



# MONTANA DIABETES PROGRAM

## LOWER-LIMB AMPUTATIONS, 2016-2023

### Burden Facts

- 3,058 diabetes-related lower-limb amputations (LLAs) occurred in Montana hospitals between 2016-2023.
- The rate of diabetes-related LLAs among Montana adults has increased from 4.2 per 1,000 adults with diabetes to 5.5 per 1,000 adults with diabetes.
- Men accounted for 76 percent of Montana's diabetes-related LLAs between 2016-2023.

### National Goals Seek to Reduce Lower-Limb Amputations

Lower-limb amputations (LLA), sometimes known as lower-extremity amputations (LEA), are surgeries to remove all or part of a toe, foot, or leg. According to the Centers for Disease Control and Prevention (CDC), these amputations are on the rise in the United States, with 80 percent of them being a result of diabetes-related complications<sup>1</sup>. Healthy People 2030, which sets data-driven objectives to improve health in the nation by 2030, has set a target to reduce the rate of LLAs among adults with diagnosed diabetes from 6.1 amputations per 1,000 adults in 2020 to 5.5 amputations per 1,000 in 2030, after age-adjusting<sup>2</sup>.

Diabetes self-management and education support (DSMES) visits with health care professionals offer opportunities to learn critical skills to prevent complications and ultimately save the diabetes patient's life and limb. The American Diabetes Association (ADA) recommends health care providers strongly encourage all people with diabetes to participate in DSMES to facilitate informed decision-making, self-care behaviors, problem-solving, and active collaboration with the health care team (recommendation 5.1)<sup>3</sup>. For care of patients with diabetes, the ADA also recommends comprehensive foot evaluations at least annually to identify risk factors for ulcers and amputations (recommendation 12.23), with the frequency increasing to every visit for patients with evidence of sensory loss or prior ulceration or amputation (recommendation 12.25)<sup>4</sup>.

The purpose of this report is to describe recent trends in diabetes-related LLAs in Montana.

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### RESOURCES

- Diabetes-related LLAs are preventable. Review the current [Standards of Care in Diabetes](#) published by the American Diabetes Association for best practices.
- [Lower Extremity Amputation Prevention \(LEAP\)](#) can dramatically reduce lower extremity amputations in individuals with any condition that results in loss of protective sensation in the feet, including diabetes.



### LLAs are Increasingly Common, Middle-Aged Men Account for Most

The number of Montanan adults estimated to have diabetes from 2016 through 2023 ranged from 64,104 to 85,227 people, or 7.6 percent to 9.4 percent of the adult population each year (Table 1)<sup>5</sup>. During this timeframe, 611,192 Montanans aged 18 years and older were hospitalized, 105,797 of which had a diabetes diagnosis (17 percent), and 3,058 had a diabetes-related LLA (one percent)<sup>6</sup>.

In 2016, the rate of diabetes-related LLAs was 4. 2 amputations per 1,000 adults with diabetes. This has since steadily increased to 5.5 per 1,000 adults with diabetes in 2023. The maximum occurred in 2022, when it reached 6.1 per 1,000 adults with diabetes. Reaching this peak was particularly driven by an increase in LLAs among younger men (18-44 years) and older women (65+ years; Figure 1)<sup>5,6</sup>.

Although men represented 47 percent of people with diabetes, they accounted for 76 percent of diabetes-related LLAs. This disproportionate burden was especially pronounced among men aged between 45-64 years, who accounted for 20 percent of people with diabetes and 38 percent of diabetes-related LLAs. Women aged between 18 and 44 years were the least affected, representing six percent of people with diabetes and three percent of diabetes-related LLAs (Figure 2)<sup>5,6</sup>.

**TABLE 1. THE NUMBER OF MONTANA ADULTS WITH DIABETES AND THE NUMBER OF MONTANA ADULTS WITH DIABETES LLAS HAS BEEN INCREASING, BUT THE NUMBER OF DIABETES-RELATED HOSPITALIZATIONS HAS NOT<sup>5,6</sup>.**

The number of MT adults who...	2016	2017	2018	2019	2020	2021	2022	2023
Reported ever being diagnosed with diabetes (with percent of adult population): *	66,284 (8.1%)	64,954 (7.9%)	77,847 (9.3%)	64,014 (7.6%)	76,837 (9.1%)	77,136 (8.4%)	74,364 (8.4%)	85,227 (9.4%)
Had a diabetes-related hospitalization: ^	13,684	14,485	13,823	13,632	12,510	13,036	12,569	12,058
Had a diabetes-related LLA: ^	279	326	372	346	403	408	453	471

\*Weighted estimate. ^Hospital admissions only. Does not include Emergency Department visits or ambulatory visits.

### Diabetes-Related LLAs are Preventable

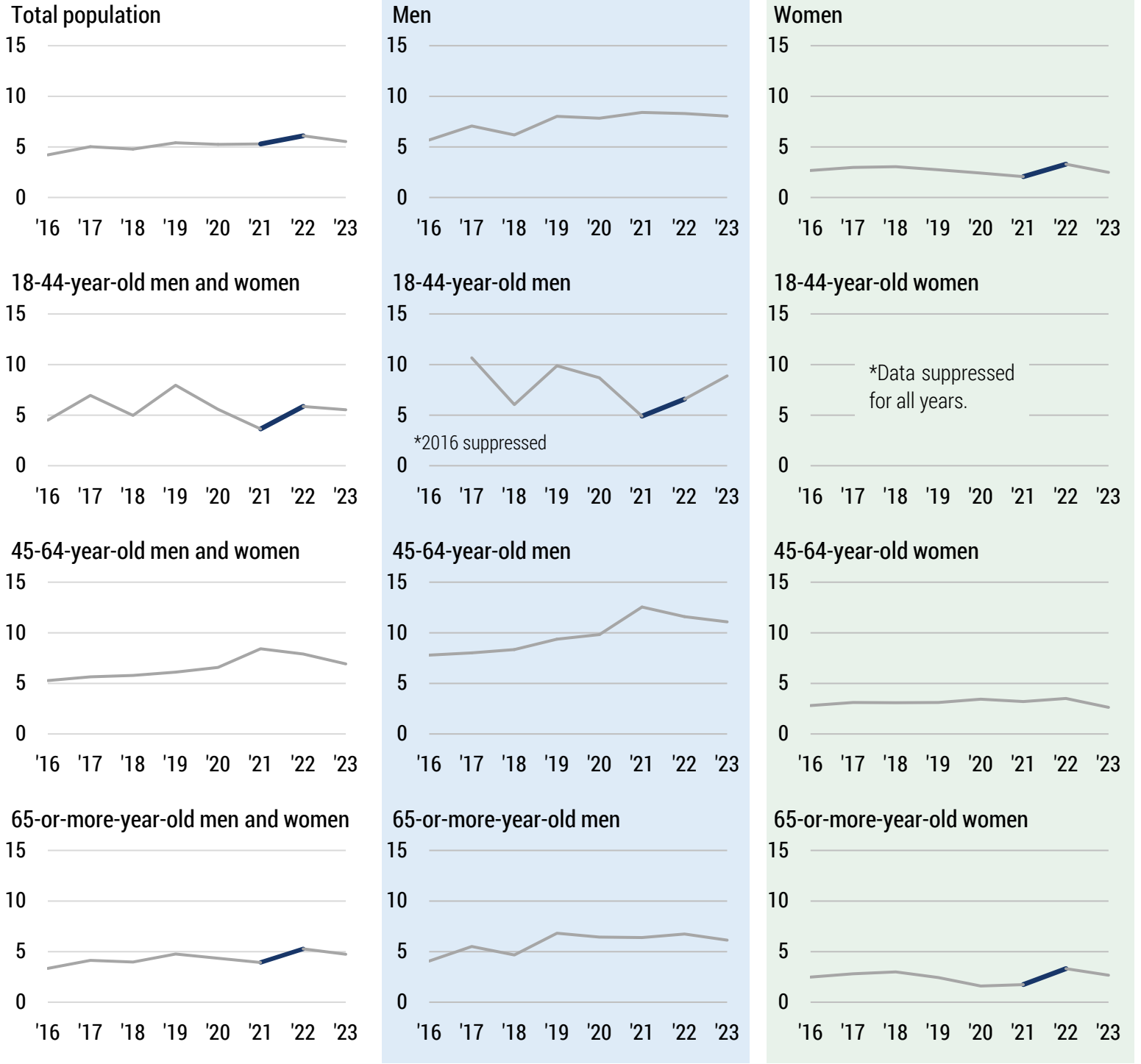
Diabetes can lead to LLAs through peripheral neuropathy followed by poor attention to lower-limb wounds. Diabetes-related LLAs are a preventable condition with wound monitoring and care. DSMES often includes training to patients on how to do daily foot checks, what to look for, and when to call their provider. The ADA provides annual updates for standards of care for patients with diabetes, including guidance on frequency of visits, providing DSMES, and how and when to check patient feet for wounds. Patients with diabetes should also be aware of their risk and how to monitor their own feet outside of the health care provider’s office<sup>3,4</sup>. The Association of Diabetes Care and Education Specialists (ADCES) offers an [online tool to locate accredited DSMES programs](#); the ADA has a similar [tool for locating ADA recognized DSEMS programs](#)<sup>7,8</sup>. The Montana Diabetes Program offers quality improvement project opportunities to improve foot screenings; to learn more about these opportunities, reach out to the Montana Diabetes Program by email ([diabetes@mt.gov](mailto:diabetes@mt.gov)) or phone (1-844-684-5848).





**FIGURE 1. THE SPIKE IN 2022 WAS DRIVEN BY 18-44-YEAR-OLDS AND WOMEN AGED 65-OR-MORE-YEARS<sup>5,6</sup>.**

Rate of diabetes-related LLAs per 1,000 adults with diabetes.

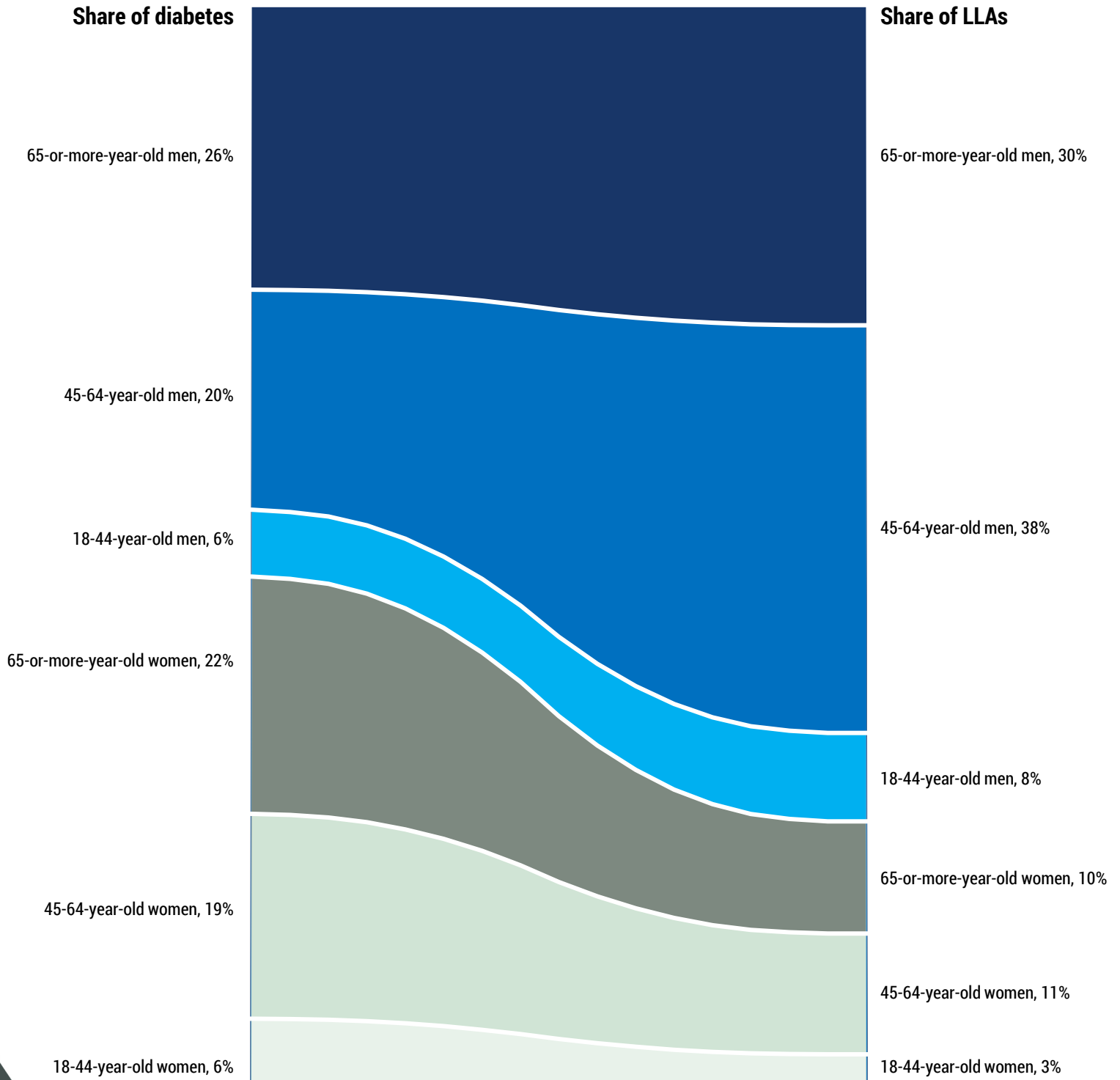


\*Data suppression occurred where there were 15 or fewer diabetes-related LLAs.



**FIGURE 2. THE BURDEN OF DIABETES-RELATED LOWER-LIMB AMPUTATIONS IS HIGHER AMONG 45-64-YEAR-OLD MEN COMPARED TO THEIR BURDEN OF DIABETES<sup>5,6</sup>.**

Distribution of adults with diabetes compared to distribution of adults who had a diabetes-related LLA, 2016-2023.





## Data and Methods

The number of LLAs between 2016-2023 comes from the Montana Hospital Discharge Data System (HDD). LLA estimates were limited to inpatient admissions. The data include up to nine diagnostic codes and six procedural codes which use the standardized ICD-10 coding structure. The data also include age and gender for demographic analysis. Identification of LLAs in this dataset matches the methods described in the Healthy People 2030 objective<sup>2</sup>. In Montana, there were no diabetes-related LLAs in the Emergency Department between 2016-2023, and so the data were limited to hospital admissions.

The number of Montanan adults with diabetes comes from the Behavioral Risk Factor Surveillance System (BRFSS). This phone survey of non-institutionalized adults collects prevalence data regarding health-related risk behaviors, chronic health conditions, and the use of preventive services. Between 2016-2023, there were 50,320 Montanans aged 18 years or older who participated in the BRFSS survey.

The rate of LLAs is calculated as the number of LLAs between Jan 1 and Dec 31 in the given year divided by that year's BRFSS estimate for the number of Montanan adults living with diabetes times 1,000. This method replicates the Healthy People 2030 goal, which uses the Healthcare Cost and Utilization Project – National (Nationwide) Inpatient Sample for the numerator and the National Health Interview Survey for the denominator<sup>2</sup>. Unfortunately, the datasets used in Healthy People 2030 are not available for state level surveillance, and so even though the methods are similar, the outcomes are not directly comparable to the Healthy People 2030 goal.

## References

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