

Use of the Therapeutic Footwear Benefit Among Diabetic Medicare Beneficiaries in Three States, 1995

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OBJECTIVE — To determine the extent to which Medicare provided reimbursement for therapeutic footwear to diabetic Medicare beneficiaries in Washington, Alaska, and Idaho in 1995.

RESEARCH DESIGN AND METHODS — Using inpatient, outpatient, and durable medical equipment claims data, we selected a cohort of diabetic Medicare beneficiaries. Therapeutic footwear claims were identified using a set of billing codes intended only for the diabetes footwear benefit. People at “high risk” or “possibly increased risk” for foot problems who might benefit from therapeutic footwear claims were identified using a combination of *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) diagnostic codes in any of the databases.

RESULTS — Among 608,804 beneficiaries, 10.2% (62,170) met the inclusion criteria for diabetes. Of the diabetic beneficiaries, 13.0% (8,079) had at least one “high risk” diagnosis, and 14.0% (8,686) had at least one “possibly increased risk” diagnosis. The percentage of diabetic beneficiaries with therapeutic footwear claims was 2.9% among those with diagnoses high risk, 0.7% among those with diagnoses indicating possibly increased risk, and 0.1% among those with no diagnosis from the list. Altogether, only 0.6% of beneficiaries meeting the diabetes case ascertainment criteria had a therapeutic footwear claim in 1995.

CONCLUSIONS — Few diabetic Medicare beneficiaries in Washington, Alaska, and Idaho had claims for reimbursement for therapeutic footwear in 1995. The low utilization of the footwear benefit may represent an important opportunity to improve care for Medicare beneficiaries with diabetes. Further work should be done to characterize the use of the benefit in other regions and to assess whether the low level of usage reflects underutilization.

Foot ulcers and lower-extremity amputations account for considerable morbidity and economic costs among people with diabetes (1). The elderly constitute a substantial proportion of diabetic patients with amputations. In 1994, people aged ≥ 65 years accounted for 55.3% of 67,000 diabetic patients who had nontraumatic lower-extremity amputations in U.S.

hospitals. Amputation rates among diabetic patients aged 65–74 years and ≥ 75 years were 1.6 and 1.8 times those among patients aged ≤ 64 years (2).

Comprehensive foot care programs have been reported to reduce the incidence of subsequent amputations among high-risk diabetic individuals (3,4). One important component of comprehensive foot care

for people with diabetes is the use of appropriate footwear. Although properly fitted nontherapeutic shoes or athletic shoes are suitable for some diabetic patients with foot problems (5,6), special shoes or shoe modifications have been advocated for patients with foot deformities, prior ulcerations, or other abnormalities (4,7,8).

In May 1993, the U.S. Congress passed legislation to add coverage of therapeutic shoes for diabetic Medicare beneficiaries at risk of foot disease as a benefit of Medicare Part B coverage. This was done after a 3-year demonstration project found no evidence that such a benefit would increase overall Medicare costs (9).

During the demonstration project, the number of eligible beneficiaries who applied for the therapeutic shoe benefit was far less than predicted. Subsequent analyses suggested that use of the benefit was likely to be low after national implementation because of low physician and patient awareness, as well as barriers to successful implementation that were a consequence of requirements stipulated in the authorizing legislation (10).

We conducted a study to determine the extent to which Medicare provided reimbursement for therapeutic footwear among diabetic Medicare beneficiaries living in Alaska, Idaho, and Washington in 1995, the second full calendar year in which the benefit had been fully implemented. In addition, we used administrative data to assess selected demographic and clinical characteristics associated with beneficiaries who used the therapeutic footwear benefit.

RESEARCH DESIGN AND METHODS

Data sources

We used the National Claims History database maintained by the Health Care Financing Administration to identify and characterize diabetic beneficiaries, associated diagnoses, and footwear claims. The database combines several files containing fee-for-service inpatient, outpatient, and durable medical equipment claims data. Analyses of encounters in each of these

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Received for publication 13 August 1997 and accepted in revised form 4 February 1998.

Abbreviations: CPT-4, *Physicians' Current Procedural Terminology* fourth edition; HMO, health maintenance organization; ICD-9-CM, *International Classification of Diseases, Ninth Revision, Clinical Modification*; OR, odds ratio.

Table 1—ICD-9-CM codes used to identify people at “high risk” and “possibly increased risk” for subsequent lower-extremity complications

ICD-9-CM code	Diagnosis
High risk	
110.4	Dermatophytosis of foot
681.1	Cellulitis and abscess of toe
681.10	Cellulitis and abscess, unspecified
681.11	Onychia and paronychia of toe
682.7	Lower-extremity abscess—foot, except toes
700	Corns and callosities
707.1	Ulcer of lower limbs, except decubitus
711.07	Pyogenic arthritis (ankle and foot)
730.07	Acute osteomyelitis (ankle and foot)
730.17	Chronic osteomyelitis (ankle and foot)
730.27	Unspecified osteomyelitis (ankle and foot)
730.87	Other infections involving bone in diseases classified elsewhere (ankle and foot)
730.97	Unspecified infection of bone (ankle and foot)
735.*	Acquired deformities of toe
892.*	Open wound of foot except toe(s) alone
893.*	Open wound of toe(s)
Possibly increased risk	
110.1	Dermatophytosis of nail (especially the toenails)
110.9	Dermatophytosis of unspecified site
443	Other peripheral vascular disease
443.1	Thromboangiitis obliterans (Buerger's disease)
443.8	Other specified peripheral vascular diseases
443.81	Peripheral angiopathy in diseases classified elsewhere
443.9	Peripheral vascular disease, unspecified
681	Cellulitis and abscess of finger and toe
681.00	Cellulitis and abscess, unspecified
681.9	Cellulitis and abscess of unspecified digit
703	Diseases of nail
703.0	Ingrowing nail
703.8	Other unspecified diseases of nail
703.9	Unspecified diseases of nail

files were restricted to those occurring in Washington State, Alaska, or Idaho from 1 January 1993 through 31 December 1995. The Enrollment Database was used to determine selected characteristics of individual enrollees (such as age, sex, residence, vital status, months of enrollment in Part B, and health maintenance organization [HMO] enrollment).

Case definitions

To establish a denominator of Medicare beneficiaries, we determined the number of individuals who were 65 years old as of 1 January 1995; alive as of 1 July 1995; continuously enrolled in Medicare Part A and Part B (and not enrolled in an HMO) from 1 January through 1 July 1995; and resided continuously in Washington State, Idaho, or Alaska for the same time period. HMO

patients were excluded because the claims databases do not reliably include encounter data for people enrolled in Medicare managed care plans.

To identify Medicare beneficiaries with presumed diabetes, we selected Medicare beneficiaries ≥65 years of age who resided full time in Washington, Idaho, or Alaska in 1995, were not enrolled in an HMO, were continuously enrolled in Medicare Part A and Part B, and had a claim for at least one inpatient stay or two face-to-face outpatient encounters with a diabetes-related diagnosis from 1993 through 1995. Diabetes-related diagnoses were defined as encounters including an *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM) code of 250.XX, 362.01, 362.02, 366.41, or 357.2. Face-to-face outpatient encounters were defined to include

encounters in the National Claims History Part B Physician/Supplier files with a set of *Physicians' Current Procedural Terminology* fourth edition (CPT-4) codes used to indicate health care provider visits (see APPENDIX) as specified in the Health Plan and Employer Data Information Set (HEDIS), version 2.5 (11).

We identified claims for therapeutic footwear dispensed in calendar year 1995 by extracting from the durable medical equipment file claims with a series of Health Care Financing Administration Common Procedure Coding System (HCPCS) codes designated by the Health Care Financing Administration to be used solely for the diabetic footwear benefit. The data presented regarding footwear claims are restricted to people meeting the diabetes case ascertainment definition described above.

During the study period, eligibility for the therapeutic footwear benefit was restricted to individuals with diabetes who had one or more of the following conditions: peripheral neuropathy with evidence of callus formation, history of pre-ulcerative calluses, history of foot ulcerations, foot deformity, previous amputation of the foot or part of the foot, or poor circulation. To identify people who might meet these eligibility criteria, we empirically developed two lists of ICD-9-CM codes. The first list included diagnoses that could unambiguously be identified as wounds, deformities, neuropathic or vascular complications, or infections of the lower extremity. We refer to diagnoses in this list as “high risk” (Table 1). A second list of diagnoses was developed to include conditions which, though probably affecting lower extremities, might possibly refer to other sites (Table 1). For instance, ICD-9-CM code 681 (cellulitis and abscess of finger and toe) is not unequivocal evidence of toe cellulitis, but most diabetic Medicare beneficiaries with this code are likely to have toe rather than finger infections. We refer to these diagnoses as indicating “possibly increased risk.” These lists were developed by medical records coders, clinicians, and researchers with experience in diabetic foot problems.

Statistical analyses

Descriptive analyses of the beneficiary characteristics and footwear claims were conducted using SAS for Windows, version 6.11. Odds ratios (ORs) were computed using Epi-Info, version 6.04, to assess the likelihood of having a claim for therapeutic footwear among people with either “high

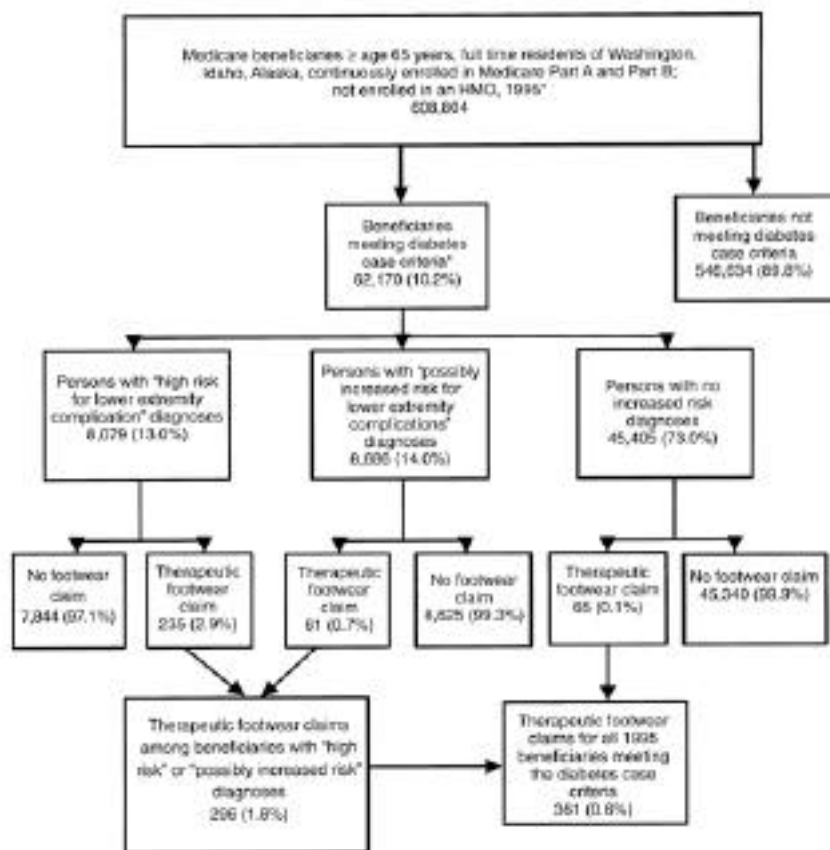


Figure 1—Study population. *See text for complete descriptions.

risk” or “possibly increased risk” diagnoses compared with the likelihood among diabetic beneficiaries without diagnoses suggestive of foot problems. Differences in proportions of footwear claims among states were assessed with χ^2 tests (or the Fisher’s exact test, as appropriate), using an α level of 0.05 for tests of significance.

RESULTS — Among an estimated 608,804 beneficiaries, 62,170 (10.2%) met the inclusion criteria for diabetes. Selected characteristics of the study population are shown in Fig. 1 and Table 2. The mean age for diabetic beneficiaries was 75.4 years for men and 76.7 years for women. The mean \pm SD annual number of outpatient face-to-face encounters was 9.6 ± 7.3 , of which 2.3 ± 2.7 included a diabetes-related line item ICD-9-CM code.

Of the 62,170 diabetic beneficiaries, only 361 (0.6%) had a therapeutic footwear claim in 1995 (Table 2). Footwear recipients were slightly younger than other diabetic beneficiaries. Nearly two-thirds of the footwear recipients were women, compared with 55.3% of all diabetic beneficia-

ries. Of the 347 claims for shoes, 288 (83.0%) were for depth inlay shoes, and 59 (17.0%) were for custom-molded shoes.

Of the 62,170 beneficiaries with presumed diabetes, 13.0% (8,079) had at least one “high risk” diagnosis; 14.0% (8,686) had at least one “possibly increased risk” diagnosis; and 73.0% (45,405) had no diagnoses in the list of diabetes-related lower-extremity complications (Table 3). The percentage of diabetic beneficiaries with therapeutic footwear claims was 2.9% (235/8,079) among those with diagnoses of high risk, 0.7% (61/8,686) among those with diagnoses indicating possibly increased risk, and 0.1% (65/45,405) among those with no diagnosis from the list. Thus, the likelihood of receiving therapeutic shoes among people with diagnoses suggestive of high-risk feet is far higher than among those without such diagnoses (OR = 20.9 for high risk vs. no risk [95% CI 15.7–27.8]; OR = 4.9 for possibly increased risk vs. no risk [95% CI 3.4–7.1]).

CONCLUSIONS — Although more than one in four diabetic Medicare benefi-

Table 2—Selected characteristics of diabetic Medicare beneficiaries, Pacific Northwest, by use of Medicare therapeutic footwear benefit, 1995

	Total
Number of diabetic beneficiaries	62,170
Number with at least one footwear claim	361 (0.6)
Sex	
All diabetic beneficiaries	
Men	27,794 (44.7)
Women	34,376 (55.3)
Footwear recipients	
Men	128 (35.5)
Women	233 (64.5)
Age (years)	
All diabetic beneficiaries	
Men	75.4 \pm 6.4
Women	76.7 \pm 7.1
Footwear recipients	
Men	74.3 \pm 6.4
Women	75.9 \pm 6.9
Number of outpatient face-to-face encounters (Medicare Part B) in 1995	
All diabetic beneficiaries	
All encounters	9.6 \pm 7.3
Encounters with a diabetes line-item diagnosis	2.3 \pm 2.7
Footwear recipients	
All encounters	15.4 \pm 8.9
Encounters with a diabetes line-item diagnosis	4.5 \pm 4.0
Number of inpatient discharges in 1995 with diabetes diagnosis	
All diabetic beneficiaries	0.4 \pm 0.9
Footwear recipients	1.0 \pm 1.4

Data are means \pm SD or n (%).

ciaries in Washington, Alaska, and Idaho had clinical diagnoses associated with the potential for lower-extremity complications, Medicare claims for reimbursement for therapeutic footwear were paid for less than 1% of these beneficiaries in 1995. In the 1989–1992 Medicare Therapeutic Shoe Demonstration, which included considerable targeted outreach to health care providers and beneficiaries with diabetic foot problems, only 2% of the targeted patients actually enrolled in the project (10). Thus, low utilization of the benefit in the

Table 3—Footwear benefits used by and risk characteristics of diabetic Medicare beneficiaries who used the Medicare therapeutic footwear benefit, Pacific Northwest, 1995

	Total
Footwear benefit used	
Depth inlay shoes	288
Custom-molded shoes	59
Inserts	168
Rigid rocker bottom modification	25
Wedge modification	1
Metatarsal bar modification	7
Offset heel modification	8
Modification not otherwise specified	3
Number of diabetic beneficiaries with at least one high-risk diagnosis	
All diabetic beneficiaries	
Men	3,251 (11.7)
Women	4,828 (14.0)
Footwear recipients	
Men	85 (66.4)
Women	150 (64.4)
Number of diabetic beneficiaries with at least one probable or high-risk diagnosis	
All diabetic beneficiaries	
Men	6,916 (24.9)
Women	9,849 (28.7)
Footwear recipients	
Men	105 (82.0)
Women	191 (82.0)

Data are number of claims or *n* (%).

demonstration project presaged low use of the benefit in the Pacific Northwest more than a year after national implementation.

Several limitations of these data should be addressed. First, the data sets we used included data on footwear for only those diabetic beneficiaries with a Medicare claim for reimbursement. An unknown number of beneficiaries may have purchased shoes using their own resources. In the Medicare Therapeutic Shoe Demonstration, nearly one-third of applicants for the program owned therapeutic shoes (10). However, most of the beneficiaries enrolled in that project had a history of serious foot problems such as amputations (25%) or previous ulcerations (59%). Thus, participants in the demonstration project may not have been entirely comparable to the beneficiary population in this study.

Second, some residents of the states included in this study may have received therapeutic footwear in other states, and claims for these services might not be included in the data we evaluated. Also, because of claims-processing practices, therapeutic footwear claims from some Indian Health Service facilities may not have been included in the data we analyzed. Third, the list of diagnoses we used to identify individuals with foot problems was developed, at least in part, by a “bootstrap” method. That is, after selecting obvious diagnoses associated with lower-extremity complications, we examined claims data for people who received therapeutic shoes in order to identify high-risk feet. This examination resulted in identification of several of the “possibly high risk” diagnoses, so it is not surprising that a high proportion of those who received shoes had diagnoses included in our list. However, some of the diagnoses on the list (such as “dermatophytosis of foot” or “corns and callosities”) may be markers for special attention to foot care or for visits to foot care specialists rather than independent predictors of feet at high risk for subsequent ulceration or amputation. The ability of this list of diagnoses to identify individuals eligible for therapeutic footwear should be tested on another population of diabetic patients. Finally, this study included only beneficiaries residing in three Pacific Northwest states and may not be generalizable to the entire nation. However, these states are diverse in terms of geography, population distribution (from remote rural to metropolitan), and population density of physicians and other health care providers.

This is the first report describing use of the therapeutic footwear benefit among Medicare beneficiaries after it was fully implemented. Data from this study cannot be used to determine whether the current use of the benefit reflects underuse, appropriate use, or overuse. Although “appropriate” use of therapeutic shoes for diabetic patients has been widely advocated (4,12,13), only one prospective, randomized trial has demonstrated improved outcomes (prevention of relapse of foot ulcerations) when special shoes were used (14). Other studies have shown that appropriately fitted commercial footwear such as athletic shoes may be suitable for some patients to reduce plantar pressures that may result in ulcerations (5,6). One recent report questioned the association between choice of footwear and the development of foot wounds (15).

Even if patient and physician knowledge of the Medicare therapeutic footwear benefit were substantially greater, considerable barriers exist to the use of the benefit. Some of these barriers are related to the steps needed to obtain reimbursement for shoes and inserts. Short of regulatory changes, the most direct way to assure appropriate use of the Medicare diabetes therapeutic footwear benefit may be to enhance physician and patient knowledge of the existence of the benefit and the steps needed to obtain reimbursement. PRO-West—an independent, private, non-profit organization that conducts health care quality improvement projects on behalf of Medicare in Washington, Alaska, and Idaho—is currently implementing a direct-mail intervention intended to increase awareness of the benefit among eligible beneficiaries. Subsequent use of the footwear benefit will be monitored by examining claims for reimbursement as reflected in durable medical equipment data. Studies should be conducted to characterize the most appropriate use of the therapeutic footwear benefit among people with diabetes and to determine whether outcomes can be improved or costs can be reduced with increased use of the benefit.

Acknowledgments— This article was developed as part of a quality improvement project conducted under the Health Care Quality Improvement Program of the Health Care Financing Administration, Baltimore, MD. The conclusions and opinions expressed and the methods used are those of the authors and not necessarily the policy of the Health Care Financing Administration. The authors assume all responsibility for accuracy and completeness.

APPENDIX

CPT-4 encounter codes used to define face-to-face encounters for Medicare Part B

Office/home visits	90000–90170
	90750–90764
Office or other outpatient services	99201–99205
	99211–99215
	99241–99245
Home services	99341–99343
	99351–99353
Nursing home visits	90300–90470
Comprehensive nursing facility assessments	99301–99303
Subsequent nursing facility care	99311–99313

Domiciliary, rest home, or custodial care services	99321-99323
Preventive medicine	99331-99333 90750-90764 99381-99387 99391-99397 99401-99404 99411-99412 99420-99429 99499
Other evaluation and management services	
Ophthalmology and optometry	92002-92014

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