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## Podiatric Services Could Reduce Costs of Treating Diabetes Complications in California by \$97 Million

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**SUMMARY:** Diabetes affects nearly 1 of every 10 Californians.<sup>1</sup> A serious side effect of the disease is foot ulcers, which significantly increase a patient's risk of amputation and death. They can be difficult and expensive to treat, and a majority of people with diabetes in the United States do not receive clinically recommended foot health screenings or access podiatric care. In California, Medi-Cal designates podiatric services as optional, limiting access to the complete care spectrum for diabetic beneficiaries. This policy brief uses Office of Statewide Health Planning and Development (OSHPD) discharge data to project total California expenditures related to lower extremity complications. It is estimated that

California spent up to \$565 million in 2014 on diabetic foot ulcers and related care. These costs are expected to rise as California's population ages. We project that podiatric care reduced California's costs of care in 2014 by between \$29 million and \$97 million, despite a minority of diabetic patients having received treatment. If a larger percentage of California's diabetic population received similar care, costs could be reduced much further. With the fate of the Affordable Care Act in limbo, lack of treatment for those enrolled in Medi-Cal or Covered California plans could lead to more hospital admissions and rising costs for the state of California.

*“Only a small percentage of people with diabetes in the United States receive clinically recommended foot health screenings or access podiatric care.”*

**D**iabetic foot ulcers (DFUs) are one of the most prevalent complications of diabetes, with the lifetime risk of foot ulcers estimated to be as high as 25 percent among people with diabetes.<sup>2</sup> DFUs may increase a patient's risk of death by up to 85 percent, and treatment can involve hospitalization and amputations in the lower extremities.<sup>3</sup> As a result, management of DFUs is extremely expensive, with conservative estimates of national spending related to DFUs at roughly \$17 billion annually.<sup>4</sup>

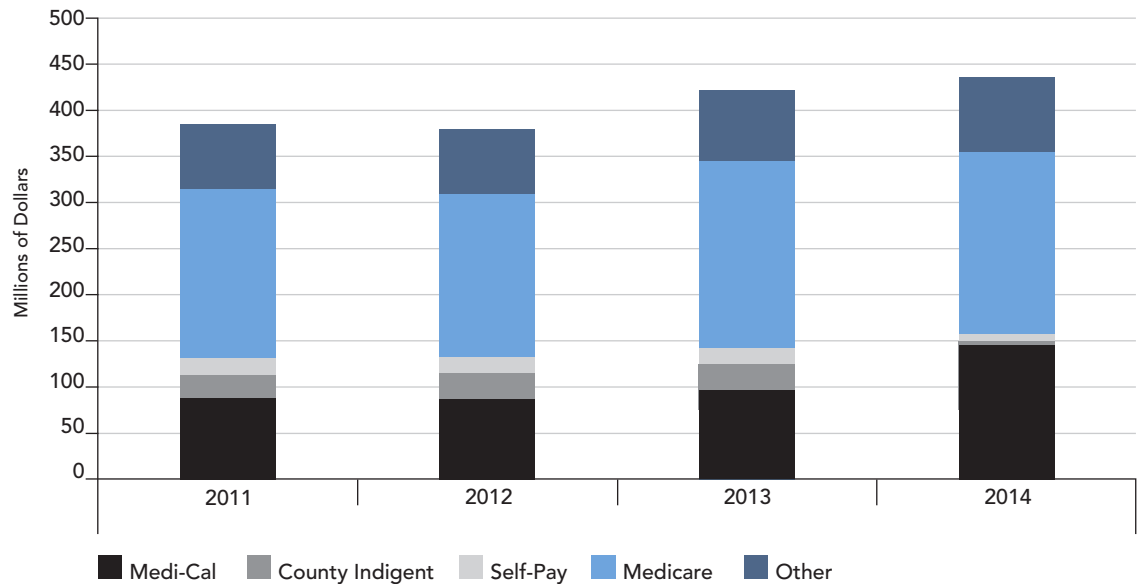
Despite the substantial costs associated with diabetic lower extremity complications in terms of hospital admissions, quality of life, and patient mortality, only a small percentage of people with diabetes in the United States receive clinically recommended foot health

screenings or access podiatric care as estimated by the CDC, with utilization rates varying between 11 percent and 28 percent, based on age.<sup>5</sup> Regular foot care is a critical component of diabetes management, and podiatric medicine has been associated with reduced downstream expenditures, lower incidence of amputations, and decreased mortality in people with diabetes.<sup>6</sup>

Podiatrists can offer a range of treatments for high-risk patients and for those already presenting with DFUs. Monitoring of diabetic patients considered to be at risk for developing foot ulcers is critical, as the factors leading to foot ulcers — including poor circulation (peripheral arterial disease), reduced flexibility, and loss of sensation (sensory neuropathy) — can also mean that patients do not realize

## Exhibit 1

## Diabetic Lower Extremity Complication Admission Expenditures by Payer Category in California over Time



*“California’s spending on inpatient stays related to DFUs and lower extremity amputations rose by 13 percent between 2011 and 2014.”*

that a once-minor lower extremity blister or callus has developed into an ulcer. Once an ulcer has formed, a podiatrist can contribute to improved outcomes through a variety of clinical pathways, administering and advising on a course of treatment that can include wound debridement, offloading, negative pressure therapy, and infection management to heal the ulcer without hospital admission or lower extremity amputation.

This analysis uses the costs of inpatient treatment for lower extremity diabetes complications as documented in OSHPD discharge data to project total California expenditures related to these lower extremity complications. It also shows how receipt of recommended screenings and specialized podiatric care may contribute to decreased health costs (averted costs). The results of this analysis are presented on the statewide, Medicaid, and county health system levels in order to demonstrate how the costs of diabetic lower extremity care affect state health system costs as a whole and, in specific, subsets of

vulnerable populations insured by public payers in the state of California.

### The Growing Costs of Lower Extremity Complications

Between 2011 and 2014, California’s statewide health spending on inpatient stays related to DFUs and lower extremity amputations rose by 13 percent, from \$385 million to \$435 million (OSHPD data). The magnitude of this cost increase is potentially attributable to the rising prevalence of diabetes and the aging diabetic population, as the cost of a lower extremity complication admission over this period remained nearly constant, increasing by less than 1 percent.<sup>7</sup> Over the same period, however, the prevalence of diabetes in California rose from 8.4 percent to 8.9 percent, according to CHIS estimates,<sup>8</sup> which equates to roughly 300,000 more people in the state living with diabetes. Of even more concern, the prevalence of diabetes among Californians older than 65 rose at four times that rate, rising from 18.6 percent in 2011 to 20.6 percent in 2014 (CHIS data).

Given the ongoing upward trend in the number of people living with diabetes in California, costs associated with DFUs can be expected to continue rising in coming years. In 2011, diabetic patients accounted for nearly one-third of all hospital admissions in the state, and public insurance financed more than three-quarters of these hospital stays.<sup>9</sup> California's experience is not unique, as the prevalence of diabetes has been rising nationally since the 1950s; according to the American Diabetes Association, the costs related to the disease have risen even more quickly.<sup>10</sup>

In terms of patient health and quality of life, the costs associated with diabetic lower extremity complications are also great: of all major comorbidities and complications arising from diabetes mellitus, those occurring in the lower extremities are among the most severe in terms of both mortality and quality of life.<sup>11</sup> A meta-analysis of several studies on mortality in people with diabetes suffering from lower extremity complications found that patients with a diabetic foot ulcer had nearly double (1.89) the risk of mortality versus other people with diabetes.<sup>3</sup> Additionally, people with diabetes who suffer from foot ulcers experience decreased mobility and overall daily functioning, higher rates of depression than people living with diabetes who do not have foot ulcers, and difficulty attaining or retaining employment.<sup>12</sup>

Once DFUs develop, patients appear to consistently experience deteriorating health status. An estimated 84 percent of diabetic lower extremity amputations (LEAs) are preceded by foot ulcers, and mortality projections for those advancing to the point of lower extremity amputations are more dire

than for those with acute ulcers.<sup>12</sup> The five-year mortality rate for LEA patients is estimated to be as high as 74 percent, exceeding the mortality rate of all cancers except lung cancer. Quality of life for diabetic lower extremity amputees suffers greatly as well, with multiple large studies of the negative effects of diabetes indicating that amputations rank first in terms of decreased quality of life.<sup>13</sup>

#### **Financial Impact of Podiatric Care on Diabetes Treatment Costs**

A 2013 analysis found that only 28 percent of older adults diagnosed with diabetes had had contact with a foot doctor in the past 12 months. Percentages were even lower for those ages 40-64 (18.7 percent) and 18-39 (11 percent).<sup>15</sup> Yet podiatric services have been linked both to reduced rates of serious complications for patients and lower treatment costs. A study assessing changes in inpatient hospitalizations associated with DFUs among adult beneficiaries of Arizona Medicaid from 2006 to 2011 found that repeal of podiatric services resulted in significantly higher aggregate hospital admissions, charges, and lengths of stay.<sup>14</sup> OSHPD public discharge files show that Arrowhead Regional Medical Center in Colton, California, saw a 20.4 percent decrease in amputations from 2011 to 2014 after implementing ambulatory podiatric services on a part-time basis.<sup>15</sup> Estimates for the cost savings associated with podiatric care vary widely; we therefore elected to use the range of deterrence of both LEA and DFU admissions in our analyses. The 35 to 75 percent deterrence of amputations and DFU admissions for podiatric medicine utilization is represented in the table below as "Averted Admissions."

*“Podiatric services have been linked both to reduced rates of serious complications for patients and lower treatment costs.”*

## Exhibit 2

## Statewide Impact of Podiatric Services on DFUs, 2014

Population	Admissions			Total Costs			Costs Per Admission		
	Acute	Amputation	Total	Acute	Amputation	Total	Acute	Amputation	Avg.
California	17,096	6,704	23,800	\$257,770,000	\$177,510,000	\$565,299,000	\$15,078	\$26,478	\$18,289
Medi-Cal	5,765	2,181	7,946	\$85,289,000	\$60,136,000	\$188,863,000	\$14,794	\$27,573	\$18,302
County Programs	73	65	138	\$1,307,000	\$2,617,000	\$5,095,000	\$17,900	\$40,258	\$28,431

Notes: "Total Costs" are estimates of outpatient expenditures as a percentage of statewide inpatient spending and are therefore rounded to nearest thousands.

"Costs Per Admission" represent a statewide average and are therefore reported without rounding.

Population	Averted Admissions			Cost Savings		
	Acute	Amputation	Total	Acute	Amputation	Total
<b>California</b>						
35% Deterrence	1255	134	1389	\$24,582,000	\$4,596,000	\$29,178,000
55% Deterrence	0	807	807	\$40,321,000	\$27,767,000	\$68,087,000
75% Deterrence	0	1152	1152	\$57,502,000	\$39,598,000	\$97,099,000
<b>Medi-Cal</b>						
35% Deterrence	231	87	318	\$4,435,000	\$3,127,000	\$7,562,000
55% Deterrence	0	140	140	\$7,133,000	\$5,029,000	\$12,162,000
75% Deterrence	0	196	196	\$9,960,000	\$7,022,000	\$16,982,000
<b>County Programs</b>						
35% Deterrence	5	5	10	\$125,000	\$250,000	\$374,000
55% Deterrence	9	8	17	\$204,000	\$409,000	\$614,000
75% Deterrence	13	11	24	\$291,000	\$584,000	\$875,000

Notes: "Averted Admissions" refers to admissions prevented due to utilization of podiatry services.

"Cost Savings" are rounded to nearest thousands.

As indicated in Exhibit 1, direct inpatient costs associated with DFUs and lower extremity amputations are greater than \$430 million per year and rising steadily. When outpatient treatment is accounted for (Exhibit 2), the costs to the health care system are estimated to be \$565 million annually. As the prevalence of diabetes continues to grow and the diabetic population in California continues to age,<sup>8</sup> we expect this trend to continue.

Employing the assumptions outlined in the previous section, we estimate podiatric care to have averted between \$29 million and \$97 million in costs in 2014. These savings, the result of potentially avoided DFU-related admissions and lower extremity amputations, are attributable to the minority of diabetic patients utilizing podiatric services. Increasing the utilization rate of podiatric care would yield greater savings, per our analysis.

### Medi-Cal

Within the smaller Medi-Cal sample, a total of 7,946 diabetic foot ulcer discharges occurred in 2014, with 2,181 resulting in amputations. Using these totals, we estimate a savings of between \$7.5 and \$16.9 million attributable to podiatric care. These savings arrive despite the low rate of estimated podiatric medicine utilization in this population due to the “optional” designation of podiatric services by Medi-Cal. Obtaining reimbursement for preventive podiatric care administered to Medi-Cal patients can be difficult, and utilization of such care by those in the Medi-Cal population is therefore estimated at half the rate of utilization by the rest of California’s diabetic population. While the observed rate of incidence for lower extremity complication admissions in the Medi-Cal population is only slightly higher than the state average, Medi-Cal insures a large number of people living with diabetes and sees higher than state average costs per admission, particularly in the case of lower extremity amputations. Thus, the potential for further savings through increased access to preventive podiatric care in this group is high.

### County Indigent Care Services

The number of inpatient stays related to lower extremity complications of diabetes that were financed by county indigent services shrank rapidly from 2011 to 2014, reflecting the dwindling enrollment in these programs due to Medicaid expansion in the state of California. By 2014, only about 20,000 people living with diabetes were enrolled in county indigent programs. Nevertheless, costs in this group were even higher than for those enrolled in Medi-Cal, averaging \$28,430.96 per admission in 2014. Overall savings arising from only a small number of averted admissions in this population in 2014 are estimated at between \$400,000 and \$1 million, down from between \$4.1 and \$10 million in 2013 as a result of expanded Medi-Cal coverage.

### Policy Implications

This analysis found significant savings to the state’s health care system associated with podiatric services, with additional quality-of-life benefits for people with diabetes who utilize these services. By helping to prevent and mitigate the severity of DFUs, podiatrists may also have some effect on patients’ mobility and job readiness, thereby reducing productivity losses associated with DFUs. Finally, the high mortality rates associated with DFUs and lower extremity amputations may suggest that podiatric medicine can help reduce mortality rates among people with diabetes. These cost savings arise despite the low utilization of podiatric medicine among California’s most vulnerable diabetes populations. Increasing the number of people with diabetes who receive the recommended standard of foot care, particularly among Medi-Cal patients with limited access to preventive podiatric care, could yield even greater value to the state’s diabetes patients and health care system.

*“Utilization of podiatric care by Medi-Cal enrollees is estimated at half that of the rest of California’s diabetic population.”*



*“Severing access to podiatric medicine for those enrolled in Covered California plans could lead to more hospital admissions and a corresponding rise in expenditures.”*

Alternatively, with the fate of the Affordable Care Act in limbo, severing access to podiatric medicine for those enrolled in Covered California plans could lead to more hospital admissions as a result of painful, life-altering DFUs, with a corresponding rise in expenditures attributable to the state’s chronic disease patients. Should large numbers of diabetes patients lose coverage due to policy shifts at a federal level, policymakers would be wise to closely follow outcomes and costs related to DFUs among the newly uninsured.

The savings associated with podiatric care in California represent the value of one step toward optimal diabetes care. In addition to the lower rates of foot care provided to people living with diabetes nationally, a 2002 study found that a majority of those in the U.S. with diabetes fail to manage lipid intake, nearly 18.9 percent are above recommended hemoglobin-A1C levels, and 36.7 percent fail to have an annual eye exam.<sup>16</sup> In order to benefit from integrated care, chronic disease patients must have access to the entire care spectrum. This includes integration of behavioral health services, since depression is correlated with nonadherence with diabetes medication, doubles the risk of new DFUs and nonhealing DFUs, increases the risk of DFU recurrence fivefold, and is associated with a 33 percent increase in the risk of lower extremity amputation.<sup>17, 18, 19</sup>

With the prevalence of diabetes and the cost of diabetes care both rising rapidly, improving outcomes in people with diabetes will only grow more important in the coming years. The American Diabetes Association’s 2012 survey of the economic impact of diabetes in the U.S. estimated total costs at \$245 billion, an increase of 41 percent over its 2007 analysis.<sup>10, 20</sup> Ensuring that Californians have access to an important component of chronic illness care will improve quality of life for California’s growing diabetic population and help stem the financial impact of diabetes complications on California’s health system.

## Methodology

OSHPD public discharge records representing all California hospital stays from 2011 through 2014 served as the primary data source for this analysis. Discharges related to diabetes and its complications, lower extremity procedures, and amputations were identified using queries built in CUPID 2.0 software. Stata 13 was used to identify specific ICD-9 and ICD-9-CM codes matching those used in the AHRQ Diabetic Foot Ulcer and Lower Extremity Amputation Data Points series.<sup>21</sup>

The primary outcome variable analyzed in this analysis is “estimated cost,” a metric based on total charges generated during the patient’s inpatient stay adjusted by the hospital’s charge-to-cost ratio. Because OSHPD cost data were only available for inpatient discharge records, a previously published estimate of the percentage of total DFU-attributable costs arising from the inpatient setting (77 percent) was used to project total DFU spending in the state of California.<sup>21</sup>

While evidence suggests that podiatric care leads to improved outcomes for diabetic patients with lower extremity complications, no study has conclusively demonstrated a rate at which podiatric care can prevent specific adverse outcomes. Estimates for this rate vary widely, and we therefore elected to project cost estimates based on a range of possible deterrence levels for both lower extremity amputations and diabetic foot ulcer admissions in the analyses included in this paper. Our analysis uses a 35-75 percent range of amputation prevention estimated for podiatric care in a study published in 2010,<sup>6</sup> expanding this deterrence range to estimate the effects of podiatric care on both DFUs and amputations. To project the rate of podiatric medicine utilization in California, we used data from the CDC on services utilization by diabetics across age groups nationally. Weighting age groups in CDC data by the age distribution of California’s diabetic population, we arrived at a 22 percent utilization rate for the general population in California. To account for the limited access to podiatric care in the California Medicaid population due to the “optional” designation of podiatric services, we halved this rate for Medi-Cal patients (11 percent). Based on a weighted average of these two utilization rates, the overall statewide utilization in California in 2014 was 19.5 percent.

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