

LETTER TO THE EDITORS

Research Letter

Dear Editor,

The cost of dupilumab treatment for severe atopic dermatitis is largely offset by broader health-care savings and improvement in quality of life

Dupilumab is a monoclonal antibody highly effective in the treatment of severe atopic dermatitis.^{1,2} It was approved by the US Food and Drug Administration and European Medicine Agency in 2017.^{3,4} It is approved for use in Australia by the Therapeutic Goods Administration,⁵ but is not currently listed on the Pharmaceutical Benefits Scheme.

Features of severe atopic dermatitis include persistent pruritus, xerosis and extensive skin lesions, which cause significant psychological and sociological issues such as highly interrupted sleep and consequent effects on occupational, physical and social activities.⁶ In severe atopic dermatitis, these problems often persist despite adhering to complex topical treatment regimens and using toxic systemic agents that require vigilant clinical and laboratory monitoring and management of adverse effects.

Here, we compare overall economic burden to the Australian health-care system of treating severe atopic dermatitis using dupilumab with currently available systemic agents. Dupilumab itself is more expensive than existing therapies, but requires less clinical intervention, less laboratory monitoring, reduces rates of costly adverse drug effects and reduces disease complications such as secondary bacterial and viral infections of the skin.⁷

Dupilumab improves dermatologist-rated disease severity¹ and patient-reported quality-of-life measures such as pruritus, sleep, anxiety and depression.⁸

In addition to patients' improved disease control, quality of life and productivity, we hypothesise that the cost of dupilumab treatment is largely offset by reduction in health-care needs.

We compared the health-care costs of three patients in the 12 months before and the 12 months after starting dupilumab for severe atopic dermatitis.

Medical records of these patients were reviewed. GP and dermatology clinic visits, prescription and over-the-counter drugs, pathology and hospital stays in the 12 months before starting dupilumab were compared with the 12 months after starting dupilumab. The costs of disease and drug complications were also included.

As shown in Table 1, while the drug cost increased due to the high cost of dupilumab, pathology costs were greatly reduced, outpatient costs decreased by a third, and inpatient costs reduced to zero. Inpatient costs were the largest expense in the 12 months before dupilumab treatment, averaging \$16,231.92, approaching the cost of dupilumab.

The net cost of treating severe atopic dermatitis with dupilumab was positive in two patients and resulted in a net cost saving in one patient. For these three patients overall, dupilumab conferred a net cost saving.

As shown in Table 2, all three patients had poor disease control prior to being treated with dupilumab. All three improved with dupilumab on Eczema Area and Severity Index (EASI) and Dermatology Life Quality Index (DLQI), averaging improvements of 96% and 91%, respectively, and demonstrated in Patient 3's clinical improvement (Fig. 1).

The symptomatic improvement with dupilumab treatment follows a baseline of these patients describing a poor quality of life. In consultations prior to dupilumab treatment, they reported that they were 'over it', needing 'to end my life', required social work and psychological care (costs not quantified), experienced relationship problems and severely restricted occupational, physical and social activities.

Table 1 Costs by category and totals for three patients with severe atopic dermatitis treated with dupilumab, 12 months before and 12 months after initiation of dupilumab treatment

	Patient 1	Patient 2	Patient 3	Mean
Drug costs				
Before	\$6504.33	\$460.35	\$3055.76	\$3340.15
After	\$19 139.63	\$18 000.00	\$18 000.00	\$18 379.88
Pathology costs				
Before	\$592.30	\$213.65	\$308.44	\$371.46
After	\$124.85	\$0.00	\$0.00	\$41.62
Outpatient costs				
Before	\$929.70	\$2376.55	\$1050.75	\$1452.33
After	\$1167.50	\$1401.00	\$467.00	\$1011.83
Inpatient costs				
Before	\$5000.00	\$1695.75	\$42 000.00	\$16 231.92
After	\$0.00	\$0.00	\$0.00	\$0.00
Total cost				
Before	\$13 026.33	\$4746.30	\$46 414.95	\$21 395.86
After	\$20 431.98	\$19 401.00	\$18 467.00	\$19 433.33
Net cost	\$7405.65	\$14 654.70	–\$27 947.95	–\$1962.55

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Table 2 EASI and DLQI scores of three patients with severe atopic dermatitis treated with dupilumab, 12 months before and 12 months after initiation of dupilumab treatment. EASI; Eczema Area and Severity Index, DLQI; Dermatology Life Quality Index.

	Patient 1	Patient 2	Patient 3	Mean
EASI score				
Before	54.0	48.5	55.0	52.5
After	2.8	0.0	3.1	2.0
Change (%)	−94.8	−100.0	−94.4	−96.3
DLQI score				
Before	25.0	10.0	30.0	21.0
After	2.0	0.0	4.0	2.0
Change (%)	−91.3	−100.0	−86.7	−90.5

In the year following commencement of dupilumab treatment, these patients reported that ‘everything has improved’, describe themselves as being ‘a totally different person’ and that it ‘feels like a new life now’. These results accord with a core outcome focus in the recommendations of the latest Australian atopic dermatitis management consensus⁹ and outcome measure recommendations of a recent review of systemic therapies for atopic dermatitis in the Australian and New Zealand context.¹⁰

In the patients analysed, dupilumab resulted in significantly reduced outpatient costs, hospital stays, complications and laboratory monitoring. The costliest of these hospital stays were for sepsis secondary to infected atopic dermatitis. Dupilumab also produced much better dermatologist-assessed disease control (EASI) and patient-reported quality of life (DLQI).

This broad cost-benefit analysis of dupilumab shows that the drug is only a portion of the overall health system cost of caring for patients with severe atopic dermatitis. The cost is countered by savings in health-care system involvement and improvements in dermatologist-assessed and patient-assessed disease control.

This is important to consider when making clinical and funding decisions regarding atopic dermatitis and its treatment. The high cost of inpatient care for patients with severe atopic dermatitis suggests that patients who have been treated as inpatients or are at high risk of needing such care should be treated with dupilumab.

Limitations of this design are that some costs are extrapolated from known data, and therefore, the analysed costs are not exhaustive. Additionally, this case series involves only three patients, but the results indicate that a larger analysis may be warranted.

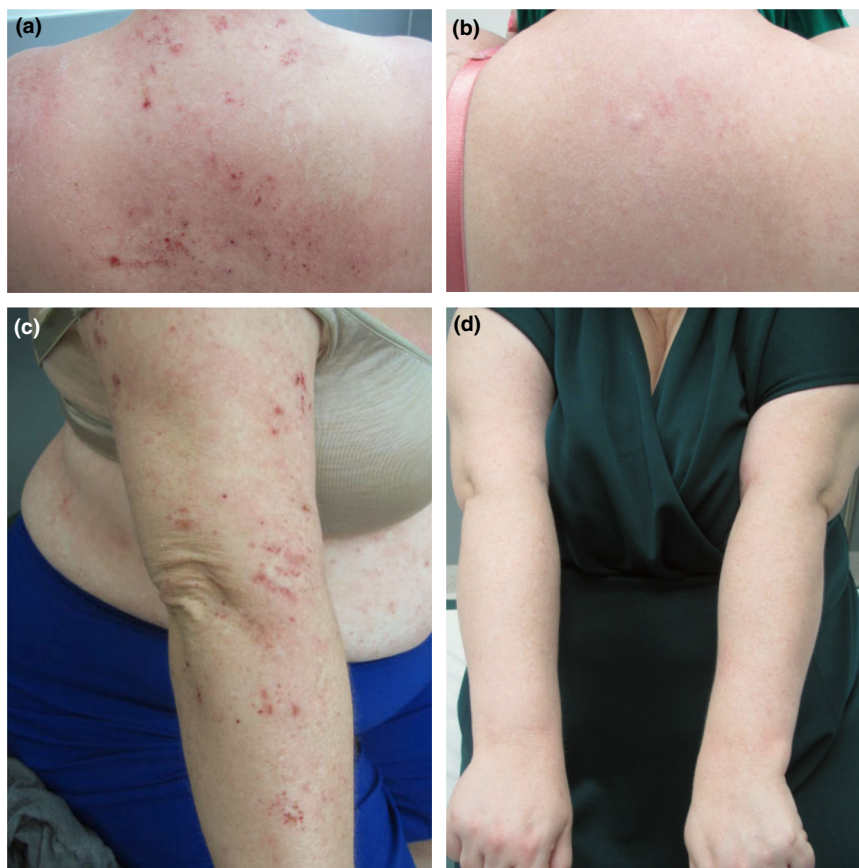


Figure 1 Photographs (Patient 5) pre- and post-treatment with dupilumab, showing marked clinical improvement.

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This project has been approved by Metro South Health Human Research Ethics Committee (HREC) (Reference number: LNR/2019/QMS/57827), and all involved patients have provided written consent on an HREC-approved form.

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