

A cost comparison of benralizumab, mepolizumab, and dupilumab in patients with severe asthma: A US third-party payer perspective

Short title: Biologics cost comparison model for severe asthma

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SUPPLEMENTARY TABLE 1 Base case model parameters: exacerbation reduction, OCS-dependence reduction, and cost of biologics^a

		Benralizumab	Mepolizumab	Dupilumab
Exacerbation reduction, % ^b	Year 1	82.4	83.1	76.7
	Year 2	87.2	79.1	86.2
	Year 3	88.2	82.9	86.2
	Year 4	87.2	80.5	86.2
OCS dependence reduction, % ^c	Year 1	63.0	14.0	52.4
	Year 2	63.0	29.0	52.4
	Year 3	63.0	43.0	52.4
	Year 4	63.0	64.0	52.4
Dose details	Dose per administration, mg ^d	30	100	200/300
	Cost per prefilled syringe ^e	\$5,195	\$3,167	\$1,602
	Adjusted drug cost per visit	\$5,080	\$3,052	\$1,487
Frequency of injections, n	Year 1	8	13	27
	Year 2	6	13	26
	Year 3	7	13	26
	Year 4	6	13	26
Administration ratios	Administration visit cost	\$107	\$107	\$107
	Office, %	63.0	60.0	1st dose only
	Home, %	37.0	40.0	100.0 ^f

^aWhere longer-term data were not available, the model assumed the prior year benefits were maintained over time.

^bFor benralizumab, data are based on results from internal analyses of a subpopulation of patients, N = 77, with bEOS \geq 150 cells/ μ L, from SIROCCO,^{1,2} CALIMA,^{2,3} and BORA⁴ trials that were enrolled in MELTEMI.⁵ Annualized exacerbation rate at baseline was 2.96; year 1- 0.52, year 2 - 0.38, year 3 - 0.35,

and year 4 - 0.38. For mepolizumab, data are based on results from published trials, MENSA,⁶ COSMOS⁷, and COSMEX⁸—and for dupilumab—LIBERTY QUEST,⁹ and TRAVERSE.¹⁰

^eData are based on results from published trials for benralizumab—PONENTE;¹¹ for mepolizumab—SIRIUS,¹² COSMOS, and COSMEX; and for dupilumab—VENTURE.¹³

^dDosing for patients with asthma: benralizumab is 30 mg once every 4 weeks for the first 3 doses, and then once every 8 weeks thereafter;¹⁴ mepolizumab for patients ≥ 12 years of age 100 mg once every 4 weeks;¹⁵ dupilumab 400 mg initial dose then 200 mg every 2 weeks or 600 mg initial dose then 300 mg every 2 weeks.¹⁶

^cCost is in 2021 US dollars.

^fAdministration dose is 100% after first dose.

OCS = oral corticosteroids.

SUPPLEMENTARY TABLE 2 Real-world evidence scenario model parameters: exacerbation reduction, OCS-dependence reduction, and cost of biologics^a

		Benralizumab	Mepolizumab
Exacerbation reduction, % ^b	Year 1	61.9	54.4
	Year 2	61.9	54.4
OCS dependence reduction, % ^b	Year 1	18.3	13.7
	Year 2	18.3	13.7
Dose details	Dose per administration, mg	30	100
	Cost per prefilled syringe ^c	\$5,195	\$3,167
	Adjusted drug cost per visit	\$5,080	\$3,052
Frequency of injections, n	Year 1	8	13
	Year 2	6	13
Administration ratios	Administration visit cost	\$107	\$107
	Office, %	63.0	60.0
	Home, %	37.0	40.0

^aWhere longer-term data were not available, the model assumed the prior year benefits were maintained over time.

^bData are based on results of patients with bEOS ≥ 150 cells/ μ L from the published study for benralizumab—ZEPHYR1.¹⁷ Data are based on results from published study for mepolizumab, GSK ID: 209017.¹⁸

^cCost is in 2021 US dollars.

OCS = oral corticosteroids.

SUPPLEMENTARY TABLE 3 One-way sensitivity analysis base case model parameters

<i>Effectiveness Parameter</i>	<i>Base Case</i>	<i>Lower range</i>	<i>Upper range</i>
% OCS dependent, Baseline	15%	10%	20%
Annual exacerbation rate, Baseline	3	2	4
Benralizumab AER reduction %, Y1	82.40%	0.724	0.924
Benralizumab AER reduction %, Y2	87.20%	0.772	0.972
Benralizumab AER reduction %, Y3	88.20%	0.782	0.982
Benralizumab AER reduction %, Y4	87.20%	0.772	0.972
Mepolizumab AER reduction %, Y1	83.10%	0.731	0.931
Mepolizumab AER reduction %, Y2	79.10%	0.691	0.891
Mepolizumab AER reduction %, Y3	82.90%	0.729	0.929
Mepolizumab AER reduction %, Y4	80.50%	0.705	0.905
Dupilumab AER %, Y1	76.70%	0.667	0.867
Dupilumab AER %, Y2	86.20%	0.762	0.962
Dupilumab AER %, Y3	86.20%	0.762	0.962
Dupilumab AER %, Y4	86.20%	0.762	0.962
Benralizumab OCS rate reduction %, Y1	63.00%	0.53	0.73
Benralizumab OCS rate reduction %, Y2	63.00%	0.53	0.73
Benralizumab OCS rate reduction %, Y3	63.00%	0.53	0.73
Benralizumab OCS rate reduction %, Y4	63.00%	0.53	0.73
Mepolizumab OCS rate reduction %, Y1	14.00%	0.04	0.24
Mepolizumab OCS rate reduction %, Y2	29.00%	0.19	0.39
Mepolizumab OCS rate reduction %, Y3	43.00%	0.33	0.53
Mepolizumab OCS rate reduction %, Y4	64.00%	0.54	0.74
Dupilumab OCS rate reduction %, Y1	52.40%	0.424	0.624
Dupilumab OCS rate reduction %, Y2	52.40%	0.424	0.624
Dupilumab OCS rate reduction %, Y3	52.40%	0.424	0.624
Dupilumab OCS rate reduction %, Y4	52.40%	0.424	0.624

<i>Cost Parameter</i>	<i>Base Case</i>	<i>Lower range</i>	<i>Upper range</i>
Benralizumab, unit cost per pre-filled syringe	5,195.03	4,675.53	5,714.53
Mepolizumab, unit cost per pre-filled syringe	3,166.99	2,850.29	3,483.69
Dupilumab, unit cost per pre-filled syringe	1,601.70	1,441.53	1,761.86
Benralizumab, Office administration %	63%	0.53	0.73
Mepolizumab, Office administration %	60%	0.50	0.70
Administration, unit cost	106.78	50.00	150.00
Exacerbation, unit cost	2,781.03	2,502.93	3,059.13
OCS total annual cost of care, unit cost	10,592.20	9,532.98	11,651.42

SUPPLEMENTARY TABLE 4 Probabalistic sensitivity analysis base case model parameters

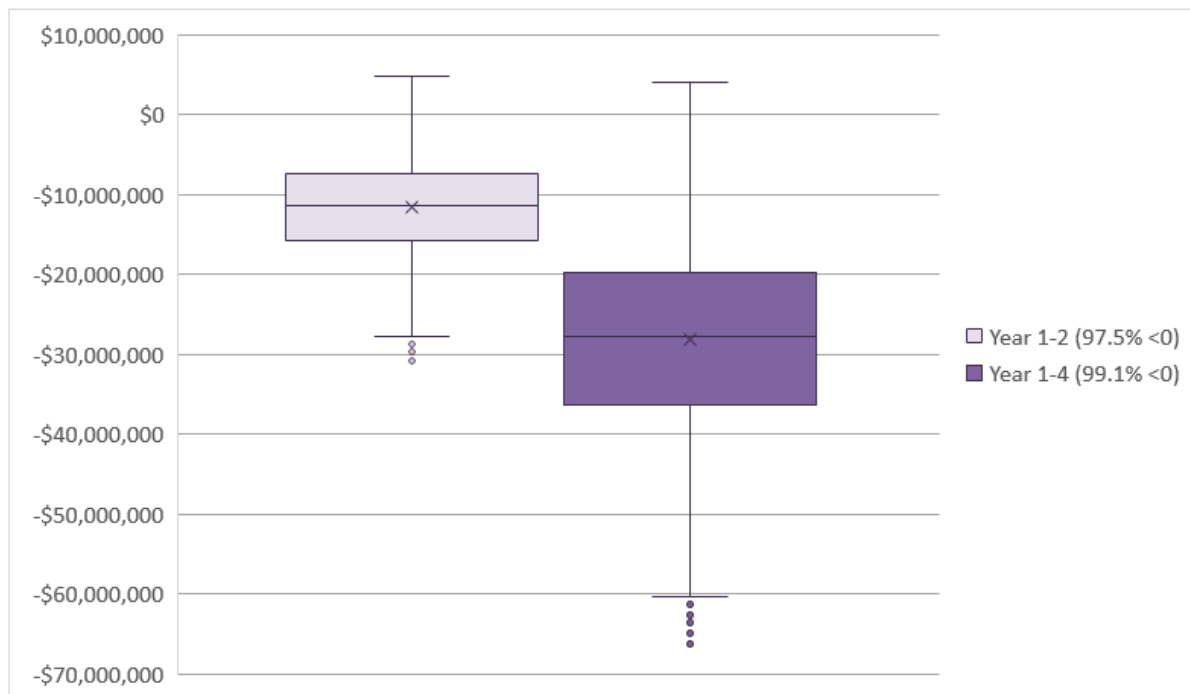
<i>Effectiveness Parameter</i>	<i>Base Case</i>	<i>SE</i>	<i>Distribution</i>	<i>Alpha</i>	<i>Beta</i>
% OCS dependent, Baseline	15%	0.025	Beta	30	173
Annual exacerbation rate, Baseline	3	1.630	Normal	-	-
Benralizumab AER reduction %, Y1	82.40%	0.050		47	10
Benralizumab AER reduction %, Y2	87.20%	-		-	-
Benralizumab AER reduction %, Y3	88.20%	-	Beta	-	-
Benralizumab AER reduction %, Y4	87.20%	-		-	-
Mepolizumab AER reduction %, Y1	83.10%	0.050		46	9
Mepolizumab AER reduction %, Y2	79.10%	-		-	-
Mepolizumab AER reduction %, Y3	82.90%	-	Beta	-	-
Mepolizumab AER reduction %, Y4	80.50%	-		-	-
Dupilumab AER %, Y1	76.70%	0.050		54	16
Dupilumab AER %, Y2	86.20%	-		-	-
Dupilumab AER %, Y3	86.20%	-	Beta	-	-
Dupilumab AER %, Y4	86.20%	-		-	-
Benralizumab OCS rate reduction %, Y1	63.00%	0.050		58	34
Benralizumab OCS rate reduction %, Y2	63.00%	-	Beta	-	-
Benralizumab OCS rate reduction %, Y3	63.00%	-		-	-
Benralizumab OCS rate reduction %, Y4	63.00%	-		-	-
Mepolizumab OCS rate reduction %, Y1	14.00%	0.050		7	41
Mepolizumab OCS rate reduction %, Y2	29.00%	-		-	-
Mepolizumab OCS rate reduction %, Y3	43.00%	-	Beta	-	-
Mepolizumab OCS rate reduction %, Y4	64.00%	-		-	-
Dupilumab OCS rate reduction %, Y1	52.40%	0.050		52	47
Dupilumab OCS rate reduction %, Y2	52.40%	-	Beta	-	-
Dupilumab OCS rate reduction %, Y3	52.40%	-		-	-
Dupilumab OCS rate reduction %, Y4	52.40%	-		-	-

<i>Cost Parameter</i>	<i>Base Case</i>	<i>SE</i>	<i>Distribution</i>	<i>Alpha</i>	<i>Beta</i>
Benralizumab, unit cost per pre-filled syringe	5,195.03	259.75	Gamma	400	13.0
Mepolizumab, unit cost per pre-filled syringe	3,166.99	158.35	Gamma	400	7.9
Dupilumab, unit cost per pre-filled syringe	1,601.70	80.08	Gamma	400	4.0
Benralizumab, Office administration %	63%	0.050	Beta	58	34
Mepolizumab, Office administration %	60%	0.050		57	38
Administration, unit cost	106.78	25	Gamma	18	5.9
Exacerbation, unit cost	2,781.03	139.05	Gamma	400	7.0
OCS total annual cost of care, unit cost	10,592.20	529.61	Gamma	400	26.5

SUPPLEMENTARY FIGURE 1a Probabilistic sensitivity analysis results comparing benralizumab versus mepolizumab

Probabilistic Sensitivity Analysis - Year 1 to 4 Net Total Costs (Benralizumab vs Mepolizumab)

Net total cost <0 means Benralizumab compared to Mepolizumab is cost saving



x: Mean

lines in box: Median

lower of box: Q1

upper of box: Q3

lower whisker: Min or $Q1 - IQR * 1.5$ (the bigger one)

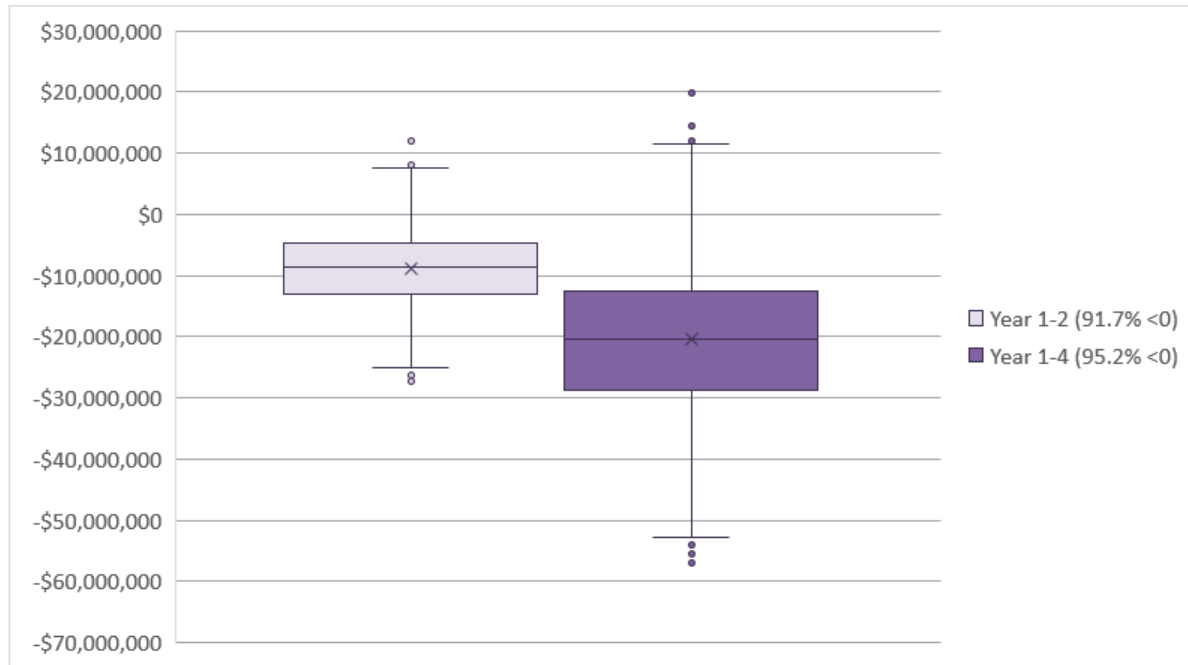
upper whisker: Max or $Q3 + IQR * 1.5$ (the smaller one)

Values outside whiskers' range are considered to be outliers and are represented by dots.

SUPPLEMENTARY FIGURE 1b Probabilistic sensitivity analysis results comparing benralizumab versus dupilumab

Probabilistic Sensitivity Analysis - Year 1 to 4 Net Total Costs (Benralizumab vs Dupilumab)

Net total cost <0 means Benralizumab compared to Dupilumab is cost saving



×: Mean

lines in box: Median

lower of box: Q1

upper of box: Q3

lower whisker: Min or $Q1 - IQR * 1.5$ (the bigger one)

upper whisker: Max or $Q3 + IQR * 1.5$ (the smaller one)

Values outside whiskers' range are considered to be outliers and are represented by dots.

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