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Rate of Lower Extremity Amputation Episodes Among Persons with Diabetes--New Mexico, 2000

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Lower extremity amputation (LEA) is one of the most disabling complications of diabetes (1). Lower extremity problems tend to recur among persons because of underlying complications, including the loss of “protective” sensation (2,3). To define the burden of LEA among persons with diabetes in New Mexico, the New Mexico Diabetes Prevention and Control Program (DPCP) analyzed data from the Hospital Inpatient Discharge Database (HIDD) and the Santa Fe Indian Hospital (SFIH) during 2000 by linking hospital discharges to persons to create “episodes” of LEA. This report summarizes the findings of that analysis, which indicated that the age-adjusted rate of LEA by episode was approximately 3.5 times higher for AIs (11.4 per 1,000 persons with diabetes) than for non-Hispanic whites (3.3). To address this disparity, DPCP is collaborating with the Indian Health Service (IHS) to determine the needs in AI communities with respect to foot-care resources and education.

Maintained by the New Mexico Health Policy Commission, HIDD includes discharges

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The number of persons with diabetes at risk for LEA in 2000 was estimated by multiplying racial/ethnic-specific prevalence rates from the Behavioral Risk Factor Surveillance System (BRFSS) by the appropriate New Mexico adult population for that year from the U.S. Bureau of the Census. BRFSS is a state-based random-digit-dialed telephone survey of the noninstitutionalized U.S. population aged ≥ 18 years. Because the sample size of AIs in BRFSS is small, estimates of AIs with diabetes were based on IHS outpatient data for the same year. The

published in Morbidity and Mortality Weekly Report, Vol. 52, No. 4, Jan 31, 2003. IHS outpatient database contains clinical and demographic information from IHS and tribal and health-care facilities in New Mexico. Unique patient identifiers were used to exclude duplicate records, and geographic location was determined according to where the patient received services most recently. BRFSS data from 1998 -- 2000 were aggregated to estimate the age-specific diabetes prevalence for non-Hispanic whites and Hispanics. Age adjustment was performed using the direct method and the 2000 U.S. standard population (4).

In 2000, a total of 307 persons with diabetes had 354 LEA episodes; 265 persons had a single episode and 42 had two or more episodes. The median age of persons was 66 years (range: 28-92 years) (95% confidence interval [CI] =64.6-67.4). Among the episodes, 193 (55%) of LEAs were minor; 161 (45%) were major.

The incidence of LEA was twice as high for men as for women (4.5 episodes per 1,000 persons with diabetes versus 2.1; $p<0.05$) and increased with age (Table). The age-adjusted LEA rate was 3.5 times higher for AIs than for non-Hispanic whites (11.4 versus 3.3; $p<0.05$). The rate was not significantly different for non-Hispanic whites and Hispanics (3.3 versus 2.6). Overall, the age-adjusted LEA rate was 3.4 per 1,000 persons with diabetes (95% CI = 2.9--3.9).

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Editorial Note: Approximately one third of persons with diabetes are at high risk for LEA (2,3).

Risk factors for LEA include having had a previous ulcer or amputation. Foot ulcers usually precede amputation and are caused by several underlying problems, including neuropathy and

published in Morbidity and Mortality Weekly Report, Vol. 52, No. 4, Jan 31, 2003. reduced circulation, which lead to injury and poor healing (1). LEA surveillance is conducted typically by analyzing hospital discharges without knowing how many persons are represented (5-8). Conducting surveillance of LEAs at the individual level helps to monitor the success of LEA-prevention efforts. Similar to other studies of LEA among persons with diabetes, the findings in this report indicate that the rate of LEA is higher among men than among women (5-8) and higher among non-Hispanic whites than among Hispanics (5). AIs had the highest rate of LEAs among the groups analyzed. Age-adjusted rates of LEA found in this analysis were lower than those reported previously in other areas (5,6,8) because persons with multiple discharges were counted only once.

The findings in this report are subject to at least six limitations. First, the number of LEA discharges and persons undergoing LEAs probably were underestimated because Veterans Health Administration data, which contain a high percentage of persons aged ≥ 65 years with a high prevalence of diabetes, and complete IHS data could not be obtained. However, only 2 additional IHS facilities exist that perform LEAs in New Mexico. Second, 24 persons in HIDD were classified as “unknown” or “other” for race, which could influence LEA rates among racial/ethnic groups. Third, the number of procedures that occurred among persons with diabetes might have been underestimated because coexisting diabetes was not always coded on hospital discharge records. Fourth, denominator data were based on a self-reported diagnosis of diabetes; however, diagnosis of diabetes has been reported accurately in BRFSS (9). Because this denominator data were based on telephone surveys and some areas in New Mexico have very low telephone coverage, these areas were underrepresented in BRFSS. Fifth, because of the

published in Morbidity and Mortality Weekly Report, Vol. 52, No. 4, Jan 31, 2003. small sample size of AIs in the BRFSS, IHS outpatient data were used to determine diabetes prevalence among AIs. Using survey and outpatient data might introduce some bias; however, this bias does not account completely for the large difference in rates between AIs and other racial/ethnic groups because of the likely underestimation of LEAs among AIs. Finally, the definition of an episode for a person readmitted within 14 days of the initial hospitalization might be arbitrary because surgical philosophies differ regarding how much healing time should be allowed before further amputation. However, in the absence of data, 14 days was considered a conservative time interval for a lesion to heal, and the majority of repeat hospitalizations within 14 days were probably related to the original lesion.

Regular comprehensive foot examinations are important for early detection of foot problems, and efforts to prevent recurring problems can be effective in reducing the number of persons with diabetes who undergo LEA (*1*). The New Mexico DPCP collaborates with health-care providers and professionals to provide standardized practice guidelines and provider education in several areas related to diabetes, including foot care. During this process, DPCP has become a key partner in “New Mexico Healthcare Takes on Diabetes”, a broad collaborative effort of New Mexico’s health-care professionals, health plans, and the New Mexico Medical Review Association. Radio messages on foot care also are broadcast in English, Spanish, and Navajo. As a result of the findings of this study, DPCP is collaborating with the Albuquerque Area IHS. A survey of AI communities was conducted on various topics, including 1) level of knowledge about foot care among health-care providers, community health representatives, and patients; 2) access to a podiatrist; and 3) barriers encountered in providing foot care. As part of

published in Morbidity and Mortality Weekly Report, Vol. 52, No. 4, Jan 31, 2003. this process, DPCP is exploring surveillance at other IHS facilities. Continued surveillance of LEA episodes will be useful in expanding and tailoring future interventions and in tracking the success of prevention efforts.

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TABLE. Number and rate* of lower extremity amputation (LEA) episodes †among persons with diabetes, by selected characteristics—New Mexico, 2000

Characteristic	LEA Episodes (number)	LEA Rate (per 1,000) †	95% CI §
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Sex			
Male	223	4.5	(3.8 – 5.1)
Female	131	2.1	(1.5 – 2.7)
Age Group (years)			
18–44	31	2.2	(1.5 – 3.0)
45–64	123	3.5	(2.9 – 4.1)
65–74	120	6.1	(5.0 – 7.2)
≥75	80	7.9	(6.2 – 9.6)
Race or Ethnicity[¶]			
Non-Hispanic white	104	3.3	(2.4 – 4.2)
Hispanic	158	2.6	(2.0 – 3.3)
American Indian	59	11.4	(9.7 – 13.1)
Total	354	3.4	(2.9 – 3.9)

*Per 1,000 persons with diabetes. All rates are age-adjusted to the 2000 U.S. standard population (except for age-specific rates).

†An episode is a discharge for an LEA that occurs for a person. For multiple discharges, an interval between a discharge and readmission of ≤ 14 days is considered as a single episode; an interval of >14 days is considered a separate episode.

§Confidence interval.

¶Racial and ethnic groups too small for meaningful analysis were not included; therefore, episodes do not add up to total.

Source: Hospital Inpatient Discharge Database, and the Santa Fe Indian Hospital.