

A Systematic Review of Socioeconomic Burden in Hereditary Angioedema

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Background

- Hereditary angioedema (HAE) is a rare, genetic disease characterized by debilitating swelling episodes in various parts of the body¹
- Over the past decade, several treatment options for HAE have emerged, however, concerns regarding the financial impact of these therapies on patients, caregivers, and healthcare systems persist
- Previous literature indicates that HAE is associated with substantial direct medical costs; however, indirect costs are not as well-characterized
- This study aimed to comprehensively evaluate and synthesize the current body of evidence around the socioeconomic burden of HAE on patients and caregivers

Methods

- We conducted an SLR on economic outcomes, including indirect costs, among patients with HAE, including those using prophylactic and/or on-demand HAE therapies, in accordance with PRISMA guidelines
- Searches were conducted in PubMed, Embase, and Google Scholar
- Article inclusion was limited to English peer-reviewed and grey literature published between January 1, 2007 and July 1, 2022
- Two independent reviewers assessed literature eligibility and abstracted data
- We adjusted all costs for inflation to 2022 USD

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Results

- We identified 66 studies. The majority of studies were observational (64%) and peer-reviewed (59%), and the most common study location was the United States (42%) (**Table 1**)
- Among these 66 studies, 41% assessed socioeconomic burden in HAE, revealing annual costs of up to \$57,238, which reflects both patient and caregiver indirect costs
- Factors contributing to indirect costs included reduced work productivity, travel, childcare, and caregiver burden
- The most significant driver of indirect patient costs was reduced hours and lower labor market participation (up to \$20,156 or 35% of total indirect costs)^{2,3} (**Figure 1**)
- Caregiver indirect costs accounted for up to 14% of total indirect costs, with lower productivity and/or presenteeism being the most significant driver (\$5,395)³ (**Figure 2**)

Table 1. SLR Study and Sample Characteristics

Characteristic	n (%)
Total Number of Publications	66 (100)
Sample Size, number of patients	
Minimum	1
Maximum	737
Publication Type	
Peer-Reviewed	39 (59.1)
Conference Proceeding	14 (21.2)
Economic Report	13 (19.7)
Study Design	
Observational	42 (63.6)
Economic Analysis/Modeling	23 (34.8)
Randomized Controlled Trial	1 (1.5)
Study Location	
United States	28 (42.4)
Europe	25 (37.9)
Other	13 (19.7)
HAE Treatment Type, Studies*	
On-demand treatment	20
Prophylactic Treatment	15

*32 studies assessed HAE therapies; some assessed both on-demand and prophylactic treatments

Figure 1. Maximum Annual Patient Indirect Costs^{2,3}

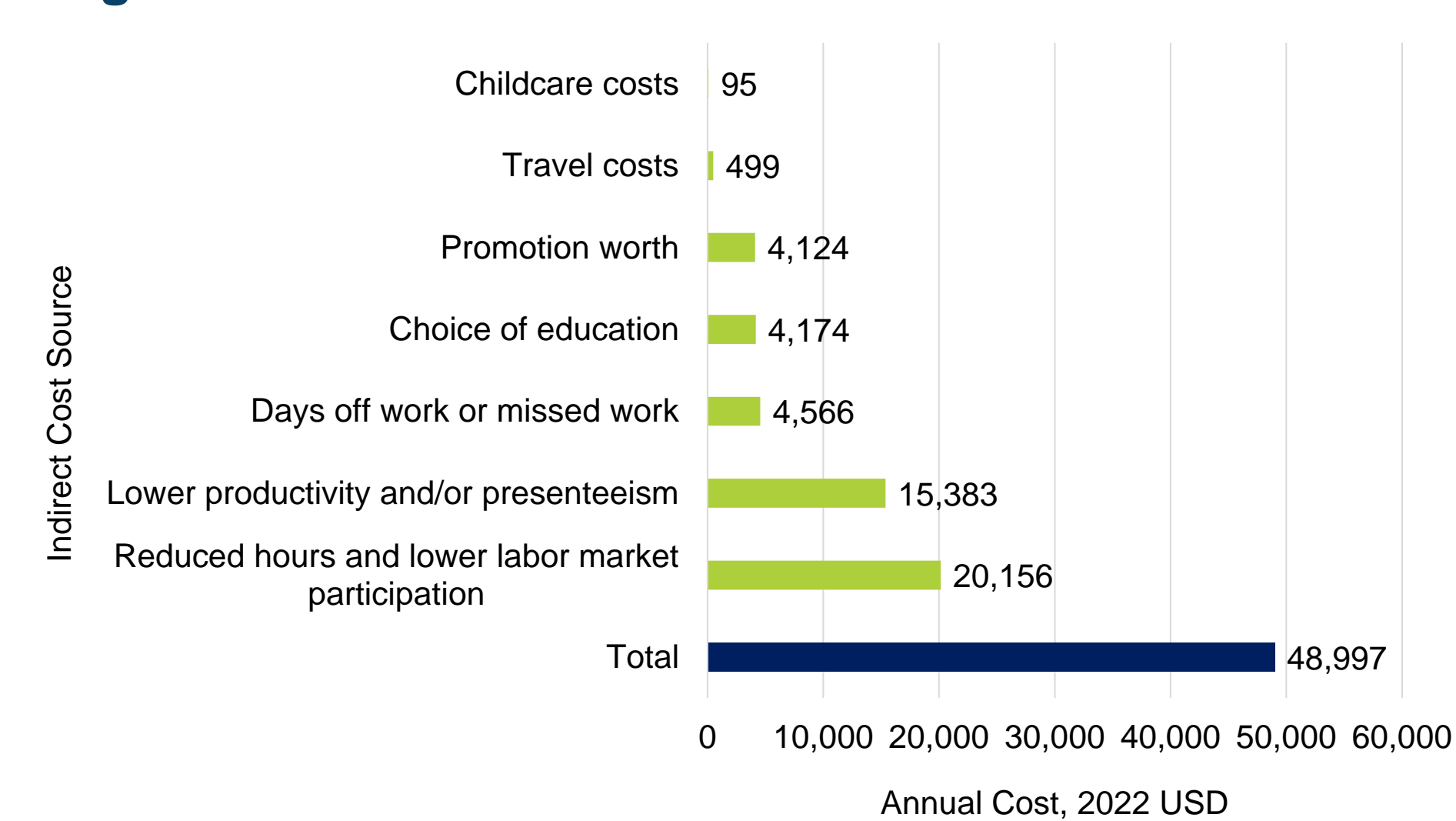


Figure 2. Annual Caregiver Indirect Costs³

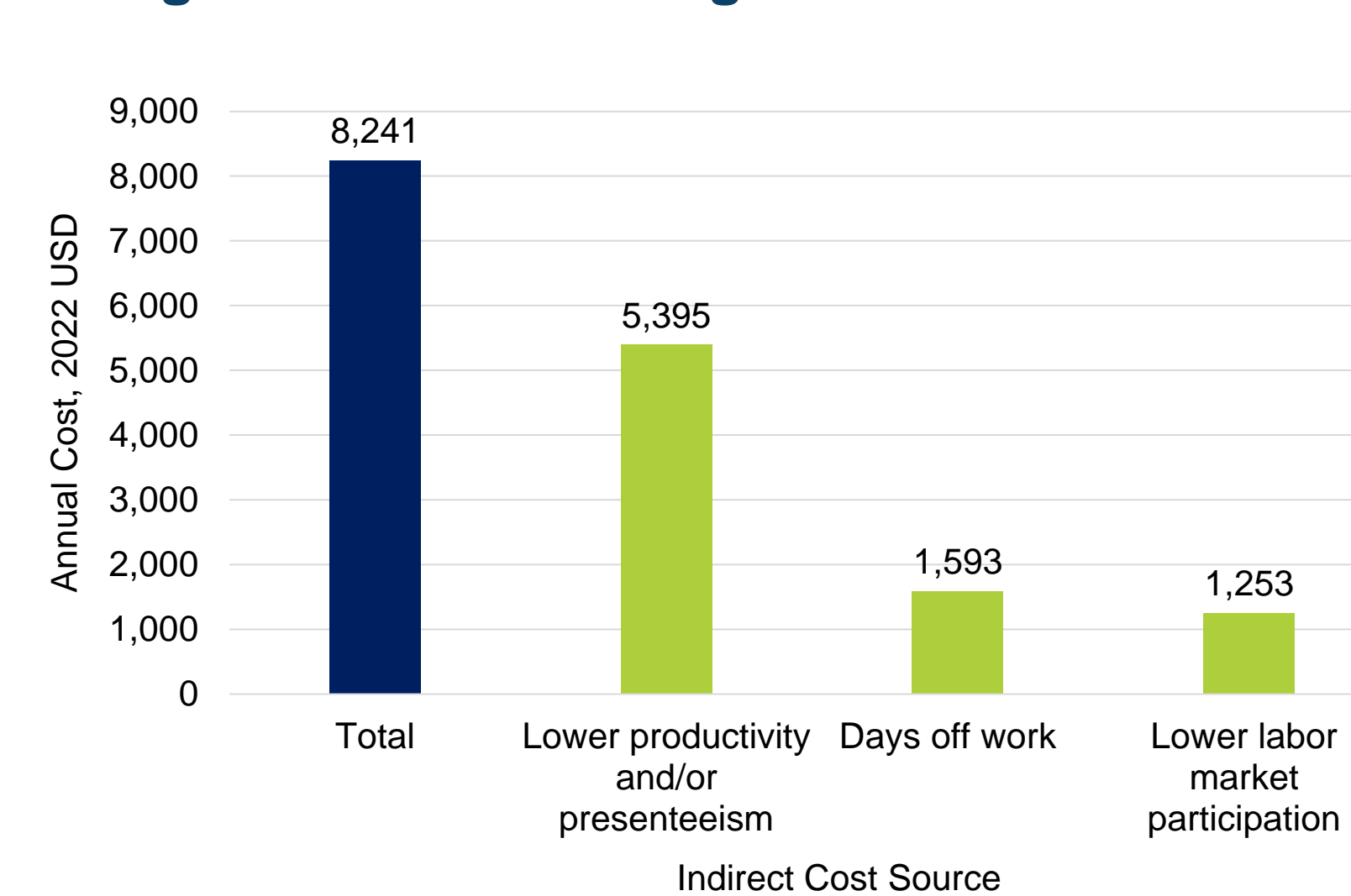


Table 2. Work/School Absenteeism Due to HAE^{2,4-9}

Attack Severity*	Range of number of days missed per attack	Mean number of days missed per year	Range of mean WPAI work productivity loss	Range of mean WPAI activity impairment
Overall (range)	1.0 – 3.3	9.0 – 19.9	22.11 - 25.40	20.6- 33.88
Mild	0.5 - 2.2	19.3	-	-
Moderate	1.0 - 1.8	16.8	-	-
Severe	1.8 - 5.5	28.2	-	-

*Severity was assessed using study-specific definitions for mild, moderate, and severe attacks

- Findings indicated “moderate” levels of impairment related to work productivity loss and activity impairment, as measured by the Work Productivity and Activity Impairment Questionnaire (WPAI): 22 – 25% and 21 – 34%, respectively
- Days missed per year ranged from 9.0 – 19.9, with up to 28.2 days missed for severe attacks

Conclusion

- This SLR revealed substantial socioeconomic burden for patients with HAE and their caregivers, with indirect costs being driven largely by decreased productivity and labor market participation**
- We also found HAE to impede patient work productivity and attendance, with more severe impacts observed as attack severity increased**
- Understanding indirect costs related to HAE, which are often underappreciated, is crucial to facilitating holistic HAE disease management approaches that benefit patients, caregivers, and society**

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