Economic Value of Treating and Reducing the Burden of Atopic Dermatitis and Comorbid Asthma in Paediatric Patients using Dupilumab: A Dutch Societal Cost-Consequence Analysis

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Objective

To evaluate the potential societal impacts of dupilumab in treating paediatric patients with moderate-to-severe (M2S) atopic dermatitis (AD) and preventing/ treating comorbid asthma from a Dutch societal perspective.

Background

- Type 2 (T2) inflammation is a common biological pathway underlying multiple atopic conditions
- These conditions often follow a progression called “atopic march,” which typically begins with AD in childhood and may advance to asthma and other allergic diseases[1,2]
- Dupilumab, a monoclonal antibody targeting interleukin (IL)-4/IL-13 signalling, has demonstrated clinical efficacy in treating various T2-mediated inflammatory conditions[3]
- Real-world evidence demonstrated that dupilumab treatment in paediatric AD patients was associated with a reduced risk of atopic march progression, including development of asthma relative to conventional systemic therapies[4]
- However, evidence on the broader societal impacts of dupilumab remains limited

Methods

Model Structure

Time horizon: A cost-consequence model was developed from a Dutch societal perspective with a 5-year time horizon

Patient population: Children aged 6–11 years with M2S AD (N = 16,650 at Year 1, with new incident cases entering annually)[5,6], with prevalent asthma estimated from Dutch epidemiological data,[5,6] or at risk of developing asthma based on incidence risk reported by Lin et al.[4]

Model Input

Epidemiological Assumptions: 7.4% had prevalent asthma at baseline[4]

Cost Inputs: Drug acquisition, administration and training, AD management, prevalent asthma severe exacerbation management, incident asthma management, and indirect costs[c] (€, 2025). Education costs were used as a proxy for productivity losses in paediatric patients, and lost working hours were used as a proxy for productivity losses in caregivers, per Zorginstituut Nederland guidelines[7]

Clinical Data Inputs: Treatment effect for M2S AD was derived from LIBERTY AD PEDS (NCT03345914),[8] treatment effect for comorbid severe asthma was derived from LIBERTY Asthma VOYAGE (NCT02948959),[9] and asthma incidence risk reduction with dupilumab was derived from Lin et al. (2024)[4a]

Outcome

Dupilumab vs Best Supportive Care (BSC)[b] Over 5 Years

- **Cost outcomes[d]**
- **Clinical outcomes[e]**
- **Productivity outcomes[f]**

Note: [a]Annual incident asthma risk with BSC: Year 1 = 6.18%, Year 2 = 3.37%, Year 3 = 5.75%, Year 4 = 4.81%, Year 5 = 4.63% (fitted values from Lin et al. 2024).[4] [b]BSC was defined as topical corticosteroids (TCS) combined with an indifferent hydrating agent, in addition to standard asthma background therapy, excluding biologics. [c]Indirect costs were estimated using the friction-cost method. Yearly days of productivity loss were 1.5 (AD responders) and 28.9 (AD non-responders) for absenteeism, and 40.1 and 77.1 for presenteeism, respectively.[10] Productivity costs were valued at €11.60 per hour for patients and €44.17 per hour for caregivers, with working hours of 18 and 36 per week and working days of 4 and 5 per week, respectively.[7] Days missed from school/work in prevalent AS patients were 12.8 & 2.75 for patients and caregivers respectively[11,12]. Days missed from school/work for incident AS were 4.3 & 1.18 respectively for patients and caregivers[10,13] [d]Total costs, total direct costs, AD management costs, asthma management costs (prevalent and incident), indirect costs, incremental cost, overall & per patient-year (€, 2025). [e]Incident asthma cases, healthcare resource utilisation (HCRU) claims (hospitalisations, general practitioner visits, specialist visits, emergency room visits, other services), healthcare provider time (hours). [f]Days missed from school (children) and work (parents/caregivers).

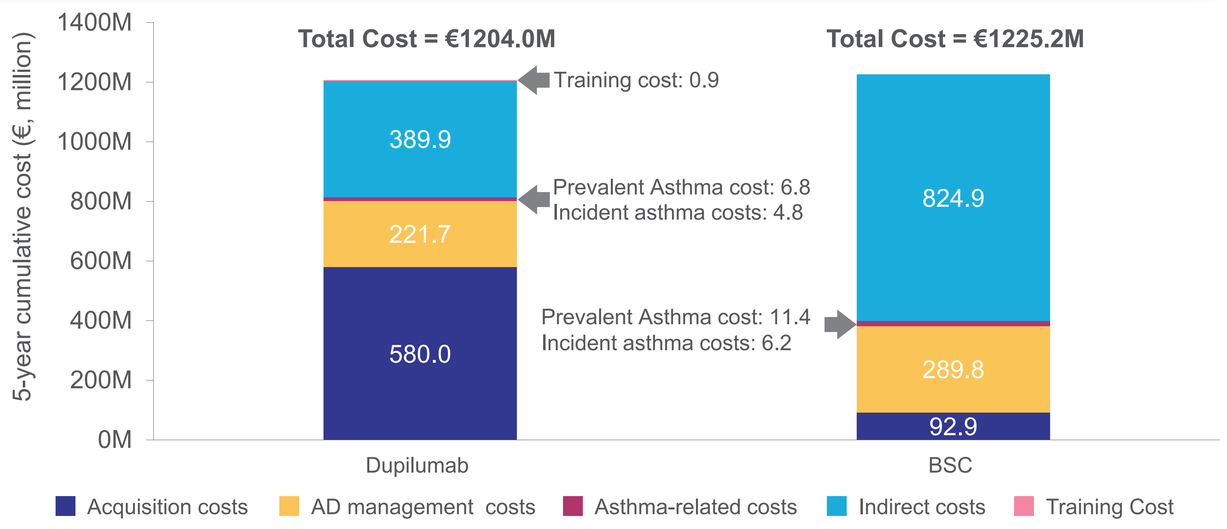
BSC, best supportive care; TCS, topical corticosteroids

Conclusion

- **The model suggests that dupilumab treatment was associated with reductions in costs in paediatric patients with moderate-to-severe AD**
- **From a societal perspective, expected savings in indirect (productivity) costs outweighed the additional drug acquisition cost, compared with best supportive care**
- **Dupilumab is also expected to improve health outcomes by lowering the burden of both comorbid and newly diagnosed (incident) asthma cases**

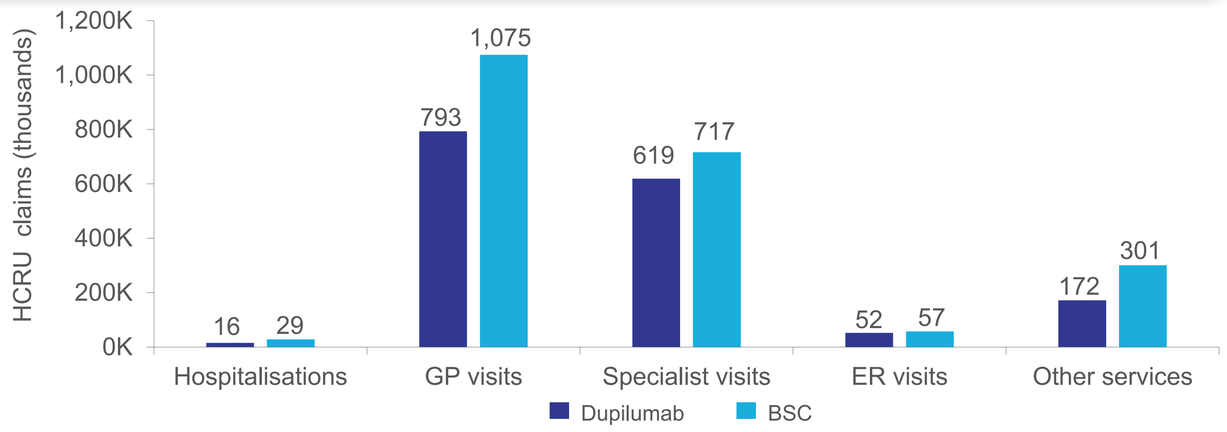
Results

- **Compared with BSC, dupilumab was associated with a net societal cost saving of €21.1M over 5 years**
- **This was despite higher dupilumab acquisition costs (€487.1M), as savings were driven by reductions in indirect costs (€435.0M, 53%), AD management costs (€68.0M, 23%) and prevalent asthma costs (€4.6M, 41%)**



AD, atopic dermatitis; BSC, best supportive care

- **Dupilumab reduced healthcare contacts by 524,810 over 5 years versus BSC (24%)**
- **The largest reductions were in hospitalisations (12,753 fewer; 45%) and other services[c] (128,621 fewer; 43%), followed by GP visits (281,211 fewer; 26%), specialist visits (97,134 fewer; 14%) and ER visits (5,092 fewer; 9%)**



Note: [c]Other services: diagnostic/laboratory tests, spirometry, and ambulance use.

BSC, best supportive care; ER, emergency room; GP, general practitioner; HCRU, healthcare resource utilisation

- **Dupilumab treatment reduced days missed from school/work by 41% (returning approximately 4.8 million days to society over 5 years) and practitioners’ time by 21% (freeing up approximately 94,600 hours), reducing long-term healthcare burden and increasing productivity compared with BSC**
- **At the patient-year level, dupilumab allows patients and caregivers to have ~47 additional days of attendance at school or work**

Metric	Dupilumab treatment	BSC	Percent reduction with Dupilumab treatment vs. BSC	Impact of Dupilumab vs. BSC
Incident asthma cases	3,455	4,433	22.1%	978 fewer cases prevented over 5 years
Practitioners’ time (hours)	353,195	447,782	21.1%	Equivalent to freeing ~10 full-time practitioners[a] per year
Days missed from school/work	6,959,596	11,803,855	41.0%	~47 additional days of school/work attendance per patient-year

Note: [a]includes general practitioners and specialists, assuming 36 hours/week work & 0.25 hours per visit for each practitioner. Days missed from school or work represent cumulative 5-year productivity losses across patients and caregivers.

BSC, best supportive care

Limitations

- Productivity-loss estimates rely on literature-based assumptions rather than directly observed data, and indirect costs drive most of the net saving
- Some epidemiological inputs derive from administrative claims databases, which may carry misclassification, missing data, and coding errors
- Impact of AD and asthma were assumed to be additive

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AK, ZW are employees and shareholders of Regeneron Pharmaceuticals, Inc.; **MF, DB,CC,GLB** are employees of Sanofi and may hold share and/or stock options in the company. **SG** was an employee of Sanofi at the time of conduct of the study.