Number Needed to Treat and Associated Costs per Additional Responder of Biologic Therapies in Adult Patients With Moderate-to-Severe Atopic Dermatitis: A US Payer Perspective

Marie Fournier[1], Kerry Noonan[2], Andreas Kuznik[3], Zhixiao Wang[3]

[1]Sanofi, Gentilly, France; [2]Sanofi, Cambridge, MA, USA; [3]Regeneron Pharmaceuticals, Inc., Sleepy Hollow, NY, USA

Full poster download
Copies of this poster obtained through the QR code are for personal use only and may not be reproduced without permission from ISPOR and the authors

EE581
AD

Conclusions

- **Dupilumab was associated with a lower NNT and approximately 3.2- and 3.5-times lower CPR compared with lebrikizumab and nemolizumab, respectively**
- **These data suggest that at Week 16, dupilumab was $127,144 and $143,734 less expensive per additional responder than lebrikizumab and nemolizumab respectively, for the management of moderate-to-severe AD**
- **Results were consistent across sensitivity analyses of alternative response outcomes and a 1-year time horizon**

Objective

To compare the number needed to treat (NNT) and cost per additional responder (CPR) of dupilumab, lebrikizumab, and nemolizumab in adults with moderate-to-severe atopic dermatitis (AD) from a US payer perspective

Background

- Dupilumab, lebrikizumab, and nemolizumab are approved biologic therapies in the United States for patients with moderate-to-severe AD who are ineligible for, or have an inadequate response to topical therapies[1-3]
- No head-to-head trials have compared these biologics; in their absence, placebo-adjusted Bucher indirect treatment comparisons (ITCs) have shown a greater likelihood of achieving improvements in efficacy outcomes with dupilumab vs lebrikizumab and vs nemolizumab, each in combination with topical corticosteroids (TCS)[4,5]
- The number needed to treat (NNT) and cost per additional responder (CPR) are valuable metrics that help contextualize the clinical and economic benefits of treatments. These measures are increasingly used to support payer decision-making[6]

Methods

NNT model

- An Excel-based economic model was developed to estimate the NNT and incremental CPR using placebo-adjusted efficacy estimates derived from two published Bucher ITCs[7]:Ständer et al. (2025; dupilumab vs lebrikizumab)[4] and Steinhoff et al. (2026; dupilumab vs nemolizumab)[5]
- Dupilumab, lebrikizumab, and nemolizumab, each in combination with topical therapy, were compared over a 16-week treatment period

Efficacy outcomes

- Response to treatment was defined as a ≥75% reduction from baseline in the Eczema Area and Severity Index (EASI-75) score at Week 16
- The NNT was calculated as the inverse of the absolute risk reduction (ARR) versus the standard of care for each biologic
- Comparator response rates were derived from the ITC odds ratio, anchored on the dupilumab + TCS response rate in LIBERTY AD CHRONOS study[8]

Drug costs

- The CPR analysis considered the drug acquisition costs as per the US list prices provided in the RED BOOK (IBM Micromedex, 2024).[9] The doses were calculated as per label[1-3]
- CPR was calculated as NNT × drug acquisition cost over the 16-week treatment period

Sensitivity analyses

- Sensitivity analyses were done based on outcome and time horizon variations

NNT and CPR model structure



[a]EASI-75 (primary analysis); [b]difference in response rates vs SoC, NNT rounded up to the next whole number; [c]Source: Drug prices were obtained from RED BOOK (IBM Micromedex, 2024)

Drug acquisition costs (US list prices)

Treatment	Week 0-16 dosing	Price per injection	Injections to Week 16	Week 16 cost
Dupilumab 300 mg	600 mg loading dose, then 300 mg q2w	$2,096.52	9	$18,868.64
Lebrikizumab 250 mg	500 mg at Weeks 0 and 2, then 250 mg q2w	$3,675.00	10	$36,750.00
Nemolizumab 30 mg	60 mg loading dose, then 30 mg q4w	$4,452.00	5	$22,260.00

Dupilumab list price $4,193.03 per 2-syringe pack. Doses per US prescribing information[1-3]; maintenance dosing after Week 16 (1-year analysis): dupilumab 300 mg q2w; lebrikizumab 250 mg q4w and nemolizumab 30 mg q8w in Week 16 responders.

Results

The NNT to achieve one additional EASI-75 responder vs SoC at Week 16 was lower with dupilumab (3) than with lebrikizumab (5) and nemolizumab (9)

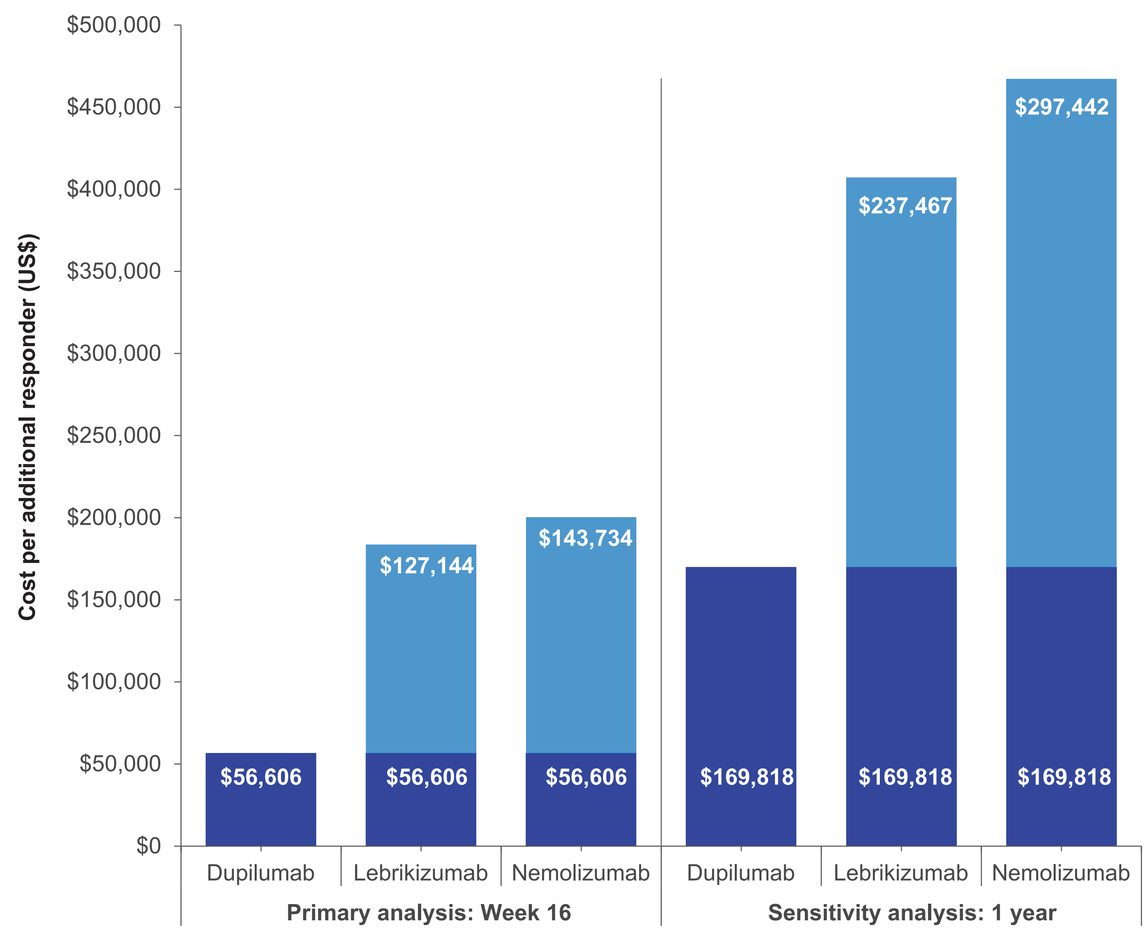
Week 16 EASI-75 response rates, ARR, and NNT vs SoC

Treatment	EASI-75 response	ARR vs SoC	NNT vs SoC
Dupilumab 300 mg	68.9%	45.7%	3
Lebrikizumab 250 mg	48.0%	24.8%	5
Nemolizumab 30 mg	35.1%	11.9%	9
Placebo	23.2%	**Reference arm (LIBERTY AD CHRONOS)**	

Dupilumab + TCS and SoC (placebo + TCS) response rates are from LIBERTY AD CHRONOS (non-responder imputation)[8]; lebrikizumab + TCS and nemolizumab + TCS response rates were derived by applying the Week 16 ORs from the Bucher ITCs (Table 1) to the dupilumab + TCS response rate. NNT = 1/ARR, rounded up to the next whole number.

The CPR was approximately 3.2- and 3.5-fold lower with dupilumab ($56.6K) than with lebrikizumab ($183.8K) and nemolizumab ($200.3K)

Drug acquisition cost per additional EASI-75 responder vs SoC: primary analysis (Week 16) and 1-year time horizon (sensitivity analysis)



Primary analysis: CPR = NNT × Week 16 drug acquisition cost. 1-year time horizon: CPR = NNT × Year 1 drug acquisition cost, assuming Week 16 response is maintained to Week 52 with no discontinuation; maintenance dosing applied to Week 16 responders (lebrikizumab q4w; nemolizumab q8w); Year 1 injections: dupilumab 27, lebrikizumab 22.2, nemolizumab 11.7.

Dupilumab had the lowest NNT and CPR across all sensitivity analyses

NNT and CPR vs SoC across the primary and 1-year time horizon

Scenario	Dupilumab + TCS		Lebrikizumab + TCS		Nemolizumab + TCS	
	NNT	CPR	NNT	CPR	NNT	CPR
EASI-75	3	$169.8K	5	$407.3K	9	$467.3K
IGA 0/1	4	$226.4K	8	$714.2K	15	$837.0K
PP-NRS ≥4 improvement	3	$169.8K	4	$343.6K	4	$199.7K

NNT at Week 16; 1-year CPR = NNT × Year 1 drug acquisition cost, assuming Week 16 response is maintained till Week 52 with no discontinuation and maintenance dosing for Week 16 responders of the outcome shown (lebrikizumab q4w; nemolizumab q8w). Values as reported by the model workbook.

Limitations

Reliance on ITCs rather than head-to-head randomized controlled trials, potential cross-trial differences between source studies (e.g., TCS run-in in ARCADIA 1 & 2), and the usage of list prices, which may not reflect actual net costs; only drug acquisition costs were considered

Abbreviations

AD, atopic dermatitis; ARR, absolute risk reduction; CPR, cost per additional responder; EASI-75, ≥75% reduction from baseline in Eczema Area and Severity Index; IGA 0/1, Investigator's Global Assessment score of 0 (clear) or 1 (almost clear); ITC, indirect treatment comparison; K, thousand; NNT, number needed to treat; OR, odds ratio; PP-NRS, Peak Pruritus Numerical Rating Scale; q2w, every 2 weeks; q4w, every 4 weeks; q8w, every 8 weeks; SoC, standard of care; TCS, topical corticosteroids; US, United States.

References:
1. DUPIXENT (dupilumab) Prescribing Information. Regeneron Pharmaceuticals, Inc./sanofi-aventis U.S. LLC. **2.** EBGLYSS (lebrikizumab-lbkz) Prescribing Information. Eli Lilly and Company. **3.** NEMLUVIO (nemolizumab-ilto) Prescribing Information. Galderma Laboratories, L.P. **4.** Ständer S, et al. Dermatol Ther (Heidelb). 2025;15:2537-2551. **5.** Steinhoff M, et al. J of Skin. 2026;10(2):s738. **6.** Weston G, et al. Value Health. 2023;26(Suppl 6): S49. **7.** Bucher HC, et al. J Clin Epidemiol. 1997;50:683-691. **8.** Blauvelt A, et al. Lancet. 2017;389:2287-2303. **9.** RED BOOK. IBM Micromedex.

Acknowledgments and funding sources:
This study was sponsored by Sanofi and Regeneron Pharmaceuticals, Inc. Medical writing/editorial support was provided by Avinash Thakur (Sanofi) according to the Good Publication Practice guidelines.

Disclosures:
MF,KN: Sanofi employees; may hold stock and/or stock options in the company. **AK, ZW:** Regeneron Pharmaceuticals, Inc. employees; may hold stock and/or stock options in the company.

Presented at ISPOR Europe 2026; Vienna, Austria; November 8-11, 2026.