SCORAD severity band threshold analysis from dupilumab clinical trials in adults with moderate-to-severe atopic dermatitis

Andreas Wollenberg,1,2 Eric L. Simpson,3 Yael A. Leshem,4,5 Alain Taieb,6 Norito Katoh,7 Jingdong Chao,8
Ana B. Rossi,9 Amy Praestgaard9

1Augsburg University Hospital, Augsburg, Germany; 2Ludwig Maximilian University of Munich, Munich, Germany; 3Oregon Health and Science University, Portland, OR, USA; 4Rabin Medical Center, Petach-Tikva, Israel; 5Tel-Aviv University, Tel Aviv, Israel; 6INSERM U1312, BRIC, University of Bordeaux, Bordeaux, France; 7Prefectural University of Medicine Graduate School of Medical Science, Kyoto, Japan; 8Regeneron Pharmaceuticals, Inc., Tarrytown, NY, USA; 9Sanofi, Cambridge, MA, USA

Introduction/Background: The SCORing Atopic Dermatitis (SCORAD) index is a validated clinician-reported measurement used to assess the extent and intensity of atopic dermatitis (AD). Multiple severity threshold bands have been published to translate the SCORAD’s numeric scoring index into clinically meaningful categories, most of which were developed using small patient numbers in clinical practice. Further analyses using larger patient numbers from other clinical settings may provide additional insights into AD severity and outcomes.

Objective: To report an analysis of SCORAD severity bands using a large, pooled dataset of global, randomized, placebo-controlled clinical trials of dupilumab in adults with moderate-to-severe AD.
**Methods:** Data were collected during 2013–2016 from 5 double-blind, randomized, placebo-controlled trials of dupilumab in adults with moderate-to-severe AD (NCT01859988, NCT02277743, NCT02277769, NCT02260986, NCT02755649). Total SCORAD (range 0–103) data from all patients receiving dupilumab and placebo were pooled from all visits, excluding first visit.

SCORAD values were anchored to the Investigator’s Global Assessment (IGA) and designated into 5 severity categories: Clear, Almost Clear, Mild, Moderate, and Severe. Spearman’s rank correlations were calculated between total SCORAD and IGA values. For each integer value of SCORAD, the following were calculated to determine potential threshold bands: means analyzed with spline regression (which accounts for potential non-linear relationships between anchor and outcome, and provides a broader range of potential thresholds); medians and modes; frequencies (where the threshold of the first severity band was set to 0 and each successive severity band was set at the value of the outcome measure where the maximum anchor frequency changes category); and results of previous analyses by Chopra et al. (*Br J Dermatol*. 2017;177:1316-21) and Kunz et al. (*Dermatology*. 1997;195:10-19), modified to incorporate 5 severity categories. Thresholds for body surface area (BSA, 0–100) and total SCORAD subscales (observed SCORAD [oSCORAD, 0–83], Pruritus Visual Analog [VAS, 0–10], and Sleep Loss VAS [0–10]) by medians were also evaluated. Goodness-of-fit and concordance between bands and anchors were assessed using $R^2$ and quadratic weighted kappa ($\kappa$)-coefficients.

**Results:** Data from 31,367 visits from 2,822 adults with moderate-to-severe AD were used. The following banding thresholds were identified using the frequencies, medians, and modes: 0–4.9 (Clear), 5–17.9 (Almost Clear), 18–36.9 (Mild), 37–68.9 (Moderate), and 69–103 (Severe; $R^2$: 0.997; $\kappa$: 0.831). Bands identified using the means were similar: 0–5.9 (Clear), 6–17.9 (Almost Clear), 18–36.9 (Mild), 37–77.9 (Moderate), 78–103 (Severe; $R^2$: 0.999; $\kappa$: 0.815).
Severity thresholds evaluated using modified results from Chopra et al. and Kunz et al. produced the following bands, respectively: 0–5.9 (Clear), 6–24.9 (Almost Clear), 25–49.9 (Mild), 50–77.9 (Moderate), and 78–103 (Severe; $R^2$: 0.998; $\kappa$: 0.742); and 0–9.9 (Clear), 10–28.9 (Almost Clear), 29–39.9 (Mild), 40–77.9 (Moderate), and 78–103 (Severe; $R^2$: 0.998; $\kappa$: 0.769).

Analysis of BSA and SCORAD subscales by medians produced the following bands: BSA – 0–0.09 (Clear), 1–4.9 (Almost Clear), 5–22.9 (Mild), 23–79.9 (Moderate), and 80–100 (Severe); oSCORAD - 0–4.9 (Clear), 5–15.9 (Almost Clear), 16–31.9 (Mild), 32–58.9 (Moderate), and 59–83 (Severe); Pruritus VAS - 0–1.9 (None), 2–4.9 (Mild), 5–8.9 (Moderate/Severe), and 9–10 (Very Severe); and Sleep Loss VAS - 0–0.9 (None), 1–3.9 (Mild), 4–8.9 (Moderate), and 9–10 (Severe/Very Severe).

Conclusions: The SCORAD threshold bands developed in this anchor-based analysis utilized a large, global, diverse data set of adult patients with AD from clinical trials and used spline regressions as a novel methodology. These potential severity bands may enhance the understanding of AD severity and disease stratification.

Keywords (up to 5): severity thresholds, SCORAD, adult, dupilumab, outcome measures

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