}. The results showed minimal per member per month (PMPM) estimates per state. PMPM is a term used to describe the amount of money paid on a monthly basis for each individual enrolled in a managed care plan, often used in commercial insurance networks¹⁴. Results of these studies quoted a range increase of \$0.09 - \$0.37 and considered a minimal fiscal impact to the commercial insurance network. Subsequently, 100% of the legislation introduced referencing this data was enacted in Maine, New Mexico, Colorado, and Illinois between 2021 to 2023. However, these studies only analyzed activity-specific prosthetic coverage and did not assess the general-use device cost or orthotic coverage component¹⁵.

Additional research has shown considerable cost and patient outcome benefits from prosthetic and orthotic device use:

For every dollar spent on rehabilitation, there is a savings of more than \$11 in disability

benefits. In addition, knee or hip problems resulting from lack of appropriate prosthetic care can result in health care costs ranging from \$80,000 to \$150,000 over a lifetime¹⁶.

Considering the above findings, it is hypothesized that expanded state-regulated commercial insurance coverage of both general-use and activity-specific devices could generate long-term social and fiscal benefits by improving access to healthcare and enhancing patient outcomes compared to the current state insurance coverage options and standard of care.

This study aims to expand on previous relevant methodology previously used to calculate PMPM for activity-specific prosthetic device coverage. However, this analysis will seek to include general-use device insurance coverage of orthoses and prostheses and activity-specific device coverage in 11 states with proposed legislation. The outcome will calculate an estimated PMPM per state, estimated healthcare cost savings by providing preventative-related health benefits based on existing actuarial and policy review literature, and both values' overall net benefit or cost.

Material and Methods

Understanding the legislative landscape:

States proposing legislation on relevant device coverage in their upcoming 2024-2025 legislative sessions include Idaho, Kentucky, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, Ohio, Oregon, Pennsylvania, and Tennessee.

Among these, Idaho, Kentucky, Minnesota, Ohio, and Pennsylvania and Tennessee

advocate for legislation to mandate commercial insurance for general-use and activity-specific prosthetic and orthotic device coverage.

States with previously enacted legislation covering general-use devices and seeking expanded coverage for activity-specific prosthetic and orthotic devices include Maryland, Massachusetts, New Hampshire, New Jersey, and Oregon.

Device type and coverage requirements for each state's legislation vary based on locally sponsored legislative representation and advocates' determination, which may change throughout upcoming legislative sessions. Thus, for the purpose of this study, estimates will be based on proposed levels of coverage as of the current date, January 2024.

Understanding existing policy and research literature:

The existing literature used to calculate the estimated PMPM for activity-specific prostheses was analyzed using Minnesota's actuarial PMPM published by the Minnesota Department of Commerce¹⁷. Minnesota's actuarial analysis found minimal fiscal impact with a net increase of \$0.39 PMPM, with indications of improving quality of life and decreasing the cost of episodic care. For the purpose of the following methodology, all values referenced from the Minnesota Department of Commerce report were adjusted substantially based on the methodology below and no longer represent the findings of the initial report.

Utilizing the \$0.39 PMPM estimate as a base value, various calculations can be applied to reach a similar estimate for the 11 additional states seeking legislation.

The first calculation aimed to understand the total cost breakdown between orthotic and prosthetic devices. Minnesota notes a total estimated paid expenditure amount of \$116,395,832 in the first year of the coverage across 84,776 orthoses (44.74% of total devices) and 21,520 prostheses (55.26% of total devices).

Suppose these percentages of costs are applied to the two categories of devices; a per-device PMPM can be calculated (image 1). This value is useful to apply on a population basis as each state's population varies, and the PMPM would change as a result. Population data referenced in this methodology comes directly from the U.S. Census Bureau's July 2022 report¹⁸.

To further calculate the estimated cost within a state, the device utilization prevalence was calculated from Minnesota's analysis by comparing the 84,776 orthoses and 21,520 prostheses against their total population. As Minnesota's values and estimates projected in 2025, this study first recalculated the prevalence based on 2022 U.S. census values as the most recent published census data¹⁹.

Orthoses were found to have a 1.47% prevalence, and prostheses were found to have a 0.37% prevalence against the total M.N. population. These prevalence values were used to calculate each additional state's device utilization values. Once device values were identified, the cost per device determined in image one was multiplied to individually estimate the PMPM associated with orthotic and prosthetic coverage. Breaking out these two cost categories is imperative as states' coverages vary, and the related costs must be accounted for as such.

For example, Idaho is seeking legislation for orthotics and prosthetics for general and

activity-specific use. Thus, the orthotic PMPM must be added to the prosthetic PMPM to sum up the general-use of PMPM. To ensure the activity-specific prosthetic PMPM value is then added, we assume an additional 50% of the prosthetic cost as a recent fiscal analysis estimates 50% utilization for activity-specific devices in comparison to general use devices²⁰.

In contrast, other states already have enacted insurance mandates covering general-use devices. Thus, only the activity-specific costs are summated to estimate the net PMPM. All calculations can be referenced in image 2.

Each state's employer-insured and nongroup member rate was gathered from the Kaiser Family Foundation²¹ insurance coverage 2022 analysis to compare population variations in employer and nongroup insurance from Minnesota's member rate (image 3). If the percentage of this covered population was lower than Minnesota's, the difference was flagged as a potential increase to the PMPM, based on the assumption that the number of members to spread the cost increased by that value. After further analysis, if the member amount decreased in total member count, the number of individuals utilizing these devices would also decrease.

As the exact decrease in utilization and member values is unknown unless payer claims data is available, this analysis calculated the potential cost difference if the delta in the payer population was to be applied to the PMPM.

For example, Kentucky was found to have the most significant variance in nongroup and employer-covered lives population at 11.6% less than Minnesota's. The average variance across all states was 4% less of the population

holding nongroup or employer insurance than M.N., calculating a less than one cent increase in PMPM. As the specific utilization rate cannot be assumed without payer claims data, and the average impact would increase at less than one cent PMPM, this calculation was not included in the fiscal estimate methodology.

Similar outcomes were calculated when comparing the difference in disability prevalence in each state and subsequent impact in PMPM. The average variance across all states was found to have a 1.9% higher disability prevalence when compared to M.N. This difference would equate to less than one cent increase in PMPM. Additionally, the disability rate referenced by the US Census Bureau is not exclusive to prosthetic and orthotic device utilization pathologies and is subsequently a gross overestimate based on the inclusion of non-mobility-affecting categories (deaf, blind). For these reasons, this calculation was not included in the methodology.

This study also analyzed the Centers for Medicare and Medicaid Services Durable Medical Equipment Prosthetic Orthotic Schedule²² (DMEPOS) reimbursement state rate differences between the two most frequently coded prosthetic L-codes (L5301 and L5321) and L1970, one of the most coded orthotic L-codes.

Only Idaho and Oregon were found to have higher reimbursement rates across all three codes, at 2.19%. This would equate to a minute impact at less than a one-cent increase in PMPM.

When considering the \$2,500 annual savings found in a recent study by the American Heart Association⁴, this value can be applied to each state's utilization population for a state specific impact of savings. These values can be found in image 4.

All the estimates found within the results sections are calculations that estimate the potential per month per member cost per state, based on the assumptions above. The basis of these calculations originated with the actuarial study by Minnesota's Commerce Department. All assumptions and calculations completed in this research are not made on an actuarial basis. The calculations are based on population assumptions made available through the U.S. Census Bureau and supporting publicly available data, as referenced.

Results

States with prior enacted legislation covering insurance fairness and pursuing 2024 legislation covering prosthetic and orthotic devices for both activity-specific insurance coverage only:

- Maryland (SB0614/HB0865): \$0.01 - \$0.25 PMPM
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This analysis conservatively estimates PMPM increases concerning each state's proposed legislation based on the following assumptions:

- The PMPM identified in Minnesota's Commerce Department 2024 analysis can be applied to state specific populations to estimate a PMPM. Further analysis

against state specific all payer claims data is needed as utilization is likely varied due to disability prevalence differentials.

- When assuming each individual will create healthcare cost savings at \$2500 annually, when provided access to recreation, a cost net savings is found at each state, between \$50M - \$392M. The net savings calculation includes per month per member costs⁶.

The above net benefit assumes every individual receiving a prosthetic or orthotic device would see subsequent improvements in quality of life and health.

Image 1: The calculations within images stem from MN's \$0.39 PMPM estimate, referenced within Minnesota Commerce Department's analysis¹⁶.

	Totals	Orthotics	Prosthetics
Paid expenditures:	\$116,395,832.00	44.74%	55.26%
Device breakdown	106,296	84,776	21,520
PMPM	\$0.39	\$0.175	\$0.2158
Per device cost (PMPM divided by # of devices)	NA	\$0.000002060	\$0.00001000

Image 2: Calculation breakdown of estimates per state, on the basis of population variances.

Equation assumptions:	Column H * \$0.00001	50% of column F based on assumption: patients will receive an activity specific and general use device at 50% of the cost (per 2024 NJ Fiscal Analysis)	MN Commerce Department 2024 analysis quotes 0.37 of the population	MN Commerce Department 2024 analysis quotes 1.47% of the population.	Column I * \$0.00000206	Columns F+G+J = Total State PMPM for O&P rec & fairness - exception of TN px only	Columns G+J = Total State PMPM for O&P rec & fairness - exception of TN px only
State	Prosthetic general use cost	Prosthetic active use cost	Estimated annual prosthetic device utilization	Estimated annual orthotic device utilization	Orthotic cost	General-use & Activity-specific PMPM	Activity-specific only PMPM
Idaho	\$0.06	\$0.03	5955	23658	\$0.05	\$0.14	NA
Kentucky	\$0.14	\$0.07	13757	54657	\$0.11	\$0.32	NA
Maryland	\$0.19	\$0.09	18954	75306	\$0.16	NA	\$0.25
Massachusetts	\$0.21	\$0.11	21157	84058	\$0.17	NA	\$0.28
Minnesota	\$0.29	\$0.14	28573	113519	\$0.23	\$0.66	NA
New Hampshire	\$0.04	\$0.02	4120	16367	\$0.03	NA	\$0.05
New Jersey	\$0.28	\$0.14	28306	112457	\$0.23	NA	\$0.37
Ohio	\$0.35	\$0.18	35494	141016	\$0.29	\$0.82	NA
Oregon	\$0.13	\$0.06	12676	50363	\$0.10	NA	\$0.17
Pennsylvania	\$0.39	\$0.19	38589	153314	\$0.32	\$0.89	NA
Tennessee	\$0.22	\$0.11	21576	85722	\$0.18	\$0.50	NA

Image 3: State's variances from MN's commercial insured population.

<i>Equation assumptions:</i>	<i>Insurance coverage of the total state population per 2022 Kaiser Family Foundation</i>	<i>Under 65 yo population data from 2022 US Census Bureau</i>	<i>Disability rate under 65 yo per 2022 US Census Bureau</i>
State	Non-group & employer insured difference from MN	Delta from MN's under 65 yo population	Delta from MN's under 65 yo population
Idaho	-6.30%	0.0%	2.0%
Kentucky	-11.60%	0.0%	5.6%
Maryland	-1.80%	0.0%	0.10%
Massachusetts	-1.10%	-1.0%	0.3%
New Hampshire	1.30%	-3.0%	1.3%
New Jersey	-0.90%	0.0%	1.0%
Ohio	-9.70%	-1.0%	2.4%
Oregon	-7.40%	-2.0%	2.6%
Pennsylvania	-5.10%	-3.0%	2.3%
Tennessee	-6.30%	0.0%	3.4%

Image 4: Calculations estimating cost and savings associated with PMPM increases, and \$2500 in healthcare savings, per individual receiving devices.

<i>Equation assumptions:</i>	<i>US Census info</i>	<i>Annual saving, per state on the assumption individuals provided access to general-use and/or activity specific devices save \$2,500 per year</i>	<i>Per Kaiser Foundation</i>	<i>Annual state cost</i>	<i>Net State cost/savings per year</i>
State	Total O&P population under 65	O&P population * \$2,500	Total commercial & non-group members	(PMPM *12) member population	Annual cost - Annual savings
Idaho	29613	\$74,032,262	796652	\$1,319,803	\$72,712,459
Kentucky	68414	\$171,034,578	1840481	\$7,044,250	\$163,990,328
Maryland	94260	\$235,650,272	3037840	\$9,109,946	\$226,540,326
Massachusetts	105216	\$263,038,902	3430942	\$11,484,614	\$251,554,288
Minnesota	142092	\$355,230,124	2885383	\$22,936,798	\$332,293,326
New Hampshire	20486	\$51,216,124	694758	\$452,818	\$50,763,306
New Jersey	140763	\$351,907,498	4605398	\$20,624,277	\$331,283,221
Ohio	176510	\$441,275,378	4930773	\$48,690,503	\$392,584,875
Oregon	63039	\$157,597,426	1839778	\$3,689,756	\$153,907,670
Pennsylvania	191903	\$479,756,724	5840517	\$62,703,522	\$417,053,202
Tennessee	107299	\$268,247,022	3195639	\$19,182,807	\$249,064,215

Discussion

The average maximum fiscal impact across all 11 states proposing relevant legislation is found at \$0.01 - \$0.38 PMPM. A cost insignificant in comparison to the risk of not providing access to mobility, both at a basic life necessity basis, and a recreational basis, for this population.

Benefits can also be found at a systematic healthcare level. For example, if this particular patient population utilizes the healthcare system less frequently due to a decrease in chronic health concerns prevented or relived by physical activity, provider resources can be reallocated for other patient needs. This could result in a decrease in next available appointments and a general increase in diagnosis times as access to healthcare is enhanced across the system²².

Additional fiscal impact considerations include relevant legislation proposed in the 11 states would total a small proportion of the total healthcare cost, and the probable net positive fiscal benefit based on previous studies would be advantageous to all patients and healthcare systems alike. Minnesota's analysis quotes coverage of these devices as providing optimal health outcomes for this population and minimizes associated impacts on health disparities.

Further research is required to confirm these estimates against claims data, per state. Without this data, the estimates of this report are not able to confirm utilization variances in each population subcategory (differentials in payer groups, disability prevalence variances in each state, etc).

Conclusion

In conclusion, the increase in PMPM is less than the estimated annual healthcare savings calculated per state. While the proposed legislation in each state aims to increase commercial per-member per-month expenses, this report brings attention to potential long-term savings associated with these bills. These savings could alleviate out-of-pocket burdens for individuals with amputations seeking recreational prosthetics, and also positively impact healthcare facilities, government-funded programs, and orthotics and prosthetics providers. Further investigation is necessary to validate these findings.

The bills introduced in all 11 states have the potential to improve access to healthcare services and equity in appointment scheduling at orthotics and prosthetics clinics, which play a crucial role in meeting patient needs.

Enhancing access and equity in healthcare is linked with better long-term patient outcomes and overall quality of life. Additionally, the authors suggest that these bills would likely have limited social and fiscal repercussions for state residents, while potentially enhancing health access and equity compared to current insurance options and the negative outcomes associated with non-recreational prosthetic use.

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