Public Health Burden and Epidemiology of Atopic Dermatitis

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KEYWORDS

- Atopic dermatitis • Eczema • Epidemiology • Cost • Children • Adult • Severity • Prevalence

KEY POINTS

- Atopic dermatitis (AD) poses a significant public health burden owing to its high prevalence, considerable morbidity, increased health care utilization, and cost of care.
- AD may be more common in adults than previously recognized, secondary to both persistence of childhood disease and adult-onset disease.
- The prevalence of childhood atopic dermatitis dramatically increased in the United States and internationally over the past few years.
- Recent studies suggest that atopic dermatitis is more common in adults than previously thought.
- Atopic dermatitis is associated with a considerable public health burden owing to its very high prevalence, considerable patient-burden and increased healthcare utilization.

INTRODUCTION

AD is a chronic inflammatory skin disease affecting both children and adults. AD is associated with a substantial public health burden secondary to high prevalence in many regions and increased health care utilization and costs. The epidemiology of AD has evolved over the past few decades, with emerging trends and novel insights into the burden of disease. Studying the epidemiology of AD is complex. This review addresses recent developments in the epidemiology and public health burden of AD.

CHALLENGES OF STUDYING THE EPIDEMIOLOGY OF ATOPIC DERMATITIS

There are several challenges of studying the epidemiology of AD. First, there are no widely accepted biomarkers or objective diagnostic tests for AD. Moreover, the lack of standardized nomenclature for AD internationally, for example, atopic neurodermatitis, eczema, atopic eczema, and childhood eczema, makes it difficult to develop consistent and valid questionnaires for epidemiology research. In particular, the term, *eczema*, has several different uses, including as the most commonly used lay synonym for AD, as a descriptive morphologic and/or histologic term encompassing multiple etiologies, and as a diagnostic term for AD.[1] Furthermore, there is considerable heterogeneity of AD with respect to the distribution (eg, flexural, extensor, head and neck areas, and generalized), morphology (eg, oozing, scaling, lichenification, prurigo nodules, ill-demarcated, and psoriasiform), intensity and time course (intermittent, chronic persistent disease,

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seasonal variation, and episodic flares), and associated comorbidities. As such, numerous approaches have been used to assess the epidemiology of AD, but there is no universally valid approach.

EPIDEMIOLOGY OF CHILDHOOD ATOPIC DERMATITIS
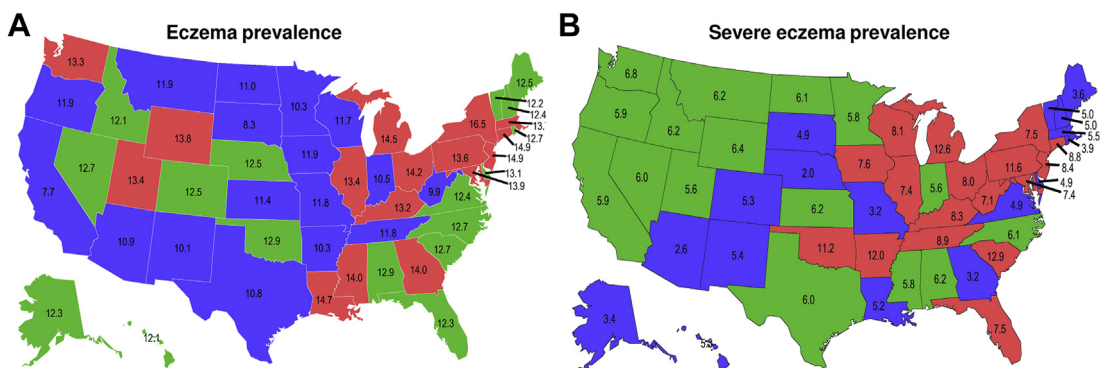### United States

Recent prevalence estimates of childhood AD in the United States range from 6% to 12.98%, depending on the study design and approach used to assess for AD. A household survey of 42,249 children and adults in 1998 found that 10.7% had empirically defined eczema, and 6% had empirically defined AD.[2] This study did not distinguish, however, between AD in children and adults. Household surveys of 102,353 and 91,642 children ages 0 to 17 from the 2003–2004 National Survey of Children's Health (NSCH) and 2007–2008 NSCH found the 1-year prevalence of caregiver-reported health care–diagnosed eczema to be 10.7% and 12.98%, respectively, with significant variation between states and districts (8.7%–18.1%)[3,4] (**Fig. 1**A). The question used to assess AD was subsequently validated and found to have good sensitivity and excellent specificity and positive predictive value.[5] Comparison between 2003–2004 and 2007–2008 suggests that the prevalence of childhood AD is increasing over time. Data from the National Health Interview Survey (NHIS), a US population-based household survey, indicate that the prevalence of childhood AD steadily increased from approximately 8% in 1997 to more than 12% in 2010 and 2011 but may have plateaued in 2012 and 2013 (**Fig. 2**).

Several sociodemographic groups seem at higher risk for childhood AD in the United States. Several studies found higher prevalence of AD in African Americans/blacks, even after controlling for several potential confounding factors, such as household income, health insurance coverage, and parental education level.[4,6] Multiple US population-based studies found no association between gender and AD.[3,7] Children from the NSCH study also had a higher prevalence of caregiver-reported AD with increased household incomes, higher family education levels, smaller family sizes, and urban and metropolitan living.[3]

International

Many studies have been performed to determine the prevalence of childhood AD in other countries around the world. It is often difficult, however, to compare the results of such studies owing to disparate study designs, sampling methodologies, and definitions of AD. Some of the best estimates of AD prevalence internationally were generated from the International Study of Asthma and Allergies in Childhood (ISAAC). This international epidemiologic research collaboration provided a global map of AD, allowing for comparison of prevalence estimates between different countries by consistently using a modified version of the United Kingdom Working Party criteria to define AD.[8] Odhiambo and colleagues[8] analyzed data from 385,853 participants ages 6 to 7 and 663,256 participants ages 13 to 14 in the ISAAC Phase 3 study. They found a wide variation in prevalence values worldwide, from 0.9% in India to 22.5% in Ecuador at ages 6 years to 7 years and from 0.2% in China to 24.6% in Colombia at ages 13 years to 14 years. Comparison of prevalence estimates between Phases 1 and 3 of the ISAAC study suggest increasing prevalence of AD among 6 year olds to 7 year olds in both developing and developed nations and increasing prevalence in 13 year olds to 14 year olds in developing

Fig. 1. The distribution of childhood AD and severe AD in the United States from the 2007–2008 NSCH. (*A*) AD prevalence (%); (*B*) severe AD prevalence (%). Data were divided into tertiles and color coded: tertile 1 = blue, tertile 2 = green, and tertile 3 = red.