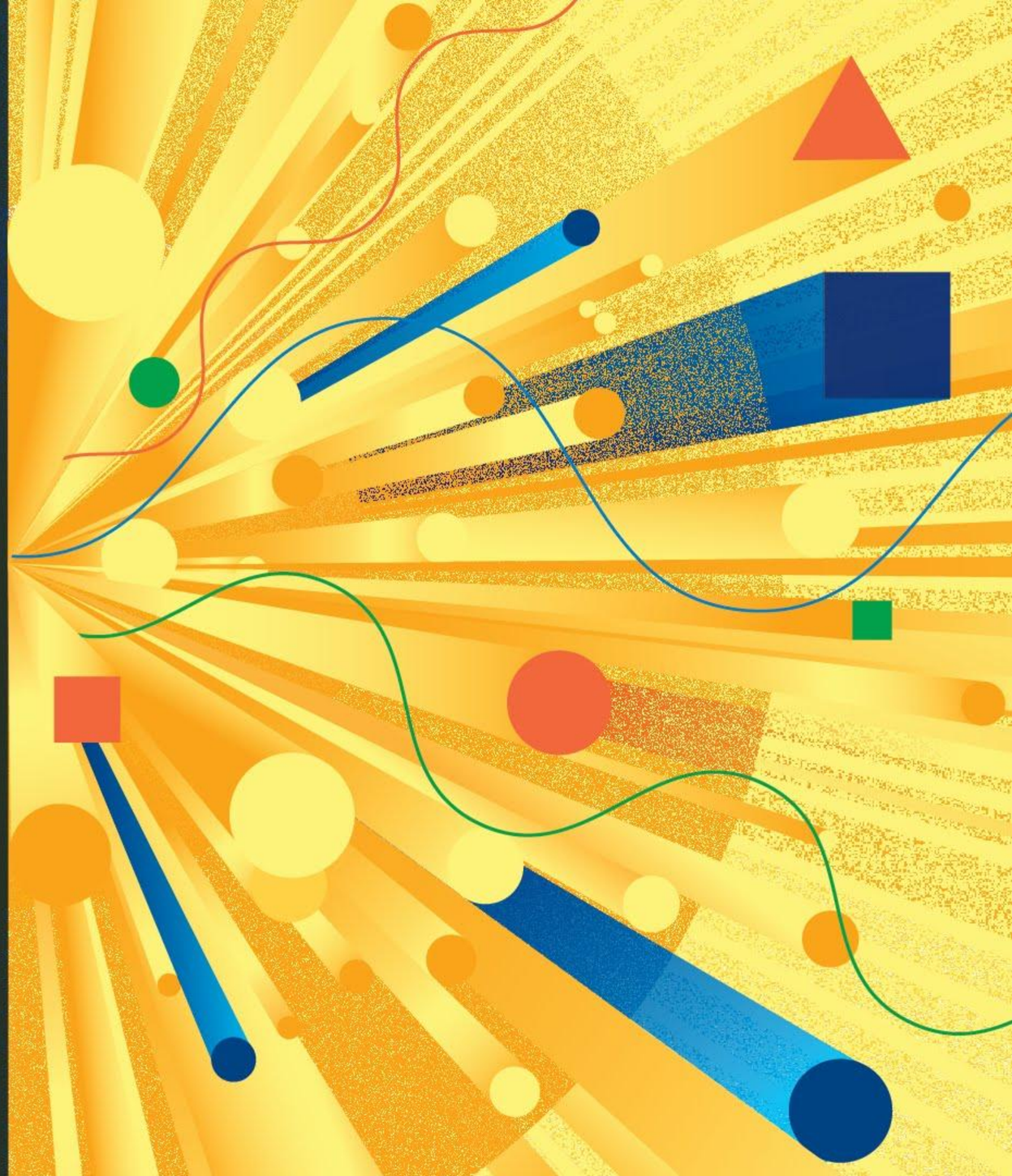
ASCPT American Society for Clinical Pharmacology & Therapeutics

ASCPT 2021
ANNUAL MEETING

REIMAGINING THE THERAPEUTIC LANDSCAPE



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Metrum Research Group

Interactive Simulation Based on an Integrated Pharmacoeconomic-Pharmacometric Model

Pharmacoeconomic (PE) Model: Dupilumab in Atopic Dermatitis

JULY 2018 750 VOLUME 17 • ISSUE 7
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Economic Evaluation of Dupilumab for Moderate-to-Severe Atopic Dermatitis: A Cost-Utility Analysis

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6.3% yearly discontinuation used in article, but RWE suggests substantially higher rates (~83% persistence at 1 year)

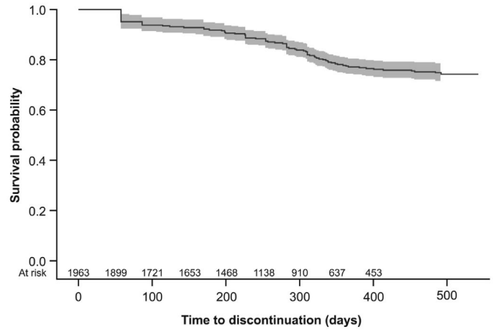
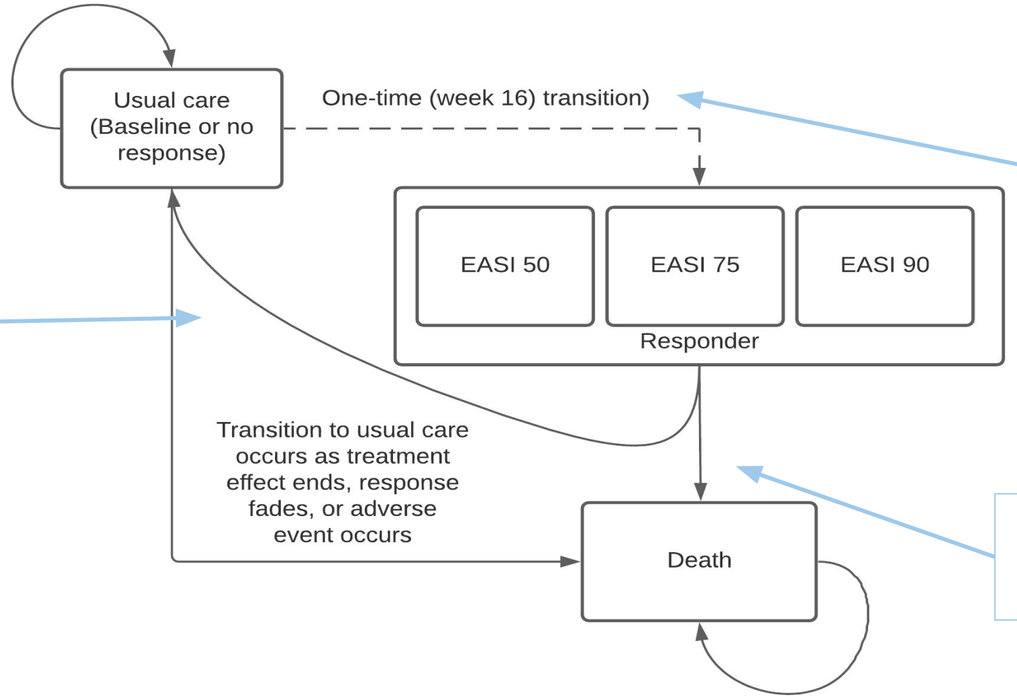


Figure 2. Persistence with dupilumab treatment allowing a 30-day grace period. Kaplan-Meier survival analysis was used to estimate persistence with dupilumab therapy. Blue shading represents the Hall-Wellner 95% confidence band.

Silverberg, et al 2021



In combined PD-PE model, this is determined by week 16 response rate from longitudinal model

WHO gender and age based mortality

Pharmacometric (PM) Model: Dupilumab Effects on EASI

Longitudinal EASI score is a fractional decrease of baseline EASI score (E0). For patient *i*'s *j*th observation at time *t* :

$$\mathrm{EASI}(t_{ij}|\mathrm{drug}_i) = \frac{\mathrm{E0}_i}{1 + g_{\mathrm{Pbo}}(t_{ij}) + g_{\mathrm{TCS}}(t_{ij}) + g_{\mathrm{Drug}}(t_{ij})}$$

Drug effects are hyperbolic Emax models:

$$g_{\mathrm{Pbo}}(t_i) = \frac{\mathrm{Emax}_{\mathrm{Pbo}} \times t_i}{\mathrm{ET50}_{\mathrm{Pbo}} + t_i}$$

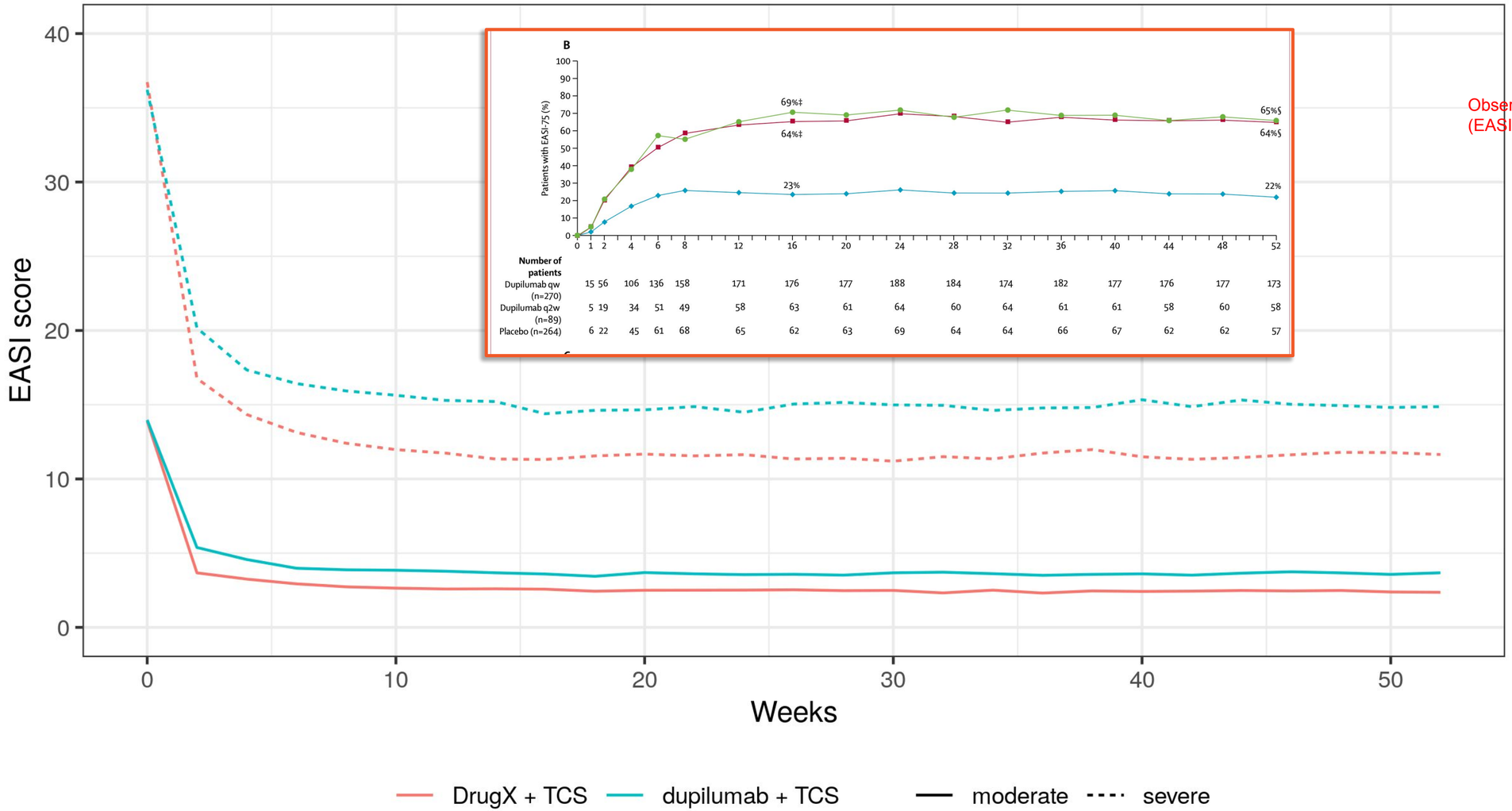
$$g_{\mathrm{TCS}}(t_i) = \frac{\mathrm{Emax}_{\mathrm{TCSi},i} \times t_i}{\mathrm{ET50}_{\mathrm{TCS}} + t_i} \times e^{-k_{\mathrm{off,TCS}} \quad (t_i - \mu_{\mathrm{TCS}})^+}$$

$$g_{\mathrm{Drug}}(t_i) = \frac{\mathrm{Emax}_{\mathrm{Drug},i} \times t_i}{\mathrm{ET50}_{\mathrm{Drug}} + t_i}$$

Primary data sources:

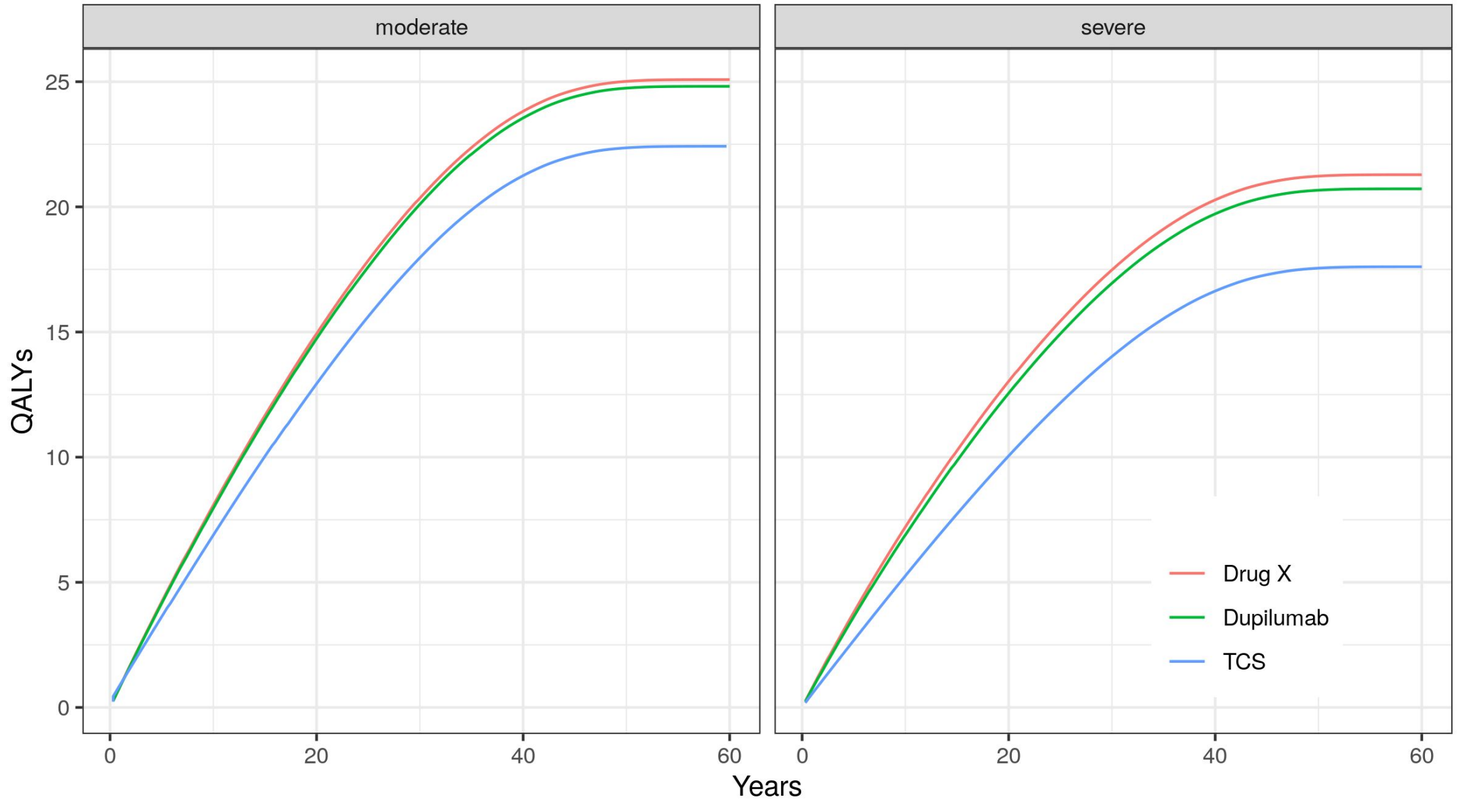
- SOLO 1&2
  - 16 weeks, placebo controlled in moderate-to-severe AD where TCS provided inadequate control or was medically inadvisable. TCS as rescue.
- LIBERTY AD-CHRONOS
  - Long-term (1 yr) management of moderate-to-severe AD with concomitant TCS
- Abrocitinib dose ranging
  - Used to specify proportional residual error

Efficacy Benchmarking via PMPE Model



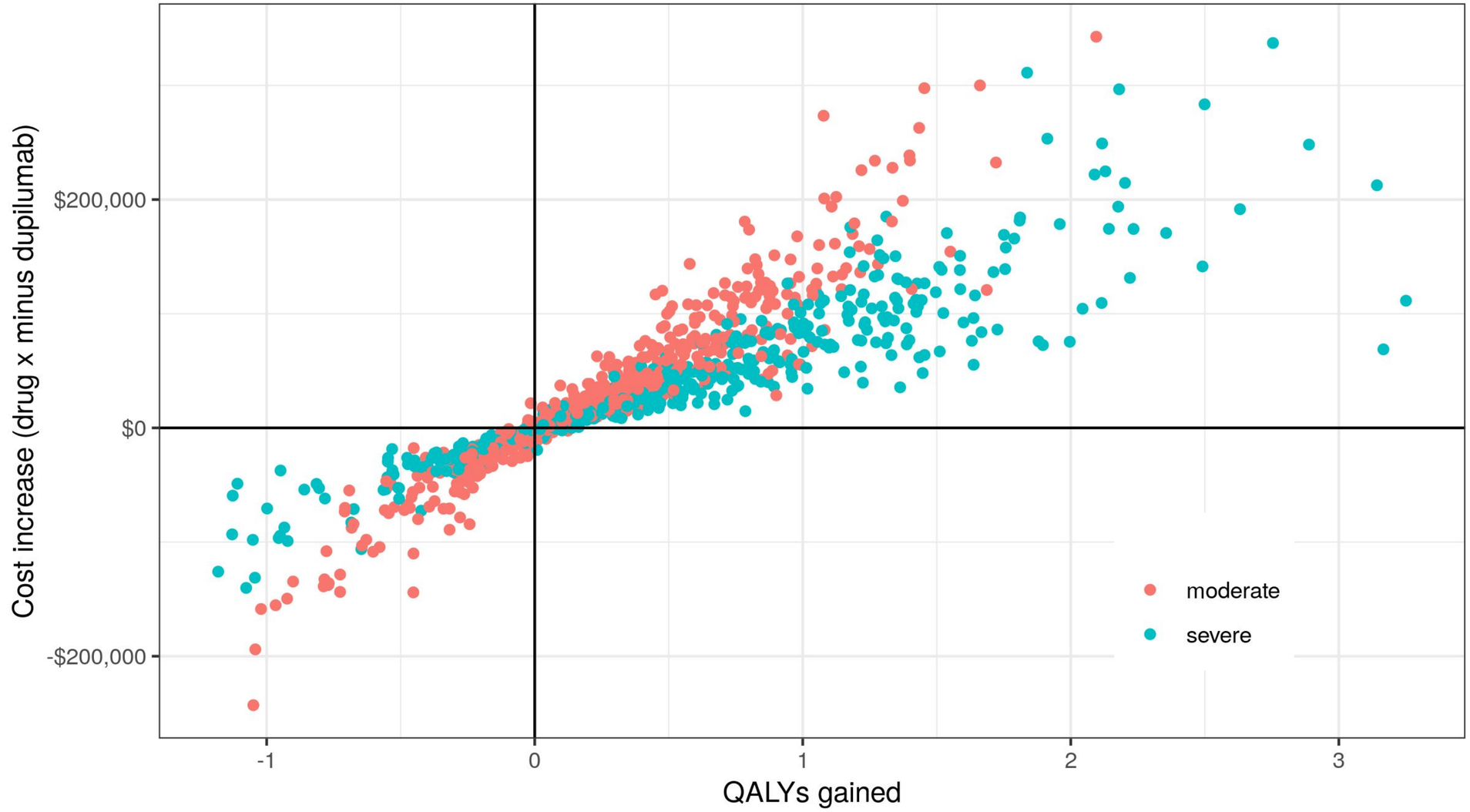
Observed dupilumab 52 week efficacy (EASI-75) – Blauvelt et al, 2017

Projected Quality Adjusted Life Years (QALYs)

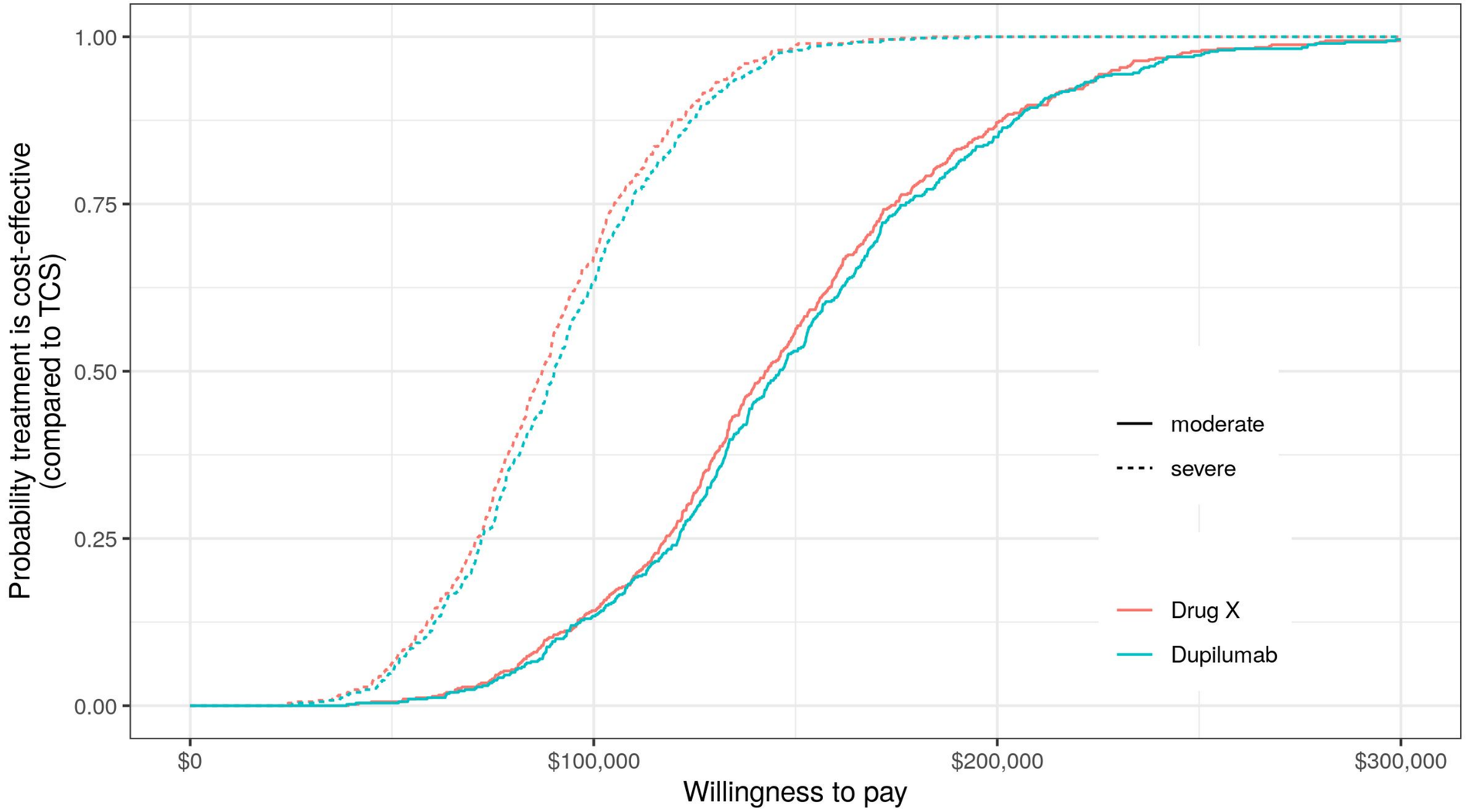


- Superior clinical efficacy translates into marginal differences in QALYs

Incremental Cost-Effectiveness Ratio (ICER)



Cost-Utility Analysis



Access to the Interactive Simulator

If you would like to explore the prototypical PMPE simulation app demonstrated in this session, please indicate **PMPE App** in the subject line and send your **name** and **email address** to:

training@metrumrg.com