The burden of skin disease in the United States

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Since the publication of the last US national burden of skin disease report in 2006, there have been substantial changes in the practice of dermatology and the US health care system. These include the development of new treatment modalities, marked increases in the cost of medications, increasingly complex payer rules and regulations, and an aging of the US population. Recognizing the need for up-to-date data to inform researchers, policy makers, public stakeholders, and health care providers about the impact of skin disease on patients and US society, the American Academy of Dermatology produced a new national burden of skin disease report. Using 2013 claims data from private and governmental insurance providers, this report analyzed the prevalence, cost, and mortality attributable to 24 skin disease categories in the US population. In this first of 3 articles, the presented data demonstrate that nearly 85 million Americans were seen by a physician for at least 1 skin disease in 2013. This led to an estimated direct health care cost of $75 billion and an indirect lost opportunity cost of $11 billion. Further, mortality was noted in half of the 24 skin disease categories. (J Am Acad Dermatol 2017;76:958-72.)

Key words: burden of skin disease; burden of skin disease report; costs of skin disease; direct health care costs; health care economics; indirect health care costs; loss of productivity costs; over-the-counter drug costs; prescription drug costs.

Skin disease is one of the leading causes of global disease burden, affecting millions of people worldwide.[1] Aging, environmental and genetic factors, and trauma can result in the development of a diverse set of skin diseases, with over 3000 entities identified in the literature.[2,3]

A limited number of studies have addressed the burden of skin disease (BSD) in the United States.[4-6] The most comprehensive study was a 2006 publication by the American Academy of Dermatology (AAD) and the Society for Investigative Dermatology (SID), based on data before 2004.[4] Since 2006, there have been substantial changes in the practice of dermatology and in the US health care system. These changes include the development of new treatment modalities, marked increases in the cost of medications, increasingly complex payer rules and regulations, and an aging US population. In response to these changes, the AAD developed this updated national BSD report to provide a comprehensive appraisal of skin disease prevalence, mortality, and current direct health care and indirect economic costs. This report analyzed information from the 2013 claims tabulations of the US

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population pertaining to 24 skin disease categories that broadly represent skin diseases relevant to both the practice of dermatology (medical, surgical, and pediatric) and to other health care providers treating the skin. Therefore, in this report, data are presented for patients with skin disease treated by dermatologists and/or by other physicians who are not dermatologists.

METHODS

In 2014, the AAD appointed a BSD Work Group* to develop a current BSD report. Milliman (New York, NY) was selected to work with the BSD Work Group. Detailed methodology can be found in the AAD BSD report.[5]

Skin disease categories

The work group identified 24 skin disease categories for inclusion in this report, and assigned the appropriate corresponding *International Classification of Diseases, Ninth Revision* (*ICD-9*) diagnosis codes, which were in use in 2013. The following principles for identifying and assigning *ICD-9* codes were established:

- Diseases of hair, nails, lips, eyelids, external genitalia, and external ear were included as skin disease.
- Skin damage from external causes (eg, thermal burns) and cutaneous manifestations of systemic diseases (eg, drug eruptions from chemotherapy) were included.
- Skin diseases that overlapped 2 or more categories were assigned to the most prevalent one (eg, eczema not otherwise specified was assigned to dermatitis not otherwise specified; ICD-9 692.9).

It should be noted that diagnosis codes pertaining to diseases that are remotely or rarely associated with skin manifestations were not included in this analysis; these included bone/skin neoplasms and other nonclassifiable diagnoses such as unspecified disorder of skin and subcutaneous tissue (ICD-9 709.9). Table I shows the skin diseases assigned to the 24 categories. The list of *ICD-9* diagnoses for each category can be accessed in the full report.[5]

CAPSULE SUMMARY

- 85 Million Americans (ie, 1 in 4 individuals of all ages) were seen by a physician for at least 1 skin disease in 2013.
- In 2013, skin disease resulted in direct health care costs of $75 billion, and indirect lost opportunity costs of $11 billion.
- The costs and prevalence of skin disease are comparable with or exceed other diseases with significant public health concerns, such as cardiovascular disease and diabetes.

US population and insurance classifications

Medical Expenditure Panel Survey data were used to estimate the US 2013 population by age and insurance status. Specifically, the participants' primary payer as of July 1, 2013, was used, with participants assigned to 1 of 4 insurance statuses: commercial, Medicare, Medicaid, and uninsured. The following insurance enrollment and claims databases were used for the development of 2013 prevalence and cost estimates: Truven Health Analytics MarketScan Commercial Database, Medicare 5% sample, Milliman Medicare Part D Claims Database, and Milliman Medicaid Consolidated Health Cost Guidelines Sources Database. The databases were supplemented by information from the Medicare Part D Prescriber Public Use Files, the Kaiser Family Foundation (Medicaid and uninsured data), and Information Resource Inc. (over-the-counter [OTC] drug data).[6,7]

A set of data selection rules for each database source was established to ensure representative and quality data.[5]

Prevalence measurement methodology

Prevalence in this report refers to the portion of the population having the diagnosis of at least 1 of the 24 skin disease categories recorded on a health insurance claim during the course of 2013. A skin disease diagnosis during 2013 may reflect both newly diagnosed skin disease and chronic skin disease requiring ongoing treatment (eg, acne, psoriasis). Prevalence by disease category was calculated as the number of single-counted individuals with a diagnosis in the category divided by the total population. This approach to prevalence, therefore, excludes people with skin disease who did not file insurance claims (ie, did not see a physician), regardless of reason, during 2013 (Fig 1). For the uninsured population, prevalence was estimated using the Medicaid population, adjusting for the

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