SUPPLEMENTARY MATERIAL

Efficacy of Biologics in Severe, Uncontrolled Asthma Stratified by Blood Eosinophil Count: A Systematic Review

Stephanie Korn,[1,2] Bill Cook,[3] Lisa J. Simpson,[4] Jean-Pierre Llanos,[5] Christopher S. Ambrose[3]

[1]IKF Pneumologie Mainz, Mainz, Germany

[2]Thoraxklinik Heidelberg, Heidelberg, Germany

[3]Respiratory and Immunology, BioPharmaceuticals Medical, AstraZeneca, Gaithersburg, MD, USA

[4]PharmaGenesis London, London, UK

[5]Global Medical Affairs, Amgen, Thousand Oaks, CA, USA

Correspondence

Christopher S. Ambrose, AstraZeneca, One MedImmune Way, Gaithersburg, MD 20878, USA

Email: chris.ambrose@astrazeneca.com

ORCID: 0000-0003-4175-7336

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Fig. S1 Summary of risk of bias in the included publications according to the revised Cochrane Collaboration's tool for assessing risk of bias in randomized trials

Reference	Study	Biologic	D1	D2	D3	D4	D5	Overall
Menzies-Gow et al, 2021	NAVIGATOR	Tezepelumab	+	+	+	+	+	+
Corren et al, 2017	PATHWAY phase 2b	Tezepelumab	+	+	+	+	+	+
Unpublished data	PATHWAY phase 2b + NAVIGATOR pooled	Tezepelumab	+	+	+	+	!	!
Castro et al, 2020	LIBERTY ASTHMA QUEST	Dupilumab	+	+	+	+	!	!
Castro et al, 2018	LIBERTY ASTHMA QUEST	Dupilumab	+	+	+	+	+	+
Wenzel et al, 2016	Phase 2b trial	Dupilumab	+	+	+	+	+	+
Harrison et al, 2021	ANDHI	Benralizumab	+	+	+	+	+	+
O'Quinn et al, 2019	SIROCCO + CALIMA pooled	Benralizumab	+	+	+	+	!	!
FitzGerald et al, 2018	SIROCCO + CALIMA pooled	Benralizumab	+	+	+	+	!	!
Bleecker et al, 2018	SIROCCO + CALIMA pooled	Benralizumab	+	+	+	+	!	!
Goldman et al, 2017	SIROCCO and CALIMA (assessed separately)	Benralizumab	+	+	+	+	!	!
Bleecker et al, 2016	SIROCCO	Benralizumab	+	+	+	+	+	+
FitzGerald et al, 2016	CALIMA	Benralizumab	+	+	+	+	+	+
Castro et al, 2015	Study 1 and 2 (assessed separately)	Reslizumab	+	+	+	+	+	+
Castro et al, 2011	Phase 2b trial	Reslizumab	+	+	+	+	!	!
Yancey et al, 2019	DREAM phase 2b, MENSA, MUSCA (assessed separately)	Mepolizumab	+	!	+	+	!	!
Chupp et al, 2017	MUSCA	Mepolizumab	+	+	+	+	+	+
Ortega et al, 2016	DREAM and MENSA (assessed separately; pooled doses)	Mepolizumab	+	+	+	+	!	!
Ortega et al, 2014	MENSA	Mepolizumab	+	+	+	+	+	+
Pavord et al, 2012	DREAM phase 2b	Mepolizumab	+	+	+	+	+	+
Hanania et al, 2013	EXTRA	Omalizumab	+	+	+	+	+	+

+	Low risk
!	Some concerns
-	High risk
D1	Randomization process
D2	Deviations from the intended interventions
D3	Missing outcome data
D4	Measurement of the outcome
D5	Selection of the reported result

All trials are phase 3 unless otherwise specified.

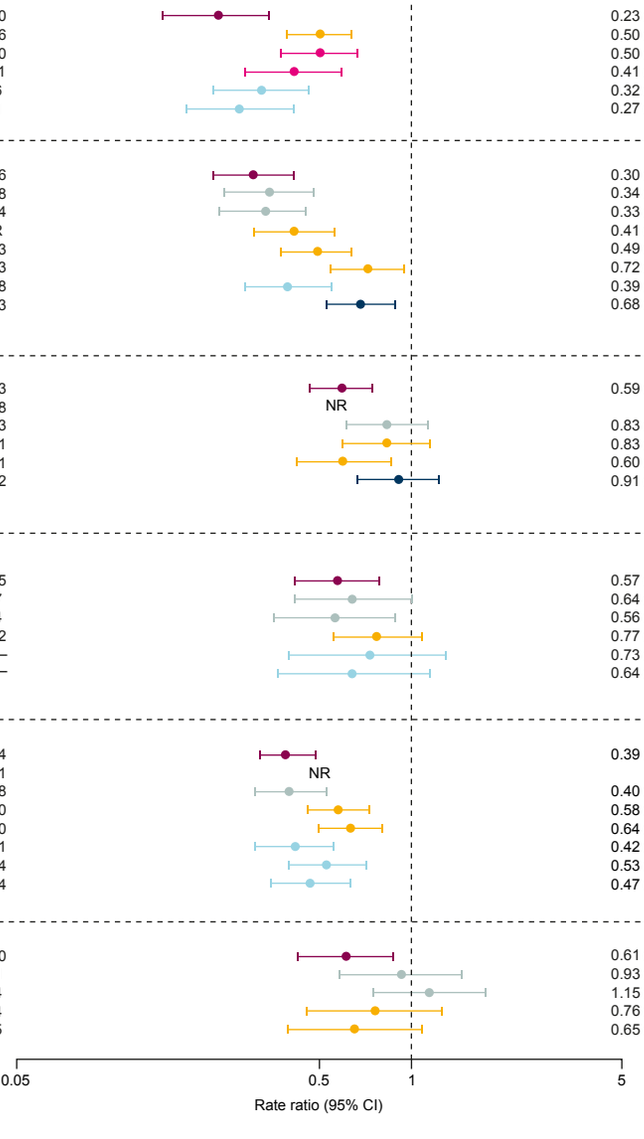
Fig. S2 AAER by biologic therapy across baseline BEC subgroups by (i) phase 2b and (ii) phase 3 trials

i) Phase 2b studies

	Study	Dose group	Treatment *n* / rate	Placebo *n* / rate	Rate ratio (95% CI)
≥ 450 cells/µL	PATHWAY (phase 2b)	Tezepelumab 210 mg SC Q4W	41 / 0.31	44 / 0.82	0.38 (0.16, 0.90)
	DREAM (phase 2b)	Mepolizumab 75 mg IV Q4W[c]	38 / 0.78	50 / 3.34	0.23 (0.14, 0.39)
≥ 300 cells/µL	PATHWAY (phase 2b)	Tezepelumab 210 mg SC Q4W	68 / 0.26	71 / 0.65	0.40 (0.19, 0.85)
	Phase 2b	Dupilumab 200 mg SC Q2W	65 / 0.30	68 / 1.04	0.29 (0.11, 0.76)
	Phase 2b	Dupilumab 300 mg SC Q2W	64 / 0.20	68 / 1.04	0.19 (0.07, 0.56)
	DREAM (phase 2b)	Mepolizumab 75 mg IV Q4W	153 / 1.24	155 / 2.40	0.52 (0.39, 0.69)
0 to < 300 cells/µL	PATHWAY (phase 2b)	Tezepelumab 210 mg SC Q4W	69 / 0.15	67 / 0.80	0.19 (0.08, 0.46)
	Phase 2b	Dupilumab 200 mg SC Q2W	85 / 0.25	90 / 0.78	0.32 (0.14, 0.76)
	Phase 2b	Dupilumab 300 mg SC Q2W	93 / 0.31	90 / 0.78	0.40 (0.19, 0.84)
150 to < 300 cells/µL	PATHWAY (phase 2b)	Tezepelumab 210 mg SC Q4W	35 / 0.18	34 / 0.68	0.24 (0.07, 0.78)
	DREAM (phase 2b)	Mepolizumab 75 mg IV Q4W	45 / 1.36	35 / 2.26	0.60 (0.32, 1.13)
≥ 150 cells/µL	PATHWAY (phase 2b)	Tezepelumab 210 mg SC Q4W	103 / 0.23	105 / 0.66	0.34 (0.18, 0.65)
0 to < 150 cells/µL	PATHWAY (phase 2b)	Tezepelumab 210 mg SC Q4W	34 / 0.12	33 / 0.92	0.17 (0.05, 0.64)

ii) Phase 3 studies

	Study	Dose group	Treatment *n* / rate	Placebo *n* / rate	Rate ratio (95% CI)
≥ 450 cells/µL	NAVIGATOR	Tezepelumab 210 mg SC Q4W	120 / 0.68	127 / 3.00	0.23 (0.15, 0.34)
	SIROCCO / CALIMA	Benralizumab 30 mg SC Q8W[a]	298 / 0.58	306 / 1.16	0.50 (0.39, 0.64)
	Study 1	Reslizumab 3.0 mg/kg IV Q4W[b]	245 / 0.90	244 / 1.80	0.50 (0.37, 0.67)
	Study 2	Reslizumab 3.0 mg/kg IV Q4W[b]	232 / 0.86	232 / 2.11	0.41 (0.28, 0.59)
	MENSA	Mepolizumab 75 mg IV / 100 mg SC Q4W[a,b]	161 / 0.66	87 / 2.06	0.32 (0.22, 0.46)
	MENSA	Mepolizumab 75 mg IV / 100 mg SC Q4W[a,c]	124 / 0.58	66 / 2.11	0.27 (0.18, 0.41)
≥ 300 cells/µL	NAVIGATOR	Tezepelumab 210 mg SC Q4W	219 / 0.79	222 / 2.66	0.30 (0.22, 0.40)
	QUEST	Dupilumab 200 mg SC Q2W	264 / 0.37	148 / 1.08	0.34 (0.24, 0.48)
	QUEST	Dupilumab 300 mg SC Q2W	277 / 0.40	142 / 1.24	0.33 (0.23, 0.45)
	ANDHI	Benralizumab 30 mg SC Q8W	281 / NR	155 / NR	0.41 (0.30, 0.56)
	SIROCCO	Benralizumab 30 mg SC Q8W	267 / 0.65	267 / 1.33	0.49 (0.37, 0.64)
	CALIMA	Benralizumab 30 mg SC Q8W	239 / 0.66	248 / 0.93	0.72 (0.54, 0.95)
	MENSA	Mepolizumab 75 mg IV / 100 mg SC Q4W[a]	202 / 0.78	106 / 1.98	0.39 (0.28, 0.55)
	EXTRA	Omalizumab 0.008 mg/kg/IgE (IU/mL) SC Q2W or 0.016 mg/kg/IgE (IU/mL) SC Q4W[d]	214 / 0.70	200 / 1.03	0.68 (0.52, 0.89)
0 to < 300 cells/µL	NAVIGATOR	Tezepelumab 210 mg SC Q4W	309 / 1.02	309 / 1.73	0.59 (0.46, 0.75)
	QUEST	Dupilumab 200 mg SC Q2W	366 / 0.51	169 / 0.68	NR
	QUEST	Dupilumab 300 mg SC Q2W	356 / 0.61	178 / 0.73	0.83 (0.61, 1.14)
	SIROCCO	Benralizumab 30 mg SC Q8W	131 / 1.00	140 / 1.21	0.83 (0.59, 1.16)
	CALIMA	Benralizumab 30 mg SC Q8W	125 / 0.73	122 / 1.21	0.60 (0.42, 0.86)
	EXTRA	Omalizumab 0.008 mg/kg/IgE (IU/mL) SC Q2W or 0.016 mg/kg/IgE (IU/mL) SC Q4W[e]	186 / 0.65	197 / 0.72	0.91 (0.66, 1.24)
150 to < 300 cells/µL	NAVIGATOR	Tezepelumab 210 mg SC Q4W	171 / 1.00	171 / 1.75	0.57 (0.41, 0.79)
	QUEST	Dupilumab 200 mg SC Q2W	173 / 0.56	84 / 0.87	0.64 (0.41, 1.02)
	QUEST	Dupilumab 300 mg SC Q2W	175 / 0.47	95 / 0.84	0.56 (0.35, 0.89)
	SIROCCO / CALIMA	Benralizumab 30 mg SC Q8W[a]	147 / 0.94	137 / 1.22	0.77 (0.55, 1.09)
	MUSCA	Mepolizumab 100 mg SC Q4W	136 / NR		0.73 (0.40, 1.31)
	MENSA	Mepolizumab 75 mg IV / 100 mg SC Q4W[a]	145 / NR		0.64 (0.36, 1.16)
≥ 150 cells/µL	NAVIGATOR	Tezepelumab 210 mg SC Q4W	390 / 0.89	393 / 2.24	0.39 (0.32, 0.49)
	QUEST	Dupilumab 200 mg SC Q2W	437 / 0.45	232 / 1.01	NR
	QUEST	Dupilumab 300 mg SC Q2W	452 / 0.43	237 / 1.08	0.40 (0.31, 0.53)
	SIROCCO	Benralizumab 30 mg SC Q8W	325 / 0.87	306 / 1.50	0.58 (0.46, 0.74)
	CALIMA	Benralizumab 30 mg SC Q8W	300 / 0.70	315 / 1.10	0.64 (0.50, 0.81)
	MUSCA	Mepolizumab 100 mg SC Q4W	274 / 0.51	277 / 1.21	0.42 (0.31, 0.56)
	MENSA	Mepolizumab 75 mg IV Q4W	191 / 0.93	191 / 1.74	0.53 (0.40, 0.72)
	MENSA	Mepolizumab 100 mg SC Q4W	194 / 0.83	191 / 1.74	0.47 (0.35, 0.64)
0 to < 150 cells/µL	NAVIGATOR	Tezepelumab 210 mg SC Q4W	138 / 1.04	138 / 1.70	0.61 (0.42, 0.88)
	QUEST	Dupilumab 200 mg SC Q2W	193 / 0.47	85 / 0.51	0.93 (0.58, 1.47)
	QUEST	Dupilumab 300 mg SC Q2W	181 / 0.74	83 / 0.64	1.15 (0.75, 1.77)
	SIROCCO	Benralizumab 30 mg SC Q8W	48 / 1.01	74 / 1.34	0.76 (0.45, 1.27)
	CALIMA	Benralizumab 30 mg SC Q8W	48 / 1.01	40 / 1.55	0.65 (0.39, 1.09)



In the 0 to < 300 cells/μL panel for phase 3 trials (ii), QUEST data are from www.clinicaltrials.gov; reported for the 300 mg dose only. Patient numbers for MUSCA and MENSA in the 150 to < 300 cells/μL panel for phase 3 trials (ii) are the overall population (breakdown by treatment group not given).

[a]Pooled trials or doses; [b]BEC ≥ 400 cells/μL; [c]BEC ≥ 500 cells/μL; [d]BEC ≥ 260 cells/μL; [e]BEC < 260 cells/μL.

AAER annualized asthma exacerbation rate, *BEC* blood eosinophil count, *CI* confidence interval, *IgE* immunoglobulin E, *IV* intravenous, *NR* not reported, *Q2W* every 2 weeks, *Q4W* every 4 weeks, *Q8W* every 8 weeks, *SC* subcutaneous.

Table S1 PubMed search strategy

(asthma[Title] OR asthmatic[title])
AND
(severe[Title/Abstract] OR uncontrolled[Title/Abstract] OR poorly controlled[Title/Abstract] OR inadequately controlled[Title/Abstract])
AND
(tezepelumab[Title] OR dupilumab[Title] OR benralizumab[Title] OR mepolizumab[Title] OR reslizumab[Title] OR omalizumab[Title] OR REGN3500[Title] OR SAR440340[Title] OR biologic[Title] OR monoclonal[Title] OR anti-[Title])
AND
(eosinophil[Title/Abstract] OR eosinophils[Title/Abstract] OR eosinophilic[Title/Abstract])
AND
(exacerbation[Title/Abstract] OR exacerbations[Title/Abstract] OR FEV1[Title/Abstract] OR ACQ[Title/Abstract] OR AQLQ[Title/Abstract] OR SGRQ[Title/Abstract])

ACQ Asthma Control Questionnaire, *AQLQ* Asthma Quality of Life Questionnaire, FEV_1 forced expiratory volume in 1 s, *SGRQ* St George's Respiratory Questionnaire

Table S2. Articles included and excluded from literature screen

Title	Authors	Citation	URL	Included/ exclude	Reason	Include	Not RCT	Meta-analysis	Extension study	Ineligible study design	Protocol only	Wrong population	Exacs not 1°/2° endpoint	Discontinued drug	Not approved dose	No eligible EOS subgroup data	Duplicate data	Full text acquired
Benralizumab for Prednisone-Dependent Eosinophilic Asthma Associated With Novel STAT3 Loss of Function Mutation	Adatia A, Allen CJ, Wald J, Richards CD, Waserman S, Nair P.	Chest. 2021 Apr;159(4):e181-e184. doi: 10.1016/j.chest.2020.11.042. Epub 2021 Apr 6.	https://pubmed.ncbi.nlm.nih.gov/34022014	Exclude	Case report(s)		1											
Dual biologic therapy in a patient with severe asthma and other allergic disorders	Caskey JR, Kaufman D.	BMJ Case Rep. 2021 May 20;14(5):e242211. doi: 10.1136/bcr-2021-242211.	https://pubmed.ncbi.nlm.nih.gov/34016636	Exclude	Case report(s)		1											
Monoclonal antibodies in type 2 asthma: an updated network meta-analysis	Edris A, Lahousse L.	Minerva Med. 2021 May 14. doi: 10.23736/S0026-4806.21.07623-0. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33988014	Exclude	Meta-analysis			1										
Tezepelumab in Adults and Adolescents with Severe, Uncontrolled Asthma	Menzies-Gow A, Corren J, Bourdin A, Chupp G, Israel E, Wechsler ME, Brightling CE, Griffiths JM, Hellqvist Å, Bowen K, Kaur P, Almqvist G, Ponnarambil S, Colice G.	N Engl J Med. 2021 May 13;384(19):1800-1809. doi: 10.1056/NEJMoa2034975.	https://pubmed.ncbi.nlm.nih.gov/33979488	Included	NAVIGATOR study	1												1
Benralizumab Improves Symptoms of Patients with Severe, Eosinophilic Asthma with a Diagnosis of Nasal Polyposis	Canonica GW, Harrison TW, Chanez P, Menzella F, Louis R, Cosio BG, Lugogo NL, Mohan A, Burden A, Garcia Gil E.	Allergy. 2021 May 12. doi: 10.1111/all.14902. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33978983	Exclude	Nasal polyps subanalysis of ANDHI trial							1						
Benefit of switching to mepolizumab from omalizumab in severe eosinophilic asthma based on patient characteristics	Liu MC, Chipps B, Munoz X, Devouassoux G, Bergna M, Smith SG, Price RG, Galkin DV, Azmi J, Mouneimne D, Albers FC, Chapman KR.	Respir Res. 2021 May 10;22(1):144. doi: 10.1186/s12931-021-01733-9.	https://pubmed.ncbi.nlm.nih.gov/33971856	Exclude	Switch study					1								
The inflammatory profile of exacerbations in patients with severe refractory eosinophilic asthma receiving mepolizumab (the MEX study): a prospective observational study	McDowell PJ, Diver S, Yang F, Borg C, Busby J, Brown V, Shrimanker R, Cox C, Brightling CE, Chaudhuri R, Pavord ID, Heaney LG; Medical Research Council: Refractory Asthma Stratification Programme (RASP-UK Consortium).	Lancet Respir Med. 2021 May 7:S2213-2600(21)00004-7. doi: 10.1016/S2213-2600(21)00004-7. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33971168	Exclude	Observational study		1											
Real-World Effectiveness of Mepolizumab in Severe Eosinophilic Asthma: A Systematic Review and Meta-analysis	Li H, Zhang Q, Wang J, Gao S, Li C, Wang J, Zhang S, Lin J.	Clin Ther. 2021 May 4:S0149-2918(21)00158-2. doi: 10.1016/j.clinthera.2021.03.023. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33962763	Exclude	Observational study		1											
Effectiveness of mepolizumab therapy on symptoms, asthma exacerbations, steroid dependence and small airways in patients with severe eosinophilic asthma	Yilmaz I, Nazik Bahçecioğlu S, Türk M, Tutar N, Paçaci Çetin G, Arslan B.	Turk J Med Sci. 2021 May 2. doi: 10.3906/sag-2009-41. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33932968	Exclude	Observational study		1											
[Impact of reslizumab on the course of chronic rhinosinusitis in patients with eosinophilic asthma]	Boiko NV, Lodochkina OE, Kit MM, Kuleshova VG, Nedashkovskaya NG.	Vestn Otorinolaringol. 2021;86(2):43-48. doi: 10.17116/otorino20218602143.	https://pubmed.ncbi.nlm.nih.gov/33929151	Exclude	Observational study		1											
Mepolizumab improves sino-nasal symptoms and asthma control in severe eosinophilic asthma patients with chronic rhinosinusitis and nasal polyps: a 12-month real-life study	Detoraki A, Tremante E, D'Amato M, Calabrese C, Casella C, Maniscalco M, Poto R, Brancaccio R, Boccia M, Martino M, Imperatore C, Spadaro G.	Ther Adv Respir Dis. 2021 Jan-Dec;15:17534666211009398. doi: 10.1177/17534666211009398.	https://pubmed.ncbi.nlm.nih.gov/33910399	Exclude	Observational study		1											
Astegolimab (anti-ST2) efficacy and safety in adults with severe asthma: A randomized clinical trial	Kelsen SG, Agache IO, Soong W, Israel E, Chupp GL, Cheung DS, Theess W, Yang X, Staton TL, Choy DF, Fong A, Dash A, Dolton M, Pappu R, Brightling CE.	J Allergy Clin Immunol. 2021 Apr 16:S0091-6749(21)00609-6. doi: 10.1016/j.jaci.2021.03.044. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33872652	Exclude	Astegolimab development discontinued									1				
The significance of eosinophil and eosinophil lymphocyte ratio (ELR) in predicting response to omalizumab treatment in patients with severe allergic asthma	Özgen H, Tepetam FM, Bulut İ, Örçen C.	Tuberk Toraks. 2021 Mar;69(1):39-48. doi: 10.5578/tt.20219905.	https://pubmed.ncbi.nlm.nih.gov/33853304	Exclude	Observational study		1											
Efficacy of mepolizumab in elderly patients with severe asthma and overlapping COPD in real-world settings: A retrospective observational study	Isoyama S, Ishikawa N, Hamai K, Matsumura M, Kobayashi H, Nomura A, Ueno S, Tanimoto T, Maeda H, Iwamoto H, Hattori N.	Respir Investig. 2021 Apr 10:S2212-5345(21)00041-1. doi: 10.1016/j.resinv.2021.02.009. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33849780	Exclude	Observational study		1											
Early responders within seven days of dupilumab treatment for severe asthma evaluated by patient-reported outcome: a pilot study	Tani N, Kataoka N, Kunimatsu Y, Tachibana Y, Sugimoto T, Sato I, Ogura Y, Hirose K, Takeda T.	Multidiscip Respir Med. 2021 Mar 17;16(1):736. doi: 10.4081/mrm.2021.736. eCollection 2021 Jan 15.	https://pubmed.ncbi.nlm.nih.gov/33815789	Exclude	Observational study		1											
Clinical and economic consequences of switching from omalizumab to mepolizumab in uncontrolled severe eosinophilic asthma	Carpagnano GE, Resta E, Povero M, Pelaia C, D'Amato M, Crimi N, Scichilone N, Scioscia G, Resta O, Calabrese C, Pelaia G, Barbaro MPF.	Sci Rep. 2021 Mar 9;11(1):5453. doi: 10.1038/s41598-021-84895-2.	https://pubmed.ncbi.nlm.nih.gov/33750842	Exclude	Observational study		1											
May mepolizumab used in asthma correct subfertility?	Ozden G, Pınar Deniz P.	Ann Med. 2021 Dec;53(1):456-458. doi: 10.1080/07853890.2021.1900591.	https://pubmed.ncbi.nlm.nih.gov/33739210	Exclude	Case report(s)		1											
Identification of distinct phenotypes related to benralizumab responsiveness in patients with severe eosinophilic asthma	Yamada H, Nakajima M, Matsuyama M, Morishima Y, Arai N, Hida N, Nakaizumi T, Masuko H, Yatagai Y, Saito T, Hizawa N.	PLoS One. 2021 Mar 11;16(3):e0248305. doi: 10.1371/journal.pone.0248305. eCollection 2021.	https://pubmed.ncbi.nlm.nih.gov/33705484	Exclude	Observational study		1											
Real-World Effectiveness of Anti-IL-5/5R Therapy in Severe Atopic Eosinophilic Asthma with Fungal Sensitization	Dhariwal J, Hearn AP, Kavanagh JE, d'Ancona G, Green L, Fernandes M, Thomson L, Roxas C, Kent BD, Nanzer AM, Jackson DJ.	J Allergy Clin Immunol Pract. 2021 Mar 6:S2213-2198(21)00291-9. doi: 10.1016/j.jaip.2021.02.048. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33689868	Exclude	Observational study		1											
Effectiveness of Benralizumab in Improving the Quality of Life of Severe Eosinophilic Asthmatic Patients: Our Real-Life Experience	Scioscia G, Carpagnano GE, Quarato CMI, Lacedonia D, Santamaria S, Soccio P, Depalo A, Fuso P, Foschino Barbaro MP.	Front Pharmacol. 2021 Feb 12;12:631660. doi: 10.3389/fphar.2021.631660. eCollection 2021.	https://pubmed.ncbi.nlm.nih.gov/33679414	Exclude	Observational study		1											
Spontaneous resolution of atopic dermatitis incidental to participation in benralizumab clinical trial for severe, uncontrolled asthma: a case report	Pham DN.	J Med Case Rep. 2021 Mar 6;15(1):103. doi: 10.1186/s13256-021-02663-2.	https://pubmed.ncbi.nlm.nih.gov/33673870	Exclude	Case report(s)		1											

Therapeutic Effects of Benralizumab Assessed in Patients with Severe Eosinophilic Asthma: Real-Life Evaluation Correlated with Allergic and Non-Allergic Phenotype Expression	Pelaia C, Crimi C, Benfante A, Caiaffa MF, Calabrese C, Carpagnano GE, Ciotta D, D'Amato M, Macchia L, Nolasco S, Pelaia G, Pellegrino S, Scichilone N, Scioscia G, Spadaro G, Valenti G, Vatrella A, Crimi N.	J Asthma Allergy. 2021 Feb 22;14:163-173. doi: 10.2147/JAA.S297273. eCollection 2021.	https://pubmed.ncbi.nlm.nih.gov/33654413	Exclude	Observational study		1											
Real-World Experience with Benralizumab in Patients with Severe Eosinophilic Asthma: A Case Series	Menzella F, Bonavia M, Bonini M, D'Amato M, Lombardo S, Murgia N, Patella V, Triggiani M, Pelaia G.	J Asthma Allergy. 2021 Feb 22;14:149-161. doi: 10.2147/JAA.S295676. eCollection 2021.	https://pubmed.ncbi.nlm.nih.gov/33654412	Exclude	Observational study		1											
Results in clinical practice in the treatment of severe eosinophilic asthma with mepolizumab: a real-life study	Enríquez-Rodríguez AI, Hermida Valverde T, Romero Álvarez P, López-González FJ, Gullón Blanco JA, Expósito Villegas AR, Escobar Fernández MJ, Beristáin Urquiza AM, Alonso Fernández MÁ, Gutiérrez Rodríguez M, Castaño De Las Pozas G, Jiménez Pérez J, Fernández Mellado R, García Clemente MM, Casan Clara P.	J Asthma. 2021 Mar 27:1-7. doi: 10.1080/02770903.2021.1897835. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33653213	Exclude	Observational study		1											
Benralizumab for adolescent patients with severe, eosinophilic asthma: Safety and efficacy after 3 years of treatment	Busse WW, Bleecker ER, FitzGerald JM, Ferguson GT, Barker P, Brooks L, Olsson RF, Martin UJ, Goldman M; BORA study investigators.	J Allergy Clin Immunol. 2021 Feb 17:S0091-6749(21)00226-8. doi: 10.1016/j.jaci.2021.02.009. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33609624	Exclude	Extension study				1									
Regulatory T cell monitoring in severe eosinophilic asthma patients treated with mepolizumab	Bergantini L, d'Alessandro M, Cameli P, Bono C, Perruzza M, Biagini M, Pini L, Bigliazzi C, Sestini P, Dotta F, Bargagli E.	Scand J Immunol. 2021 Feb 19:e13031. doi: 10.1111/sji.13031. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33606277	Exclude	Not RCT		1											
Economic impact of mepolizumab in uncontrolled severe eosinophilic asthma, in real life	Bagnasco D, Povero M, Pradelli L, Brussino L, Rolla G, Caminati M, Menzella F, Heffler E, Canonica GW, Paggiaro P, Senna G, Milanese M, Lombardi C, Bucca C, Manfredi A, Canevari RF, Passalacqua G; SANI Network (Severe Asthma Network Italy).	World Allergy Organ J. 2021 Jan 27;14(2):100509. doi: 10.1016/j.waojou.2021.100509. eCollection 2021 Feb.	https://pubmed.ncbi.nlm.nih.gov/33598095	Exclude	Observational study		1											
Efficacy of Tezepelumab in Patients with Severe, Uncontrolled Asthma with and without Nasal Polyposis: A Post Hoc Analysis of the Phase 2b PATHWAY Study	Emson C, Corren J, Salapa K, Hellqvist Å, Parnes JR, Colice G.	J Asthma Allergy. 2021 Feb 3;14:91-99. doi: 10.2147/JAA.S288260. eCollection 2021.	https://pubmed.ncbi.nlm.nih.gov/33568920	Exclude	Nasal polyps subanalysis of PATHWAY							1						
Tezepelumab as an Emerging Therapeutic Option for the Treatment of Severe Asthma: Evidence to Date	Dorey-Stein ZL, Shenoy KV.	Drug Des Devel Ther. 2021 Jan 27;15:331-338. doi: 10.2147/DDDT.S250825. eCollection 2021.	https://pubmed.ncbi.nlm.nih.gov/33536746	Exclude	Review		1											
Serum microRNAs as Tool to Predict Early Response to Benralizumab in Severe Eosinophilic Asthma	Cañas JA, Valverde-Monge M, Rodrigo-Muñoz JM, Sastre B, Gil-Martínez M, García-Latorre R, Rial MJ, Gómez-Cardeñosa A, Fernández-Nieto M, Pinillos-Robles EJ, Rodríguez-Nieto MJ, González-Mangado N, Sastre J, Pozo VD.	J Pers Med. 2021 Jan 28;11(2):76. doi: 10.3390/jpm11020076.	https://pubmed.ncbi.nlm.nih.gov/33525548	Exclude	Not RCT		1											
Rapid effect of benralizumab in exacerbation of severe eosinophilic asthma associated with eosinophilic granulomatosis with polyangiitis	Martínez-Rivera C, Garcia-Olivé I, Urrutia-Royo B, Basagaña-Torrento M, Rosell A, Abad J.	BMC Pulm Med. 2021 Jan 21;21(1):35. doi: 10.1186/s12890-021-01397-7.	https://pubmed.ncbi.nlm.nih.gov/33478439	Exclude	Case report(s)		1											
Changes in Type 2 Biomarkers After Anti-IL5 Treatment in Patients With Severe Eosinophilic Asthma	Jang JH, Woo SD, Lee Y, Kim CK, Shin YS, Ye YM, Park HS.	Allergy Asthma Immunol Res. 2021 Mar;13(2):330-338. doi: 10.4168/aair.2021.13.2.330.	https://pubmed.ncbi.nlm.nih.gov/33474865	Exclude	Not RCT		1											
Tezepelumab Reduces Exacerbations Across All Seasons in Patients with Severe, Uncontrolled Asthma: A Post Hoc Analysis of the PATHWAY Phase 2b Study	Corren J, Karpefors M, Hellqvist Å, Parnes JR, Colice G.	J Asthma Allergy. 2021 Jan 11;14:1-11. doi: 10.2147/JAA.S286036. eCollection 2021.	https://pubmed.ncbi.nlm.nih.gov/33469316	Exclude	Subanalysis of PATHWAY											1		1
No difference in omalizumab efficacy in patients with asthma by number of asthma-related and allergic comorbidities	Chen M, Choo E, Yoo B, Raut P, Haselkorn T, Pazwash H, Holweg CTJ, Hudes G.	Ann Allergy Asthma Immunol. 2021 Jan 17:S1081-1206(21)00023-5. doi: 10.1016/j.anai.2021.01.015. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33465457	Exclude	Wrong population (not just EXTRA included)							1						
Targeting the IL-5 pathway in eosinophilic asthma: a comparison of mepolizumab to benralizumab in the reduction of peripheral eosinophil counts	Ghassemian A, Park JJ, Tsoulis MW, Kim H.	Allergy Asthma Clin Immunol. 2021 Jan 6;17(1):3. doi: 10.1186/s13223-020-00507-0.	https://pubmed.ncbi.nlm.nih.gov/33407869	Exclude	Observational study		1											
Onset of effect and impact on health-related quality of life, exacerbation rate, lung function, and nasal polyposis symptoms for patients with severe eosinophilic asthma treated with benralizumab (ANDHI): a randomised, controlled, phase 3b trial	Harrison TW, Chanez P, Menzella F, Canonica GW, Louis R, Cosio BG, Lugogo NL, Mohan A, Burden A, McDermott L, Garcia Gil E, Zangrilli JG; ANDHI study investigators.	Lancet Respir Med. 2021 Mar;9(3):260-274. doi: 10.1016/S2213-2600(20)30414-8. Epub 2020 Dec 22.	https://pubmed.ncbi.nlm.nih.gov/33357499	Included	ANDHI study	1												1
Clinical Outcomes and Health-Care Resource Use Associated With Reslizumab Treatment in Adults With Severe Eosinophilic Asthma in Real-World Practice	Wechsler ME, Peters SP, Hill TD, Ariely R, DePietro MR, Driessen MT, Terasawa EL, Thomason DR, Panettieri RA Jr.	Chest. 2021 May;159(5):1734-1746. doi: 10.1016/j.chest.2020.11.060. Epub 2020 Dec 14.	https://pubmed.ncbi.nlm.nih.gov/33333058	Exclude	Observational study		1											
Effect of Benralizumab in Patients With Severe Eosinophilic Asthma and Chronic Rhinosinusitis With Nasal Polyps: A Case Series	Chitguppi C, Patel P, Gandler A, Murphy K, Khoury Md T, Monostra P, Bork S, Toskala E, Rabinowitz M, Rosen M, Nyquist G, Most J.	Am J Rhinol Allergy. 2020 Dec 10:1945892420978351. doi: 10.1177/1945892420978351. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33302694	Exclude	Case report(s)		1											
Characterisation of patients with severe asthma in the UK Severe Asthma Registry in the biologic era	Jackson DJ, Busby J, Pfeffer PE, Menzies-Gow A, Brown T, Gore R, Doherty M, Mansur AH, Message S, Niven R, Patel M, Heaney LG; UK Severe Asthma Registry.	Thorax. 2021 Mar;76(3):220-227. doi: 10.1136/thoraxjnl-2020-215168. Epub 2020 Dec 9.	https://pubmed.ncbi.nlm.nih.gov/33298582	Exclude	Observational study		1											
Benralizumab improves patient reported outcomes and functional parameters in difficult-to-treat patients with severe asthma: Data from a real-life cohort	Di Bona D, Minenna E, Albanesi M, Nettis E, Caiaffa MF, Macchia L.	Pulm Pharmacol Ther. 2020 Oct;64:101974. doi: 10.1016/j.pupt.2020.101974. Epub 2020 Nov 1.	https://pubmed.ncbi.nlm.nih.gov/33137516	Exclude	Observational study		1											
Dual Monoclonal Antibody Therapy for a Severe Asthma Patient	Domingo C, Pomares X, Morón A, Sogo A.	Front Pharmacol. 2020 Sep 30;11:587621. doi: 10.3389/fphar.2020.587621. eCollection 2020.	https://pubmed.ncbi.nlm.nih.gov/33101041	Exclude	Case report(s)		1											
Long-Term Therapy Response to Anti-IL-5 Biologics in Severe Asthma-A Real-Life Evaluation	Eger K, Kroes JA, Ten Brinke A, Bel EH.	J Allergy Clin Immunol Pract. 2021 Mar;9(3):1194-1200. doi: 10.1016/j.jaip.2020.10.010. Epub 2020 Oct 15.	https://pubmed.ncbi.nlm.nih.gov/33069885	Exclude	Observational study		1											

Unmet need in severe, uncontrolled asthma: can anti-TSLP therapy with tezepelumab provide a valuable new treatment option?	Menzies-Gow A, Wechsler ME, Brightling CE.	Respir Res. 2020 Oct 15;21(1):268. doi: 10.1186/s12931-020-01505-x.	https://pubmed.ncbi.nlm.nih.gov/33059715	Exclude	Review		1										
Assessing the cost-effectiveness of mepolizumab as add-on therapy to standard of care for severe eosinophilic asthma in Singapore	Tan LE, Tan WHG, Aziz MIA, Koh MS, Tay TR, Pearce F, Ng K.	J Asthma. 2020 Nov 10:1-11. doi: 10.1080/02770903.2020.1837158. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/33058740	Exclude	HEOR study		1										
NAVIGATOR: a phase 3 multicentre, randomized, double-blind, placebo-controlled, parallel-group trial to evaluate the efficacy and safety of tezepelumab in adults and adolescents with severe, uncontrolled asthma	Menzies-Gow A, Colice G, Griffiths JM, Almqvist G, Ponnarambil S, Kaur P, Ruberto G, Bowen K, Hellqvist Å, Mo M, Garcia Gil E.	Respir Res. 2020 Oct 13;21(1):266. doi: 10.1186/s12931-020-01526-6.	https://pubmed.ncbi.nlm.nih.gov/33050934	Exclude	Study design paper						1						
CASCADE: a phase 2, randomized, double-blind, placebo-controlled, parallel-group trial to evaluate the effect of tezepelumab on airway inflammation in patients with uncontrolled asthma	Emson C, Diver S, Chachi L, Megally A, Small C, Downie J, Parnes JR, Bowen K, Colice G, Brightling CE.	Respir Res. 2020 Oct 13;21(1):265. doi: 10.1186/s12931-020-01513-x.	https://pubmed.ncbi.nlm.nih.gov/33050900	Exclude	Study design paper						1						
Rapid effect of benralizumab for severe asthma with chronic rhinosinusitis with nasal polyps	Matsuno O, Minamoto S.	Pulm Pharmacol Ther. 2020 Oct;64:101965. doi: 10.1016/j.pupt.2020.101965. Epub 2020 Oct 9.	https://pubmed.ncbi.nlm.nih.gov/33039667	Exclude	Not RCT		1										
Significant improvement in lung function and asthma control after benralizumab treatment for severe refractory eosinophilic asthma	Menzella F, Ruggiero P, Galeone C, Scelfo C, Bagnasco D, Facciolongo N.	Pulm Pharmacol Ther. 2020 Oct;64:101966. doi: 10.1016/j.pupt.2020.101966. Epub 2020 Oct 8.	https://pubmed.ncbi.nlm.nih.gov/33039666	Exclude	Observational study		1										
Dupilumab is effective in type 2-high asthma patients receiving high-dose inhaled corticosteroids at baseline	Bourdin A, Papi AA, Corren J, Virchow JC, Rice MS, Deniz Y, Djandji M, Rowe P, Pavord ID.	Allergy. 2021 Jan;76(1):269-280. doi: 10.1111/all.14611. Epub 2020 Oct 21.	https://pubmed.ncbi.nlm.nih.gov/33010038	Exclude	Duplicate data											1	1
Real-life effectiveness of mepolizumab in patients with severe refractory eosinophilic asthma and multiple comorbidities	Crimi C, Campisi R, Cacopardo G, Intravaia R, Nolasco S, Porto M, Pelaia C, Crimi N.	World Allergy Organ J. 2020 Sep 18;13(9):100462. doi: 10.1016/j.waojou.2020.100462. eCollection 2020 Sep.	https://pubmed.ncbi.nlm.nih.gov/32994855	Exclude	Observational study		1										
Anti-IL5 Therapies for Severe Eosinophilic Asthma: Literature Review and Practical Insights	Menzella F, Ruggiero P, Ghidoni G, Fontana M, Bagnasco D, Livrieri F, Scelfo C, Facciolongo N.	J Asthma Allergy. 2020 Sep 9;13:301-313. doi: 10.2147/JAA.S258594. eCollection 2020.	https://pubmed.ncbi.nlm.nih.gov/32982318	Exclude	Review		1										
Dupilumab Improves Asthma Control and Lung Function in Patients with Insufficient Outcome During Previous Antibody Therapy	Mümmler C, Munker D, Barnikel M, Veit T, Kayser MZ, Welte T, Behr J, Kneidinger N, Suhling H, Milger K.	J Allergy Clin Immunol Pract. 2021 Mar;9(3):1177-1185.e4. doi: 10.1016/j.jaip.2020.09.014. Epub 2020 Sep 24.	https://pubmed.ncbi.nlm.nih.gov/32980583	Exclude	Observational study		1										
Effectiveness of mepolizumab therapy in patients with severe eosinophilic asthma: Austrian real-life data	Renner A, Marth K, Patocka K, Idzko M, Pohl W.	Pulm Pharmacol Ther. 2020 Oct;64:101946. doi: 10.1016/j.pupt.2020.101946. Epub 2020 Sep 17.	https://pubmed.ncbi.nlm.nih.gov/32949705	Exclude	Observational study		1										
Differential response to biologics in a patient with severe asthma and ABPA: a role for dupilumab?	Mümmler C, Kemmerich B, Behr J, Kneidinger N, Milger K.	Allergy Asthma Clin Immunol. 2020 Jun 26;16:55. doi: 10.1186/s13223-020-00454-w. eCollection 2020.	https://pubmed.ncbi.nlm.nih.gov/32944023	Exclude	Case report(s)		1										
Clinical Development of Mepolizumab for the Treatment of Severe Eosinophilic Asthma: On the Path to Personalized Medicine	Pavord ID, Menzies-Gow A, Buhl R, Chanez P, Dransfield M, Lugogo N, Keene ON, Bradford ES, Yancey SW.	J Allergy Clin Immunol Pract. 2021 Mar;9(3):1121-1132.e7. doi: 10.1016/j.jaip.2020.08.039. Epub 2020 Sep 2.	https://pubmed.ncbi.nlm.nih.gov/32889223	Exclude	Review		1										
Real-World Effectiveness of Benralizumab in Severe Eosinophilic Asthma	Kavanagh JE, Hearn AP, Dhariwal J, d'Ancona G, Douiri A, Roxas C, Fernandes M, Green L, Thomson L, Nanzer AM, Kent BD, Jackson DJ.	Chest. 2021 Feb;159(2):496-506. doi: 10.1016/j.chest.2020.08.2083. Epub 2020 Aug 31.	https://pubmed.ncbi.nlm.nih.gov/32882249	Exclude	Observational study		1										
Case Report: Acute effect of benralizumab on asthma exacerbation without concomitant corticosteroid use	Nolasco S, Campisi R, Intravaia R, Porto M, Pelaia C, Crimi N, Crimi C.	F1000Res. 2020 Jun 23;9:637. doi: 10.12688/f1000research.24603.2. eCollection 2020.	https://pubmed.ncbi.nlm.nih.gov/32864107	Exclude	Case report(s)		1										
Impact of mepolizumab on exacerbations in severe asthma: Results from a U.S. insurance claims data base	Ortega H, Hahn B, Bogart M, Bell CF, Bancroft T, Chastek B, Llanos JP.	Allergy Asthma Proc. 2020 Sep 1;41(5):341-347. doi: 10.2500/aap.2020.41.200043.	https://pubmed.ncbi.nlm.nih.gov/32867888	Exclude	Observational study		1										
Asthma exacerbations on benralizumab are largely non-eosinophilic	Poznanski SM, Mukherjee M, Zhao N, Huang C, Radford K, Ashkar AA, Nair P.	Allergy. 2021 Jan;76(1):375-379. doi: 10.1111/all.14514. Epub 2020 Aug 7.	https://pubmed.ncbi.nlm.nih.gov/32767484	Exclude	Not RCT		1										
[Anti-IL-5 treatments in severe eosinophilic asthma: real life datas]	Özdel Öztürk B, Bavbek S.	Tuberk Toraks. 2020 Jul;68(2):148-159. doi: 10.5578/tt.69416.	https://pubmed.ncbi.nlm.nih.gov/32755115	Exclude	Observational study		1										
Efficacy of benralizumab for patients with severe eosinophilic asthma: a retrospective, real-life study	Numata T, Miyagawa H, Nishioka S, Okuda K, Utsumi H, Hashimoto M, Minagawa S, Ishikawa T, Hara H, Araya J, Kuwano K.	BMC Pulm Med. 2020 Aug 3;20(1):207. doi: 10.1186/s12890-020-01248-x.	https://pubmed.ncbi.nlm.nih.gov/32746787	Exclude	Observational study		1										
Personalized Approach of Severe Eosinophilic Asthma Patients Treated with Mepolizumab and Benralizumab	Bergantini L, d'Alessandro M, Cameli P, Bianchi F, Sestini P, Bargagli E, Refini RM.	Int Arch Allergy Immunol. 2020;181(10):746-753. doi: 10.1159/000508936. Epub 2020 Jul 30.	https://pubmed.ncbi.nlm.nih.gov/32731216	Exclude	Not RCT		1										
A Low Serum CCL4/MIP-1β Level May Predict a Severe Asthmatic Responsiveness to Mepolizumab	Suzukawa M, Ohshima N, Tashimo H, Asari I, Kobayashi N, Shoji S, Tohma S, Ohta K.	Intern Med. 2020 Nov 15;59(22):2849-2855. doi: 10.2169/internalmedicine.5159-20. Epub 2020 Jul 21.	https://pubmed.ncbi.nlm.nih.gov/32713920	Exclude	Not RCT		1										
[Clinical and economic analysis of Reslizumab use in the treatment of patients with severe allergic eosinophilic asthma]	Kolbin AS, Avdeev SN, Zhuravleva MV, Gomon YM, Balykina YE, Matveyev NV, Proskurin MA, Fedosenko SV.	Ter Arkh. 2019 Dec 15;91(12):47-56. doi: 10.26442/00403660.2019.12.000452.	https://pubmed.ncbi.nlm.nih.gov/32598589	Exclude	HEOR study		1										

Real-Life effects of benralizumab on exacerbation number and lung hyperinflation in atopic patients with severe eosinophilic asthma	Pelaia C, Busceti MT, Crimi C, Carpagnano GE, Lombardo N, Terracciano R, Vatrella A, Pelaia G.	Biomed Pharmacother. 2020 Sep;129:110444. doi: 10.1016/j.biopha.2020.110444. Epub 2020 Jun 24.	https://pubmed.ncbi.nlm.nih.gov/32593131	Exclude	Observational study		1											
Anti-alarmins in asthma: targeting the airway epithelium with next-generation biologics	Porsbjerg CM, Sverrild A, Lloyd CM, Menzies-Gow AN, Bel EH.	Eur Respir J. 2020 Nov 12;56(5):2000260. doi: 10.1183/13993003.00260-2020. Print 2020 Nov.	https://pubmed.ncbi.nlm.nih.gov/32586879	Exclude	Review		1											
Exacerbations of Severe Asthma While on Anti-IL-5 Biologics	Bhalla A, Zhao N, Rivas DD, Ho T, Perez de Llano L, Mukherjee M, Nair P.	J Investig Allergol Clin Immunol. 2020;30(5):307-316. doi: 10.18176/jiaci.0628. Epub 2020 Jun 23.	https://pubmed.ncbi.nlm.nih.gov/32573459	Exclude	Case report(s)		1											
Mepolizumab in Severe Eosinophilic Asthma: A 2-Year Follow-Up in Specialized Asthma Clinics in Greece: An Interim Analysis	Kallieri M, Zervas E, Katsoulis K, Fouka E, Porpodis K, Samitas K, Papaioannou AI, Kipourou M, Gaki E, Vittorakis S, Markatos M, Dimakou K, Ampelioti S, Koukidou S, Makris M, Ntakoula M, Mitrova MH, Glynos K, Antoniou KM, Gaga M, Tzanakis N, Markopoulou K, Papakosta D, Bakakos P, Loukides S.	Int Arch Allergy Immunol. 2020;181(8):613-617. doi: 10.1159/000508559. Epub 2020 Jun 22.	https://pubmed.ncbi.nlm.nih.gov/32570256	Exclude	Case report(s)		1											
Massive atelectasis by mucoid impaction in an asthma patient during treatment with anti-interleukin-5 receptor antibody	Takimoto T, Kagawa T, Tachibana K, Arai T, Inoue Y.	Respirol Case Rep. 2020 Jun 18;8(6):e00599. doi: 10.1002/rcr2.599. eCollection 2020 Aug.	https://pubmed.ncbi.nlm.nih.gov/32566229	Exclude	Case report(s)		1											
Efficacy of Reslizumab Treatment in Exacerbation-Prone Patients with Severe Eosinophilic Asthma	Wechsler ME, Hickey L, Garin M, Chauhan A.	J Allergy Clin Immunol Pract. 2020 Nov-Dec;8(10):3434-3442.e4. doi: 10.1016/j.jaip.2020.06.009. Epub 2020 Jun 18.	https://pubmed.ncbi.nlm.nih.gov/32562877	Exclude	No EOS subgroup data (already considered)											1		1
Anti-IL-5 monoclonal antibodies for the treatment of asthma: an update	Walsh GM.	Expert Opin Biol Ther. 2020 Oct;20(10):1237-1244. doi: 10.1080/14712598.2020.1782381. Epub 2020 Jun 25.	https://pubmed.ncbi.nlm.nih.gov/32529893	Exclude	Review		1											
COVID-19 in a severe eosinophilic asthmatic receiving benralizumab - a case study	Renner A, Marth K, Patocka K, Pohl W.	J Asthma. 2020 Jun 18:1-3. doi: 10.1080/02770903.2020.1781165. Online ahead of print.	https://pubmed.ncbi.nlm.nih.gov/32519921	Exclude	Case report(s)		1											
Efficacy of dupilumab on clinical outcomes in patients with asthma and perennial allergic rhinitis	Busse WW, Maspero JF, Lu Y, Corren J, Hanania NA, Chipps BE, Katelaris CH, FitzGerald JM, Quirce S, Ford LB, Rice MS, Kamat S, Khan AH, Jagerschmidt A, Harel S, Rowe P, Pirozzi G, Amin N, Ruddy M, Graham NMH, Teper A.	Ann Allergy Asthma Immunol. 2020 Nov;125(5):565-576.e1. doi: 10.1016/j.anai.2020.05.026. Epub 2020 May 28.	https://pubmed.ncbi.nlm.nih.gov/32474156	Exclude	Perennial allergic rhinitis subgroup analysis							1						
Effectiveness and safety of dupilumab for the treatment of severe asthma in a real-life French multi-centre adult cohort	Dupin C, Belhadi D, Guilleminault L, Gamez AS, Berger P, De Blay F, Bonniaud P, Leroyer C, Mahay G, Girodet PO, Raherison C, Fry S, Le Bourdellès G, Proust A, Rosencher L, Garcia G, Bourdin A, Chenivesse C, Didier A, Couffignal C, Taillé C.	Clin Exp Allergy. 2020 Jul;50(7):789-798. doi: 10.1111/cea.13614. Epub 2020 May 29.	https://pubmed.ncbi.nlm.nih.gov/32469092	Exclude	Observational study		1											
Efficacy and safety of mepolizumab in Korean patients with severe eosinophilic asthma from the DREAM and MENSA studies	Kim MK, Park HS, Park CS, Min SJ, Albers FC, Yancey SW, Mayer B, Kwon N.	Korean J Intern Med. 2021 Mar;36(2):362-370. doi: 10.3904/kjim.2019.198. Epub 2020 May 26.	https://pubmed.ncbi.nlm.nih.gov/32450626	Exclude	Korean subgroup study							1						
Dupilumab efficacy and safety in Japanese patients with uncontrolled, moderate-to-severe asthma in the phase 3 LIBERTY ASTHMA QUEST study	Tohda Y, Nakamura Y, Fujisawa T, Ebisawa M, Arima K, Miyata M, Takahashi Y, Rice MS, Deniz Y, Rowe P, Patel N, Graham NMH, Teper A.	Allergol Int. 2020 Oct;69(4):578-587. doi: 10.1016/j.alit.2020.04.002. Epub 2020 May 20.	https://pubmed.ncbi.nlm.nih.gov/32444306	Exclude	Japanese subgroup study							1						
Three cases of severe adolescent asthma treated with mepolizumab: lung function trajectories	Hoshi M, Matsunaga M, Nogami K, Hamada K, Kobori T, Kainuma K, Nagao M, Fujisawa T.	Asia Pac Allergy. 2020 Apr 10;10(2):e13. doi: 10.5415/apallergy.2020.10.e13. eCollection 2020 Apr.	https://pubmed.ncbi.nlm.nih.gov/32411578	Exclude	Case report(s)		1											
Mabs for treating asthma: omalizumab, mepolizumab, reslizumab, benralizumab, dupilumab	Ridolo E, Pucciarini F, Nizi MC, Makri E, Kihlgren P, Panella L, Incorvaia C.	Hum Vaccin Immunother. 2020 Oct 2;16(10):2349-2356. doi: 10.1080/21645515.2020.1753440. Epub 2020 May 13.	https://pubmed.ncbi.nlm.nih.gov/32401603	Exclude	Review		1											
Effectiveness and safety of benralizumab for severe asthma in clinical practice (J-BEST): a prospective study	Izumo T, Tone M, Kuse N, Awano N, Tanaka A, Jo T, Yoshimura H, Minami J, Takada K, Inomata M.	Ann Transl Med. 2020 Apr;8(7):438. doi: 10.21037/atm.2020.04.01.	https://pubmed.ncbi.nlm.nih.gov/32395482	Exclude	Observational study		1											
Bronchial thermoplasty versus mepolizumab: Comparison of outcomes in a severe asthma clinic	Langton D, Sha J, Guo S, Sharp J, Banks C, Wang W, Plummer V, Thien F.	Respirology. 2020 Dec;25(12):1243-1249. doi: 10.1111/resp.13830. Epub 2020 May 4.	https://pubmed.ncbi.nlm.nih.gov/32365431	Exclude	Not RCT		1											
Real-life evaluation of mepolizumab efficacy in patients with severe eosinophilic asthma, according to atopic trait and allergic phenotype	Pelaia C, Crimi C, Pelaia G, Nolasco S, Campisi R, Heffler E, Valenti G, Crimi N.	Clin Exp Allergy. 2020 Jul;50(7):780-788. doi: 10.1111/cea.13613. Epub 2020 May 13.	https://pubmed.ncbi.nlm.nih.gov/32347992	Exclude	Not RCT		1											
In patients with severe asthma with eosinophilia in reslizumab clinical trials, high peripheral blood eosinophil levels are associated with low FEV(1) reversibility	Virchow JC, Hickey L, Du E, Garin M.	Allergy Asthma Clin Immunol. 2020 Apr 19;16:26. doi: 10.1186/s13223-020-00424-2. eCollection 2020.	https://pubmed.ncbi.nlm.nih.gov/32328116	Exclude	Post hoc analysis of reslizumab studies NCT01287039 and NCT01285323 by FEV1 reversibility subgroups (combined with eos subgroups) - already have eos subgroup data for these studies from Castro 2015												1	1
Treatment Benefit with Omalizumab in Children by Indicators of Asthma Severity	Szefler SJ, Casale TB, Haselkorn T, Yoo B, Ortiz B, Kattan M, Busse WW.	J Allergy Clin Immunol Pract. 2020 Sep;8(8):2673-2680.e3. doi: 10.1016/j.jaip.2020.03.033. Epub 2020 Apr 13.	https://pubmed.ncbi.nlm.nih.gov/32298853	Exclude	Population not right							1						
Real-World Effectiveness and the Characteristics of a "Super-Responder" to Mepolizumab in Severe Eosinophilic Asthma	Kavanagh JE, d'Ancona G, Elstad M, Green L, Fernandes M, Thomson L, Roxas C, Dhariwal J, Nanzer AM, Kent BD, Jackson DJ.	Chest. 2020 Aug;158(2):491-500. doi: 10.1016/j.chest.2020.03.042. Epub 2020 Apr 8.	https://pubmed.ncbi.nlm.nih.gov/32275980	Exclude	Observational study		1											
Mepolizumab in a population with severe eosinophilic asthma and corticosteroid dependence: results from a French early access programme	Taillé C, Chanez P, Devouassoux G, Didier A, Pison C, Garcia G, Charriot J, Bouée S, Gruber A, Pribil C, Bourdin A, Humbert M.	Eur Respir J. 2020 Jun 25;55(6):1902345. doi: 10.1183/13993003.02345-2019. Print 2020 Jun.	https://pubmed.ncbi.nlm.nih.gov/32241829	Exclude	Observational study		1											

Effectiveness of omalizumab on patient reported outcomes, lung function, and inflammatory markers in severe allergic asthma	Frix AN, Schleich F, Paulus V, Guissard F, Henket M, Louis R.	Biochem Pharmacol. 2020 Sep;179:113944. doi: 10.1016/j.bcp.2020.113944. Epub 2020 Mar 30.	https://pubmed.ncbi.nlm.nih.gov/32240649	Exclude	Observational study		1											
Updated Evaluation of Dupilumab in the Treatment of Asthma: Patient Selection and Reported Outcomes	Brooks GD.	Ther Clin Risk Manag. 2020 Mar 4;16:181-187. doi: 10.2147/TCRM.S192392. eCollection 2020.	https://pubmed.ncbi.nlm.nih.gov/32184610	Exclude	Review		1											
Anti-IL-5 Biologicals Targeting Severe Late Onset Eosinophilic Asthma	Özyiğit LP, Öztürk AB, Bavbek S.	Turk Thorac J. 2020 Jan;21(1):61-68. doi: 10.5152/TurkThoracJ.2019.180204. Epub 2020 Jan 1.	https://pubmed.ncbi.nlm.nih.gov/32163366	Exclude	Review		1											
Mepolizumab effectiveness and identification of super-responders in severe asthma	Harvey ES, Langton D, Katelaris C, Stevens S, Farah CS, Gillman A, Harrington J, Hew M, Kritikos V, Radhakrishna N, Bardin P, Peters M, Reynolds PN, Upham JW, Baraket M, Bowler S, Bowden J, Chien J, Chung LP, Grainge C, Jenkins C, Katsoulotos GP, Lee J, McDonald VM, Reddel HK, Rimmer J, Wark PAB, Gibson PG.	Eur Respir J. 2020 May 21;55(5):1902420. doi: 10.1183/13993003.02420-2019. Print 2020 May.	https://pubmed.ncbi.nlm.nih.gov/32139455	Exclude	Observational study		1											
Benralizumab: an updated treatment of eosinophilic asthma	Cushen B, Menzies-Gow A.	Expert Rev Respir Med. 2020 May;14(5):435-444. doi: 10.1080/17476348.2020.1739526. Epub 2020 Mar 17.	https://pubmed.ncbi.nlm.nih.gov/32133878	Exclude	Review		1											
Onset of Effect, Changes in Airflow Obstruction and Lung Volume, and Health-Related Quality of Life Improvements with Benralizumab for Patients with Severe Eosinophilic Asthma: Phase IIIb Randomized, Controlled Trial (SOLANA)	Panettieri RA Jr, Welte T, Shenoy KV, Korn S, Jandl M, Kerwin EM, Feijoo R, Barker P, Olsson RF, Martin UJ; SOLANA Study Investigators.	J Asthma Allergy. 2020 Feb 17;13:115-126. doi: 10.2147/JAA.S240044. eCollection 2020.	https://pubmed.ncbi.nlm.nih.gov/32110060	Exclude	Exacerbation data only from 12 months prior to study, not an endpoint for study itself (already considered)								1					
Real-World Effectiveness of Mepolizumab in Patients with Severe Asthma: An Examination of Exacerbations and Costs	Llanos JP, Ortega H, Bogart M, Packnett ER, Manjelievskaia J, Bell CF, Hahn B.	J Asthma Allergy. 2020 Jan 29;13:77-87. doi: 10.2147/JAA.S236609. eCollection 2020.	https://pubmed.ncbi.nlm.nih.gov/32099413	Exclude	Observational study		1											
Efficacy of mepolizumab treatment in oral corticosteroid-dependent severe eosinophilic asthma patients with chronic rhinosinusitis with nasal polyps: single center, real life study	Yilmaz I, Türk M, Nazik Bahçecioğlu S, Tutar N, Gülmez I.	Turk J Med Sci. 2020 Apr 9;50(2):433-441. doi: 10.3906/sag-1912-62.	https://pubmed.ncbi.nlm.nih.gov/32093447	Exclude	Not RCT		1											
Effect of fixed-dose subcutaneous reslizumab on asthma exacerbations in patients with severe uncontrolled asthma and corticosteroid sparing in patients with oral corticosteroid-dependent asthma: results from two phase 3, randomised, double-blind, placebo-controlled trials	Bernstein JA, Virchow JC, Murphy K, Maspero JF, Jacobs J, Adir Y, Humbert M, Castro M, Marsteller DA, McElhattan J, Hickey L, Garin M, Vanlandingham R, Brusselle G.	Lancet Respir Med. 2020 May;8(5):461-474. doi: 10.1016/S2213-2600(19)30372-8. Epub 2020 Feb 14.	https://pubmed.ncbi.nlm.nih.gov/32066536	Exclude	Not approved mepo dose (already considered)										1			
Adherence to corticosteroids and clinical outcomes in mepolizumab therapy for severe asthma	d'Ancona G, Kavanagh J, Roxas C, Green L, Fernandes M, Thomson L, Dhariwal J, Nanzer AM, Jackson DJ, Kent BD.	Eur Respir J. 2020 May 7;55(5):1902259. doi: 10.1183/13993003.02259-2019. Print 2020 May.	https://pubmed.ncbi.nlm.nih.gov/32060061	Exclude	Observational study		1											
Efficacy and safety of treatment with biologicals (benralizumab, dupilumab, mepolizumab, omalizumab and reslizumab) for severe eosinophilic asthma. A systematic review for the EAACI Guidelines - recommendations on the use of biologicals in severe asthma	Agache I, Beltran J, Akdis C, Akdis M, Canelo-Aybar C, Canonica GW, Casale T, Chivato T, Corren J, Del Giacco S, Eiwegger T, Firinu D, Gern JE, Hamelmann E, Hanania N, Mäkelä M, Hernández-Martín I, Nair P, O'Mahony L, Papadopoulos NG, Papi A, Park HS, Pérez de Llano L, Posso M, Rocha C, Quirce S, Sastre J, Shamji M, Song Y, Steiner C, Schwarze J, Alonso-Coello P, Palomares O, Jutel M.	Allergy. 2020 May;75(5):1023-1042. doi: 10.1111/all.14221. Epub 2020 Feb 24.	https://pubmed.ncbi.nlm.nih.gov/32034960	Exclude	Review		1											
Comparative Efficacy and Safety of Dupilumab and Benralizumab in Patients with Inadequately Controlled Asthma: A Systematic Review	Ando K, Tanaka A, Sagara H.	Int J Mol Sci. 2020 Jan 30;21(3):889. doi: 10.3390/ijms21030889.	https://pubmed.ncbi.nlm.nih.gov/32019141	Exclude	Review		1											
Dupilumab improves lung function in patients with uncontrolled, moderate-to-severe asthma	Castro M, Rabe KF, Corren J, Pavord ID, Katelaris CH, Tohda Y, Zhang B, Rice MS, Maroni J, Rowe P, Pirozzi G, Amin N, Ruddy M, Akinlade B, Graham NMH, Teper A.	ERJ Open Res. 2020 Jan 27;6(1):00204-2019. doi: 10.1183/23120541.00204-2019. eCollection 2020 Jan.	https://pubmed.ncbi.nlm.nih.gov/32010719	Included	Lung function outcomes in QUEST by blood EOS subgroups	1												1
Mepolizumab add-on therapy in a real world cohort of patients with severe eosinophilic asthma: response rate, effectiveness, and safety	van Toor JJ, van der Mark SC, Kappen JH, In 't Veen JCCM, Braunstahl GJ.	J Asthma. 2021 May;58(5):651-658. doi: 10.1080/02770903.2020.1723623. Epub 2020 Feb 12.	https://pubmed.ncbi.nlm.nih.gov/31999203	Exclude	Observational study		1											
The Current State of Biologic Therapies for Treatment of Refractory Asthma	Mavissakalian M, Brady S.	Clin Rev Allergy Immunol. 2020 Oct;59(2):195-207. doi: 10.1007/s12016-020-08776-8.	https://pubmed.ncbi.nlm.nih.gov/31981048	Exclude	Review		1											
Antibodies targeting the interleukin-5 signaling pathway used as add-on therapy for patients with severe eosinophilic asthma: a review of the mechanism of action, efficacy, and safety of the subcutaneously administered agents, mepolizumab and benralizumab	Hillas G, Fouka E, Papaioannou AI.	Expert Rev Respir Med. 2020 Apr;14(4):353-365. doi: 10.1080/17476348.2020.1718495. Epub 2020 Jan 23.	https://pubmed.ncbi.nlm.nih.gov/31958239	Exclude	Review		1											
Effect of Anti-IL5, Anti-IL5R, Anti-IL13 Therapy on Asthma Exacerbations: A Network Meta-analysis	Ramonell RP, Iftikhar IH.	Lung. 2020 Feb;198(1):95-103. doi: 10.1007/s00408-019-00310-8. Epub 2020 Jan 1.	https://pubmed.ncbi.nlm.nih.gov/31894410	Exclude	Meta-analysis			1										
Serum Levels of Epithelial-Derived Cytokines as Interleukin-25 and Thymic Stromal Lymphopoietin after a Single Dose of Mepolizumab in Patients with Severe Non-Allergic Eosinophilic Asthma: A Short Report	Kalinauskaite-Zukauske V, Januskevicius A, Janulaityte I, Miliauskas S, Malakauskas K.	Can Respir J. 2019 Dec 1;2019:8607657. doi: 10.1155/2019/8607657. eCollection 2019.	https://pubmed.ncbi.nlm.nih.gov/31885750	Exclude	Exacerbations not primary/secondary endpoint								1					
The effectiveness of Reslizumab in severe asthma treatment: a real-world experience	Ibrahim H, O'Sullivan R, Casey D, Murphy J, MacSharry J, Plant BJ, Murphy DM.	Respir Res. 2019 Dec 20;20(1):289. doi: 10.1186/s12931-019-1251-3.	https://pubmed.ncbi.nlm.nih.gov/31861993	Exclude	Observational study		1											

Two-year integrated steroid-sparing analysis and safety of benralizumab for severe asthma	Bourdin A, Shaw D, Menzies-Gow A, FitzGerald JM, Bleecker ER, Busse WW, Ferguson GT, Brooks L, Barker P, Gil EG, Martin UJ.	J Asthma. 2021 Apr;58(4):514-522. doi: 10.1080/02770903.2019.1705333. Epub 2019 Dec 26.	https://pubmed.ncbi.nlm.nih.gov/31859541	Exclude	Observational study / OCS reduction		1											
Two-Year Integrated Efficacy And Safety Analysis Of Benralizumab In Severe Asthma	FitzGerald JM, Bleecker ER, Bourdin A, Busse WW, Ferguson GT, Brooks L, Barker P, Martin UJ.	J Asthma Allergy. 2019 Dec 9;12:401-413. doi: 10.2147/JAA.S227170. eCollection 2019.	https://pubmed.ncbi.nlm.nih.gov/31849500	Exclude	Observational study		1											
Ability of Serum IgE Concentration to Predict Exacerbation Risk and Benralizumab Efficacy for Patients with Severe Eosinophilic Asthma	Jackson DJ, Humbert M, Hirsch I, Newbold P, Garcia Gil E.	Adv Ther. 2020 Feb;37(2):718-729. doi: 10.1007/s12325-019-01191-2. Epub 2019 Dec 14.	https://pubmed.ncbi.nlm.nih.gov/31836949	Exclude	Pooled SIROCCO/CALIMA analysis by serum IgE levels / BEC & AAERs												1	1
In search of clinically relevant parameters to monitor successful omalizumab therapy in allergic asthma	Probst M, Gogolka A, Krüll M, Noga O.	Allergol Select. 2019 Sep 1;2(1):49-55. doi: 10.5414/ALX01377E. eCollection 2018.	https://pubmed.ncbi.nlm.nih.gov/31826042	Exclude	Observational study		1											
Effect of omalizumab on lung function and eosinophil levels in adolescents with moderate-to-severe allergic asthma	Busse WW, Humbert M, Haselkorn T, Ortiz B, Trzaskoma BL, Stephenson P, Garcia Conde L, Kianifard F, Holgate ST.	Ann Allergy Asthma Immunol. 2020 Feb;124(2):190-196. doi: 10.1016/j.anai.2019.11.016. Epub 2019 Nov 22.	https://pubmed.ncbi.nlm.nih.gov/31760132	Exclude	Post-hoc pooled analysis of 8 omalizumab trials							1						
Baseline blood eosinophil count as a predictor of treatment response to the licensed dose of mepolizumab in severe eosinophilic asthma	Albers FC, Licskai C, Chanez P, Bratton DJ, Bradford ES, Yancey SW, Kwon N, Quirce S.	Respir Med. 2019 Nov;159:105806. doi: 10.1016/j.rmed.2019.105806. Epub 2019 Nov 3.	https://pubmed.ncbi.nlm.nih.gov/31751853	Exclude	Meta-analysis of MENSA/MUSCA			1										
Eosinophils, the IL-5/IL-5Rα axis, and the biologic effects of benralizumab in severe asthma	Matucci A, Maggi E, Vultaggio A.	Respir Med. 2019 Nov-Dec;160:105819. doi: 10.1016/j.rmed.2019.105819. Epub 2019 Nov 11.	https://pubmed.ncbi.nlm.nih.gov/31734469	Exclude	Review		1											
Dupilumab: A Review in Moderate to Severe Asthma	Deeks ED.	Drugs. 2019 Nov;79(17):1885-1895. doi: 10.1007/s40265-019-01221-x.	https://pubmed.ncbi.nlm.nih.gov/31728838	Exclude	Review		1											
A Review of Respiratory Biologic Agents in Severe Asthma	Johnson N, Varughese B, De La Torre MA, Surani SR, Udeani G.	Cureus. 2019 Sep 18;11(9):e5690. doi: 10.7759/cureus.5690.	https://pubmed.ncbi.nlm.nih.gov/31728232	Exclude	Review		1											
Economic evaluation and budgetary burden of mepolizumab in severe refractory eosinophilic asthma	García-Mochón L, Gil-Sierra MD, Alegre-Del Rey EJ, Alarcón de la Lastra-Romero C, Sánchez-Hidalgo M.	Farm Hosp. 2019 Nov 1;43(6):187-193. doi: 10.7399/fh.11221.	https://pubmed.ncbi.nlm.nih.gov/31705642	Exclude	Cost efficacy analysis		1											
Severe asthma phenotypes in patients controlled with omalizumab: A real-world study	Campo P, Soto Campos G, Aparicio MB, Jorge AM, González Expósito HM, Quirce S, Dávila I.	Respir Med. 2019 Nov;159:105804. doi: 10.1016/j.rmed.2019.105804. Epub 2019 Oct 21.	https://pubmed.ncbi.nlm.nih.gov/31704593	Exclude	Observational study		1											
Reslizumab and mepolizumab for moderate-to-severe poorly controlled asthma: an indirect comparison meta-analysis	Yan K, Balijepalli C, Sharma R, Barakat S, Sun SX, Falcao S, Druyts E, FitzGerald JM.	Immunotherapy. 2019 Dec;11(17):1491-1505. doi: 10.2217/imt-2019-0113. Epub 2019 Nov 5.	https://pubmed.ncbi.nlm.nih.gov/31686556	Exclude	Meta-analysis			1										
Efficacy of Intravenous Reslizumab in Oral Corticosteroid-Dependent Asthma	Nair P, Bardin P, Humbert M, Murphy KR, Hickey L, Garin M, Vanlandingham R, Chanez P.	J Allergy Clin Immunol Pract. 2020 Feb;8(2):555-564. doi: 10.1016/j.jaip.2019.09.036. Epub 2019 Oct 15.	https://pubmed.ncbi.nlm.nih.gov/31626990	Exclude	Post-hoc pooled analysis of dupilumab trials / OCS reduction							1						
Benralizumab efficacy for patients with fixed airflow obstruction and severe, uncontrolled eosinophilic asthma	Chipps BE, Hirsch I, Trudo F, Alacqua M, Zangrilli JG.	Ann Allergy Asthma Immunol. 2020 Jan;124(1):79-86. doi: 10.1016/j.anai.2019.10.006. Epub 2019 Oct 15.	https://pubmed.ncbi.nlm.nih.gov/31626906	Exclude	Pooled SIROCCO/CALIMA post-hoc analysis on FAO							1						
Efficacy of mepolizumab for patients with severe asthma and eosinophilic chronic rhinosinusitis	Numata T, Nakayama K, Utsumi H, Kobayashi K, Yanagisawa H, Hashimoto M, Minagawa S, Ishikawa T, Hara H, Araya J, Kuwano K.	BMC Pulm Med. 2019 Oct 12;19(1):176. doi: 10.1186/s12890-019-0952-1.	https://pubmed.ncbi.nlm.nih.gov/31606052	Exclude	Observational study		1											
Mepolizumab for severe eosinophilic asthma: a real-world snapshot on clinical markers and timing of response	Caminati M, Cegolon L, Vianello A, Chieco Bianchi F, Festi G, Marchi MR, Micheletto C, Mazza F, Tognella S, Senna G.	Expert Rev Respir Med. 2019 Dec;13(12):1205-1212. doi: 10.1080/17476348.2019.1676734. Epub 2019 Oct 16.	https://pubmed.ncbi.nlm.nih.gov/31592700	Exclude	Observational study		1											
Anti-IgE Significantly Changes Circulating Interleukin-25, Vitamin-D and Interleukin-33 Levels in Patients with Allergic Asthma	Yalcin AD, Uzun R.	Curr Pharm Des. 2019;25(35):3784-3795. doi: 10.2174/1381612825666190930095725.	https://pubmed.ncbi.nlm.nih.gov/31566129	Exclude	Exacerbations not primary/secondary endpoint								1					
Dupilumab Efficacy in Patients with Uncontrolled, Moderate-to-Severe Allergic Asthma	Corren J, Castro M, O'Riordan T, Hanania NA, Pavord ID, Quirce S, Chipps BE, Wenzel SE, Thangavelu K, Rice MS, Harel S, Jagerschmidt A, Khan AH, Kamat S, Maroni J, Rowe P, Lu Y, Amin N, Pirozzi G, Ruddy M, Graham NMH, Teper A.	J Allergy Clin Immunol Pract. 2020 Feb;8(2):516-526. doi: 10.1016/j.jaip.2019.08.050. Epub 2019 Sep 12.	https://pubmed.ncbi.nlm.nih.gov/31521831	Exclude	Post-hoc analysis of QUEST patients with/without evidence of allergic asthma											1		1
Efficacy of add-on mepolizumab in adolescents with severe eosinophilic asthma	Yancey SW, Ortega HG, Keene ON, Bradford ES.	Allergy Asthma Clin Immunol. 2019 Sep 3;15:53. doi: 10.1186/s13223-019-0366-x. eCollection 2019.	https://pubmed.ncbi.nlm.nih.gov/31507641	Exclude	Small post-hoc analysis of AAER in adolescents from MENSA/MUSCA											1		1
Subcutaneous mepolizumab in children aged 6 to 11 years with severe eosinophilic asthma	Gupta A, Pouliquen I, Austin D, Price RG, Kempsford R, Steinfeld J, Bradford ES, Yancey SW.	Pediatr Pulmonol. 2019 Dec;54(12):1957-1967. doi: 10.1002/ppul.24508. Epub 2019 Sep 9.	https://pubmed.ncbi.nlm.nih.gov/31502421	Exclude	Not RCT		1											
Anti-interleukin-5 therapy (mepolizumab) in life-threatening asthma attack: A case-based discussion	Tello K, Hoffmann A, Beutel B, Greulich T, Vogelmeier CF, Richter MJ, Kuhnert S, Böselt T, Alter P, Holland A, Idzko M, Buhl R, Koczulla AR.	Respir Med Case Rep. 2019 Aug 22;28:100927. doi: 10.1016/j.rmcr.2019.100927. eCollection 2019.	https://pubmed.ncbi.nlm.nih.gov/31485410	Exclude	Case report(s)		1											
Efficacy and safety of mepolizumab in a real-world cohort of patients with severe eosinophilic asthma	Pertzov B, Unterman A, Shtraichman O, Shitenberg D, Rosengarten D, Kramer MR.	J Asthma. 2021 Jan;58(1):79-84. doi: 10.1080/02770903.2019.1658208. Epub 2019 Sep 3.	https://pubmed.ncbi.nlm.nih.gov/31479312	Exclude	Observational study		1											

Long-term Safety and Clinical Benefit of Mepolizumab in Patients With the Most Severe Eosinophilic Asthma: The COSMEX Study	Khurana S, Brusselle GG, Bel EH, FitzGerald JM, Masoli M, Korn S, Kato M, Albers FC, Bradford ES, Gilson MJ, Price RG, Humbert M.	Clin Ther. 2019 Oct;41(10):2041-2056.e5. doi: 10.1016/j.clinthera.2019.07.007. Epub 2019 Aug 22.	https://pubmed.ncbi.nlm.nih.gov/31447130	Exclude	Extension study				1									
Long-term safety and pharmacodynamics of mepolizumab in children with severe asthma with an eosinophilic phenotype	Gupta A, Ikeda M, Geng B, Azmi J, Price RG, Bradford ES, Yancey SW, Steinfeld J.	J Allergy Clin Immunol. 2019 Nov;144(5):1336-1342.e7. doi: 10.1016/j.jaci.2019.08.005. Epub 2019 Aug 16.	https://pubmed.ncbi.nlm.nih.gov/31425781	Exclude	Extension study				1									
Monoclonal antibodies in type 2 asthma: a systematic review and network meta-analysis	Edris A, De Feyter S, Maes T, Joos G, Lahousse L.	Respir Res. 2019 Aug 8;20(1):179. doi: 10.1186/s12931-019-1138-3.	https://pubmed.ncbi.nlm.nih.gov/31395084	Exclude	Meta-analysis			1										
Mepolizumab reduces exacerbations in patients with severe eosinophilic asthma, irrespective of body weight/body mass index: meta-analysis of MENSA and MUSCA	Albers FC, Papi A, Taillé C, Bratton DJ, Bradford ES, Yancey SW, Kwon N.	Respir Res. 2019 Jul 30;20(1):169. doi: 10.1186/s12931-019-1134-7.	https://pubmed.ncbi.nlm.nih.gov/31362741	Exclude	Post-hoc analysis of AAER + other outcomes in MENSA/MUSCA by BMI/body weight						1							
Real-life rapidity of benralizumab effects in patients with severe allergic eosinophilic asthma: Assessment of blood eosinophils, symptom control, lung function and oral corticosteroid intake after the first drug dose	Pelaia C, Busceti MT, Vatrella A, Rago GF, Crimi C, Terracciano R, Pelaia G.	Pulm Pharmacol Ther. 2019 Oct;58:101830. doi: 10.1016/j.pupt.2019.101830. Epub 2019 Jul 22.	https://pubmed.ncbi.nlm.nih.gov/31344472	Exclude	Observational study		1											
Eosinophils depletion therapy for severe asthma management following favorable response to mepolizumab	Matsuno O, Minamoto S.	Respir Med Case Rep. 2019 Jul 9;28:100899. doi: 10.1016/j.rmcr.2019.100899. eCollection 2019.	https://pubmed.ncbi.nlm.nih.gov/31341763	Exclude	Case report(s)		1											
Effect of intravenously administered reslizumab on spirometric lung age in patients with moderate-to-severe eosinophilic asthma	Carr WW, McDonald M, Meizlik P.	Allergy Asthma Proc. 2019 Jul 1;40(4):240-249. doi: 10.2500/aap.2019.40.4225.	https://pubmed.ncbi.nlm.nih.gov/31262379	Exclude	Post-hoc analysis of reslizumab trials - lung age/AQLQ							1						
Effect of mepolizumab in severe eosinophilic asthma according to omalizumab eligibility	Humbert M, Albers FC, Bratton DJ, Yancey SW, Liu MC, Hozawa S, Llanos JP, Kwon N.	Respir Med. 2019 Jul-Aug;154:69-75. doi: 10.1016/j.rmed.2019.06.004. Epub 2019 Jun 8.	https://pubmed.ncbi.nlm.nih.gov/31220806	Exclude	Meta-analysis			1										
Proportion of Severe Asthma Patients Eligible for Mepolizumab Therapy by Age and Age of Onset of Asthma	Comberiati P, McCormack K, Malka-Rais J, Spahn JD.	J Allergy Clin Immunol Pract. 2019 Nov-Dec;7(8):2689-2696.e2. doi: 10.1016/j.jaip.2019.05.053. Epub 2019 Jun 13.	https://pubmed.ncbi.nlm.nih.gov/31201938	Exclude	Not RCT		1											
Effectiveness and safety of mepolizumab in severe refractory eosinophilic asthma: results in clinical practice	Montero-Pérez O, Contreras-Rey MB, Sánchez-Gómez E.	Drugs Context. 2019 May 27;8:212584. doi: 10.7573/dic.212584. eCollection 2019.	https://pubmed.ncbi.nlm.nih.gov/31191705	Exclude	Observational study		1											
New horizons for the treatment of severe, eosinophilic asthma: benralizumab, a novel precision biologic	Caminati M, Bagnasco D, Vaia R, Senna G.	Biologics. 2019 May 22;13:89-95. doi: 10.2147/BTT.S157183. eCollection 2019.	https://pubmed.ncbi.nlm.nih.gov/31190733	Exclude	Review		1											
Efficacy and Safety of Benralizumab for Korean Patients With Severe, Uncontrolled Eosinophilic Asthma	Park HS, Lee SH, Lee SY, Kim MK, Lee BJ, Werkström V, Barker P, Zangrilli JG.	Allergy Asthma Immunol Res. 2019 Jul;11(4):508-518. doi: 10.4168/aair.2019.11.4.508.	https://pubmed.ncbi.nlm.nih.gov/31172719	Exclude	Korean subgroup study						1							
Adverse events of benralizumab in moderate to severe eosinophilic asthma: A meta-analysis	Liu W, Ma X, Zhou W.	Medicine (Baltimore). 2019 May;98(22):e15868. doi: 10.1097/MD.0000000000015868.	https://pubmed.ncbi.nlm.nih.gov/31145343	Exclude	Meta-analysis			1										
Chitinase-like protein YKL-40 correlates with inflammatory phenotypes, anti-asthma responsiveness and future exacerbations	Liu L, Zhang X, Liu Y, Zhang L, Zheng J, Wang J, Hansbro PM, Wang L, Wang G, Hsu AC.	Respir Res. 2019 May 22;20(1):95. doi: 10.1186/s12931-019-1051-9.	https://pubmed.ncbi.nlm.nih.gov/31113430	Exclude	Not RCT		1											
The clinical benefit of mepolizumab replacing omalizumab in uncontrolled severe eosinophilic asthma	Chapman KR, Albers FC, Chipps B, Muñoz X, Devouassoux G, Bergna M, Galkin D, Azmi J, Mouneimne D, Price RG, Liu MC.	Allergy. 2019 Sep;74(9):1716-1726. doi: 10.1111/all.13850. Epub 2019 Jul 1.	https://pubmed.ncbi.nlm.nih.gov/31049972	Exclude	Observational study		1											
Disease burden and efficacy of mepolizumab in patients with severe asthma and blood eosinophil counts of ≥150-300 cells/µL	Yancey SW, Bradford ES, Keene ON.	Respir Med. 2019 May;151:139-141. doi: 10.1016/j.rmed.2019.04.008. Epub 2019 Apr 8.	https://pubmed.ncbi.nlm.nih.gov/31047111	Included	150-300 EOS subgroups for DREAM, MENSA and MUSCA	1												1
Comparison of Monoclonal Antibodies for Treatment of Uncontrolled Eosinophilic Asthma	Koski RR, Grzegorczyk KM.	J Pharm Pract. 2020 Aug;33(4):513-522. doi: 10.1177/0897190019840597. Epub 2019 May 2.	https://pubmed.ncbi.nlm.nih.gov/31046541	Exclude	Review		1											
Benralizumab: A New Approach for the Treatment of Severe Eosinophilic Asthma	Dávila González I, Moreno Benítez F, Quirce S.	J Investig Allergol Clin Immunol. 2019 Apr;29(2):84-93. doi: 10.18176/jiaci.0385.	https://pubmed.ncbi.nlm.nih.gov/31017107	Exclude	Review		1											
Predictors of reversible airway obstruction with omalizumab in severe asthma: a real-life study	Solidoro P, Patrucco F, de Blasio F, Brussino L, Bellocchia M, Dassetto D, Pivetta E, Riccio A, Heffler E, Canonica W, Rolla G, Bucca C.	Ther Adv Respir Dis. 2019 Jan-Dec;13:1753466619841274. doi: 10.1177/1753466619841274.	https://pubmed.ncbi.nlm.nih.gov/31002021	Exclude	Observational study		1											
Cost-utility analysis of reslizumab for patients with severe eosinophilic asthma inadequately controlled with high-dose inhaled corticosteroids and long-acting β(2)-agonists in South Korea	Han S, Kim S, Kim H, Suh HS.	Curr Med Res Opin. 2019 Sep;35(9):1597-1605. doi: 10.1080/03007995.2019.1605159. Epub 2019 May 16.	https://pubmed.ncbi.nlm.nih.gov/30964365	Exclude	Cost efficacy analysis		1											
Omalizumab as alternative to chronic use of oral corticosteroids in severe asthma	Katsaounou P, Buhl R, Brusselle G, Pfister P, Martínez R, Wahn U, Bousquet J.	Respir Med. 2019 Apr;150:51-62. doi: 10.1016/j.rmed.2019.02.003. Epub 2019 Feb 7.	https://pubmed.ncbi.nlm.nih.gov/30961951	Exclude	Review		1											
Effectiveness of Omalizumab in Severe Allergic Asthma and Nasal Polyposis: A Real-Life Study	Tiotiu A, Oster JP, Roux PR, Nguyen Thi PL, Peiffer G, Bonniaud P, Dalphin JC, de Blay F.	J Investig Allergol Clin Immunol. 2020;30(1):49-57. doi: 10.18176/jiaci.0391. Epub 2019 Apr 1.	https://pubmed.ncbi.nlm.nih.gov/30931917	Exclude	Observational study		1											
Severe uncontrolled asthma with bronchiectasis: a pilot study of an emerging phenotype that responds to mepolizumab	Carpagnano GE, Scioscia G, Lacedonia D, Curradi G, Foschino Barbaro MP.	J Asthma Allergy. 2019 Mar 5;12:83-90. doi: 10.2147/JAA.S196200. eCollection 2019.	https://pubmed.ncbi.nlm.nih.gov/30881051	Exclude	Not RCT		1											
Mepolizumab improves small airway function in severe eosinophilic asthma	Farah CS, Badal T, Reed N, Rogers PG, King GG, Thamrin C, Peters MJ, Seccombe LM.	Respir Med. 2019 Mar;148:49-53. doi: 10.1016/j.rmed.2019.01.016. Epub 2019 Feb 1.	https://pubmed.ncbi.nlm.nih.gov/30827474	Exclude	Observational study		1											

Rapid onset of effect of benralizumab on morning peak expiratory flow in severe, uncontrolled asthma	Chupp G, Lugogo NL, Kline JN, Ferguson GT, Hirsch I, Goldman M, Zangrilli JG, Trudo F.	Ann Allergy Asthma Immunol. 2019 May;122(5):478-485. doi: 10.1016/j.anai.2019.02.016. Epub 2019 Feb 23.	https://pubmed.ncbi.nlm.nih.gov/30802500	Exclude	Analysis on PEF, no EOS subgroup data											1		1
Daily patient-reported health status assessment improvements with benralizumab for patients with severe, uncontrolled eosinophilic asthma	O'Quinn S, Xu X, Hirsch I.	J Asthma Allergy. 2019 Jan 23;12:21-33. doi: 10.2147/JAA.S190221. eCollection 2019.	https://pubmed.ncbi.nlm.nih.gov/30774388	Included	Pooled SIROCCO/CALIMA daily morning/evening PRO assessment by EOS group in high-dose ICS patients	1												1
Efficacy and Safety of Reslizumab in Patients with Severe Asthma with Inadequate Response to Omalizumab: A Multicenter, Open-Label Pilot Study	Pérez de Llano LA, Cosío BG, Domingo C, Urrutia I, Bobolea I, Valero A, Entrenas Costa LM, Quirce S, Barranco P, Marina Malanda N, Andrés LP, Alvarez-Gutiérrez FJ.	J Allergy Clin Immunol Pract. 2019 Sep-Oct;7(7):2277-2283.e2. doi: 10.1016/j.jaip.2019.01.017. Epub 2019 Jan 21.	https://pubmed.ncbi.nlm.nih.gov/30677539	Exclude	Not RCT		1											
Relationship Between Benralizumab Exposure and Efficacy for Patients With Severe Eosinophilic Asthma	Chia YL, Yan L, Yu B, Wang B, Barker P, Goldman M, Roskos L.	Clin Pharmacol Ther. 2019 Aug;106(2):383-390. doi: 10.1002/cpt.1371. Epub 2019 Mar 22.	https://pubmed.ncbi.nlm.nih.gov/30661249	Exclude	Population efficacy modeling study		1											
Efficacy, adverse events, and inter-drug comparison of mepolizumab and reslizumab anti-IL-5 treatments of severe asthma - a systematic review and meta-analysis	Henriksen DP, Bodtger U, Sidenius K, Maltbaek N, Pedersen L, Madsen H, Andersson EA, Norgaard O, Madsen LK, Chawes BL.	Eur Clin Respir J. 2018 Nov 7;5(1):1536097. doi: 10.1080/20018525.2018.1536097. eCollection 2018.	https://pubmed.ncbi.nlm.nih.gov/30533206	Exclude	Review		1											
Anti-IL-5 and IL-5Ra: Efficacy and Safety of New Therapeutic Strategies in Severe Uncontrolled Asthma	Bagnasco D, Caminati M, Ferrando M, Aloè T, Testino E, Canonica GW, Passalacqua G.	Biomed Res Int. 2018 Nov 5;2018:5698212. doi: 10.1155/2018/5698212. eCollection 2018.	https://pubmed.ncbi.nlm.nih.gov/30519580	Exclude	Review		1											
Benralizumab, an add-on treatment for severe eosinophilic asthma: evaluation of exacerbations, emergency department visits, lung function, and oral corticosteroid use	Maselli DJ, Rogers L, Peters JI.	Ther Clin Risk Manag. 2018 Oct 23;14:2059-2068. doi: 10.2147/TCRM.S157171. eCollection 2018.	https://pubmed.ncbi.nlm.nih.gov/30425502	Exclude	Review		1											
A Review of Three New Anti-interleukin-5 Monoclonal Antibody Therapies for Severe Asthma	Agumadu VC, Ramphul K, Mejias SG, Sonaye R, Sombans S, Lohana P.	Cureus. 2018 Aug 27;10(8):e3216. doi: 10.7759/cureus.3216.	https://pubmed.ncbi.nlm.nih.gov/30416896	Exclude	Review		1											
Long-term safety and efficacy of benralizumab in patients with severe, uncontrolled asthma: 1-year results from the BORA phase 3 extension trial	Busse WW, Bleecker ER, FitzGerald JM, Ferguson GT, Barker P, Sproule S, Olsson RF, Martin UJ, Goldman M; BORA study investigators.	Lancet Respir Med. 2019 Jan;7(1):46-59. doi: 10.1016/S2213-2600(18)30406-5. Epub 2018 Nov 8.	https://pubmed.ncbi.nlm.nih.gov/30416083	Exclude	Extension study				1									
Omalizumab lowers asthma exacerbations, oral corticosteroid intake and blood eosinophils: Results of a 5-YEAR single-centre observational study	Pelaia C, Calabrese C, Barbuto S, Busceti MT, Preianò M, Gallelli L, Savino R, Vatrella A, Pelaia G.	Pulm Pharmacol Ther. 2019 Feb;54:25-30. doi: 10.1016/j.pupt.2018.11.002. Epub 2018 Nov 7.	https://pubmed.ncbi.nlm.nih.gov/30414440	Exclude	Observational study		1											
Small, Prospective, Observational, Pilot Study in Patients with Severe Asthma after Discontinuation of Omalizumab Treatment	Krčmová I, Novosad J, Malá E, Krejsek J.	Clin Ther. 2018 Nov;40(11):1942-1953. doi: 10.1016/j.clinthera.2018.09.004. Epub 2018 Nov 1.	https://pubmed.ncbi.nlm.nih.gov/30391022	Exclude	Observational study		1											
Assessment of the long-term safety of mepolizumab and durability of clinical response in patients with severe eosinophilic asthma	Khatri S, Moore W, Gibson PG, Leigh R, Bourdin A, Maspero J, Barros M, Buhl R, Howarth P, Albers FC, Bradford ES, Gilson M, Price RG, Yancey SW, Ortega H.	J Allergy Clin Immunol. 2019 May;143(5):1742-1751.e7. doi: 10.1016/j.jaci.2018.09.033. Epub 2018 Oct 23.	https://pubmed.ncbi.nlm.nih.gov/30359681	Exclude	Extension study				1									
Mepolizumab in the management of severe eosinophilic asthma in adults: current evidence and practical experience	Emma R, Morjaria JB, Fuochi V, Polosa R, Caruso M.	Ther Adv Respir Dis. 2018 Jan-Dec;12:1753466618808490. doi: 10.1177/1753466618808490.	https://pubmed.ncbi.nlm.nih.gov/30354852	Exclude	Review		1											
Predicting Responders to Reslizumab after 16 Weeks of Treatment Using an Algorithm Derived from Clinical Studies of Patients with Severe Eosinophilic Asthma	Bateman ED, Djukanović R, Castro M, Canvin J, Germinaro M, Noble R, Garin M, Buhl R.	Am J Respir Crit Care Med. 2019 Feb 15;199(4):489-495. doi: 10.1164/rccm.201708-1668OC.	https://pubmed.ncbi.nlm.nih.gov/30346831	Exclude	Predicting response to treatment modeling study		1											
Omalizumab Treatment for Atopic Severe Persistant Asthma: A Single-Center, Long-Term, Real-Life Experience with 38 Patients	Türk M, Bahçecioğlu SN, Tutar N, Oymak FS, Gülmez İ, Yılmaz İ.	Turk Thorac J. 2018 Sep 13;19(4):187-192. doi: 10.5152/TurkThoracJ.2018.17109. Print 2018 Oct.	https://pubmed.ncbi.nlm.nih.gov/30322442	Exclude	Observational study		1											
Matching-adjusted indirect comparison of benralizumab versus interleukin-5 inhibitors for the treatment of severe asthma: a systematic review	Bourdin A, Husereau D, Molinari N, Golam S, Siddiqui MK, Lindner L, Xu X.	Eur Respir J. 2018 Nov 29;52(5):1801393. doi: 10.1183/13993003.01393-2018. Print 2018 Nov.	https://pubmed.ncbi.nlm.nih.gov/30309978	Exclude	Review		1											
Real-life evaluation of the clinical, functional, and hematological effects of mepolizumab in patients with severe eosinophilic asthma: Results of a single-centre observational study	Pelaia C, Busceti MT, Solinas S, Terracciano R, Pelaia G.	Pulm Pharmacol Ther. 2018 Dec;53:1-5. doi: 10.1016/j.pupt.2018.09.006. Epub 2018 Sep 11.	https://pubmed.ncbi.nlm.nih.gov/30217438	Exclude	Observational study		1											
Anti-IL-5 treatments in patients with severe asthma by blood eosinophil thresholds: Indirect treatment comparison	Busse W, Chupp G, Nagase H, Albers FC, Doyle S, Shen Q, Bratton DJ, Gunsoy NB.	J Allergy Clin Immunol. 2019 Jan;143(1):190-200.e20. doi: 10.1016/j.jaci.2018.08.031. Epub 2018 Sep 8.	https://pubmed.ncbi.nlm.nih.gov/30205189	Exclude	Review		1											
Effects of Reslizumab on Asthma Outcomes in a Subgroup of Eosinophilic Asthma Patients with Self-Reported Chronic Rhinosinusitis with Nasal Polyps	Weinstein SF, Katial RK, Bardin P, Korn S, McDonald M, Garin M, Bateman ED, Hoyte FCL, Germinaro M.	J Allergy Clin Immunol Pract. 2019 Feb;7(2):589-596.e3. doi: 10.1016/j.jaip.2018.08.021. Epub 2018 Sep 5.	https://pubmed.ncbi.nlm.nih.gov/30193936	Exclude	Not EOS subgroups		1											
Anti-IL-5 in Mild Asthma Alters Rhinovirus-induced Macrophage, B-Cell, and Neutrophil Responses (MATERIAL). A Placebo-controlled, Double-Blind Study	Sabogal Piñeros YS, Bal SM, van de Pol MA, Dierdorp BS, Dekker T, Dijkhuis A, Brinkman P, van der Sluijs KF, Zwinderman AH, Majoor CJ, Bonta PI, Ravanetti L, Sterk PJ, Lutter R.	Am J Respir Crit Care Med. 2019 Feb 15;199(4):508-517. doi: 10.1164/rccm.201803-0461OC.	https://pubmed.ncbi.nlm.nih.gov/30192638	Exclude	Not relevant - mild asthma							1						
Impact of reslizumab on outcomes of severe asthmatic patients: current perspectives	Padilla Galo A, Labor M, Tiotiu A, Baiardini I, Scichilone N, Braido F.	Patient Relat Outcome Meas. 2018 Aug 17;9:267-273. doi: 10.2147/PROM.S146966. eCollection 2018.	https://pubmed.ncbi.nlm.nih.gov/30147386	Exclude	Review		1											
Baseline patient factors impact on the clinical efficacy of benralizumab for severe asthma	Bleecker ER, Wechsler ME, FitzGerald JM, Menzies-Gow A, Wu Y, Hirsch I, Goldman M, Newbold P, Zangrilli JG.	Eur Respir J. 2018 Oct 18;52(4):1800936. doi: 10.1183/13993003.00936-2018. Print 2018 Oct.	https://pubmed.ncbi.nlm.nih.gov/30139780	Exclude	Pooled analysis of SIROCCO/CALIMA already extracted to spreadsheet - already have data for individual studies												1	1

Seasonal variability of exacerbations of severe, uncontrolled eosinophilic asthma and clinical benefits of benralizumab	DuBuske L, Newbold P, Wu Y, Trudo F.	Allergy Asthma Proc. 2018 Sep 4;39(5):345-349. doi: 10.2500/aap.2018.39.4162. Epub 2018 Aug 4.	https://pubmed.ncbi.nlm.nih.gov/30077185	Exclude	Post-hoc analysis - AAER across seasons											1	1
Pharmacoeconomic Review Report: Benralizumab (Fasenra): (AstraZeneca Canada Inc.): Indication: An add-on maintenance treatment of adult patients with severe eosinophilic asthma		Ottawa (ON): Canadian Agency for Drugs and Technologies in Health; 2018 Aug.	https://pubmed.ncbi.nlm.nih.gov/31141326	Exclude	Review		1										
Anti-IL-5 therapy in patients with severe eosinophilic asthma - clinical efficacy and possible criteria for treatment response	Drick N, Seeliger B, Welte T, Fuge J, Suhling H.	BMC Pulm Med. 2018 Jul 18;18(1):119. doi: 10.1186/s12890-018-0689-2.	https://pubmed.ncbi.nlm.nih.gov/30021546	Exclude	Observational study		1										
A cost-effectiveness analysis of reslizumab in the treatment of poorly controlled eosinophilic asthma	Lam J, Hay JW, Salcedo J, Kenyon NJ.	J Asthma. 2019 Aug;56(8):872-881. doi: 10.1080/02770903.2018.1500584. Epub 2018 Aug 29.	https://pubmed.ncbi.nlm.nih.gov/30003833	Exclude	Cost efficacy analysis		1										
Benralizumab for the add-on maintenance treatment of patients with severe asthma aged 12 years and older with an eosinophilic phenotype	Al Efraij K, FitzGerald JM.	Expert Rev Clin Pharmacol. 2018 Jul;11(7):669-676. doi: 10.1080/17512433.2018.1496819. Epub 2018 Jul 11.	https://pubmed.ncbi.nlm.nih.gov/29972739	Exclude	Review		1										
Prospective Open-Label Study of 48-Week Subcutaneous Administration of Mepolizumab in Japanese Patients With Severe Eosinophilic Asthma	Kurosawa M, Sutoh E.	J Investig Allergol Clin Immunol. 2019;29(1):40-45. doi: 10.18176/jiaci.0285. Epub 2018 Jun 29.	https://pubmed.ncbi.nlm.nih.gov/29957591	Exclude	Japanese subgroup study						1						
Rapid and Consistent Improvements in Morning PEF in Patients with Severe Eosinophilic Asthma Treated with Mepolizumab	Ortega H, Menzies-Gow A, Llanos JP, Forshag M, Albers F, Gunsoy N, Bradford ES, Yancey SW, Kraft M.	Adv Ther. 2018 Jul;35(7):1059-1068. doi: 10.1007/s12325-018-0727-8. Epub 2018 Jun 15.	https://pubmed.ncbi.nlm.nih.gov/29949045	Exclude	Meta-analysis so exclude (reason given as no eligible data)										1		1
Prevalence of Patients Eligible for Anti-IL-5 Treatment in a Cohort of Adult-Onset Asthma	Ilmarinen P, Tuomisto LE, Niemelä O, Kankaanranta H.	J Allergy Clin Immunol Pract. 2019 Jan;7(1):165-174.e4. doi: 10.1016/j.jaip.2018.05.032. Epub 2018 Jun 9.	https://pubmed.ncbi.nlm.nih.gov/29894793	Exclude	Not RCT		1										
Dupilumab Efficacy and Safety in Moderate-to-Severe Uncontrolled Asthma	Castro M, Corren J, Pavord ID, Maspero J, Wenzel S, Rabe KF, Busse WW, Ford L, Sher L, FitzGerald JM, Katelaris C, Tohda Y, Zhang B, Staudinger H, Pirozzi G, Amin N, Ruddy M, Akinlade B, Khan A, Chao J, Martincova R, Graham NMH, Hamilton JD, Swanson BN, Stahl N, Yancopoulos GD, Teper A.	N Engl J Med. 2018 Jun 28;378(26):2486-2496. doi: 10.1056/NEJMoa1804092. Epub 2018 May 21.	https://pubmed.ncbi.nlm.nih.gov/29782217	Included	LIBERTY ASTHMA QUEST study	1											1
Update on new biologics for intractable eosinophilic asthma: impact of reslizumab	Sahota J, Robinson DS.	Drug Des Devel Ther. 2018 May 8;12:1173-1181. doi: 10.2147/DDDT.S109489. eCollection 2018.	https://pubmed.ncbi.nlm.nih.gov/29780238	Exclude	Review		1										
Case study: A Combination of Mepolizumab and Omaluzimab injections for severe asthma	Dedaj R, Unsel L.	J Asthma. 2019 May;56(5):473-474. doi: 10.1080/02770903.2018.1471706. Epub 2018 Oct 25.	https://pubmed.ncbi.nlm.nih.gov/29733738	Exclude	Case report(s)		1										
Reslizumab for Treating Asthma with Elevated Blood Eosinophils Inadequately Controlled by Inhaled Corticosteroids: An Evidence Review Group Perspective of a NICE Single Technology Appraisal	Cooper K, Frampton G, Harris P, Rose M, Chorozoglou M, Pickett K.	Pharmacoeconomics. 2018 May;36(5):545-553. doi: 10.1007/s40273-017-0608-z.	https://pubmed.ncbi.nlm.nih.gov/29582406	Exclude	Review		1										
Omalizumab effectiveness in patients with severe allergic asthma according to blood eosinophil count: the STELLAIR study	Humbert M, Taillé C, Mala L, Le Gros V, Just J, Molimard M; STELLAIR investigators.	Eur Respir J. 2018 May 10;51(5):1702523. doi: 10.1183/13993003.02523-2017. Print 2018 May.	https://pubmed.ncbi.nlm.nih.gov/29545284	Exclude	Observational study		1										
Benralizumab for the treatment of asthma	Matera MG, Rogliani P, Calzetta L, Canonica GW, Cazzola M.	Drugs Today (Barc). 2017 Dec;53(12):633-645. doi: 10.1358/dot.2017.53.12.2736670.	https://pubmed.ncbi.nlm.nih.gov/29517082	Exclude	Review		1										
Safety of humanized monoclonal antibodies against IL-5 in asthma: focus on reslizumab	Cazzola M, Matera MG, Levi-Schaffer F, Rogliani P.	Expert Opin Drug Saf. 2018 Apr;17(4):429-435. doi: 10.1080/14740338.2018.1446940. Epub 2018 Mar 8.	https://pubmed.ncbi.nlm.nih.gov/29486600	Exclude	Review		1										
Therapeutic Effect of Omalizumab in Severe Asthma: A Real-World Study in Korea	Lee JH, Lee HY, Jung CG, Ban GY, Shin YS, Ye YM, Nahm DH, Park HS.	Allergy Asthma Immunol Res. 2018 Mar;10(2):121-130. doi: 10.4168/aair.2018.10.2.121.	https://pubmed.ncbi.nlm.nih.gov/29411552	Exclude	Real-world study		1										
Benralizumab efficacy by atopy status and serum immunoglobulin E for patients with severe, uncontrolled asthma	Chipps BE, Newbold P, Hirsch I, Trudo F, Goldman M.	Ann Allergy Asthma Immunol. 2018 May;120(5):504-511.e4. doi: 10.1016/j.anai.2018.01.030. Epub 2018 Feb 1.	https://pubmed.ncbi.nlm.nih.gov/29409951	Exclude	Pooled analysis by atopic status/serum IgE						1						
Benralizumab: an anti-IL-5 receptor α monoclonal antibody in the treatment of asthma	Kupczyk M, Kuna P.	Immunotherapy. 2018 Apr;10(5):349-359. doi: 10.2217/imt-2017-0161. Epub 2018 Jan 23.	https://pubmed.ncbi.nlm.nih.gov/29359607	Exclude	Review		1										
Evaluation of Potential Continuation Rules for Mepolizumab Treatment of Severe Eosinophilic Asthma	Gunsoy NB, Cockle SM, Yancey SW, Keene ON, Bradford ES, Albers FC, Pavord ID.	J Allergy Clin Immunol Pract. 2018 May-Jun;6(3):874-882.e4. doi: 10.1016/j.jaip.2017.11.026. Epub 2017 Dec 16.	https://pubmed.ncbi.nlm.nih.gov/29258789	Exclude	Post-hoc analysis of continuation rules										1		1
No genetic association detected with mepolizumab efficacy in severe asthma	Condreay L, Chiano M, Ortega H, Buchan N, Harris E, Bleecker ER, Thompson PJ, Humbert M, Gibson P, Yancey S, Ghosh S.	Respir Med. 2017 Nov;132:178-180. doi: 10.1016/j.rmed.2017.10.019. Epub 2017 Oct 26.	https://pubmed.ncbi.nlm.nih.gov/29229094	Exclude	Post-hoc analysis of genetic markers						1						
Efficacy and safety of benralizumab for eosinophilic asthma: A systematic review and meta-analysis of randomized controlled trials	Tian BP, Zhang GS, Lou J, Zhou HB, Cui W.	J Asthma. 2018 Sep;55(9):956-965. doi: 10.1080/02770903.2017.1379534. Epub 2017 Dec 6.	https://pubmed.ncbi.nlm.nih.gov/29211545	Exclude	Meta-analysis			1									

Near-fatal asthma responsive to mepolizumab after failure of omalizumab and bronchial thermoplasty	Menzella F, Galeone C, Lusuardi M, Simonazzi A, Castagnetti C, Ruggiero P, Facciolongo N.	Ther Clin Risk Manag. 2017 Nov 8;13:1489-1493. doi: 10.2147/TCRM.S149775. eCollection 2017.	https://pubmed.ncbi.nlm.nih.gov/29184413	Exclude	Case report(s)		1											
Pharmacokinetic drug evaluation of mepolizumab for the treatment of severe asthma associated with persistent eosinophilic inflammation in adults	Kallur L, Gonzalez-Estrada A, Eidelman F, Dimov V.	Expert Opin Drug Metab Toxicol. 2017 Dec;13(12):1275-1280. doi: 10.1080/17425255.2017.1406919.	https://pubmed.ncbi.nlm.nih.gov/29157020	Exclude	Review		1											
Efficacy and safety of benralizumab in Japanese patients with severe, uncontrolled eosinophilic asthma	Ohta K, Adachi M, Tohda Y, Kamei T, Kato M, Mark Fitzgerald J, Takanuma M, Kakuno T, Imai N, Wu Y, Aurivillius M, Goldman M.	Allergol Int. 2018 Apr;67(2):266-272. doi: 10.1016/j.alit.2017.10.004. Epub 2017 Nov 8.	https://pubmed.ncbi.nlm.nih.gov/29128192	Exclude	Japanese subgroup study							1						
Long-term Safety and Efficacy of Reslizumab in Patients with Eosinophilic Asthma	Murphy K, Jacobs J, Bjermer L, Fahrenholz JM, Shalit Y, Garin M, Zangrilli J, Castro M.	J Allergy Clin Immunol Pract. 2017 Nov-Dec;5(6):1572-1581.e3. doi: 10.1016/j.jaip.2017.08.024.	https://pubmed.ncbi.nlm.nih.gov/29122156	Exclude	Extension study				1									
Baseline asthma burden, comorbidities, and biomarkers in omalizumab-treated patients in PROSPERO	Chipps BE, Zeiger RS, Luskin AT, Busse WW, Trzaskoma BL, Antonova EN, Pazwash H, Limb SL, Solari PG, Griffin NM, Casale TB.	Ann Allergy Asthma Immunol. 2017 Dec;119(6):524-532.e2. doi: 10.1016/j.anai.2017.09.056. Epub 2017 Oct 18.	https://pubmed.ncbi.nlm.nih.gov/29054589	Exclude	Observational study		1											
Response to omalizumab in patients with severe allergic asthma: A real-life study	Zierau L, Walsted ES, Thomsen SF, Backer V.	Respir Med. 2017 Oct;131:109-113. doi: 10.1016/j.rmed.2017.08.011. Epub 2017 Aug 12.	https://pubmed.ncbi.nlm.nih.gov/28947015	Exclude	Observational study		1											
Anti-IL5 therapies for asthma	Farne HA, Wilson A, Powell C, Bax L, Milan SJ.	Cochrane Database Syst Rev. 2017 Sep 21;9(9):CD010834. doi: 10.1002/14651858.CD010834.pub3.	https://pubmed.ncbi.nlm.nih.gov/28933516	Exclude	Review		1											
Mepolizumab for Treating Severe Eosinophilic Asthma: An Evidence Review Group Perspective of a NICE Single Technology Appraisal	Bermejo I, Stevenson M, Cooper K, Harnan S, Hamilton J, Clowes M, Carroll C, Harrison T, Saha S.	Pharmacoeconomics. 2018 Feb;36(2):131-144. doi: 10.1007/s40273-017-0571-8.	https://pubmed.ncbi.nlm.nih.gov/28933002	Exclude	Review		1											
Predictors of enhanced response with benralizumab for patients with severe asthma: pooled analysis of the SIROCCO and CALIMA studies	FitzGerald JM, Bleecker ER, Menzies-Gow A, Zangrilli JG, Hirsch I, Metcalfe P, Newbold P, Goldman M.	Lancet Respir Med. 2018 Jan;6(1):51-64. doi: 10.1016/S2213-2600(17)30344-2. Epub 2017 Sep 11.	https://pubmed.ncbi.nlm.nih.gov/28919200	Included	Pooled analysis SIROCCO/CALIMA by EOS subgroups	1												1
Weight-adjusted Intravenous Reslizumab in Severe Asthma with Inadequate Response to Fixed-Dose Subcutaneous Mepolizumab	Mukherjee M, Aleman Paramo F, Kjarsgaard M, Salter B, Nair G, LaVigne N, Radford K, Sehmi R, Nair P.	Am J Respir Crit Care Med. 2018 Jan 1;197(1):38-46. doi: 10.1164/rccm.201707-1323OC.	https://pubmed.ncbi.nlm.nih.gov/28915080	Exclude	Comparative dosing study										1			
Anti-Interleukin 5 (IL-5) and IL-5Ra Biological Drugs: Efficacy, Safety, and Future Perspectives in Severe Eosinophilic Asthma	Bagnasco D, Ferrando M, Varricchi G, Puggioni F, Passalacqua G, Canonica GW.	Front Med (Lausanne). 2017 Aug 31;4:135. doi: 10.3389/fmed.2017.00135. eCollection 2017.	https://pubmed.ncbi.nlm.nih.gov/28913336	Exclude	Review		1											
Tezepelumab in Adults with Uncontrolled Asthma	Corren J, Parnes JR, Wang L, Mo M, Roseti SL, Griffiths JM, van der Merwe R.	N Engl J Med. 2017 Sep 7;377(10):936-946. doi: 10.1056/NEJMoa1704064.	https://pubmed.ncbi.nlm.nih.gov/28877011	Included	PATHWAY study	1												1
Mepolizumab Attenuates Airway Eosinophil Numbers, but Not Their Functional Phenotype, in Asthma	Kelly EA, Esnault S, Liu LY, Evans MD, Johansson MW, Mathur S, Mosher DF, Denlinger LC, Jarjour NN.	Am J Respir Crit Care Med. 2017 Dec 1;196(11):1385-1395. doi: 10.1164/rccm.201611-2234OC.	https://pubmed.ncbi.nlm.nih.gov/28862877	Exclude	Not RCT		1											
Response to omalizumab using patient enrichment criteria from trials of novel biologics in asthma	Casale TB, Chipps BE, Rosén K, Trzaskoma B, Haselkorn T, Omachi TA, Greenberg S, Hanania NA.	Allergy. 2018 Feb;73(2):490-497. doi: 10.1111/all.13302. Epub 2017 Sep 23.	https://pubmed.ncbi.nlm.nih.gov/28859263	Exclude	Post-hoc analysis of pooled omalizumab trials / allergic asthma							1						
Stratification of eosinophilic asthma patients treated with reslizumab and GINA Step 4 or 5 therapy	Brusselle G, Canvin J, Weiss S, Sun SX, Buhl R.	ERJ Open Res. 2017 Aug 17;3(3):00004-2017. doi: 10.1183/23120541.00004-2017. eCollection 2017 Jul.	https://pubmed.ncbi.nlm.nih.gov/28845430	Exclude	Post-hoc analysis of pooled reslizumab trials & patients treated as per GINA steps 4/5 as subgroups												1	1
Pharmacokinetic/pharmacodynamic drug evaluation of benralizumab for the treatment of asthma	Matera MG, Calzetta L, Rinaldi B, Cazzola M.	Expert Opin Drug Metab Toxicol. 2017 Sep;13(9):1007-1013. doi: 10.1080/17425255.2017.1359253. Epub 2017 Jul 24.	https://pubmed.ncbi.nlm.nih.gov/28737051	Exclude	Review		1											
Patient profiles and clinical utility of mepolizumab in severe eosinophilic asthma	Haldar P.	Biologics. 2017 Jun 27;11:81-95. doi: 10.2147/BTT.S93954. eCollection 2017.	https://pubmed.ncbi.nlm.nih.gov/28721009	Exclude	Review		1											
Biologic Therapy and Novel Molecular Targets of Severe Asthma	Pepper AN, Renz H, Casale TB, Garn H.	J Allergy Clin Immunol Pract. 2017 Jul-Aug;5(4):909-916. doi: 10.1016/j.jaip.2017.04.038.	https://pubmed.ncbi.nlm.nih.gov/28689841	Exclude	Review		1											
Reslizumab in the treatment of inadequately controlled asthma in adults and adolescents with elevated blood eosinophils: clinical trial evidence and future prospects	Máspero J.	Ther Adv Respir Dis. 2017 Aug;11(8):311-325. doi: 10.1177/1753465817717134. Epub 2017 Jul 6.	https://pubmed.ncbi.nlm.nih.gov/28683596	Exclude	Review		1											
Mepolizumab for the treatment of severe eosinophilic asthma	Poulakos MN, Cargill SM, Waineo MF, Wolford AL Jr.	Am J Health Syst Pharm. 2017 Jul 1;74(13):963-969. doi: 10.2146/ajhp160291.	https://pubmed.ncbi.nlm.nih.gov/28645995	Exclude	Review		1											
The association between blood eosinophil count and benralizumab efficacy for patients with severe, uncontrolled asthma: subanalyses of the Phase III SIROCCO and CALIMA studies	Goldman M, Hirsch I, Zangrilli JG, Newbold P, Xu X.	Curr Med Res Opin. 2017 Sep;33(9):1605-1613. doi: 10.1080/03007995.2017.1347091. Epub 2017 Jul 19.	https://pubmed.ncbi.nlm.nih.gov/28644104	Included	Goldman SIROCCO/CALIMA 150 EOS subgroup outcomes	1												1
Benralizumab for patients with mild to moderate, persistent asthma (BISE): a randomised, double-blind, placebo-controlled, phase 3 trial	Ferguson GT, FitzGerald JM, Bleecker ER, Laviolette M, Bernstein D, LaForce C, Mansfield L, Barker P, Wu Y, Jison M, Goldman M; BISE Study Investigators.	Lancet Respir Med. 2017 Jul;5(7):568-576. doi: 10.1016/S2213-2600(17)30190-X. Epub 2017 May 22.	https://pubmed.ncbi.nlm.nih.gov/28545978	Exclude	Wrong population - mild to moderate asthma							1						

Predictors of response to therapy with omalizumab in patients with severe allergic asthma - a real life study	Kallieri M, Papaioannou AI, Papathanasiou E, Ntontsi P, Papiris S, Loukides S.	Postgrad Med. 2017 Aug;129(6):598-604. doi: 10.1080/00325481.2017.1321945. Epub 2017 Apr 28.	https://pubmed.ncbi.nlm.nih.gov/28427296	Exclude	Observational study		1											
Reslizumab in Eosinophilic Asthma: A Review	Deeks ED, Brusselle G.	Drugs. 2017 May;77(7):777-784. doi: 10.1007/s40265-017-0740-2.	https://pubmed.ncbi.nlm.nih.gov/28421429	Exclude	Review		1											
Efficacy of mepolizumab add-on therapy on health-related quality of life and markers of asthma control in severe eosinophilic asthma (MUSCA): a randomised, double-blind, placebo-controlled, parallel-group, multicentre, phase 3b trial	Chupp GL, Bradford ES, Albers FC, Bratton DJ, Wang-Jairaj J, Nelsen LM, Trevor JL, Magnan A, Ten Brinke A.	Lancet Respir Med. 2017 May;5(5):390-400. doi: 10.1016/S2213-2600(17)30125-X. Epub 2017 Apr 5.	https://pubmed.ncbi.nlm.nih.gov/28395936	Included	MUSCA study	1												1
Reslizumab and Eosinophilic Asthma: One Step Closer to Precision Medicine?	Varricchi G, Senna G, Loffredo S, Bagnasco D, Ferrando M, Canonica GW.	Front Immunol. 2017 Mar 10;8:242. doi: 10.3389/fimmu.2017.00242. eCollection 2017.	https://pubmed.ncbi.nlm.nih.gov/28344579	Exclude	Review		1											
Longterm clinical outcomes of omalizumab therapy in severe allergic asthma: Study of efficacy and safety	Mansur AH, Srivastava S, Mitchell V, Sullivan J, Kasujee I.	Respir Med. 2017 Mar;124:36-43. doi: 10.1016/j.rmed.2017.01.008. Epub 2017 Jan 25.	https://pubmed.ncbi.nlm.nih.gov/28284319	Exclude	Observational study		1											
Economic analysis of the phase III MENSA study evaluating mepolizumab for severe asthma with eosinophilic phenotype	Basu A, Dalal A, Canonica GW, Forshag M, Yancey SW, Nagar S, Bell CF.	Expert Rev Pharmacoecon Outcomes Res. 2017 Apr;17(2):121-131. doi: 10.1080/14737167.2017.1298444. Epub 2017 Mar 17.	https://pubmed.ncbi.nlm.nih.gov/28277854	Exclude	Cost efficacy analysis		1											
Reslizumab in patients with inadequately controlled late-onset asthma and elevated blood eosinophils	Brusselle G, Germinaro M, Weiss S, Zangrilli J.	Pulm Pharmacol Ther. 2017 Apr;43:39-45. doi: 10.1016/j.pupt.2017.01.011. Epub 2017 Jan 31.	https://pubmed.ncbi.nlm.nih.gov/28159511	Exclude	Meta-analysis			1										
Comparative effectiveness of mepolizumab and omalizumab in severe asthma: An indirect treatment comparison	Cockle SM, Stynes G, Gunsoy NB, Parks D, Alfonso-Cristancho R, Wex J, Bradford ES, Albers FC, Willson J.	Respir Med. 2017 Feb;123:140-148. doi: 10.1016/j.rmed.2016.12.009. Epub 2016 Dec 21.	https://pubmed.ncbi.nlm.nih.gov/28137490	Exclude	Review		1											
Efficacy and safety of mepolizumab in Japanese patients with severe eosinophilic asthma	Shimoda T, Odajima H, Okamasa A, Kawase M, Komatsubara M, Mayer B, Yancey S, Ortega H.	Allergol Int. 2017 Jul;66(3):445-451. doi: 10.1016/j.alit.2016.11.006. Epub 2017 Jan 16.	https://pubmed.ncbi.nlm.nih.gov/28110896	Exclude	Japanese subgroup study							1						
Assessing the value of mepolizumab for severe eosinophilic asthma: a cost-effectiveness analysis	Whittington MD, McQueen RB, Ollendorf DA, Tice JA, Chapman RH, Pearson SD, Campbell JD.	Ann Allergy Asthma Immunol. 2017 Feb;118(2):220-225. doi: 10.1016/j.anai.2016.10.028. Epub 2016 Dec 4.	https://pubmed.ncbi.nlm.nih.gov/27923549	Exclude	Cost efficacy analysis		1											
Comparison of anti-interleukin-5 therapies in patients with severe asthma: global and indirect meta-analyses of randomized placebo-controlled trials	Cabon Y, Molinari N, Marin G, Vachier I, Gamez AS, Chanez P, Bourdin A.	Clin Exp Allergy. 2017 Jan;47(1):129-138. doi: 10.1111/cea.12853. Epub 2016 Dec 8.	https://pubmed.ncbi.nlm.nih.gov/27859832	Exclude	Review		1											
Mepolizumab in the management of severe eosinophilic asthma in adults: current evidence and practical experience	Varricchi G, Bagnasco D, Ferrando M, Puggioni F, Passalacqua G, Canonica GW.	Ther Adv Respir Dis. 2017 Jan;11(1):40-45. doi: 10.1177/1753465816673303. Epub 2016 Nov 17.	https://pubmed.ncbi.nlm.nih.gov/27856823	Exclude	Review		1											
Severe asthma: anti-IgE or anti-IL-5?	Papathanassiou E, Loukides S, Bakakos P.	Eur Clin Respir J. 2016 Nov 7;3:31813. doi: 10.3402/ecrj.v3.31813. eCollection 2016.	https://pubmed.ncbi.nlm.nih.gov/27834175	Exclude	Review		1											
Mepolizumab for severe refractory eosinophilic asthma: evidence to date and clinical potential	Menzella F, Lusuardi M, Galeone C, Taddei S, Facciolongo N, Zucchi L.	Ther Adv Chronic Dis. 2016 Nov;7(6):260-277. doi: 10.1177/2040622316659863. Epub 2016 Aug 11.	https://pubmed.ncbi.nlm.nih.gov/27803792	Exclude	Review		1											
Monoclonal antibody therapy for the treatment of asthma and chronic obstructive pulmonary disease with eosinophilic inflammation	Nixon J, Newbold P, Mustelin T, Anderson GP, Kolbeck R.	Pharmacol Ther. 2017 Jan;169:57-77. doi: 10.1016/j.pharmthera.2016.10.016. Epub 2016 Oct 20.	https://pubmed.ncbi.nlm.nih.gov/27773786	Exclude	Review		1											
Novel targets of omalizumab in asthma	Sattler C, Garcia G, Humbert M.	Curr Opin Pulm Med. 2017 Jan;23(1):56-61. doi: 10.1097/MCP.0000000000000340.	https://pubmed.ncbi.nlm.nih.gov/27798419	Exclude	Review		1											
Meta-analysis of asthma-related hospitalization in mepolizumab studies of severe eosinophilic asthma	Yancey SW, Ortega HG, Keene ON, Mayer B, Gunsoy NB, Brightling CE, Bleecker ER, Haldar P, Pavord ID.	J Allergy Clin Immunol. 2017 Apr;139(4):1167-1175.e2. doi: 10.1016/j.jaci.2016.08.008. Epub 2016 Oct 7.	https://pubmed.ncbi.nlm.nih.gov/27726946	Exclude	Meta-analysis			1										
An early innate response underlies severe influenza-induced exacerbations of asthma in a novel steroid-insensitive and anti-IL-5-responsive mouse model	Ravanetti L, Dijkhuis A, Sabogal Pineros YS, Bal SM, Dierdorp BS, Dekker T, Logiantara A, Adcock IM, Rao NL, Boon L, Villetti G, Sterk PJ, Facchinetti F, Lutter R; U-BIOPRED Study Group.	Allergy. 2017 May;72(5):737-753. doi: 10.1111/all.13057. Epub 2016 Nov 10.	https://pubmed.ncbi.nlm.nih.gov/27696462	Exclude	Not in humans - animal model study		1											
A Critical Evaluation of Anti-IL-13 and Anti-IL-4 Strategies in Severe Asthma	Bagnasco D, Ferrando M, Varricchi G, Passalacqua G, Canonica GW.	Int Arch Allergy Immunol. 2016;170(2):122-31. doi: 10.1159/000447692. Epub 2016 Aug 3.	https://pubmed.ncbi.nlm.nih.gov/27637004	Exclude	Review		1											
Reslizumab in the management of poorly controlled asthma: the data so far	Maselli DJ, Velez MI, Rogers L.	J Asthma Allergy. 2016 Aug 31;9:155-62. doi: 10.2147/JAA.S94164. eCollection 2016.	https://pubmed.ncbi.nlm.nih.gov/27621657	Exclude	Review		1											
Efficacy and safety of benralizumab for patients with severe asthma uncontrolled with high-dosage inhaled corticosteroids and long-acting β(2)-agonists (SIROCCO): a randomised, multicentre, placebo-controlled phase 3 trial	Bleecker ER, FitzGerald JM, Chanez P, Papi A, Weinstein SF, Barker P, Sproule S, Gilmartin G, Aurivillius M, Werkström V, Goldman M; SIROCCO study investigators.	Lancet. 2016 Oct 29;388(10056):2115-2127. doi: 10.1016/S0140-6736(16)31324-1. Epub 2016 Sep 5.	https://pubmed.ncbi.nlm.nih.gov/27609408	Included	SIROCCO study	1												1
Benralizumab, an anti-interleukin-5 receptor α monoclonal antibody, as add-on treatment for patients with severe, uncontrolled, eosinophilic asthma (CALIMA): a randomised, double-blind, placebo-controlled phase 3 trial	FitzGerald JM, Bleecker ER, Nair P, Korn S, Ohta K, Lommatzsch M, Ferguson GT, Busse WW, Barker P, Sproule S, Gilmartin G, Werkström V, Aurivillius M, Goldman M; CALIMA study investigators.	Lancet. 2016 Oct 29;388(10056):2128-2141. doi: 10.1016/S0140-6736(16)31322-8. Epub 2016 Sep 5.	https://pubmed.ncbi.nlm.nih.gov/27609406	Included	CALIMA study	1												1
Long-term Efficacy and Safety of Mepolizumab in Patients With Severe Eosinophilic Asthma: A Multi-center, Open-label, Phase IIIb Study	Lugogo N, Domingo C, Chanez P, Leigh R, Gilson MJ, Price RG, Yancey SW, Ortega HG.	Clin Ther. 2016 Sep;38(9):2058-2070.e1. doi: 10.1016/j.clinthera.2016.07.010. Epub 2016 Aug 21.	https://pubmed.ncbi.nlm.nih.gov/27553751	Exclude	Extension study				1									

Reslizumab: Maintenance treatment for eosinophilic asthma inadequately controlled on corticosteroids	Paton DM.	Drugs Today (Barc). 2016 Jun;52(6):323-9. doi: 10.1358/dot.2016.52.6.2510261.	https://pubmed.ncbi.nlm.nih.gov/27458609	Exclude	Review		1											
Role of biologics in severe eosinophilic asthma - focus on reslizumab	Pelaia G, Vatrella A, Busceti MT, Gallelli L, Preianò M, Lombardo N, Terracciano R, Maselli R.	Ther Clin Risk Manag. 2016 Jul 1;12:1075-82. doi: 10.2147/TCRM.S111862. eCollection 2016.	https://pubmed.ncbi.nlm.nih.gov/27445482	Exclude	Review		1											
The efficacy and safety of reslizumab for inadequately controlled asthma with elevated blood eosinophil counts: A systematic review and meta-analysis	Li J, Wang F, Lin C, Du J, Xiao B, Du C, Sun J.	J Asthma. 2017 Apr;54(3):300-307. doi: 10.1080/02770903.2016.1212371. Epub 2016 Jul 19.	https://pubmed.ncbi.nlm.nih.gov/27435534	Exclude	Review		1											
Clinical usefulness of mepolizumab in severe eosinophilic asthma	Menzella F, Lusuardi M, Montanari G, Galeone C, Facciolongo N, Zucchi L.	Ther Clin Risk Manag. 2016 Jun 8;12:907-16. doi: 10.2147/TCRM.S86299. eCollection 2016.	https://pubmed.ncbi.nlm.nih.gov/27354806	Exclude	Review		1											
Mepolizumab: A Review in Eosinophilic Asthma	Deeks ED.	BioDrugs. 2016 Aug;30(4):361-70. doi: 10.1007/s40259-016-0182-5.	https://pubmed.ncbi.nlm.nih.gov/27311938	Exclude	Review		1											
Severe eosinophilic asthma treated with mepolizumab stratified by baseline eosinophil thresholds: a secondary analysis of the DREAM and MENSA studies	Ortega HG, Yancey SW, Mayer B, Gunsoy NB, Keene ON, Bleecker ER, Brightling CE, Pavord ID.	Lancet Respir Med. 2016 Jul;4(7):549-556. doi: 10.1016/S2213-2600(16)30031-5. Epub 2016 May 10.	https://pubmed.ncbi.nlm.nih.gov/27177493	Included	Post-hoc analysis of DREAM/MENSA pooled doses	1												1
Dupilumab efficacy and safety in adults with uncontrolled persistent asthma despite use of medium-to-high-dose inhaled corticosteroids plus a long-acting β2 agonist: a randomised double-blind placebo-controlled pivotal phase 2b dose-ranging trial	Wenzel S, Castro M, Corren J, Maspero J, Wang L, Zhang B, Pirozzi G, Sutherland ER, Evans RR, Joish VN, Eckert L, Graham NM, Stahl N, Yancopoulos GD, Louis-Tisserand M, Teper A.	Lancet. 2016 Jul 2;388(10039):31-44. doi: 10.1016/S0140-6736(16)30307-5. Epub 2016 Apr 27.	https://pubmed.ncbi.nlm.nih.gov/27130691	Included	Phase IIb study	1												1
Utility of serum periostin and free IgE levels in evaluating responsiveness to omalizumab in patients with severe asthma	Tajiri T, Matsumoto H, Gon Y, Ito R, Hashimoto S, Izuhara K, Suzukawa M, Ohta K, Ono J, Ohta S, Ito I, Oguma T, Inoue H, Iwata T, Kanemitsu Y, Nagasaki T, Niimi A, Mishima M.	Allergy. 2016 Oct;71(10):1472-9. doi: 10.1111/all.12922. Epub 2016 May 17.	https://pubmed.ncbi.nlm.nih.gov/27113353	Exclude	Observational study		1											
A Phase 2a Study of Benralizumab for Patients with Eosinophilic Asthma in South Korea and Japan	Park HS, Kim MK, Imai N, Nakanishi T, Adachi M, Ohta K, Tohda Y; Asian Benralizumab Study Group.	Int Arch Allergy Immunol. 2016;169(3):135-45. doi: 10.1159/000444799. Epub 2016 Apr 21.	https://pubmed.ncbi.nlm.nih.gov/27097165	Exclude	Korean/Japanese subgroup study							1						
Treatment response with mepolizumab in severe eosinophilic asthma patients with previous omalizumab treatment	Magnan A, Bourdin A, Prazma CM, Albers FC, Price RG, Yancey SW, Ortega H.	Allergy. 2016 Sep;71(9):1335-44. doi: 10.1111/all.12914. Epub 2016 May 24.	https://pubmed.ncbi.nlm.nih.gov/27087007	Exclude	Post-hoc analysis - not relevant					1								
Mepolizumab for the reduction of exacerbations in severe eosinophilic asthma	Russell R, Brightling C.	Expert Rev Respir Med. 2016 Jun;10(6):607-17. doi: 10.1080/17476348.2016.1176532. Epub 2016 May 3.	https://pubmed.ncbi.nlm.nih.gov/27058452	Exclude	Review		1											
Reslizumab for Inadequately Controlled Asthma With Elevated Blood Eosinophil Levels: A Randomized Phase 3 Study	Bjermer L, Lemiere C, Maspero J, Weiss S, Zangrilli J, Germinaro M.	Chest. 2016 Oct;150(4):789-798. doi: 10.1016/j.chest.2016.03.032. Epub 2016 Apr 4.	https://pubmed.ncbi.nlm.nih.gov/27056586	Included	BREATH program	1												1
Phase 3 Study of Reslizumab in Patients With Poorly Controlled Asthma: Effects Across a Broad Range of Eosinophil Counts	Corren J, Weinstein S, Janka L, Zangrilli J, Garin M.	Chest. 2016 Oct;150(4):799-810. doi: 10.1016/j.chest.2016.03.018. Epub 2016 Mar 25.	https://pubmed.ncbi.nlm.nih.gov/27018175	Exclude	Primary endpoint is FEV1, study not long enough to evaluate reductions in exacerbations					1								
Omalizumab therapy in a 13-year-old boy with severe persistent asthma and concomitant eosinophilic esophagitis	Arasi S, Costa S, Magazzù G, Ieni A, Crisafulli G, Caminiti L, Chiera F, Vaccaro M, Del Giudice MM, Pajno GB.	Ital J Pediatr. 2016 Mar 22;42:32. doi: 10.1186/s13052-016-0243-x.	https://pubmed.ncbi.nlm.nih.gov/27000314	Exclude	Case report(s)		1											
Phase 2, randomised placebo-controlled trial to evaluate the efficacy and safety of an anti-GM-CSF antibody (KB003) in patients with inadequately controlled asthma	Molfino NA, Kuna P, Leff JA, Oh CK, Singh D, Chernow M, Sutton B, Yarranton G.	BMJ Open. 2016 Jan 6;6(1):e007709. doi: 10.1136/bmjopen-2015-007709.	https://pubmed.ncbi.nlm.nih.gov/26739717	Exclude	KB003 development discontinued									1				
Mepolizumab in the treatment of severe eosinophilic asthma	Fainardi V, Pisi G, Chetta A.	Immunotherapy. 2016;8(1):27-34. doi: 10.2217/imt.15.102. Epub 2015 Dec 10.	https://pubmed.ncbi.nlm.nih.gov/26653083	Exclude	Review		1											
Profile of anti-IL-5 mAb mepolizumab in the treatment of severe refractory asthma and hypereosinophilic diseases	Menzella F, Lusuardi M, Galeone C, Taddei S, Zucchi L.	J Asthma Allergy. 2015 Oct 8;8:105-14. doi: 10.2147/JAA.S40244. eCollection 2015.	https://pubmed.ncbi.nlm.nih.gov/26504401	Exclude	Review		1											
Update on reslizumab for eosinophilic asthma	Cardet JC, Israel E.	Expert Opin Biol Ther. 2015;15(10):1531-9. doi: 10.1517/14712598.2015.1090972.	https://pubmed.ncbi.nlm.nih.gov/26372797	Exclude	Review		1											
[PERSONALIZED TREATMENT OF ASTHMA: THE ISSUE OF ANTI-INTERLEUKIN-5 ANTIBODIES]	Louis R, Demarche S, Van Hees T, Schleich F.	Rev Med Liege. 2015 May-Jun;70(5-6):306-9.	https://pubmed.ncbi.nlm.nih.gov/26285457	Exclude	Review - article in French		1											
Mepolizumab versus placebo for asthma	Powell C, Milan SJ, Dwan K, Bax L, Walters N.	Cochrane Database Syst Rev. 2015 Jul 27;(7):CD010834. doi: 10.1002/14651858.CD010834.pub2.	https://pubmed.ncbi.nlm.nih.gov/26214266	Exclude	Review		1											
Mepolizumab for eosinophilic severe asthma: recent studies	Robinson DS, Kariyawasam HH.	Expert Opin Biol Ther. 2015 Jun;15(6):909-14. doi: 10.1517/14712598.2015.1041911. Epub 2015 May 8.	https://pubmed.ncbi.nlm.nih.gov/25951938	Exclude	Review		1											
Reslizumab for inadequately controlled asthma with elevated blood eosinophil counts: results from two multicentre, parallel, double-blind, randomised, placebo-controlled, phase 3 trials	Castro M, Zangrilli J, Wechsler ME, Bateman ED, Brusselle GG, Bardin P, Murphy K, Maspero JF, O'Brien C, Korn S.	Lancet Respir Med. 2015 May;3(5):355-66. doi: 10.1016/S2213-2600(15)00042-9. Epub 2015 Feb 23.	https://pubmed.ncbi.nlm.nih.gov/25736990	Included	Castro Study 1 and 2	1												1
Anti-IgE therapy with omalizumab for severe asthma: current concepts and potential developments	Pelaia G, Vatrella A, Busceti MT, Gallelli L, Terracciano R, Maselli R.	Curr Drug Targets. 2015;16(2):171-8. doi: 10.2174/1389450116666141219122157.	https://pubmed.ncbi.nlm.nih.gov/25523898	Exclude	Review		1											

Changes in blood eosinophilia during omalizumab therapy as a predictor of asthma exacerbation	Skiepko R, Ziętkowski Z, Lukaszyk M, Budny W, Skiepko U, Milewski R, Bodzenta-Łukaszyk A.	Postepy Dermatol Alergol. 2014 Oct;31(5):305-9. doi: 10.5114/pdia.2014.40973. Epub 2014 Oct 22.	https://pubmed.ncbi.nlm.nih.gov/25395927	Exclude	Not RCT - small study		1											
Benralizumab, an anti-interleukin 5 receptor α monoclonal antibody, versus placebo for uncontrolled eosinophilic asthma: a phase 2b randomised dose-ranging study	Castro M, Wenzel SE, Bleecker ER, Pizzichini E, Kuna P, Busse WW, Gossage DL, Ward CK, Wu Y, Wang B, Khatry DB, van der Merwe R, Kolbeck R, Molfino NA, Raible DG.	Lancet Respir Med. 2014 Nov;2(11):879-890. doi: 10.1016/S2213-2600(14)70201-2. Epub 2014 Oct 8.	https://pubmed.ncbi.nlm.nih.gov/25306557	Exclude	Eos subgroups are based on predicted sputum eos (not blood eos)							1						
Oral glucocorticoid-sparing effect of mepolizumab in eosinophilic asthma	Bel EH, Wenzel SE, Thompson PJ, Prazma CM, Keene ON, Yancey SW, Ortega HG, Pavord ID; SIRIUS Investigators.	N Engl J Med. 2014 Sep 25;371(13):1189-97. doi: 10.1056/NEJMoa1403291. Epub 2014 Sep 8.	https://pubmed.ncbi.nlm.nih.gov/25199060	Exclude	OCS reduction trial							1						
Mepolizumab treatment in patients with severe eosinophilic asthma	Ortega HG, Liu MC, Pavord ID, Brusselle GG, FitzGerald JM, Chetta A, Humbert M, Katz LE, Keene ON, Yancey SW, Chanez P; MENSA Investigators.	N Engl J Med. 2014 Sep 25;371(13):1198-207. doi: 10.1056/NEJMoa1403290. Epub 2014 Sep 8.	https://pubmed.ncbi.nlm.nih.gov/25199059	Included	MENSA study	1												1
Comprehensive efficacy of omalizumab for severe refractory asthma: a time-series observational study	Tajiri T, Niimi A, Matsumoto H, Ito I, Oguma T, Otsuka K, Takeda T, Nakaji H, Inoue H, Iwata T, Nagasaki T, Kanemitsu Y, Izuhara Y, Mishima M.	Ann Allergy Asthma Immunol. 2014 Oct;113(4):470-5.e2. doi: 10.1016/j.anai.2014.06.004. Epub 2014 Jul 1.	https://pubmed.ncbi.nlm.nih.gov/24994694	Exclude	Observational study		1											
Cluster analysis and characterization of response to mepolizumab. A step closer to personalized medicine for patients with severe asthma	Ortega H, Li H, Suruki R, Albers F, Gordon D, Yancey S.	Ann Am Thorac Soc. 2014 Sep;11(7):1011-7. doi: 10.1513/AnnalsATS.201312-454OC.	https://pubmed.ncbi.nlm.nih.gov/24983709	Exclude	Post-hoc cluster analysis, not relevant		1											
Characterisation of an OCS-dependent severe asthma population treated with mepolizumab	Prazma CM, Wenzel S, Barnes N, Douglass JA, Hartley BF, Ortega H.	Thorax. 2014 Dec;69(12):1141-2. doi: 10.1136/thoraxjnl-2014-205581. Epub 2014 May 16.	https://pubmed.ncbi.nlm.nih.gov/24834924	Exclude	Not relevant - OCS							1						
Efficacy and safety of an anti-IL-13 mAb in patients with severe asthma: a randomized trial	De Boever EH, Ashman C, Cahn AP, Locantore NW, Overend P, Pouliquen IJ, Serone AP, Wright TJ, Jenkins MM, Panesar IS, Thiagarajah SS, Wenzel SE.	J Allergy Clin Immunol. 2014 Apr;133(4):989-96. doi: 10.1016/j.jaci.2014.01.002. Epub 2014 Feb 28.	https://pubmed.ncbi.nlm.nih.gov/24582316	Exclude	GSK679586 development discontinued									1				
Monoclonal antibodies for the treatment of refractory asthma	Hambly N, Nair P.	Curr Opin Pulm Med. 2014 Jan;20(1):87-94. doi: 10.1097/MCP.0000000000000007.	https://pubmed.ncbi.nlm.nih.gov/24275927	Exclude	Review		1											
Anti-interleukin-5 therapy in severe asthma	Garcia G, Taillé C, Laveneziana P, Bourdin A, Chanez P, Humbert M.	Eur Respir Rev. 2013 Sep 1;22(129):251-7. doi: 10.1183/09059180.00004013.	https://pubmed.ncbi.nlm.nih.gov/23997052	Exclude	Review		1											
No exacerbation but impaired anti-viral mechanisms in a rhinovirus-chronic allergic asthma mouse model	Rochlitzer S, Hoymann HG, Müller M, Braun A; U-BIOPRED consortium.	Clin Sci (Lond). 2014 Jan 1;126(1):55-65. doi: 10.1042/CS20130174.	https://pubmed.ncbi.nlm.nih.gov/23822145	Exclude	Not in humans - animal model study		1											
Dupilumab in persistent asthma with elevated eosinophil levels	Wenzel S, Ford L, Pearlman D, Spector S, Sher L, Skobieranda F, Wang L, Kirkesseli S, Rocklin R, Bock B, Hamilton J, Ming JE, Radin A, Stahl N, Yancopoulos GD, Graham N, Pirozzi G.	N Engl J Med. 2013 Jun 27;368(26):2455-66. doi: 10.1056/NEJMoa1304048. Epub 2013 May 21.	https://pubmed.ncbi.nlm.nih.gov/23688323	Exclude	Exclude due to study design differences (background medication is tapered during treatment)					1								
Effectiveness of omalizumab in non-allergic severe asthma	Domingo C, Pomares X, Angril N, Rudi N, Amengual MJ, Mirapeix RM.	J Biol Regul Homeost Agents. 2013 Jan-Mar;27(1):45-53.	https://pubmed.ncbi.nlm.nih.gov/23489686	Exclude	Observational study		1											
Exploring the effects of omalizumab in allergic asthma: an analysis of biomarkers in the EXTRA study	Hanania NA, Wenzel S, Rosén K, Hsieh HJ, Mosesova S, Choy DF, Lal P, Arron JR, Harris JM, Busse W.	Am J Respir Crit Care Med. 2013 Apr 15;187(8):804-11. doi: 10.1164/rccm.201208-1414OC.	https://pubmed.ncbi.nlm.nih.gov/23471469	Included	EXTRA study	1												1
Mepolizumab for severe eosinophilic asthma	Robinson DS.	Expert Rev Respir Med. 2013 Feb;7(1):13-7. doi: 10.1586/ers.12.84.	https://pubmed.ncbi.nlm.nih.gov/23362812	Exclude	Commentary		1											
IL-8, IL-10, TGF-β, and GCSF levels were increased in severe persistent allergic asthma patients with the anti-IgE treatment	Yalcin AD, Bisgin A, Gorczynski RM.	Mediators Inflamm. 2012;2012:720976. doi: 10.1155/2012/720976. Epub 2012 Dec 19.	https://pubmed.ncbi.nlm.nih.gov/23316107	Exclude	Not RCT		1											
Mepolizumab treatment for asthma	Robinson DS.	Expert Opin Biol Ther. 2013 Feb;13(2):295-302. doi: 10.1517/14712598.2012.725717. Epub 2012 Sep 24.	https://pubmed.ncbi.nlm.nih.gov/22998420	Exclude	Commentary		1											
Mepolizumab for severe eosinophilic asthma (DREAM): a multicentre, double-blind, placebo-controlled trial	Pavord ID, Korn S, Howarth P, Bleecker ER, Buhl R, Keene ON, Ortega H, Chanez P.	Lancet. 2012 Aug 18;380(9842):651-9. doi: 10.1016/S0140-6736(12)60988-X.	https://pubmed.ncbi.nlm.nih.gov/22901886	Included	DREAM study	1												1
Effects of adding omalizumab, an anti-immunoglobulin E antibody, on airway wall thickening in asthma	Hoshino M, Ohtawa J.	Respiration. 2012;83(6):520-8. doi: 10.1159/000334701. Epub 2012 Jan 11.	https://pubmed.ncbi.nlm.nih.gov/22236804	Exclude	Analysis on airway wall thickness on CT with omalizumab								1					
Omalizumab decreases exacerbation frequency, oral intake of corticosteroids and peripheral blood eosinophils in atopic patients with uncontrolled asthma	Pelaia G, Gallelli L, Romeo P, Renda T, Busceti MT, Proietto A, Grembiale RD, Marsico SA, Maselli R, Vatrella A.	Int J Clin Pharmacol Ther. 2011 Dec;49(12):713-21. doi: 10.5414/cp201586.	https://pubmed.ncbi.nlm.nih.gov/22122813	Exclude	Observational study		1											
Anti-interleukin-5 antibody therapy in asthma and allergies	Corren J.	Curr Opin Allergy Clin Immunol. 2011 Dec;11(6):565-70. doi: 10.1097/ACI.0b013e32834c3d30.	https://pubmed.ncbi.nlm.nih.gov/21971335	Exclude	Review		1											
Changes of immunomodulatory cytokines associated with omalizumab therapy for severe persistent asthma	Shimizu Y, Dobashi K, Fueki N, Fueki M, Okada T, Tomioka S, Makino S, Mori M.	J Biol Regul Homeost Agents. 2011 Apr-Jun;25(2):177-86.	https://pubmed.ncbi.nlm.nih.gov/21880206	Exclude	Not RCT		1											

Reslizumab for poorly controlled, eosinophilic asthma: a randomized, placebo-controlled study	Castro M, Mathur S, Hargreave F, Boulet LP, Xie F, Young J, Wilkins HJ, Henkel T, Nair P; Res-5-0010 Study Group.	Am J Respir Crit Care Med. 2011 Nov 15;184(10):1125-32. doi: 10.1164/rccm.201103-0396OC. Epub 2011 Aug 18.	https://pubmed.ncbi.nlm.nih.gov/21852542	Included	Castro 2011 study	1												1
Update on optimal use of omalizumab in management of asthma	Pelaia G, Gallelli L, Renda T, Romeo P, Busceti MT, Grembiale RD, Maselli R, Marsico SA, Vatrella A.	J Asthma Allergy. 2011;4:49-59. doi: 10.2147/JAA.S14520. Epub 2011 Jun 13.	https://pubmed.ncbi.nlm.nih.gov/21792319	Exclude	Review		1											
Effectiveness of omalizumab in reducing corticosteroid burden in patients with moderate to severe persistent allergic asthma	Karpel J, Massanari M, Geba GP, Kianifard F, Inhaber N, Zeldin RK.	Ann Allergy Asthma Immunol. 2010 Dec;105(6):465-70. doi: 10.1016/j.anai.2010.09.011.	https://pubmed.ncbi.nlm.nih.gov/21130385	Exclude	OCS reduction trial							1						
[Therapeutic effect of omalizumab on 10 patients with severe persistent asthma]	Kanemitsu Y, Kita H, Fuseya Y, Tanimura K, Katayama Y, Nisihara Y.	Arerugi. 2010 Aug;59(8):965-73.	https://pubmed.ncbi.nlm.nih.gov/20820138	Exclude	Japanese subgroup study							1						
Mepolizumab and exacerbations of refractory eosinophilic asthma	Haldar P, Brightling CE, Hargadon B, Gupta S, Monteiro W, Sousa A, Marshall RP, Bradding P, Green RH, Wardlaw AJ, Pavord ID.	N Engl J Med. 2009 Mar 5;360(10):973-84. doi: 10.1056/NEJMoa0808991.	https://pubmed.ncbi.nlm.nih.gov/19264686	Exclude	Not the right population							1						
Omalizumab in the treatment of severe asthma: efficacy and current problems	Pelaia G, Renda T, Romeo P, Busceti MT, Maselli R.	Ther Adv Respir Dis. 2008 Dec;2(6):409-21. doi: 10.1177/1753465808100431.	https://pubmed.ncbi.nlm.nih.gov/19124386	Exclude	Review		1											
Severe asthma and the omalizumab option	Miller CW, Krishnaswamy N, Johnston C, Krishnaswamy G.	Clin Mol Allergy. 2008 May 20;6:4. doi: 10.1186/1476-7961-6-4.	https://pubmed.ncbi.nlm.nih.gov/18489791	Exclude	Review		1											
A review of anti-IgE monoclonal antibody (omalizumab) as add on therapy for severe allergic (IgE-mediated) asthma	D'Amato G, Salzillo A, Piccolo A, D'Amato M, Liccardi G.	Ther Clin Risk Manag. 2007 Aug;3(4):613-9.	https://pubmed.ncbi.nlm.nih.gov/18472983	Exclude	Review		1											
A recombinant humanized anti-IgE monoclonal antibody (omalizumab) in the therapy of moderate-to-severe allergic asthma	D'Amato G, Piccolo A, Salzillo A, Noschese P, D'Amato M, Liccardi G.	Recent Pat Inflamm Allergy Drug Discov. 2007 Nov;1(3):225-31. doi: 10.2174/187221307782418900.	https://pubmed.ncbi.nlm.nih.gov/19075985	Exclude	Review		1											
Treating Moderate-to-Severe Allergic Asthma with a Recombinant Humanized Anti-IgE Monoclonal Antibody (Omalizumab)	D'Amato G, Bucchioni E, Oldani V, Canonica W.	Treat Respir Med. 2006;5(6):393-8. doi: 10.2165/00151829-200605060-00004.	https://pubmed.ncbi.nlm.nih.gov/17154668	Exclude	Review?		1											
Anti-IgE and other new immunomodulation-based therapies for allergic asthma	Jonkers RE, van der Zee JS.	Neth J Med. 2005 Apr;63(4):121-8.	https://pubmed.ncbi.nlm.nih.gov/15869039	Exclude	Review		1											
Effects of treatment with anti-immunoglobulin E antibody omalizumab on airway inflammation in allergic asthma	Djukanović R, Wilson SJ, Kraft M, Jarjour NN, Steel M, Chung KF, Bao W, Fowler-Taylor A, Matthews J, Busse WW, Holgate ST, Fahy JV.	Am J Respir Crit Care Med. 2004 Sep 15;170(6):583-93. doi: 10.1164/rccm.200312-1651OC. Epub 2004 Jun 1.	https://pubmed.ncbi.nlm.nih.gov/15172898	Exclude	Not relevant							1						
Anti-IgE monoclonal antibody, omalizumab: a new treatment for allergic asthma	Chung KF.	Expert Opin Pharmacother. 2004 Feb;5(2):439-46. doi: 10.1517/14656566.5.2.439.	https://pubmed.ncbi.nlm.nih.gov/14996639	Exclude	Review		1											
Butterbur, a herbal remedy, confers complementary anti-inflammatory activity in asthmatic patients receiving inhaled corticosteroids	Lee DK, Haggart K, Robb FM, Lipworth BJ.	Clin Exp Allergy. 2004 Jan;34(1):110-4. doi: 10.1111/j.1365-2222.2004.01838.x.	https://pubmed.ncbi.nlm.nih.gov/14720270	Exclude	Herbal remedy, not biologic							1						
Effect of SCH55700, a humanized anti-human interleukin-5 antibody, in severe persistent asthma: a pilot study	Kips JC, O'Connor BJ, Langley SJ, Woodcock A, Kerstjens HA, Postma DS, Danzig M, Cuss F, Pauwels RA.	Am J Respir Crit Care Med. 2003 Jun 15;167(12):1655-9. doi: 10.1164/rccm.200206-525OC. Epub 2003 Mar 20.	https://pubmed.ncbi.nlm.nih.gov/12649124	Exclude	Discontinued drug									1				
					SUBTOTALS	**20**	**202**	**10**	**7**	**4**	**2**	**29**	**5**	**4**	**2**	**7**	**6**	**33**
							265									**13**		
					TOTAL	**298**												

Table S3. All published outcomes data demonstrating the efficacy of biologics in BEC subgroups by (i) individual trials and (ii) pooled analysis

i) Individual trial subgroup outcomes

Study identifiers

Drug	Author (last name)	Publication year	Title	Citation	PubMed link	NCT number	Trial name
Tezepelumab	Menzies-Gow	2021	Tezepelumab in Adults and Adolescents with Severe, Uncontrolled Asthma	N Engl J Med. 2021 May 13;384(19):1800-1809. doi: 10.1056/NEJMoa2034975. and unpublished data	https://pubmed.ncbi.nlm.nih.gov/33979488/	NCT03347279	NAVIGATOR
Tezepelumab	Corren	2017	Tezepelumab in Adults with Uncontrolled Asthma	N Engl J Med. 2017 Sep 7;377(10):936-946. doi: 10.1056/NEJMoa1704064. and unpublished data	https://pubmed.ncbi.nlm.nih.gov/28877011/	NCT02054130	PATHWAY
Dupilumab	Shrimanker	2019	Prognostic and Predictive Value of Blood Eosinophil Count, Fractional Exhaled Nitric Oxide, and Their Combination in Severe Asthma: A Post Hoc Analysis	Am J Respir Crit Care Med. 2019 Nov 15;200(10):1308-1312. doi: 10.1164/rccm.201903-0599LE.	https://pubmed.ncbi.nlm.nih.gov/31298922/	NCT02414854	LIBERTY ASTHMA QUEST
Dupilumab	Castro	2020	Dupilumab improves lung function in patients with uncontrolled, moderate-to-severe asthma	ERJ Open Res. 2020 Jan 27;6(1):00204-2019. doi: 10.1183/23120541.00204-2019.	https://pubmed.ncbi.nlm.nih.gov/32010719/	NCT02414854	LIBERTY ASTHMA QUEST
Dupilumab	Castro	2018	Dupilumab Efficacy and Safety in Moderate-to-Severe Uncontrolled Asthma	N Engl J Med. 2018 Jun 28;378(26):2486-2496. doi: 10.1056/NEJMoa1804092.	https://pubmed.ncbi.nlm.nih.gov/29782217/	NCT02414854	LIBERTY ASTHMA QUEST
Dupilumab	Wenzel	2016	Dupilumab efficacy and safety in adults with uncontrolled persistent asthma despite use of medium-to-high-dose inhaled corticosteroids plus a long-acting β2 agonist: a randomised double-blind placebo-controlled pivotal phase 2b dose-ranging trial	Lancet. 2016 Jul 2;388(10039):31-44. doi: 10.1016/S0140-6736(16)30307-5.	https://pubmed.ncbi.nlm.nih.gov/27130691/	NCT01854047	Phase IIb
Benralizumab	Harrison	2021	Onset of effect and impact on health-related quality of life, exacerbation rate, lung function, and nasal polyposis symptoms for patients with severe eosinophilic asthma treated with benralizumab (ANDHI): a randomised, controlled, phase 3b trial	Lancet Respir Med. 2021 Mar;9(3):260-274. doi: 10.1016/S2213-2600(20)30414-8. Epub 2020 Dec 22.	https://pubmed.ncbi.nlm.nih.gov/33357499/	NCT03170271	ANDHI
Benralizumab	Goldman	2017	The association between blood eosinophil count and benralizumab efficacy for patients with severe, uncontrolled asthma: subanalyses of the Phase III SIROCCO and CALIMA studies	Curr Med Res Opin. 2017 Sep;33(9):1605-1613. doi: 10.1080/03007995.2017.1347091.	https://pubmed.ncbi.nlm.nih.gov/28644104/	NCT01928771 and NCT01914757	SIROCCO and CALIMA
Benralizumab	Bleecker	2016	Efficacy and safety of benralizumab for patients with severe asthma uncontrolled with high - dosage inhaled corticosteroids and long - acting β2 - agonists (SIROCCO): a randomised, multicentre, placebo - controlled phase 3 trial	Lancet. 2016 Oct 29;388(10056):2115-2127. doi: 10.1016/S0140-6736(16)31324-1.	https://pubmed.ncbi.nlm.nih.gov/27609408/	NCT01928771	SIROCCO
Benralizumab	FitzGerald	2016	Benralizumab, an anti-interleukin-5 receptor α monoclonal antibody, as add-on treatment for patients with severe, uncontrolled, eosinophilic asthma (CALIMA): a randomised, double-blind, placebo-controlled phase 3 trial	Lancet. 2016 Oct 29;388(10056):2128-2141. doi: 10.1016/S0140-6736(16)31322-8.	https://pubmed.ncbi.nlm.nih.gov/27609406/	NCT01914757	CALIMA
Mepolizumab	Yancey	2019	Disease burden and efficacy of mepolizumab in patients with severe asthma and blood eosinophil counts of ≥ 150–300 cells/μL	Respir Med. 2019 May;151:139-141. doi: 10.1016/j.rmed.2019.04.008. Epub 2019 Apr 8.	https://pubmed.ncbi.nlm.nih.gov/31047111/	NCT02281318; NCT01691521; NCT01000506	MUSCA; MENSA; DREAM
Mepolizumab	Chupp	2017	Efficacy of mepolizumab add-on therapy on health-related quality of life and markers of asthma control in severe eosinophilic asthma	Lancet Respir Med. 2017 May;5(5):390-400. doi: 10.1016/S2213-2600(17)30125-X.	https://pubmed.ncbi.nlm.nih.gov/28395936/	NCT02281318	MUSCA
Mepolizumab	Ortega	2016	Severe eosinophilic asthma treated with mepolizumab stratified by baseline eosinophil thresholds: a secondary analysis of the DREAM and MENSA studies	Lancet Respir Med. 2016 Jul;4(7):549-556. doi: 10.1016/S2213-2600(16)30031-5.	https://pubmed.ncbi.nlm.nih.gov/27177492/	NCT01000506 and NCT01691521	DREAM / MENSA (other pooled analysis - see Table S3 B)
Mepolizumab	Ortega	2014	Mepolizumab treatment in patients with severe eosinophilic asthma	N Engl J Med. 2014 Sep 25;371(13):1198-207. doi: 10.1056/NEJMoa1403290.	https://pubmed.ncbi.nlm.nih.gov/25199059/	NCT01691521	MENSA
Mepolizumab	Pavord	2012	Mepolizumab for severe eosinophilic asthma (DREAM): a multicentre, double-blind, placebo-controlled trial	Lancet. 2012 Aug 18;380(9842):651-9. doi: 10.1016/S0140-6736(12)60988-X.	https://pubmed.ncbi.nlm.nih.gov/22901886/	NCT01000506	DREAM
Reslizumab	Castro	2015	Reslizumab for inadequately controlled asthma with elevated blood eosinophil counts: results from two …	Lancet Respir Med. 2015 May;3(5):355-…	https://pubmed.ncbi.nlm.nih.gov/25736990/	NCT01287039 and …	Study 1 and Study 2 …

Population and treatment; Annual asthma exacerbation rate ratio vs placebo

Study	Subpopulation	Treatment arm	Number of exacerbations in 12 months prior to study	Time point	Definition	Number of patients analyzed	Rate	Rate ratio estimate	95% CI	% reduction estimate	95% CI
Menzies-Gow 2021	Overall	Placebo	2.7 ± 1.4 (531)	Week 52	Annualized asthma exacerbation rate ratio over 52 weeks	531	2.10 (95% CI: 1.84 to 2.39)				
		Tezepelumab 210 mg SC Q4W	2.8 ± 1.4 (528)	Week 52		528	0.93 (95% CI: 0.80 to 1.07)	0.44	0.37 to 0.53	56%	47 to 63%
	Blood eosinophils ≥ 300 cells/μL	Placebo	2.9 ± 1.5 (222)	Week 52		222	2.66				
		Tezepelumab 210 mg SC Q4W	3.0 ± 1.7 (219)	Week 52		219	0.79	0.30	0.22 to 0.40	70%	60 to 78%
	Blood eosinophils < 300 cells/μL	Placebo	2.6 ± 1.2 (309)	Week 52		309	1.73				
		Tezepelumab 210 mg SC Q4W	2.6 ± 1.2 (309)	Week 52		309	1.02	0.59	0.46 to 0.75	41%	25 to 54%
	Blood eosinophils ≥ 150 cells/μL	Placebo	2.8 ± 1.4 (393)	Week 52		393	2.24				
		Tezepelumab 210 mg SC Q4W	2.9 ± 1.5 (390)	Week 52		390	0.89	0.39	0.32 to 0.49	61%	51 to 68%
	Blood eosinophils < 150 cells/μL	Placebo	2.6 ± 1.2 (138)	Week 52		138	1.70				
		Tezepelumab 210 mg SC Q4W	2.6 ± 1.0 (138)	Week 52		138	1.04	0.61	0.42 to 0.88	39%	12 to 58%
	Blood eosinophils 150 to 300 cells/μL	Placebo	2.6 ± 1.3 (171)	Week 52		171	1.75				
		Tezepelumab 210 mg SC Q4W	2.7 ± 1.3 (171)	Week 52		171	1.00	0.57	0.41 to 0.79	43%	21 to 59%
	Blood eosinophils 300 to 450 cells/μL	Placebo	2.8 ± 1.4 (95)	Week 52		95	2.22				
		Tezepelumab 210 mg SC Q4W	2.9 ± 1.5 (99)	Week 52		99	0.92	0.41	0.27 to 0.64	59%	36 to 73%
	Blood eosinophils ≥ 450 cells/μL	Placebo	3.0 ± 1.6 (127)	Week 52		127	3.00				
		Tezepelumab 210 mg SC Q4W	3.1 ± 1.8 (120)	Week 52		120	0.68	0.23	0.15 to 0.34	77%	66 to 85%
	EOS ≥ 150 / FeNO ≥ 25	Placebo	Overall population: ≥ 634 (59.9%) >2 = 424 (40%) - Placebo group - 2 = 324 (61%) >2 = 206 (38.8%) - Teze treated group - 2 = 310 (58.7%) >2 = 218 (41.3%)	Week 52		249	2.61				
		Tezepelumab 210 mg SC Q4W		Week 52		254	0.79	0.30	0.23 to 0.40	70%	60 to 77%
	EOS ≥ 150 / FeNO < 25	Placebo		Week 52		143	1.64				
		Tezepelumab 210 mg SC Q4W		Week 52		131	1.04	0.63	0.44 to 0.91	37%	9 to 56%
	EOS < 150 / FeNO ≥ 25	Placebo		Week 52		58	2.15				
		Tezepelumab 210 mg SC Q4W		Week 52		55	0.94	0.44	0.25 to 0.76	56%	24 to 75%
	EOS < 150 / FeNO < 25	Placebo		Week 52		77	1.42				
		Tezepelumab 210 mg SC Q4W		Week 52		82	1.12	0.79	0.48 to 1.28	21%	-28 to 52%
	EOS ≥ 300 / FeNO ≥ 25	Placebo		Week 52		150	3.14				
		Tezepelumab 210 mg SC Q4W		Week 52		160	0.73	0.23	0.16 to 0.33	77%	67 to 84%
	EOS ≥ 300 / FeNO < 25	Placebo		Week 52		67	1.60				
		Tezepelumab 210 mg SC Q4W		Week 52		56	0.98	0.61	0.35 to 1.07	39%	-7 to 65%
	EOS < 300 / FeNO ≥ 25	Placebo		Week 52		152	1.94				
		Tezepelumab 210 mg SC Q4W		Week 52		149	0.91	0.47	0.33 to 0.67	53%	33 to 67%
	EOS < 300 / FeNO < 25	Placebo		Week 52		153	1.55				
		Tezepelumab 210 mg SC Q4W		Week 52		157	1.10	0.71	0.50 to 1.00	29%	0 to 50%
Corren 2017	Overall	Placebo	2.5 ± 1.2 (138)	Week 52	• Annualized rate of asthma exacerbations (events per patient-year) at week 52. • An asthma exacerbation was defined as a worsening of asthma symptoms that led to any of the following: the use of systemic glucocorticoids (oral or injectable) or, in the case of a stable maintenance regimen of oral glucocorticoids, a doubling of the dose for 3 or more days; an emergency department visit due to asthma that led to systemic glucocorticoid treatment; or an inpatient hospitalization due to asthma. • Annualized rate of asthma exacerbations was analyzed with the use of a negative binomial model, with trial group, baseline blood eosinophil count (≥ 250 or < 250 cells per microliter), and baseline dose level of inhaled glucocorticoids (medium or high) included in the model	138	0.72 (95% CI: 0.61 to 0.86)				
		Tezepelumab 210 mg SC Q4W	2.4 ± 1.2 (137)	Week 52		137	0.20 (95% CI: 0.14 to 0.28)	NR	NR	71%	54 to 82%
	Blood eosinophils ≥ 300 cells/μL	Placebo	2.5 ± 1.3 (84)	Week 52		71	0.65				
		Tezepelumab 210 mg SC Q4W	2.5 ± 1.3 (82)	Week 52		68	0.26	0.40	0.19 to 0.85	60%	15 to 81%
	Blood eosinophils < 300 cells/μL	Placebo	2.4 ± 1.1 (85)	Week 52		67	0.80				
		Tezepelumab 210 mg SC Q4W	2.4 ± 1.1 (86)	Week 52		69	0.15	0.19	0.08 to 0.46	81%	54 to 92%
	Blood eosinophils ≥ 150 cells/μL	Placebo	2.4 ± 1.2 (114)	Week 52		105	0.66				
		Tezepelumab 210 mg SC Q4W	2.5 ± 1.3 (117)	Week 52		103	0.23	0.34	0.18 to 0.65	66%	35 to 82%
	Blood eosinophils < 150 cells/μL	Placebo	2.4 ± 1.4 (39)	Week 52		33	0.92				
		Tezepelumab 210 mg SC Q4W	2.4 ± 1.2 (44)	Week 52		34	0.12	0.17	0.05 to 0.64	83%	36 to 95%
	Blood eosinophils ≥ 450 cells/μL	Placebo	2.6 ± 1.5 (53)	Week 52		44	0.82				
		Tezepelumab 210 mg SC Q4W	2.6 ± 1.5 (55)	Week 52		41	0.31	0.38	0.16 to 0.90	62%	10 to 84%
	Blood eosinophils 150 to < 300 cells/μL	Placebo	2.3 ± 0.9 (56)	Week 52		34	0.68				
		Tezepelumab 210 mg SC Q4W	2.4 ± 1.0 (58)	Week 52		35	0.18	0.24	0.07 to 0.78	76%	22 to 93%
	Blood eosinophils 300 to < 450 cells/μL	Placebo	2.3 ± 0.9 (48)	Week 52		27	0.38				
		Tezepelumab 210 mg SC Q4W	2.2 ± 0.6 (37)	Week 52		27	0.17	0.40	0.10 to 1.68	60%	0 to 90%
	Blood eosinophils < 250 cells/μL	Placebo	NR	Week 52		62	0.63				
		Tezepelumab 210 mg SC Q4W	NR	Week 52		62	0.13	0.21	0.09 to 0.54	79%	46% to 91%
	Blood eosinophils ≥ 250 cells/μL	Placebo	NR	Week 52		86	0.70				
		Tezepelumab 210 mg SC Q4W	NR	Week 52		83	0.24	0.35	0.16 to 0.74	65%	26% to 84%
	Blood eosinophils < 400 cells/μL	Placebo	NR	Week 52		98	0.59				
		Tezepelumab 210 mg SC Q4W	NR	Week 52		100	0.19	0.32	0.16 to 0.66	68%	34% to 84%
	Blood eosinophils ≥ 400 cells/μL	Placebo	NR	Week 52		50	0.84				
		Tezepelumab 210 mg SC Q4W	NR	Week 52		45	0.19	0.25	0.09 to 0.69	75%	31% to 91%
Shrimanker 2019	EOS ≥ 150 / FeNO ≥ 25	Placebo 1.14 mL SC Q2W	NR	Week 52		134	1.16				
		Dupilumab 200 mg SC Q2W	NR	Week 52		248	0.37	0.32	0.20 to 0.50	68%	50 to 80%
	EOS ≥ 150 / FeNO < 25	Placebo 1.14 mL SC Q2W	NR	Week 52		94	0.78				
		Dupilumab 200 mg SC Q2W	NR	Week 52		185	0.52	0.67	0.40 to 1.00	33%	0 to 60%
	EOS < 150 / FeNO ≥ 25	Placebo 1.14 mL SC Q2W	NR	Week 52		28	0.35				
		Dupilumab 200 mg SC Q2W	NR	Week 52		51	0.21	0.61	0.20 to 1.80	39%	-80 to 80%
	EOS < 150 / FeNO < 25	Placebo 1.14 mL SC Q2W	NR	Week 52		55	0.58				
		Dupilumab 200 mg SC Q2W	NR	Week 52		139	0.58	0.61	0.20 to 1.80	39%	-80 to 80%
Castro 2020	Blood eosinophils ≥ 300 cells/μL	Placebo 1.14 mL SC Q2W	NR	Week 52 (other time points also available)							
		Dupilumab 200 mg SC Q2W	NR								
		Placebo 2.00 mL SC Q2W	NR								
		Dupilumab 300 mg SC Q2W	NR								
	Blood eosinophils ≥ 150 cells/μL	Placebo 1.14 mL SC Q2W	NR								
		Dupilumab 200 mg SC Q2W	NR								
		Placebo 2.00 mL SC Q2W	NR								
		Dupilumab 300 mg SC Q2W	NR								
	EOS ≥ 150 / FeNO ≥ 25	Placebo 1.14 mL SC Q2W	NR								
		Dupilumab 200 mg SC Q2W	NR								
		Placebo 2.00 mL SC Q2W	NR								
		Dupilumab 300 mg SC Q2W	NR								
Castro 2018	Overall	Placebo 1.14 mL SC Q2W	2.07 ± 1.58 (317)	Week 52	12 week time point	317	0.87				
		Dupilumab 200 mg SC Q2W	2.07 ± 2.66 (631)			631	0.46	0.52	0.41 to 0.66	48%	34 to 59%
		Placebo 2.00 mL SC Q2W	2.31 ± 2.07 (321)			321	0.97				
		Dupilumab 300 mg SC Q2W	2.02 ± 1.86 (633)			633	0.52	0.54	0.43 to 0.68	46%	32 to 57%
	Blood eosinophils ≥ 300 cells/μL	Placebo 1.14 mL SC Q2W	NR	Varies by outcome (please see comments for each outcome)		148	1.08				
		Dupilumab 200 mg SC Q2W	NR			264	0.37	0.34	0.24 to 0.48	66%	52 to 76%
		Placebo 2.00 mL SC Q2W	NR			142	1.24				
		Dupilumab 300 mg SC Q2W	NR			277	0.40	0.33	0.23 to 0.45	67%	55 to 77%
	Blood eosinophils ≥ 150 to < 300 cells/μL	Placebo 1.14 mL SC Q2W	NR			84	0.87				
		Dupilumab 200 mg SC Q2W	NR			173	0.56	0.64	0.41 to 1.02	36%	-3 to 59%
		Placebo 2.00 mL SC Q2W	NR			95	0.84				
		Dupilumab 300 mg SC Q2W	NR			175	0.47	0.56	0.35 to 0.89	44%	11 to 65%
	Blood eosinophils < 150 cells/μL	Placebo 1.14 mL SC Q2W	NR			83	0.51				
		Dupilumab 200 mg SC Q2W	NR			193	0.47	0.93	0.58 to 1.47	7%	-47 to 42%
		Placebo 2.00 mL SC Q2W	NR			83	0.64				
		Dupilumab 300 mg SC Q2W	NR			181	0.74	1.15	0.75 to 1.77	-15%	-77 to 25%
	Blood eosinophils < 300 cells/μL	Placebo 1.14 mL SC Q2W	NR			169	0.68				
		Dupilumab 200 mg SC Q2W	NR			366	0.51	NR	NR	NR	NR
		Placebo 2.00 mL SC Q2W	NR			178	0.73				
		Dupilumab 300 mg SC Q2W	NR			356	0.61	0.83	0.61 to 1.14	17%	-14 to 39%
	Blood eosinophils ≥ 150 cells/μL	Placebo 1.14 mL SC Q2W	NR			232	1.01				
		Dupilumab 200 mg SC Q2W	NR			437	0.45	NR	NR	NR	NR
		Placebo 2.00 mL SC Q2W	NR			237	1.08				
		Dupilumab 300 mg SC Q2W	NR			452	0.43	0.40	0.31 to 0.53	60%	47 to 69%
Wenzel 2016	Overall	Placebo 1.14 mL SC Q2W	2.27 ± 2.25 (158)	Week 24		158	0.897				
		Dupilumab 200 mg SC Q2W	1.85 ± 1.43 (150)	Week 24		150	0.269	0.300	15.9 to 56.5	70.0%	43.5 to 84.1%
		Dupilumab 300 mg SC Q2W	2.37 ± 2.29 (157)	Week 24		157	0.265	0.295	15.9 to 54.6	70.5%	45.4 to 84.1%
	Blood eosinophils ≥ 300 cells/μL (n = 325)	Placebo	2.41 ± 2.77 (n = 68)	Week 24		68	1.04				
		Dupilumab 200 mg SC Q2W	2.08 ± 1.67 (n = 65)	Week 24		65	0.30	0.29	0.11 to 0.76	71.2%	24.3 to 89.2%
		Dupilumab 300 mg SC Q2W	2.83 ± 2.79 (n = 64)	Week 24		64	0.20	0.19	0.07 to 0.56	80.7%	44.2 to 93.3%
	Blood eosinophils < 300 cells/μL (n = 451)	Placebo	2.17 ± 1.77 (n = 90)	Week 24		90	0.78				
		Dupilumab 200 mg SC Q2W	1.67 ± 1.19 (n = 85)	Week 24		85	0.25	0.32	0.14 to 0.76	67.6%	24.4 to 85.9%
		Dupilumab 300 mg SC Q2W	2.05 ± 1.82 (n = 93)	Week 24		93	0.31	0.4	0.19 to 0.84	59.9%	16.3 to 80.8%
Harrison 2021	Overall (BEC ≥ 150 cells/μL)	Placebo	≤ 2: 113 (49%) ≥ 3: 116 (51%)	Week 24	Reduction in annualized AER for patients in the benralizumab group versus patients in the placebo group	229	1.86				
		Benralizumab 30 mg Q8W	≤ 2: 313 (49%) ≥ 3: 316 (51%)	Week 24		427	0.94	0.51	0.39 to 0.65	49%	35 to 61%
	Blood eosinophils ≥ 300 cells/μL	Placebo	NR	Week 24	AAER in ≥ 300 cells/μL subgroup	NR	NR				
		Benralizumab 30 mg Q8W	NR	Week 24		NR	NR	0.41	0.30 to 0.56	59%	44 to 70%
Goldman 2017	SIROCCO - High-dosage ICS plus LABA with baseline blood eosinophils ≥ 150 cells/μL (n = 631)	Placebo	3.1 ± 1.9 (n = 306)	48 weeks		306	1.50				
		Benralizumab 30 mg Q8W	2.9 ± 1.6 (n = 325)	48 weeks		325	0.87	0.58	0.46 to 0.74	42%	26 to 54%
	SIROCCO - High-dosage ICS plus LABA with baseline blood eosinophils < 150 cells/μL (n = 122)	Placebo	2.7 ± 1.4 (n = 74)	48 weeks		74	1.34				
		Benralizumab 30 mg Q8W	2.4 ± 0.8 (n = 48)	48 weeks		48	1.01	0.76	0.45 to 1.27	24%	-27 to 55%
	CALIMA - High-dosage ICS plus LABA with baseline blood eosinophils ≥ 150 cells/μL (n = 615)	Placebo	2.7 ± 1.5 (n = 315)	56 weeks		315	1.10				
		Benralizumab 30 mg Q8W	2.7 ± 1.2 (n = 300)	56 weeks		300	0.70	0.64	0.49 to 0.85	36%	19 to 50%
	CALIMA - High-dosage ICS plus LABA with baseline blood eosinophils < 150 cells/μL (n = 88)	Placebo	2.5 ± 1.3 (n = 40)	56 weeks		40	1.55				
		Benralizumab 30 mg Q8W	3.1 ± 2.4 (n = 48)	56 weeks		48	1.01	0.65	0.39 to 1.09	35%	-9 to 61%
Bleecker 2016	Overall	Placebo	3.0 ± 1.8 (407)	48 weeks	Annual exacerbation rate was defined as the total number of exacerbations × 365·25 / total duration of follow-up within the treatment group (days). An asthma exacerbation was defined as a worsening of asthma that led to one of the following: (1) use of systemic corticosteroids for 3 days or more or a temporary increase in a stable, background dosage of oral corticosteroids; (2) an emergency department or urgent care visit (< 24 h) due to asthma that required systemic corticosteroids; or (3) an inpatient admission to hospital (≥ 24 h) due to asthma. Worsening of asthma was defined as any new or increased symptoms or signs that were concerning to the patient or related to an Asthma Daily Diary alert						
		Benralizumab 30 mg Q8W	2.8 ± 1.5 (398)	48 weeks							
	High - dosage ICS plus LABA with baseline blood eosinophils ≥ 300 cells/μL (n = 809)	Placebo	3.1 ± 2.0 (n = 267)	48 weeks		267	1.33				
		Benralizumab 30 mg Q8W	2.8 ± 1.5 (n = 267)	48 weeks		267	0.65	0.49	0.37 to 0.64	51%	36 to 63%
	High - dosage ICS plus LABA with baseline blood eosinophils < 300 cells/μL (n = 395)	Placebo	2.7 ± 1.5 (n = 140)	48 weeks		140	1.21				
		Benralizumab 30 mg Q8W	2.6 ± 1.3 (n = 131)	48 weeks		131	1.00	0.83	0.59 to 1.16	17%	-16 to 41%
FitzGerald 2016	Overall	Placebo	2.7 ± 1.6 (440)	56 weeks							
		Benralizumab 30 mg Q8W	2.7 ± 1.4 (441)	56 weeks							
	High-dosage ICS plus LABA with baseline blood eosinophils ≥ 300 cells/μL (n = 728)	Placebo	2.8 ± 1.7 (n = 248)	56 weeks		248	0.93				
		Benralizumab 30 mg Q8W	2.7 ± 1.3 (n = 239)	56 weeks		239	0.66	0.72	0.54 to 0.95	28%	5 to 46%
	High-dosage ICS plus LABA with baseline blood eosinophils < 300 cells/μL (n = 363)	Placebo	2.7 ± 1.9 (n = 122)	56 weeks		122	1.21				
		Benralizumab 30 mg Q8W	2.7 ± 1.7 (n = 125)	56 weeks		125	0.73	0.60	0.42 to 0.86	40%	14 to 58%
Yancey 2019 (NCT02281318, MUSCA)	150 to < 300 cells/μL	Placebo	NR	NR		136	NR				
		Mepolizumab	NR	NR			NR	0.73	0.40 to 1.31	27%	-31 to 60%
Yancey 2019 (NCT01691521, MENSA)	150 to < 300 cells/μL	Placebo	NR	NR		137	NR				
		Mepolizumab	NR	NR			NR	0.64	0.36 to 1.16	36%	-16 to 64%
Yancey 2019 (NCT01000506, DREAM)	150 to < 300 cells/μL	Placebo	NR	NR		146	NR				
		Mepolizumab	NR	NR			NR	0.51	0.29 to 0.90	49%	10 to 71%
Chupp 2017	Blood eosinophils ≥ 150 cells/μL	Placebo	NR	Week 24							
		Mepolizumab 100mg	NR	Week 24							
	Blood eosinophils ≥ 300 cells/μL	Placebo	NR	Week 24							
		Mepolizumab 100mg	NR	Week 24							
	Blood eosinophils ≥ 500 cells/μL	Placebo	NR	Week 24							
		Mepolizumab 100mg	NR	Week 24							
	Blood eosinophils ≥ 150 cells/μL (screening cut-off, whole population)	Placebo	2.7 ± 1.5 (total n = 277) Note: ≥ 150 EOS screening n = 240	Week 24		277 (240)	1.21				
		Mepolizumab 100mg	2.9 ± 1.9 (total n = 274) Note: ≥ 150 EOS screening n = 234	Week 24		274 (234)	0.51	0.42	0.31 to 0.56	58%	44 to 69%
Ortega 2016	DREAM - < 150 cells/μL	Placebo	NR	Week 52		34	1.92				
		Mepolizumab 75mg IV	NR	Week 52		39	1.45	0.75	0.43 to 1.34	25%	-34 to 57%
	DREAM - 150 to < 300 cells/μL	Placebo	NR	Week 52		35	2.26				
		Mepolizumab 75mg IV	NR	Week 52		45	1.36	0.60	0.32 to 1.13	40%	-13 to 68%
	DREAM - 300 to < 500 cells/μL	Placebo	NR	Week 52		36	1.65				
		Mepolizumab 75mg IV	NR	Week 52		31	1.21	0.73	0.40 to 1.33	27%	-33 to 60%
	DREAM - ≥ 500 cells/μL	Placebo	NR	Week 52		50	3.34				
		Mepolizumab 75mg IV	NR	Week 52		38	0.78	0.23	0.14 to 0.39	77%	61 to 86%
Ortega 2014	Blood eosinophils ≥ 150 cells/μL screening cut-off, whole population	Placebo	3.6 ± 2.8 (n = 191 all placebo group)	Week 32	Reduction of Clinically Significant Exacerbations at Week 32	191	1.74				
		Mepolizumab 75 mg IV	3.5 ± 2.2 (n = 191 all IV group)	Week 32		191	0.93	0.53	0.40 to 0.72	47%	28 to 60%
		Mepolizumab 100 mg SC	3.8 ± 2.7 (n = 194 all SC group)	Week 32		194	0.83	0.47	0.35 to 0.64	53%	36 to 65%
	Blood eosinophils ≥ 500 cells/μL (n = 177)	Placebo	NR	Week 32			2.26				
		Mepolizumab 75 mg IV	NR	Week 32		177	0.59	0.26	NR	74%	NR
		Mepolizumab 100 mg SC	NR	Week 32			0.47	0.21	NR	79%	NR
Pavord 2012	Blood eosinophils ≥ 300 cells/μL	Placebo	3.7 ± 3.8 (155)	Week 52	Clinically significant exacerbations—defined as worsening of asthma requiring use of oral corticosteroids for 3 or more days, admission, or a visit to the emergency department	155	2.40				
		Mepolizumab 75 mg IV	3.7 ± 3.1 (153)	Week 52		153	1.24	0.52	0.39 to 0.69	48%	31 to 61%
Castro 2015	Study 1 (NCT01287039): ITT population is blood eosinophils ≥ 400 cells/μL	Placebo	2.1 ± 2.3 (244)	Week 52	Clinical asthma exacerbations were defined as a worsening of asthma that resulted in the use of systemic corticosteroids in patients not already receiving treatment, or a two-times increase in the dose of either inhaled …	244	1.80				
		Reslizumab 3.0 mg/kg IV	1.9 ± 1.6 (245)	Week 52		245	0.90	0.50	0.37 to 0.67	50%	33 to 63%

Severe exacerbation event rate vs placebo (incl. ED visit and/or hospital admission)

Study / Subpopulation / Arm	Definition	Number of patients analyzed	Rate	Rate ratio estimate	95% CI	% reduction estimate	95% CI
Castro 2018, BEC ≥ 300, Placebo 1.14 mL	Change from baseline to week 52 in the annualized rate of severe exacerbation events defined as a deterioration of asthma requiring: use of systemic corticosteroids for ≥3 days; or hospitalization or emergency room visit because of asthma, requiring systemic corticosteroids.	148	1.081				
Castro 2018, BEC ≥ 300, Dupilumab 200 mg		264	0.37				
Castro 2018, BEC ≥ 300, Placebo 2.00 mL		142	1.236				
Castro 2018, BEC ≥ 300, Dupilumab 300 mg		277	0.403	0.326	0.234 to 0.454	67.40%	54.6 to 76.6
Castro 2018, BEC < 300, Placebo 1.14 mL		169	0.675				
Castro 2018, BEC < 300, Dupilumab 200 mg		366	0.512				
Castro 2018, BEC < 300, Placebo 2.00 mL		178	0.732				
Castro 2018, BEC < 300, Dupilumab 300 mg		356	0.610	0.834	0.608 to 1.144	16.6%	-14.4 to 39.2
Castro 2018, BEC ≥ 150, Placebo 1.14 mL		232	1.007 (0.814 to 1.245)				
Castro 2018, BEC ≥ 150, Dupilumab 200 mg		437	0.445 (0.368 to 0.538)				
Castro 2018, BEC ≥ 150, Placebo 2.00 mL		237	1.081 (0.879 to 1.329)				
Castro 2018, BEC ≥ 150, Dupilumab 300 mg		452	0.434 (0.359 to 0.525)	0.402	0.307 to 0.526	59.8%	47.4 to 69.3
Wenzel 2016, BEC ≥ 300, Placebo	Severe exacerbation event during the study was defined as a deterioration of asthma requiring use of systemic corticosteroids for ≥ 3 days, or hospitalization or ED visit because of asthma requiring systemic corticosteroids.	68	1.064				
Wenzel 2016, BEC ≥ 300, Dupilumab 200 mg		65	0.592	0.567	0.287 to 1.122	43.0%	-12.2 to 71.3
Wenzel 2016, BEC ≥ 300, Dupilumab 300 mg		64	0.626	0.600	0.306 to 1.117	40.0%	-17.7 to 69.4
Wenzel 2016, BEC < 300, Placebo		90	0.830				
Wenzel 2016, BEC < 300, Dupilumab 200 mg		85	0.355	0.428	0.236 to 0.777	57.2%	22.3 to 76.4
Wenzel 2016, BEC < 300, Dupilumab 300 mg		93	0.392	0.472	0.272 to 0.819	52.8%	18.1 to 72.8
Goldman 2017, SIROCCO ≥ 150, Placebo	Exacerbations associated with emergency department visits or hospitalizations.	306	0.23				
Goldman 2017, SIROCCO ≥ 150, Benralizumab		325	0.12	0.54	0.32 to 0.90	46%	10 to 68%
Goldman 2017, SIROCCO < 150, Placebo		74	0.16				
Goldman 2017, SIROCCO < 150, Benralizumab		48	0.31	1.92	0.72 to 5.14	-92%	-414 to 28%
Goldman 2017, CALIMA ≥ 150, Benralizumab				Not calculable	Not calculable		
Goldman 2017, CALIMA < 150, Benralizumab				Not calculable	Not calculable		
Bleecker 2016, ≥ 300, Placebo	Exacerbations resulting in adjudicated ED visit, urgent care visit, or hospitalisation over 48 weeks	267	0.18				
Bleecker 2016, ≥ 300, Benralizumab		267	0.06	0.37	0.20 to 0.67	63%	33 to 80%
FitzGerald 2016, ≥ 300, Placebo	Exacerbations resulting in adjudicated ED visit, urgent care visit, or hospitalisation for patients receiving high-dosage ICS/LABA over 56 weeks	248	0.04				
FitzGerald 2016, ≥ 300, Benralizumab		239	0.05	1.23	0.64 to 2.35	-23%	-135 to 36%
Chupp 2017, whole population, Placebo	1) Exacerbations requiring admissions to hospital or an ED visit 2) Exacerbations requiring admission to hospital	277 (240)	0.10 0.07				
Chupp 2017, whole population, Mepolizumab 100mg		274 (234)	0.03 0.02	0.32 0.31	0.12 to 0.90 0.08 to 1.24	68% 69%	10 - 88% -24 - 92%
Ortega 2014, ≥ 150, Placebo	1) Mean rate of exacerbations requiring hospitalization or emergency department visit 2) Mean rate of exacerbations requiring hospitalization	191	0.20 0.10				
Ortega 2014, ≥ 150, Mepolizumab 75 mg IV		191	0.14 0.06	0.68 0.61	0.33 to 1.41 0.23 to 1.66	32% 39%	-41 to 67% -66 to 77%
Ortega 2014, ≥ 150, Mepolizumab 100 mg SC		194	0.08 0.03	0.39 0.31	0.18 to 0.83 0.11 to 0.91	61% 69%	17 to 82% 9 to 89%
Pavord 2012, ≥ 300, Placebo	Rate of exacerbations requiring admission or visit to emergency department per patient NOTE: also for admission only: 0.61 (0.28 to 1.33)	155	0.43				
Pavord 2012, ≥ 300, Mepolizumab 75 mg IV		153	0.17	0.40	0.19 to 0.81	60%	19 to 81%
Castro 2015, Study 1, Placebo	Clinical asthma exacerbation (CAE) rate + episodes requiring hospital admission or ER …	244	0.21				
Castro 2015, Study 1, Reslizumab		245	0.14	0.66	0.32 to 1.36	34%	-36 to 68%

Pre-bronchodilator FEV_1 mean change from baseline (L) vs placebo

Study / Subpopulation / Arm	Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI
Menzies-Gow 2021, BEC ≥ 300, Placebo	Pre-bronchodilator FEV_1 (L); change from baseline adjusted means and 95% CIs over time	189	0.14		
Menzies-Gow 2021, BEC ≥ 300, Tezepelumab		189	0.37	0.23	0.15 to 0.31
Menzies-Gow 2021, BEC < 300, Placebo		264	0.06		
Menzies-Gow 2021, BEC < 300, Tezepelumab		282	0.13	0.07	0.00 to 0.13
Menzies-Gow 2021, BEC ≥ 150, Placebo		332	0.11		
Menzies-Gow 2021, BEC ≥ 150, Tezepelumab		347	0.28	0.17	0.11 to 0.23
Menzies-Gow 2021, BEC < 150, Placebo		121	0.07		
Menzies-Gow 2021, BEC < 150, Tezepelumab		124	0.10	0.03	-0.07 to 0.13
Menzies-Gow 2021, BEC 150 to 300, Placebo		143	0.06		
Menzies-Gow 2021, BEC 150 to 300, Tezepelumab		158	0.15	0.10	0.01 to 0.18
Menzies-Gow 2021, BEC 300 to 450, Placebo		84	0.10		
Menzies-Gow 2021, BEC 300 to 450, Tezepelumab		87	0.30	0.20	0.08 to 0.31
Menzies-Gow 2021, BEC ≥ 450, Placebo		105	0.17		
Menzies-Gow 2021, BEC ≥ 450, Tezepelumab		102	0.43	0.26	0.16 to 0.36
Menzies-Gow 2021, EOS ≥ 150 / FeNO ≥ 25, Placebo		206	0.14		
Menzies-Gow 2021, EOS ≥ 150 / FeNO ≥ 25, Tezepelumab		205	0.32	0.19	0.11 to 0.26
Menzies-Gow 2021, EOS ≥ 150 / FeNO < 25, Placebo		51	-0.04		
Menzies-Gow 2021, EOS ≥ 150 / FeNO < 25, Tezepelumab		49	0.16	0.20	0.05 to 0.35
Menzies-Gow 2021, EOS < 150 / FeNO ≥ 25, Placebo		125	0.05		
Menzies-Gow 2021, EOS < 150 / FeNO ≥ 25, Tezepelumab		118	0.19	0.14	0.04 to 0.24
Menzies-Gow 2021, EOS < 150 / FeNO < 25, Placebo		68	0.14		
Menzies-Gow 2021, EOS < 150 / FeNO < 25, Tezepelumab		74	0.05	-0.09	-0.21 to 0.04
Menzies-Gow 2021, EOS ≥ 300 / FeNO ≥ 25, Placebo		128	0.18		
Menzies-Gow 2021, EOS ≥ 300 / FeNO ≥ 25, Tezepelumab		139	0.40	0.22	0.13 to 0.31
Menzies-Gow 2021, EOS ≥ 300 / FeNO < 25, Placebo		61	0.05		
Menzies-Gow 2021, EOS ≥ 300 / FeNO < 25, Tezepelumab		48	0.32	0.26	0.12 to 0.41
Menzies-Gow 2021, EOS < 300 / FeNO ≥ 25, Placebo		129	0.03		
Menzies-Gow 2021, EOS < 300 / FeNO ≥ 25, Tezepelumab		135	0.19	0.16	0.07 to 0.25
Menzies-Gow 2021, EOS < 300 / FeNO < 25, Placebo		132	0.09		
Menzies-Gow 2021, EOS < 300 / FeNO < 25, Tezepelumab		144	0.07	-0.02	-0.11 to 0.07
Corren 2017, Overall, Placebo	FEV_1 before bronchodilation, Least squares mean change from baseline at wk 52 (L)	131	-0.06		
Corren 2017, Overall, Tezepelumab		121	0.08	0.13	0.03 to 0.23
Corren 2017, BEC ≥ 300, Placebo		69	-0.10		
Corren 2017, BEC ≥ 300, Tezepelumab		58	0.11	0.21	0.06 to 0.35
Corren 2017, BEC < 300, Placebo		62	-0.04		
Corren 2017, BEC < 300, Tezepelumab		63	0.01	0.05	-0.08 to 0.19
Corren 2017, BEC ≥ 150, Placebo		102	-0.10		
Corren 2017, BEC ≥ 150, Tezepelumab		90	0.07	0.18	0.06 to 0.29
Corren 2017, BEC < 150, Placebo		29	-0.006 (-0.01 rounded)		
Corren 2017, BEC < 150, Tezepelumab		31	-0.02	-0.02	-0.23 to 0.19
Corren 2017, BEC ≥ 450, Placebo		43	0.02		
Corren 2017, BEC ≥ 450, Tezepelumab		36	0.18	0.15	-0.05 to 0.35
Corren 2017, BEC 150 to < 300, Placebo		33	0.003 (0.00 rounded)		
Corren 2017, BEC 150 to < 300, Tezepelumab		32	0.11	0.11	-0.07 to 0.29
Corren 2017, BEC 300 to < 450, Placebo		26	-0.13		
Corren 2017, BEC 300 to < 450, Tezepelumab		22	0.10	0.24	0.04 to 0.43
Corren 2017, BEC < 250, Placebo	Difference vs placebo (95% CI) LS mean change from baseline at week 52 in Pre-BD FEV_1 (L)	57	-0.08		
Corren 2017, BEC < 250, Tezepelumab		56	0.01	0.08	-0.06 to 0.23
Corren 2017, BEC ≥ 250, Placebo		84	-0.03		
Corren 2017, BEC ≥ 250, Tezepelumab		72	0.10	0.13	0.01 to 0.26
Castro 2020, BEC ≥ 300, Placebo 1.14 mL	**Change in pre-bronchodilator FEV_1 at week 52.** Reported as least-square (LS) mean values and analysed using mixed-effects models with repeated measures (MMRM). The assigned study treatment arm, patient age, sex, height, geographic region, baseline blood eosinophil strata, baseline dose of ICS, visit, treatment-by-visit, corresponding baseline value of lung function measure and baseline-by-visit interaction were included as covariates. The MMRM included changes from baseline values in lung function variables during treatment from week 2 to week 52 as response variables.	113	0.17		
Castro 2020, BEC ≥ 300, Dupilumab 200 mg		206	0.47	0.30	0.21 to 0.39
Castro 2020, BEC ≥ 300, Placebo 2.00 mL		111	0.23		
Castro 2020, BEC ≥ 300, Dupilumab 300 mg		207	0.48	0.25	0.16 to 0.33
Castro 2020, BEC ≥ 150, Placebo 1.14 mL		175	0.15		
Castro 2020, BEC ≥ 150, Dupilumab 200 mg		341	0.40	0.25	0.18 to 0.32
Castro 2020, BEC ≥ 150, Placebo 2.00 mL		185	0.23		
Castro 2020, BEC ≥ 150, Dupilumab 300 mg		347	0.39	0.15	0.09 to 0.22
Castro 2020, EOS ≥ 150 / FeNO ≥ 25, Placebo 1.14 mL		101	0.18		
Castro 2020, EOS ≥ 150 / FeNO ≥ 25, Dupilumab 200 mg		189	0.51	0.33	0.24 to 0.43
Castro 2020, EOS ≥ 150 / FeNO ≥ 25, Placebo 2.00 mL		113	0.21		
Castro 2020, EOS ≥ 150 / FeNO ≥ 25, Dupilumab 300 mg		203	0.47	0.26	0.17 to 0.35
Castro 2018, BEC ≥ 300, Placebo 1.14 mL	12 week time point. The change from baseline in continuous end points such as the FEV_1 and patient-reported outcomes were analyzed with the use of a mixed-effects model with repeated measures, including assigned intervention, age, baseline eosinophil strata, baseline inhaled glucocorticoid dose, visit, intervention-by-visit interaction, the corresponding baseline value, and baseline-by-visit interaction as covariates. Sex and baseline height were included as covariates only in the models for spirometric values.	144	0.21		
Castro 2018, BEC ≥ 300, Dupilumab 200 mg		256	0.43	0.21	0.13 to 0.29
Castro 2018, BEC ≥ 300, Placebo 2.00 mL		139	0.22		
Castro 2018, BEC ≥ 300, Dupilumab 300 mg		266	0.47	0.24	0.16 to 0.32
Castro 2018, BEC 150 to < 300, Placebo 1.14 mL		80	0.17		
Castro 2018, BEC 150 to < 300, Dupilumab 200 mg		169	0.28	0.11	0.01 to 0.21
Castro 2018, BEC 150 to < 300, Placebo 2.00 mL		90	0.25		
Castro 2018, BEC 150 to < 300, Dupilumab 300 mg		168	0.25	0.00	-0.10 to 0.10
Castro 2018, BEC < 150, Placebo 1.14 mL		83	0.13		
Castro 2018, BEC < 150, Dupilumab 200 mg		185	0.19	0.06	-0.04 to 0.15
Castro 2018, BEC < 150, Placebo 2.00 mL		83	0.11		
Castro 2018, BEC < 150, Dupilumab 300 mg		176	0.20	0.09	-0.01 to 0.18
Castro 2018, BEC < 300, Placebo 1.14 mL		163	0.12		
Castro 2018, BEC < 300, Dupilumab 200 mg		354	0.21	NR	NR
Castro 2018, BEC < 300, Placebo 2.00 mL		173	0.17		
Castro 2018, BEC < 300, Dupilumab 300 mg		344	0.21	NR	NR
Castro 2018, BEC ≥ 150, Placebo 1.14 mL		224	0.17		
Castro 2018, BEC ≥ 150, Dupilumab 200 mg		425	0.34		
Castro 2018, BEC ≥ 150, Placebo 2.00 mL		229	0.21		
Castro 2018, BEC ≥ 150, Dupilumab 300 mg		434	0.35	0.15	0.09 to 0.21
Wenzel 2016, BEC ≥ 300, Placebo	LS mean change in FEV_1 from baseline at week 24 (L), analysed with a mixed-effect model with repeated-measures approach; also reported at week 12	68	0.22		
Wenzel 2016, BEC ≥ 300, Dupilumab 200 mg		65	0.38	0.16	0.02 to 0.31
Wenzel 2016, BEC ≥ 300, Dupilumab 300 mg		64	0.38	0.16	0.01 to 0.30
Wenzel 2016, BEC < 300, Placebo		90	0.09		
Wenzel 2016, BEC < 300, Dupilumab 200 mg		85	0.23	0.14	0.03 to 0.25
Wenzel 2016, BEC < 300, Dupilumab 300 mg		93	0.23	0.14	0.03 to 0.24
Harrison 2021, BEC ≥ 300, Placebo	Prebronchodilator FEV_1 measured using spirometry at the study centre as a secondary endpoint. LS mean difference	153	0.170		
Harrison 2021, BEC ≥ 300, Benralizumab		278	0.360	0.191	0.110 to 0.270
Goldman 2017, SIROCCO ≥ 150, Placebo	Prebronchodilator FEV_1 - FEV_1 was measured by spirometry at the study center, with equipment provided by a central vendor. Spirometry was performed according to American Thoracic Society/European Respiratory Society (ATS/ERS) guidelines by the investigator or authorized delegate. Change from baseline in pre-bronchodilator FEV_1 compared using a mixed-effects model for repeated measures analysis, with adjustment for treatment, region, baseline value, oral corticosteroid use at the time of randomization, visit, and visit × treatment. Least squares mean treatment differences vs placebo at end of treatment.	300	0.160		
Goldman 2017, SIROCCO ≥ 150, Benralizumab		323	0.323	0.163	0.087 to 0.239
Goldman 2017, SIROCCO < 150, Placebo		72	0.125		
Goldman 2017, SIROCCO < 150, Benralizumab		46	0.265	0.140	-0.045 to 0.325
Goldman 2017, CALIMA ≥ 150, Placebo		308	0.169		
Goldman 2017, CALIMA ≥ 150, Benralizumab		298	0.286	0.116	0.041 to 0.191
Goldman 2017, CALIMA < 150, Placebo		37	0.164		
Goldman 2017, CALIMA < 150, Benralizumab		46	0.033	-0.131	-0.306 to 0.045
Bleecker 2016, ≥ 300, Placebo	Prebronchodilator FEV_1 - FEV_1 was measured by spirometry at the study center, with equipment provided by a central vendor. Spirometry was performed according to American Thoracic Society/European Respiratory Society (ATS/ERS) guidelines by the investigator or authorized delegate. Change from baseline in pre-bronchodilator FEV_1 compared using a mixed-effects model for repeated measures analysis, with adjustment for treatment, region, baseline value, oral corticosteroid use at the time of randomization, visit, and visit × treatment. Least squares mean treatment differences vs placebo at end of treatment.	261	0.239		
Bleecker 2016, ≥ 300, Benralizumab		264	0.398	0.159	0.068 to 0.249
Bleecker 2016, < 300, Placebo		138	0.145		
Bleecker 2016, < 300, Benralizumab		129	0.248	0.102	0.003 to 0.208
FitzGerald 2016, ≥ 300, Placebo		244	0.215		
FitzGerald 2016, ≥ 300, Benralizumab		238	0.330	0.116	0.028 to 0.204
FitzGerald 2016, < 300, Placebo		116	0.156		
FitzGerald 2016, < 300, Benralizumab		121	0.140	-0.015	-0.127 to 0.096
Chupp 2017, whole population, Placebo	Pre-bronchodilator at week 24	277 (259)	0.056		
Chupp 2017, whole population, Mepolizumab 100mg		274 (264)	0.176	0.120	0.047 to 0.192
Ortega 2014, ≥ 150, Placebo	Pre-bronchodilator	191	0.086		
Ortega 2014, ≥ 150, Mepolizumab 75 mg IV		191	0.186	0.100	0.013 to 0.187
Ortega 2014, ≥ 150, Mepolizumab 100 mg SC		194	0.183	0.098	0.011 to 0.184
Ortega 2014, ≥ 500, Placebo			0.134		
Ortega 2014, ≥ 500, Mepolizumab 75 mg IV		177	0.319	0.185	NR
Ortega 2014, ≥ 500, Mepolizumab 100 mg SC			0.266	0.132	NR
Pavord 2012, ≥ 300, Placebo	Pre-bronchodilator	155	0.060		
Pavord 2012, ≥ 300, Mepolizumab 75 mg IV		153	0.121	0.061	-39 to 161 (-0.039 to 0.161)
Castro 2015, Study 1, Placebo	For each week and overall change, inferential statistics were from mixed model repeated measures (MMRM) with treatment, visit, treatment by visit interaction, region, oral glucocorticoids …	244	0.109		
Castro 2015, Study 1, Reslizumab		245	0.235	0.126	0.06 to 0.188

Post-bronchodilator FEV_1 mean change from baseline (L) vs placebo

Study / Subpopulation / Arm	Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI
Castro 2020, BEC ≥ 300, Placebo 1.14 mL	Change in post-bronchodilator FEV_1 at week 52. Reported as least-square (LS) mean values and analysed using mixed-effects models with repeated measures (MMRM). The assigned study treatment arm, patient age, sex, height, geographic region, baseline blood eosinophil strata, baseline dose of ICS, visit, treatment-by-visit, corresponding baseline value of lung function measure and baseline-by-visit interaction were included as covariates. The MMRM included changes from baseline values in lung function variables during treatment from week 2 to week 52 as response variables.	113	-0.01		
Castro 2020, BEC ≥ 300, Dupilumab 200 mg		217	0.29	0.30	0.22 to 0.38
Castro 2020, BEC ≥ 300, Placebo 2.00 mL		115	0.03		
Castro 2020, BEC ≥ 300, Dupilumab 300 mg		211	0.25	0.22	0.14 to 0.30
Castro 2020, BEC ≥ 150, Placebo 1.14 mL		174	-0.04		
Castro 2020, BEC ≥ 150, Dupilumab 200 mg		357	0.20	0.24	0.18 to 0.30
Castro 2020, BEC ≥ 150, Placebo 2.00 mL		188	0.01		
Castro 2020, BEC ≥ 150, Dupilumab 300 mg		352	0.16	0.15	0.09 to 0.21
Castro 2020, EOS ≥ 150 / FeNO ≥ 25, Placebo 1.14 mL		100	0.00		
Castro 2020, EOS ≥ 150 / FeNO ≥ 25, Dupilumab 200 mg		196	0.28	0.28	0.19 to 0.36
Castro 2020, EOS ≥ 150 / FeNO ≥ 25, Placebo 2.00 mL		113	0.00		
Castro 2020, EOS ≥ 150 / FeNO ≥ 25, Dupilumab 300 mg		206	0.24	0.24	0.15 to 0.32
Bleecker 2016, ≥ 300, Placebo	Post-bronchodilator FEV_1 change from baseline at week 48 in patients with blood eosinophil ≥ 300 cells/μL	245	0.134		
Bleecker 2016, ≥ 300, Benralizumab		238	0.233	0.099	0.007 to 0.192
Bleecker 2016, < 300, Placebo		NR	NR		
Bleecker 2016, < 300, Benralizumab		NR	NR	NR	NR
FitzGerald 2016, ≥ 300, Placebo	Post-bronchodilator FEV_1 change from baseline at week 56 in patients with baseline eosinophil ≥ 300 cells/μL	239	0.067		
FitzGerald 2016, ≥ 300, Benralizumab		234	0.172	0.105	0.029 to 0.180
FitzGerald 2016, < 300, Placebo		NR	NR		
FitzGerald 2016, < 300, Benralizumab		NR	NR	NR	NR
Ortega 2014, ≥ 150, Placebo	Post-bronchodilator	191	0.030		
Ortega 2014, ≥ 150, Mepolizumab 75 mg IV		191	0.176	0.146	0.050 to 0.242
Ortega 2014, ≥ 150, Mepolizumab 100 mg SC		194	0.167	0.138	0.043 to 0.232
Ortega 2014, ≥ 500, Placebo			0.091		
Ortega 2014, ≥ 500, Mepolizumab 75 mg IV		177	0.409	318	NR
Ortega 2014, ≥ 500, Mepolizumab 100 mg SC			0.313	222	NR
Pavord 2012, ≥ 300, Placebo	Post-bronchodilator	155	-9 (26.7)	NR	NR
Pavord 2012, ≥ 300, Mepolizumab 75 mg IV		153	36 (26.4)	NR	NR

ACQ-5 score: change from baseline vs placebo

Study / Subpopulation / Arm	Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI	Responder analyses
Wenzel 2016, BEC ≥ 300, Placebo	LS mean difference vs placebo in ACQ-5 score from baseline to week 24	68	-1.17			
Wenzel 2016, BEC ≥ 300, Dupilumab 200 mg		65	-1.59	-0.42	-0.76 to -0.07	
Wenzel 2016, BEC ≥ 300, Dupilumab 300 mg		64	-1.72	-0.55	-0.90 to -0.20	
Wenzel 2016, BEC < 300, Placebo		90	-1.13			
Wenzel 2016, BEC < 300, Dupilumab 200 mg		85	-1.46	-0.33	-0.61 to -0.05	
Wenzel 2016, BEC < 300, Dupilumab 300 mg		93	-1.29	-0.17	-0.44 to 0.10	
Chupp 2017, BEC ≥ 150, Placebo	ACQ-5 score responders were defined as patients achieving a ≥ 0.5-point reduction from baseline in ACQ-5 score at Week 24	235	NR			n = 96 (41%)
Chupp 2017, BEC ≥ 150, Mepolizumab 100mg		222	NR	NR	NR	n = 139 (63%)
Chupp 2017, BEC ≥ 300, Placebo		166	NR			n = 62 (37%)
Chupp 2017, BEC ≥ 300, Mepolizumab 100mg		156	NR	NR	NR	n = 98 (63%)
Chupp 2017, BEC ≥ 500, Placebo		94	NR			n = 35 (37%)
Chupp 2017, BEC ≥ 500, Mepolizumab 100mg		93	NR	NR	NR	n = 58 (62%)
Chupp 2017, whole population, Placebo		276	-0.4			n = 116 (42%)
Chupp 2017, whole population, Mepolizumab 100mg		274	-0.8	-0.4	-0.6 to -0.2	n = 161 (59%)
Ortega 2014, ≥ 150, Placebo		191	-0.50			
Ortega 2014, ≥ 150, Mepolizumab 75 mg IV		191	-0.92	-0.42	-0.61 to -0.23	
Ortega 2014, ≥ 150, Mepolizumab 100 mg SC		194	-0.94	-0.44	-0.63 to -0.25	
Ortega 2014, ≥ 500, Placebo			-0.45			
Ortega 2014, ≥ 500, Mepolizumab 75 mg IV		177	-1.23	-0.78	NR	
Ortega 2014, ≥ 500, Mepolizumab 100 mg SC			-1.19	-0.75	NR	

ACQ-6 score: change from baseline vs placebo

Study / Subpopulation / Arm	Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI
Menzies-Gow 2021, BEC ≥ 300, Placebo	Asthma Control Questionnaire–6 (ACQ-6), range, 0 [no impairment] to 6 [maximum impairment]	198	-1.28		
Menzies-Gow 2021, BEC ≥ 300, Tezepelumab		201	-1.78	-0.50	-0.69 to -0.31
Menzies-Gow 2021, BEC < 300, Placebo		274	-1.15		
Menzies-Gow 2021, BEC < 300, Tezepelumab		284	-1.36	-0.21	-0.37 to -0.05
Menzies-Gow 2021, BEC ≥ 150, Placebo		352	-1.25		
Menzies-Gow 2021, BEC ≥ 150, Tezepelumab		362	-1.66	-0.41	-0.56 to -0.27
Menzies-Gow 2021, BEC < 150, Placebo		120	-1.08		
Menzies-Gow 2021, BEC < 150, Tezepelumab		120	-1.17	-0.09	-0.33 to 0.16
Menzies-Gow 2021, BEC 150 to 300, Placebo		154	-1.20		
Menzies-Gow 2021, BEC 150 to 300, Tezepelumab		161	-1.51	-0.31	-0.53 to -0.09
Menzies-Gow 2021, BEC 300 to 450, Placebo		87	-1.18		
Menzies-Gow 2021, BEC 300 to 450, Tezepelumab		92	-1.71	-0.53	-0.82 to -0.23
Menzies-Gow 2021, BEC ≥ 450, Placebo		111	-1.36		
Menzies-Gow 2021, BEC ≥ 450, Tezepelumab		109	-1.84	-0.48	-0.74 to -0.22
Corren 2017, Overall, Placebo	Asthma Control Questionnaire–6 (ACQ-6), range, 0 [no impairment] to 6 [maximum impairment]. Least squares mean change from baseline at wk 52.	53	-0.91		
Corren 2017, Overall, Tezepelumab		44	-1.20	-0.29	-0.56 to -0.03
Corren 2017, BEC ≥ 300, Placebo	Week 50 data	60	-0.99		
Corren 2017, BEC ≥ 300, Tezepelumab		53	-1.45	-0.46	-0.79 to -0.12
Corren 2017, BEC < 300, Placebo		52	-0.83		
Corren 2017, BEC < 300, Tezepelumab		57	-1.09	-0.26	-0.57 to 0.05
Corren 2017, BEC ≥ 150, Placebo		87	-0.93		
Corren 2017, BEC ≥ 150, Tezepelumab		83	-1.27	-0.35	-0.61 to -0.08
Corren 2017, BEC < 150, Placebo		25	-0.76		
Corren 2017, BEC < 150, Tezepelumab		27	-1.06	-0.30	-0.75 to 0.14
Corren 2017, BEC ≥ 450, Placebo		38	-1.03		
Corren 2017, BEC ≥ 450, Tezepelumab		32	-1.59	-0.56	-0.97 to -0.15
Corren 2017, BEC 150 to < 300, Placebo		27	-0.90		
Corren 2017, BEC 150 to < 300, Tezepelumab		30	-1.04	-0.14	-0.59 to 0.31
Corren 2017, BEC 300 to < 450, Placebo		22	-0.91		
Corren 2017, BEC 300 to < 450, Tezepelumab		21	-1.23	-0.32	-0.87 to 0.24
Corren 2017, BEC < 250, Placebo	Difference vs placebo (95% CI) LS mean ACQ-6 change from baseline at week 50[a] [a] A substantially lower proportion of patients completed the eDiary at week 52 than at weeks 48 and 50 due to a programming flaw within the eDiary which prevented patients from completing all of the questionnaires at week 52.	44	-0.91		
Corren 2017, BEC < 250, Tezepelumab		50	-1.16	-0.25	-0.58 to 0.09
Corren 2017, BEC ≥ 250, Placebo		48	-0.86		
Corren 2017, BEC ≥ 250, Tezepelumab		60	-1.29	-0.43	-0.74 to -0.13
Harrison 2021, BEC ≥ 300, Placebo	Questions (one bronchodilator use question and five symptom questions) were weighted equally and scored from 0 (totally controlled) to 6 (severely uncontrolled), with individual change scores of at least 0·5 considered clinically meaningful and used for the responder analysis at week 24. ACQ-6 scores of 0·75 or less indicated well-controlled asthma, scores between 0·75 and less than 1·5 indicated partly controlled asthma, and a score of 1·5 or more indicated uncontrolled asthma	155	-1.05		
Harrison 2021, BEC ≥ 300, Benralizumab		277	-1.66	-0.61	-0.84 to -0.39
Goldman 2017, SIROCCO ≥ 150, Placebo	The ACQ-6 assessed asthma symptoms (night-time waking, symptoms on waking, activity limitation, shortness of breath, and wheezing) and short-acting bronchodilator use. Patients were asked to recall their experiences during the previous week, and to score each of the questions on a 7-point scale ranging from 0 (totally controlled) to 6 (severely uncontrolled). The overall score was calculated as the mean response to all questions. Least-squares mean change from baseline at wk 48 (SIROCCO) and at wk 56 (CALIMA).	305	-1.13		
Goldman 2017, SIROCCO ≥ 150, Benralizumab		321	-1.27	-0.15	-0.31 to 0.02
Goldman 2017, SIROCCO < 150, Placebo		73	-0.62		
Goldman 2017, SIROCCO < 150, Benralizumab		47	-1.32	-0.70	-1.15 to -0.25
Goldman 2017, CALIMA ≥ 150, Placebo		314	-1.08		
Goldman 2017, CALIMA ≥ 150, Benralizumab		300	-1.30	-0.22	-0.39 to -0.06
Goldman 2017, CALIMA < 150, Placebo		40	-0.84		
Goldman 2017, CALIMA < 150, Benralizumab		48	-0.91	-0.07	-0.56 to 0.43
Bleecker 2016, ≥ 300, Placebo	The ACQ-6 assessed asthma symptoms (night-time waking, symptoms on waking, activity limitation, shortness of breath, and wheezing) and short-acting bronchodilator use. Patients were asked to recall their experiences during the previous week, and to score each of the questions on a 7-point scale ranging from 0 (totally controlled) to 6 (severely uncontrolled). The overall score was calculated as the mean response to all questions. Least-squares mean change from baseline at wk 48.	267	-1.17		
Bleecker 2016, ≥ 300, Benralizumab		263	-1.46	-0.29	-0.48 to -0.10
Bleecker 2016, < 300, Placebo		138	-0.89		
Bleecker 2016, < 300, Benralizumab		130	-1.11	-0.22	-0.48 to 0.05
FitzGerald 2016, ≥ 300, Placebo	The ACQ-6 assessed asthma symptoms (night-time waking, symptoms on waking, activity limitation, shortness of breath, and wheezing) and short-acting bronchodilator use24. Patients were asked to recall their experiences during the previous week, and to score each of the questions on a 7-point scale ranging from 0 (totally controlled) to 6 (severely uncontrolled). The overall score was calculated as the mean response to all questions. Least-squares mean change from baseline at wk 56.	247	-1.19		
FitzGerald 2016, ≥ 300, Benralizumab		239	-1.44	-0.25	-0.44 to -0.07
FitzGerald 2016, < 300, Placebo		122	-0.89		
FitzGerald 2016, < 300, Benralizumab		125	-1.00	-0.10	-0.37 to 0.16
Pavord 2012, ≥ 300, Placebo		155	-0.59		
Pavord 2012, ≥ 300, Mepolizumab 75 mg IV		153	-0.75	-0.16	-0.39 to 0.07

ACQ-7 score: change from baseline vs placebo

Study / Subpopulation / Arm	Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI
Castro 2015, Study 1, Placebo		244	-0.76		
Castro 2015, Study 1, Reslizumab		245	-1.02	-0.26	-0.39 to -0.12

AQOL / AQLQ score: change from baseline vs placebo

Study / Subpopulation / Arm	Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI
Menzies-Gow 2021, BEC ≥ 300, Placebo	Asthma Quality of Life Questionnaire (AQLQ), range, 1 [maximum impairment] to 7 [no impairment]	196	1.21		
Menzies-Gow 2021, BEC ≥ 300, Tezepelumab		198	1.71	0.51	0.30 to 0.71
Menzies-Gow 2021, BEC < 300, Placebo		271	1.10		
Menzies-Gow 2021, BEC < 300, Tezepelumab		282	1.31	0.21	0.04 to 0.39
Menzies-Gow 2021, BEC ≥ 150, Placebo		348	1.21		
Menzies-Gow 2021, BEC ≥ 150, Tezepelumab		358	1.62	0.41	0.26 to 0.57
Menzies-Gow 2021, BEC < 150, Placebo		119	0.96		
Menzies-Gow 2021, BEC < 150, Tezepelumab		122	1.07	0.11	-0.14 to 0.37
Menzies-Gow 2021, BEC 150 to 300, Placebo		152	1.21		
Menzies-Gow 2021, BEC 150 to 300, Tezepelumab		160	1.50	0.30	0.06 to 0.53
Menzies-Gow 2021, BEC 300 to 450, Placebo		86	1.18		
Menzies-Gow 2021, BEC 300 to 450, Tezepelumab		91	1.65	0.47	0.15 to 0.78
Menzies-Gow 2021, BEC ≥ 450, Placebo		110	1.23		
Menzies-Gow 2021, BEC ≥ 450, Tezepelumab		107	1.77	0.54	0.26 to 0.82
Corren 2017, Overall, Placebo	AQLQ(S)+12 scores range from 1 to 7, with higher scores indicating better asthma-related quality of life. The minimal clinically important difference is 0.5 points.	47	0.97		
Corren 2017, Overall, Tezepelumab		41	1.17	0.20	-0.09 to 0.48
Corren 2017, BEC ≥ 300, Placebo	Week 48 data	58	1.04		
Corren 2017, BEC ≥ 300, Tezepelumab		47	1.38	0.34	-0.03 to 0.71
Corren 2017, BEC < 300, Placebo		47	0.86		
Corren 2017, BEC < 300, Tezepelumab		50	1.18	0.32	-0.01 to 0.65
Corren 2017, BEC ≥ 150, Placebo		82	0.93		
Corren 2017, BEC ≥ 150, Tezepelumab		72	1.22	0.29	0.00 to 0.59
Corren 2017, BEC < 150, Placebo		23	0.89		
Corren 2017, BEC < 150, Tezepelumab		25	1.33	0.44	-0.02 to 0.89
Corren 2017, BEC ≥ 450, Placebo		37	1.01		
Corren 2017, BEC ≥ 450, Tezepelumab		27	1.40	0.39	-0.08 to 0.85
Corren 2017, BEC 150 to < 300, Placebo		24	0.87		
Corren 2017, BEC 150 to < 300, Tezepelumab		25	1.06	0.19	-0.30 to 0.68
Corren 2017, BEC 300 to < 450, Placebo		21	1.00		
Corren 2017, BEC 300 to < 450, Tezepelumab		20	1.32	0.32	-0.29 to 0.94
Corren 2017, BEC < 250, Placebo	Difference vs placebo (95% CI) LS mean AQLQ(S)+12 change from baseline at week 48[a] [a] A substantially lower proportion of patients completed the eDiary at week 52 than at weeks 48 and 50 due to a programming flaw within the eDiary which prevented patients from completing all of the questionnaires at week 52.	43	0.92		
Corren 2017, BEC < 250, Tezepelumab		43	1.18	0.26	-0.08 to 0.60
Corren 2017, BEC ≥ 250, Placebo		62	0.87		
Corren 2017, BEC ≥ 250, Tezepelumab		54	1.23	0.36	0.02 to 0.70
Wenzel 2016, BEC ≥ 300, Placebo		68	0.79		
Wenzel 2016, BEC ≥ 300, Dupilumab 200 mg		65	1.46	0.67	0.31 to 1.03
Wenzel 2016, BEC ≥ 300, Dupilumab 300 mg		64	1.57	0.78	0.42 to 1.15
Wenzel 2016, BEC < 300, Placebo		90	1.01		
Wenzel 2016, BEC < 300, Dupilumab 200 mg		85	1.06	0.05	-0.26 to 0.36
Wenzel 2016, BEC < 300, Dupilumab 300 mg		93	1.07	0.06	-0.24 to 0.36
Goldman 2017, SIROCCO ≥ 150, Placebo	Standardised Asthma Quality of Life Questionnaire for 12 years and older (AQLQ(S)+12), a 32-item questionnaire to assess asthma-related quality of life scored on a 1–7 scale. Four separate domains were part of the questionnaire: symptoms, activity limitations, emotional function, and environmental stimuli. Patients were asked to recall their experiences during the previous 2 weeks and to score each of the questions on a 7-point scale ranging from 7 (no impairment) to 1 (severe impairment). The overall score was calculated as the mean response to all questions. Least-squares mean change from baseline at wk 48 (SIROCCO) and at wk 56 (CALIMA).	294	1.18		
Goldman 2017, SIROCCO ≥ 150, Benralizumab		307	1.37	0.19	0.05 to 0.37
Goldman 2017, SIROCCO < 150, Placebo		70	0.77		
Goldman 2017, SIROCCO < 150, Benralizumab		46	1.24	0.46	-0.01 to 0.94
Goldman 2017, CALIMA ≥ 150, Placebo		305	1.19		
Goldman 2017, CALIMA ≥ 150, Benralizumab		292	1.39	0.20	0.02 to 0.38
Goldman 2017, CALIMA < 150, Placebo		39	0.98		
Goldman 2017, CALIMA < 150, Benralizumab		46	0.97	-0.01	-0.48 to 0.47
Bleecker 2016, ≥ 300, Placebo	Standardised Asthma Quality of Life Questionnaire for 12 years and older (AQLQ(S)+12), a 32-item questionnaire to assess asthma-related quality of life scored on a 1–7 scale. Four separate domains were part of the questionnaire: symptoms, activity limitations, emotional function, and environmental stimuli. Patients were asked to recall their experiences during the previous 2 weeks and to score each of the questions on a 7-point scale ranging from 7 (no impairment) to 1 (severe impairment). The overall score was calculated as the mean response to all questions. Least-squares mean change from baseline at wk 48.	254	1.26		
Bleecker 2016, ≥ 300, Benralizumab		252	1.56	0.30	0.10 to 0.50
Bleecker 2016, < 300, Placebo		NR	NR		
Bleecker 2016, < 300, Benralizumab		NR	NR	NR	NR
FitzGerald 2016, ≥ 300, Placebo	Standardised Asthma Quality of Life Questionnaire for 12 years and older (AQLQ(S)+12), a 32-item questionnaire to assess asthma-related quality of life scored on a 1–7 scale. Four separate domains were part of the questionnaire: symptoms, activity limitations, emotional function, and environmental stimuli. Patients were asked to recall their experiences during the previous 2 weeks and to score each of the questions on a 7-point scale ranging from 7 (no impairment) to 1 (severe impairment). The overall score was calculated as the mean response to all questions. Least-squares mean change from baseline at wk 56.	240	1.31		
FitzGerald 2016, ≥ 300, Benralizumab		230	1.56	0.24	0.04 to 0.45
FitzGerald 2016, < 300, Placebo		NR	NR		
FitzGerald 2016, < 300, Benralizumab		NR	NR	NR	NR
Pavord 2012, ≥ 300, Placebo		155	0.71		
Pavord 2012, ≥ 300, Mepolizumab 75 mg IV		153	0.80	0.08	-0.16 to 0.32
Castro 2015, Study 1, Placebo		244	0.79		
Castro 2015, Study 1, Reslizumab		245	1.09	0.30	0.14 to 0.47

ASD overall score change from baseline vs placebo

Study / Subpopulation / Arm	Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI
Menzies-Gow 2021, BEC ≥ 300, Placebo	Asthma Symptom Diary (ASD; range, 0 [no symptoms] to 4 [worst possible symptoms]) Weekly mean	146	-0.59		
Menzies-Gow 2021, BEC ≥ 300, Tezepelumab		154	-0.82	-0.23	-0.35 to -0.11
Menzies-Gow 2021, BEC < 300, Placebo		209	-0.58		
Menzies-Gow 2021, BEC < 300, Tezepelumab		220	-0.61	-0.03	-0.12 to 0.07
Menzies-Gow 2021, BEC ≥ 150, Placebo		266	-0.61		
Menzies-Gow 2021, BEC ≥ 150, Tezepelumab		285	-0.75	-0.15	-0.24 to -0.06
Menzies-Gow 2021, BEC < 150, Placebo		89	-0.53		
Menzies-Gow 2021, BEC < 150, Tezepelumab		89	-0.53	0.00	-0.15 to 0.15
Menzies-Gow 2021, BEC 150 to 300, Placebo		120	-0.62		
Menzies-Gow 2021, BEC 150 to 300, Tezepelumab		131	-0.67	-0.05	-0.18 to 0.08
Menzies-Gow 2021, BEC 300 to 450, Placebo		62	-0.55		
Menzies-Gow 2021, BEC 300 to 450, Tezepelumab		68	-0.79	-0.25	-0.42 to -0.07
Menzies-Gow 2021, BEC ≥ 450, Placebo		84	-0.62		
Menzies-Gow 2021, BEC ≥ 450, Tezepelumab		86	-0.84	-0.22	-0.38 to -0.07

SGRQ score change from baseline vs placebo

Study / Subpopulation / Arm	Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI	Responder analyses
Menzies-Gow 2021, BEC ≥ 300, Placebo	St George's Respiratory Questionnaire (SGRQ) total score change from baseline vs placebo (LS mean difference)	154	-16.60			
Menzies-Gow 2021, BEC ≥ 300, Tezepelumab		157	-25.68	-9.09	-13.27 to -4.90	
Menzies-Gow 2021, BEC < 300, Placebo		222	-15.34			
Menzies-Gow 2021, BEC < 300, Tezepelumab		232	-19.31	-3.97	-7.44 to -0.51	
Harrison 2021, BEC ≥ 300, Placebo	The SGRQ is a 50-item PRO instrument developed to measure the health status of patients with airway obstruction diseases. The SGRQ total score indicates the impact of disease on overall health status, and is expressed as a percentage of overall impairment (100 indicates worst possible health status and 0 indicates best possible health status). A mean change score of 4 units on the SGRQ is associated with a minimum clinically important difference (MCID). LS mean difference. Responder analysis = improvement at Week 24	146	-15.46			144 (63%)
Harrison 2021, BEC ≥ 300, Benralizumab		260	-26.62	-11.16	-15.10 to -7.23	308 (72%)
Chupp 2017, BEC ≥ 150, Placebo	SGRQ, St George's Respiratory Questionnaire (SGRQ) total score responders were defined as patients achieving a ≥4-point reduction from baseline in SGRQ score at Week 24	234	NR			129 (55%)
Chupp 2017, BEC ≥ 150, Mepolizumab 100mg		222	NR	NR	NR	163 (73%)
Chupp 2017, BEC ≥ 300, Placebo		165	NR			89 (54%)
Chupp 2017, BEC ≥ 300, Mepolizumab 100mg		156	NR	NR	NR	114 (73%)
Chupp 2017, BEC ≥ 500, Placebo		94	NR			54 (57%)
Chupp 2017, BEC ≥ 500, Mepolizumab 100mg		91	NR	NR	NR	69 (74%)
Chupp 2017, whole population, Placebo		275	-7.9			151 (55%)
Chupp 2017, whole population, Mepolizumab 100mg		273	-15.6	-7.7	-10.5 to -4.9	198 (73%)
Ortega 2014, ≥ 150, Placebo	SGRQ scores are based on a scale of 0 to 100, with lower scores indicating better functioning; a change of 4 units is considered clinically relevant. Change from baseline vs placebo (Both placebo and Mepo treated groups had score reductions from baseline, points difference vs placebo score)	191	-9.0			
Ortega 2014, ≥ 150, Mepolizumab 75 mg IV		191	-15.4	-6.4	-9.7 to -3.2	
Ortega 2014, ≥ 150, Mepolizumab 100 mg SC		194	-16.0	-7.0	-10.2 to -3.8	
Ortega 2014, ≥ 500, Placebo			-8.6			
Ortega 2014, ≥ 500, Mepolizumab 75 mg IV		177	-20.9	-12.3		
Ortega 2014, ≥ 500, Mepolizumab 100 mg SC			-17.5	-8.9		

Total asthma symptom score mean change vs placebo

Study / Subpopulation / Arm	Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI
Goldman 2017, SIROCCO ≥ 150, Placebo	Asthma symptom scores were derived from night-time and daytime symptom recordings by patients each morning and evening, respectively, with electronic patient-reported outcome devices. Symptoms were reported on a 4-point response scale (0–3), with 0 indicating no symptoms. In addition, symptom severity was rated from 1 (low) to 3 (high). Total asthma symptom score was a sum of night-time and morning scores, with a maximum score of 6.	306	-0.95		
Goldman 2017, SIROCCO ≥ 150, Benralizumab		320	-1.18	-0.23	-0.41 to -0.06
Goldman 2017, SIROCCO < 150, Placebo		73	-0.80		
Goldman 2017, SIROCCO < 150, Benralizumab		47	-1.20	-0.40	-0.78 to -0.03
Goldman 2017, CALIMA ≥ 150, Placebo		314	-1.08		
Goldman 2017, CALIMA ≥ 150, Benralizumab		298	-1.24	-0.16	-0.33 to 0.01
Goldman 2017, CALIMA < 150, Placebo		40	-0.84		
Goldman 2017, CALIMA < 150, Benralizumab		48	-0.79	0.04	-0.37 to 0.45
Bleecker 2016, ≥ 300, Placebo	Asthma symptom scores were derived from night-time and daytime symptom recordings by patients each morning and evening, respectively, with electronic patient-reported outcome devices. Symptoms were reported on a 4-point response scale (0–3), with 0 indicating no symptoms. In addition, symptom severity was rated from 1 (low) to 3 (high). Total asthma symptom score was a sum of night-time and morning scores, with a maximum score of 6.	267	-1.04		
Bleecker 2016, ≥ 300, Benralizumab		263	-1.30	-0.25	-0.45 to -0.06
Bleecker 2016, < 300, Placebo		139	-0.77		
Bleecker 2016, < 300, Benralizumab		127	-1.06	-0.29	-0.57 to -0.01
FitzGerald 2016, ≥ 300, Placebo		247	-1.16		
FitzGerald 2016, ≥ 300, Benralizumab		237	-1.40	-0.23	-0.43 to -0.04
FitzGerald 2016, < 300, Placebo		122	-0.95		
FitzGerald 2016, < 300, Benralizumab		124	-0.95	0.01	-0.28 to 0.29
Castro 2015, Study 1, Placebo	Change in ASUI score …	244	0.13		
Castro 2015, Study 1, Reslizumab		245	0.19	0.06	0.04 to 0.08

AM (sleep) and PM (activities) asthma symptom score mean change vs placebo

Study / Subpopulation / Arm	AM Definition	AM Number of patients analyzed	AM Estimate	AM Estimate vs placebo	AM 95% CI	PM Definition	PM Number of patients analyzed	PM Estimate	PM Estimate vs placebo	PM 95% CI
Wenzel 2016, BEC ≥ 300, Placebo	Week 24 LS mean (week 12 also available in suppl)	68	-0.45			Week 24 LS mean (week 12 also available in suppl)	68	-0.45		
Wenzel 2016, BEC ≥ 300, Dupilumab 200 mg		65	-0.69	-0.24	-0.44 to -0.04		65	-0.72	-0.28	-0.51 to -0.04
Wenzel 2016, BEC ≥ 300, Dupilumab 300 mg		64	-0.68	-0.23	-0.44 to -0.02		64	-0.84	-0.39	-0.63 to -0.15
Wenzel 2016, BEC < 300, Placebo		90	-0.30				90	-0.35		
Wenzel 2016, BEC < 300, Dupilumab 200 mg		85	-0.50	-0.20	-0.38 to -0.02		85	-0.52	-0.17	-0.38 to 0.04
Wenzel 2016, BEC < 300, Dupilumab 300 mg		93	-0.48	-0.18	-0.35 to -0.00		93	-0.46	-0.11	-0.32 to 0.09

Use of salbutamol / albuterol for symptom relief vs placebo

Study / Subpopulation / Arm	Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI
Wenzel 2016, BEC ≥ 300, Placebo	Week 24, LS mean % change from baseline (week 12 also available in suppl) Includes the use of levosalbutamol/levalbuterol for symptom relief Number of salbutamol/albuterol or levosalbutamol/levalbuterol inhalations recorded daily by the patients. Alternatively salbutamol/albuterol and levosalbutamol/levalbuterol nebulisers were	56	-0.59		
Wenzel 2016, BEC ≥ 300, Dupilumab 200 mg		59	-1.03	-0.45	-1.43 to 0.53
Wenzel 2016, BEC ≥ 300, Dupilumab 300 mg		58	-1.27	-0.69	-1.68 to 0.30
Wenzel 2016, BEC < 300, Placebo		76	-0.08		
Wenzel 2016, BEC < 300, Dupilumab 200 mg		76	-0.47	-0.39	-1.49 to 0.71
Wenzel 2016, BEC < 300, Dupilumab 300 mg		86	-0.34	-0.26	-1.33 to 0.81
Castro 2015, Study 1, Placebo	Change in SABA use	244	-0.42		
Castro 2015, Study 1, Reslizumab		245	-0.18	-0.15	-0.47 to 0.16

Mean FENO change vs placebo

Study / Subpopulation / Arm	Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI
Wenzel 2016, BEC ≥ 300, Placebo	Week 24 LS mean % change from baseline (week 12 also available in suppl)	49	3.42		
Wenzel 2016, BEC ≥ 300, Dupilumab 200 mg		49	-29.89	-33.31	-55.07 to -11.54
Wenzel 2016, BEC ≥ 300, Dupilumab 300 mg		52	-43.55	-46.96	-68.84 to -25.09
Wenzel 2016, BEC < 300, Placebo		71	15.34		
Wenzel 2016, BEC < 300, Dupilumab 200 mg		65	-15.92	-31.27	-51.72 to -10.81
Wenzel 2016, BEC < 300, Dupilumab 300 mg		72	-17.14	-32.49	-52.44 to -12.53
Pavord 2012, ≥ 300, Placebo	Ratio of geometric mean	155	1.01		
Pavord 2012, ≥ 300, Mepolizumab 75 mg IV		153	0.99	0.97	0.82 - 1.15

Blood eosinophil count mean change post treatment vs placebo

Study / Subpopulation / Arm	Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI
Bleecker 2016, ≥ 300, Placebo	Blood eosinophil count changes with benralizumab treatment for patients receiving high-dosage ICS/LABA at Week 48 Estimate cells/ul	202	375 (LS mean change 6.9%)		
Bleecker 2016, ≥ 300, Benralizumab		208	0 (LS mean change -92.7%)	-99.6%	-113.6 to -85.6
Bleecker 2016, < 300, Placebo		97	150 (LS mean change 122.1%)		
Bleecker 2016, < 300, Benralizumab		99	0 (LS mean change -88.3%)	-210.5%	-294.9 to -126.0
FitzGerald 2016, ≥ 300, Placebo	Blood eosinophil count changes with benralizumab treatment for patients receiving high dosage ICS/LABA at Week 56 Estimate cells/μL	200	390 (LS mean change 17.7%)		
FitzGerald 2016, ≥ 300, Benralizumab		193	0 (LS mean change -89.0%)	-106.8%	-149.7 to -63.9
FitzGerald 2016, < 300, Placebo		91	180 (LS mean change 229.5%)		
FitzGerald 2016, < 300, Benralizumab		84	0 (LS mean change -100.1%)	-329.6%	-636.6 to -22.7
Castro 2015, Study 1, Placebo	Change in blood eosinophil count …	244	-127		
Castro 2015, Study 1, Reslizumab		245	-582	-455	-491 to -419

Drug	Author	Year	Title	Reference	Link	Trial ID	Study	Subgroup	Arm	Exacerbations in 12 months prior to study	Timepoint	Exacerbation definition	N	Annual exacerbation rate	Rate ratio	95% CI	Reduction	95% CI
Reslizumab	Castro	2015	multicentre, parallel, double - blind, randomised, placebo - controlled, phase 3 trials	66. doi: 10.1016/S2213-2600(15)00042-9.	gov/25736990/	NCT01285323	Study 2 (both phase 3 trials)	Study 2 (NCT01285323); ITT population is Blood eosinophils ≥ 400 cells/µL	Placebo	2.0 ± 1.8 (232)	Week 52	corticosteroids or systemic corticosteroids for 3 or more days, or the need for asthma-related emergency treatment (emergency room visit, hospital admission, or unscheduled physician's offi ce visit for nebuliser or other urgent treatment).	232	2.11				
									Reslizumab 3·0 mg/kg IV	1.9 ± 1.6 (232)	Week 52		232	0.86	0.41	0.28 to 0.59	59%	41 to 72%
Reslizumab	Castro	2011	Reslizumab for poorly controlled, eosinophilic asthma: a randomized, placebo-controlled study	Am J Respir Crit Care Med. 2011 Nov 15;184(10):1125-32. doi: 10.1164/rccm.201103-0396OC. Epub 2011 Aug 18.	https://pubmed.ncbi.nlm.nih.gov/21852542/	NCT00587288	Phase 2	Blood eosinophils < 500 cells/µL	Placebo	NR	Week 15	NR						
									Reslizumab 3·0 mg/kg IV	NR	Week 15							
								Blood eosinophils ≥ 500 cells/µL	Placebo	NR	Week 15							
									Reslizumab 3·0 mg/kg IV	NR	Week 15							
Omalizumab	Hanania	2013	Exploring the effects of omalizumab in allergic asthma: an analysis of biomarkers in the EXTRA study	Am J Respir Crit Care Med. 2013 Apr 15;187(8):804-11. doi: 10.1164/rccm.201208-1414OC.	https://pubmed.ncbi.nlm.nih.gov/23471469/	NCT00314574	EXTRA	Blood eosinophils ≥ 260 cells/µL	Placebo	High eosinophil group: 2 ± 2 (n = 414)	Week 48	Treatment effect was evaluated within each biomarker subgroup as the number of observed protocol-defined exacerbations (defined as worsening asthma symptoms requiring treatment with systemic corticosteroids for >3 d; for patients receiving long-term OCS, an exacerbation was an increase of >20 mg in the average daily OCS dose); this was used to calculate protocol-defined exacerbation rates reported during the 48-week treatment period.	200	1.03				
									Omalizumab		Week 48		214	0.70	0.68	0.52 to 0.89	32%	11 to 48%
								Blood eosinophils < 260 cells/µL	Placebo	Low eosinophil group: 2 ± 1 (n = 383)	Week 48		197	0.72				
									Omalizumab		Week 48		186	0.65	0.91	0.66 to 1.24	9%	-24 to 34%

Study / Arm	Outcome	N	Value	Difference	95% CI	%	95% CI	Outcome	N	Value	Difference	95% CI
Castro 2015 – Placebo	treatment/visit NOTE: CT.gov also has CAEs requiring systemic corticosteroids >3 days also	232	0.05					use at enrollment and sex as fixed factors, and covariates for height and baseline value and patient as a random effect. Unstructured covariance structure was assumed for the repeated measures.	232	0.111		
Castro 2015 – Reslizumab 3·0 mg/kg IV		232	0.03	0·69	0·29 to 1·65	31%	-65 to 71%		232	0.201	0.090	0.003 to 0.153
Castro 2011 – Blood eosinophils < 500 – Placebo								FEV_1, L/s LS mean	25	-0.12		
Castro 2011 – Blood eosinophils < 500 – Reslizumab									24	0.08	0.19	−0.02 to 0.39
Castro 2011 – Blood eosinophils ≥ 500 – Placebo									27	-0.05		
Castro 2011 – Blood eosinophils ≥ 500 – Reslizumab									28	0.27	0.25	0.01 to 0.50
Hanania 2013 – Blood eosinophils ≥ 260 – Placebo								Values for % predicted FEV_1 change from baseline (not available in litres) Least squares mean	200	5.61		
Hanania 2013 – Blood eosinophils ≥ 260 – Omalizumab									214	6.92	1.3	-1.23 to 3.84
Hanania 2013 – Blood eosinophils < 260 – Placebo									197	2.05		
Hanania 2013 – Blood eosinophils < 260 – Omalizumab									186	3.77	1.72	-1.06 to 4.51

Study / Arm	N	Value	Difference	95% CI	Outcome	N	Value	Difference	95% CI	Outcome	N	Value	Difference	95% CI	Outcome	N	Value	Difference	95% CI	Outcome	N	Value	Difference	95% CI
Castro 2015 – Placebo	232	-0.80				232	0.89			ASUI=Asthma Symptom Utility Index	232	0.11			(puffs per day)	232	-0.55			eosinophil count (cells/µL)	232	-76		
Castro 2015 – Reslizumab 3·0 mg/kg IV	232	-1.04	-0.24	-0.37 to -0.11		232	1.12	0.23	0.07 to 0.40		232	0.15	0·04	0·01 to 0·06		232	-0.73	-0·18	-0·50 to 0·14		232	-565	-489	-525 to -453
Castro 2011 – Blood eosinophils < 500 – Placebo										ACQ score - LS mean	26	-0.4												
Castro 2011 – Blood eosinophils < 500 – Reslizumab											25	-0.6	−0.06	−0.55, 0.43										
Castro 2011 – Blood eosinophils ≥ 500 – Placebo											27	-0.1												
Castro 2011 – Blood eosinophils ≥ 500 – Reslizumab											28	-0.9	−0.57	−1.19, 0.05										
Hanania 2013 – Blood eosinophils ≥ 260 – Placebo					Least squares mean difference from placebo vs baseline	200	1.01			LS mean	200	-1.47			LS mean change in albuterol use (puffs per day)	200	-1.42							
Hanania 2013 – Blood eosinophils ≥ 260 – Omalizumab						214	1.14	0.14	-0.11 to 0.36		214	-1.63	-0.16	-0.51 to 0.19		214	-1.76	-0.34	-0.83 to 0.11					
Hanania 2013 – Blood eosinophils < 260 – Placebo						197	0.84				197	-1.06				197	-1.18							
Hanania 2013 – Blood eosinophils < 260 – Omalizumab						186	1.13	0.26	0.06 to 0.51		186	-1.41	-0.34	-0.69 to -0.02		186	-1.30	-0.13	-0.61 to 0.30					

In individual trials, data were extracted for the number of exacerbations in 12 months prior to study and the annual asthma exacerbation rates only, for the overall population.

ii) Pooled analysis for subgroup outcomes

Study Identifiers

Drug	Author (last name)	Publication year	Title	Citation	PubMed link	NCT number	Trial name
Tezepelumab	N/A	N/A	N/A	Unpublished data	N/A	NCT02054130 and NCT03347279	PATHWAY and NAVIGATOR combined
Benralizumab	O'Quinn	2019	Daily patient-reported health status assessment improvements with benralizumab for patients with severe, uncontrolled eosinophilic asthma	J Asthma Allergy. 2019 Jan 23;12:21-33. doi: 10.2147/JAA.S190221.	https://pubmed.ncbi.nlm.nih.gov/30774388/	NCT01928771 and NCT01914757	SIROCCO and CALIMA combined
Benralizumab	FitzGerald	2018	Predictors of enhanced response with benralizumab for patients with severe asthma: pooled analysis of the SIROCCO and CALIMA studies	Lancet Respir Med. 2018 Jan;6(1):51-64. doi: 10.1016/S2213-2600(17)30344-2	https://pubmed.ncbi.nlm.nih.gov/28919200/	NCT01928771 and NCT01914757	SIROCCO and CALIMA combined
Benralizumab	Bleecker	2018	Baseline patient factors impact on the clinical efficacy of benralizumab for severe asthma	Eur Respir J. 2018 Oct 18;52(4):1800936. doi: 10.1183/13993003.00936-2018.	https://pubmed.ncbi.nlm.nih.gov/30139780/	NCT01928771 and NCT01914758	SIROCCO and CALIMA combined
Mepolizumab	Ortega	2016	Severe eosinophilic asthma treated with mepolizumab stratified by baseline eosinophil thresholds: a secondary analysis of the DREAM and MENSA studies	Lancet Respir Med. 2016 Jul;4(7):549-556. doi: 10.1016/S2213-2600(16)30031-5.	https://pubmed.ncbi.nlm.nih.gov/27177493/	NCT01000506 and NCT01691521	DREAM / MENSA

Population and treatment; Annual asthma exacerbation rate vs placebo; Severe exacerbation event rate vs placebo (incl. ED visit and/or hospital admission)

Study	Subpopulation	Treatment arm	Number of exacerbations in 12 months prior to study	Time point	Annual exacerbation: Definition	Number of patients analyzed	Rate	Rate ratio estimate	95% CI	% reduction estimate	95% CI	Severe exacerbation: Definition	Number of patients analyzed	Rate	Rate ratio estimate	95% CI
Tezepelumab (unpublished)	Blood eosinophils ≥ 300 cells/µL	Placebo	NR	Week 52								1) Annual exacerbations associated with hospitalizations or ED visits over 52 weeks 2) Annual exacerbations associated with hospitalizations over 52 weeks	287	0.32 0.20		
		Tezepelumab 210 mg SC Q4W	NR	Week 52									286	0.03 0.01	0.10 0.05	0.04 to 0.24 0.01 to 0.20
	Blood eosinophils < 300 cells/µL	Placebo	NR	Week 52									382	0.22 0.16		
		Tezepelumab 210 mg SC Q4W	NR	Week 52									379	0.07 0.05	0.33 0.28	0.17 to 0.62 0.12 to 0.65
	Blood eosinophils ≥ 150 cells/µL	Placebo	NR	Week 52									498	0.24 0.14		
		Tezepelumab 210 mg SC Q4W	NR	Week 52									499	0.03 0.01	0.14 0.10	0.07 to 0.27 0.04 to 0.27
	Blood eosinophils < 150 cells/µL	Placebo	NR	Week 52									171	0.30 0.26		
		Tezepelumab 210 mg SC Q4W	NR	Week 52									166	0.12 0.08	0.40 0.29	0.18 to 0.93 0.10 to 0.86
	Blood eosinophils 150 to 300 cells/µL	Placebo	NR	Week 52									211	0.15 0.06		
		Tezepelumab 210 mg SC Q4W	NR	Week 52									213	0.04 0.02	0.23 0.32	0.08 to 0.65 0.08 to 1.32
	Blood eosinophils 300 to 450 cells/µL	Placebo	NR	Week 52									116	0.23 0.14		
		Tezepelumab 210 mg SC Q4W	NR	Week 52									127	0.02 0.01	0.10 0.05	0.02 to 0.41 0.01 to 0.50
	Blood eosinophils ≥ 450 cells/µL	Placebo	NR	Week 52									171	0.39 0.23		
		Tezepelumab 210 mg SC Q4W	NR	Week 52									159	0.04 0.01	0.10 0.05	0.03 to 0.30 0.01 to 0.28
Benralizumab O'Quinn 2019	Blood eosinophil count ≥ 300 cells/µL receiving high-dosage ICS/LABA	Placebo	NR	Pooled analysis of studies 48−56 weeks												
		Benralizumab 30 mg Q4W	NR	Pooled analysis of studies 48−56 weeks												
		Benralizumab 30 mg Q8W	NR	Pooled analysis of studies 48−56 weeks												
	Blood eosinophil count < 300 cells/µL receiving high-dosage ICS/LABA	Placebo	NR	Pooled analysis of studies 48−56 weeks												
		Benralizumab 30 mg Q4W	NR	Pooled analysis of studies 48−56 weeks												
		Benralizumab 30 mg Q8W	NR	Pooled analysis of studies 48−56 weeks												
	Blood eosinophil count ≥ 150 cells/µL receiving high-dosage ICS/LABA	Placebo	NR	Pooled analysis of studies 48−56 weeks												
		Benralizumab 30 mg Q4W	NR	Pooled analysis of studies 48−56 weeks												
		Benralizumab 30 mg Q8W	NR	Pooled analysis of studies 48−56 weeks												
	Blood eosinophil count < 150 cells/µL receiving high-dosage ICS/LABA	Placebo	NR	Pooled analysis of studies 48−56 weeks												
		Benralizumab 30 mg Q4W	NR	Pooled analysis of studies 48−56 weeks												
		Benralizumab 30 mg Q8W	NR	Pooled analysis of studies 48−56 weeks												
Benralizumab FitzGerald 2018	Blood eosinophil count < 150 cells/µL	Placebo	NR	Pooled analysis of studies 48−56 weeks	Annual exacerbation rate (AER) at week 48 (SIROCCO) or week 56 (CALIMA). An exacerbation was defined as a worsening of asthma that led to one of the following: use of systemic corticosteroids (or temporary increase in a stable oral corticosteroid background dosage) for at least 3 days or a single depotinjectable dose of corticosteroid; an asthma-related emergency department or urgent care visit (duration < 24 h) that required use of systemic corticosteroids; or an asthma-related inpatient hospital admission (duration≥ 24 h).	122	1.26									
		Benralizumab 30 mg Q4W	NR	Pooled analysis of studies 48−56 weeks		101	0.97	0·77	0·52 to 1·13	23%	-13 to 48%					
		Benralizumab 30 mg Q8W	NR	Pooled analysis of studies 48−56 weeks		105	0.91	0·72	0·49 to 1·06	28%	-6 to 51%					
	Blood eosinophil count ≥ 150 cells/µL	Placebo	NR	Pooled analysis of studies 48−56 weeks		648	1.14									
		Benralizumab 30 mg Q4W	NR	Pooled analysis of studies 48−56 weeks		647	0.69	0.61	0.51 to 0.72	39%	28 to 49%					
		Benralizumab 30 mg Q8W	NR	Pooled analysis of studies 48−56 weeks		646	0.72	0.63	0.53 to 0.74	28%	26 to 47%					
	Blood eosinophil count 150 to 299 cells/µL	Placebo	NR	Pooled analysis of studies 48−56 weeks		137	1.22									
		Benralizumab 30 mg Q4W	NR	Pooled analysis of studies 48−56 weeks		136	0.78	0·64	0·45 to 0·92	36%	8 to 55%					
		Benralizumab 30 mg Q8W	NR	Pooled analysis of studies 48−56 weeks		147	0.94	0·77	0·55 to 1·09	23%	-9 to 45%					
	Blood eosinophil count ≥ 300 cells/µL	Placebo	NR	Pooled analysis of studies 48−56 weeks		511	1.14									
		Benralizumab 30 mg Q4W	NR	Pooled analysis of studies 48−56 weeks		511	0.68	0.59	0.49 to 0.72	41%	28 to 51%					
		Benralizumab 30 mg Q8W	NR	Pooled analysis of studies 48−56 weeks		499	0.65	0.57	0.47 to 0.69	43%	31 to 53%					
	Blood eosinophil count 300 to 449 cells/µL	Placebo	NR	Pooled analysis of studies 48−56 weeks		205	1.03									
		Benralizumab 30 mg Q4W	NR	Pooled analysis of studies 48−56 weeks		216	0.62	0·60	0·44 to 0·81	40%	19 to 56%					
		Benralizumab 30 mg Q8W	NR	Pooled analysis of studies 48−56 weeks		201	0.72	0·69	0·51 to 0·94	31%	6 to 49%					
	Blood eosinophil count ≥ 450 cells/µL	Placebo	NR	Pooled analysis of studies 48−56 weeks		306	1.16									
		Benralizumab 30 mg Q4W	NR	Pooled analysis of studies 48−56 weeks		295	0.69	0·59	0·47 to 0·75	41%	25 to 53%					
		Benralizumab 30 mg Q8W	NR	Pooled analysis of studies 48−56 weeks		298	0.58	0·50	0·39 to 0·64	50%	36 to 61%					
Benralizumab Bleecker 2018	Blood eosinophil count ≥ 300 cells/µL receiving high-dosage ICS/LABA	Placebo	NR	Pooled analysis of studies 48−56 weeks		515	1.14									
		Benralizumab 30 mg Q4W	NR	Pooled analysis of studies 48−56 weeks		516	0.67	0.59	0.49 to 0.72	41%	28 to 51%					
		Benralizumab 30 mg Q8W	NR	Pooled analysis of studies 48−56 weeks		506	0.66	0.58	0.48 to 0.70	42%	30 to 52%					
	Blood eosinophil count < 300 cells/µL receiving high-dosage ICS/LABA	Placebo	NR	Pooled analysis of studies 48−56 weeks		262	1.20									
		Benralizumab 30 mg Q4W	NR	Pooled analysis of studies 48−56 weeks		240	0.82	0.68	0.53 to 0.87	32%	13 to 47%					
		Benralizumab 30 mg Q8W	NR	Pooled analysis of studies 48−56 weeks		256	0.88	0.73	0.57 to 0.94	27%	6 to 43%					
Mepolizumab Ortega 2016	MENSA - ≥ 150 cells/µL	Placebo	NR	Week 32		157	1.65									
		Mepolizumab (pooled doses)	NR	Week 32		296	0.78	0·47	0·35 to 0·63	53%	37 to 65%					
	MENSA - ≥ 300 cells/µL	Placebo	NR	Week 32		106	1.98									
		Mepolizumab (pooled doses)	NR	Week 32		202	0.78	0·39	0·28 to 0·55	61%	45 to 72%					
	MENSA - ≥ 400 cells/µL	Placebo	NR	Week 32		87	2.06									
		Mepolizumab (pooled doses)	NR	Week 32		161	0.66	0·32	0·22 to 0·46	68%	54 to 78%					
	MENSA - ≥ 500 cells/µL	Placebo	NR	Week 32		66	2.11									
		Mepolizumab (pooled doses)	NR	Week 32		124	0.58	0·27	0·18 to 0·41	73%	59 to 82%					
	MENSA - < 150 cells/µL	Placebo	NR	Week 32		32	1.92									
		Mepolizumab (pooled doses)	NR	Week 32		84	1.19	0·62	0·37 to 1·05	38%	-5 to 63%					
	MENSA - 150 to < 300 cells/µL	Placebo	NR	Week 32		51	1.02									
		Mepolizumab (pooled doses)	NR	Week 32		94	0.66	0·64	0·36 to 1·16	36%	-16 to 64%					
	MENSA - 300 to < 500 cells/µL	Placebo	NR	Week 32		40	1.66									
		Mepolizumab (pooled doses)	NR	Week 32		78	1.01	0·61	0·35 to 1·07	39%	-7 to 65%					

Pre-bronchodilator FEV1 mean change from baseline (L) vs placebo; Post-bronchodilator FEV1 mean change from baseline (L) vs placebo; ACQ - 5 score: change from baseline vs placebo; SGRQ score: change from baseline vs placebo

Study	Subpopulation	Treatment arm	Pre-BD FEV1: Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI	Post-BD FEV1: Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI	ACQ-5: Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI	SGRQ: Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI
Benralizumab FitzGerald 2018	Blood eosinophil count < 150 cells/µL	Placebo	Prebronchodilator FEV1 Least squares mean difference vs placebo (Number of patients with end of treatment data)	117 (103)	0.170																	
		Benralizumab 30 mg Q4W		97 (84)	0.148	-0·022	-0·132 to 0·089															
		Benralizumab 30 mg Q8W		101 (90)	0.214	0·044	-0·065 to 0·153															
	Blood eosinophil count ≥ 150 cells/µL	Placebo		635 (570)	0.191																	
		Benralizumab 30 mg Q4W		640 (569)	0.296	0·105	0·052 to 0·159															
		Benralizumab 30 mg Q8W		640 (563)	0.311	0·120	0·066 to 0·173															
	Blood eosinophil count 150 to 299 cells/µL	Placebo		134 (120)	0.151																	
		Benralizumab 30 mg Q4W		136 (121)	0.256	0·105	0·006 to 0·204															
		Benralizumab 30 mg Q8W		145 (124)	0.211	0·060	-0·037 to 0·157															
	Blood eosinophil count ≥ 300 cells/µL	Placebo		501 (450)	0.224																	
		Benralizumab 30 mg Q4W		504 (448)	0.339	0·114	0·051 to 0·177															
		Benralizumab 30 mg Q8W		495 (439)	0.370	0·146	0·082 to 0·209															
	Blood eosinophil count 300 to 449 cells/µL	Placebo		201 (180)	0.252																	
		Benralizumab 30 mg Q4W		212 (186)	0.281	0·029	-0·052 to 0·110															
		Benralizumab 30 mg Q8W		200 (174)	0.286	0·034	-0·049 to 0·116															
	Blood eosinophil count ≥ 450 cells/µL	Placebo		300 (270)	0.194																	
		Benralizumab 30 mg Q4W		292 (262)	0.348	0·154 0.155	0·085 to 0·224 0·071 to 0·239															
		Benralizumab 30 mg Q8W		295 (265)	0.417	0·224 0.239	0·154 to 0·293 0·155 to 0·322															
Benralizumab Bleecker 2018	Blood eosinophil count ≥ 300 cells/µL receiving high-dosage ICS/LABA	Placebo	Prebronchodilator FEV1 Least squares mean difference vs placebo (Number of patients with end of treatment data)	505 (454)	0.23																	
		Benralizumab 30 mg Q4W		509 (452)	0.34	0.11	0.05 to 0.18															
		Benralizumab 30 mg Q8W		502 (446)	0.37	0.14	0.08 to 0.20															
	Blood eosinophil count < 300 cells/µL receiving high-dosage ICS/LABA	Placebo		254 (224)	0.15																	
		Benralizumab 30 mg Q4W		234 (206)	0.17	0.02	-0.06 to 0.10															
		Benralizumab 30 mg Q8W		250 (217)	0.20	0.05	-0.03 to 0.12															
Mepolizumab Ortega 2016	MENSA - ≥ 150 cells/µL	Placebo	Pre-BD change (mL)	423	NR			Post-BD change (mL)	386	NR				402	NR				420	NR		
		Mepolizumab (pooled doses)			NR	113	28 to 198			NR	172	77 to 267			NR	-0.52	-0.70 to -0.34			NR	-8.1	-11.2 to -5.1
	MENSA - ≥ 300 cells/µL	Placebo		290	NR				268	NR				274	NR				288	NR		
		Mepolizumab (pooled doses)			NR	128	25 to 232			NR	202	90 to 315			NR	-0.73	-0.95 to -0.50			NR	-10.4	-14.2 to -6.7
	MENSA - ≥ 400 cells/µL	Placebo		NR	NR				NR	NR				NR	NR				NR	NR		
		Mepolizumab (pooled doses)			NR					NR					NR					NR		
	MENSA - ≥ 500 cells/µL	Placebo		181	NR				166	NR				171	NR				179	NR		
		Mepolizumab (pooled doses)			NR	113	-24 to 250			NR	247	102 to 392			NR	-0.76	-1.07 to -0.46			NR	-11.3	-16.3 to -6.4

ACQ - 6 score: change from baseline vs placebo; AQOL / AQLQ score: change from baseline vs placebo; Total asthma symptom score mean change vs placebo

Study	Subpopulation	Treatment arm	ACQ-6: Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI	AQLQ: Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI	Total asthma symptom score: Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI
Benralizumab FitzGerald 2018	Blood eosinophil count ≥ 150 cells/µL	Placebo	ACQ-6 is a reflective (previous 7 days) six-item questionnaire to assess daytime and night-time symptoms and rescue β-agonist use on a scale from 0 to 6, where small numbers represent better control. Least squares mean difference vs placebo (Number of patients with end of treatment data)	646 (478)	-1.10			AQLQ(S)+12 is a 32-item questionnaire to assess asthma-related quality of life scored on a 1−7 scale. Least squares mean difference vs placebo (Number of patients with end of treatment data)	624 (465)	1.19			A composite of daytime and night-time symptoms scored from 0 to 6 overall) at end of treatment Least squares mean difference vs placebo (Number of patients with end of treatment data)	647 (468)	-1.03		
		Benralizumab 30 mg Q4W		646 (481)	-1.28	-0.18	-0·29 to -0·06		620(467)	1.36	0·17	0·05 to 0·29		645 (483)	-1.19	-0·16	-0·28 to -0·04
		Benralizumab 30 mg Q8W		642 (470)	-1.29	-0.18	-0·30 to -0·07		619 (458)	1.38	0·19	0·07 to 0·31		637 (457)	-1.22	-0·19	-0·31 to -0·07
	Blood eosinophil count ≥ 300 cells/µL	Placebo		510 (379)	-1.16				490 (367)	1.27				510 (365)	-1.10		
		Benralizumab 30 mg Q4W		510 (387)	-1.35	-0.19	-0·32 to -0·05		490 (375)	1.45	0·18	0·04 to 0·32		509 (377)	-1.21	-0·11	-0·25 to 0·03
		Benralizumab 30 mg Q8W		495 (371)	-1.45	-0.29	-0·43 to 0·16		475 (362)	1.57	0·30	0·15 to 0·44		493 (359)	-1.36	-0·26	-0·40 to -0·12
	Blood eosinophil count ≥ 450 cells/µL	Placebo		305 (223)	-1.24				293 (216)	1.35				306 (208)	-1.19		
		Benralizumab 30 mg Q4W		295 (218)	-1.56	-0·32	-0·50 to -0·15		285 (213)	1.63	0·27	0·09 to 0·46		294 (218)	-1.39	-0·20	-0·38 to -0·02
		Benralizumab 30 mg Q8W		296 (227)	-1.55	-0·31	-0·48 to -0·14		283 (219)	1.71	0·35	0·17 to 0·54		294 (212)	-1.54	-0·35	-0·53 to -0·17
Benralizumab Bleecker 2018	Blood eosinophil count ≥ 300 cells/µL receiving high-dosage ICS/LABA	Placebo	ACQ-6 is a reflective (previous 7 days) six-item questionnaire to assess daytime and night-time symptoms and rescue β-agonist use on a scale from 0 to 6, where small numbers represent better control. Least squares mean difference vs placebo (Number of patients with end of treatment data)	514 (383)	-1.16								A composite of daytime and night-time symptoms scored from 0 to 6 overall) at end of treatment Least squares mean difference vs placebo (Number of patients with end of treatment data)	514 (367)	-1.11		
		Benralizumab 30 mg Q4W		515 (390)	-1.36	-0.20	-0.32 to -0.07							514 (381)	-1.21	-0.10	-0.24 to 0.04
		Benralizumab 30 mg Q8W		502 (376)	-1.45	-0.29	-0.42 to -0.16							500 (363)	-1.35	-0.25	-0.38 to -0.11
	Blood eosinophil count < 300 cells/µL receiving high-dosage ICS/LABA	Placebo		260 (189)	-0.88									261 (188)	-0.85		
		Benralizumab 30 mg Q4W		240 (177)	-1.03	-0.15	-0.34 to 0.04							238 (181)	-1.04	-0.19	-0.39 to 0.01
		Benralizumab 30 mg Q8W		255 (177)	-1.06	-0.18	-0.37 to 0.01							251 (176)	-0.99	-0.14	-0.34 to 0.06

Daily rescue medication use (puffs): change from baseline vs placebo; Percentage of nights with awakenings requiring rescue medication use change from baseline vs placebo; Activity limitation change from baseline vs placebo; Perceived tiredness change from baseline vs placebo (Benralizumab, O'Quinn 2019)

Subpopulation	Treatment arm	Rescue medication: Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI	Night awakenings: Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI	Activity limitation: Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI	Perceived tiredness: Definition	Number of patients analyzed	Estimate	Estimate vs placebo	95% CI
Blood eosinophil count ≥ 300 cells/µL receiving high-dosage ICS/LABA	Placebo	LS mean change from baseline	514	−2.23			LS mean change from baseline	514	−34%			LS mean change from baseline	514	−0.66			LS mean change from baseline	514	−0.67		
	Benralizumab 30 mg Q4W		514	−2.45	−0.22	−0.63 to 0.19		515	−35%	−1%	−4% to 2%		515	−0.77	−0.11	(−0.20 to −0.01		515	−0.74	−0.07	−0.17 to 0.03
	Benralizumab 30 mg Q8W		500	−2.93	−0.71	−1.12 to −0.29		501	−38%	−4%	−7% to −1%		501	−0.83	−0.16	(−0.26 to −0.07		501	−0.82	−0.14	−0.25 to −0.04
Blood eosinophil count < 300 cells/µL receiving high-dosage ICS/LABA	Placebo		261	−1.92				261	−33%				261	−0.42				261	−0.51		
	Benralizumab 30 mg Q4W		238	−2.35	−0.43	−1.04 to 0.19		238	−34%	0%	−5% to 5%		238	−0.59	−0.17	−0.31 to −0.04		238	−0.58	−0.06	−0.21 to 0.08
	Benralizumab 30 mg Q8W		251	−2.12	−0.19	−0.80 to −0.42		253	−34%	−1%	−6% to 4%		253	−0.60	−0.18	−0.31 to −0.05		253	−0.62	−0.11	−0.25 to 0.03
Blood eosinophil count ≥ 150 cells/µL receiving high-dosage ICS/LABA	Placebo		647	−2.13				647	−34%				647	−0.59				647	−0.61		
	Benralizumab 30 mg Q4W		645	−2.48	−0.35	−0.73 to 0.02		464	−35%	−1%	−4% to 2%		646	−0.75	−0.17	−0.25 to −0.08		646	−0.72	−0.11	−0.20 to −0.02
	Benralizumab 30 mg Q8W		637	−2.58	−0.45	−0.82 to −0.07		639	−36%	−2%	−5% to 1%		639	−0.73	−0.14	−0.23 to −0.06		639	−0.71	−0.10	−0.19 to −0.01
Blood eosinophil count < 150 cells/µL receiving high-dosage ICS/LABA	Placebo		121	−1.83				121	−30%				121	−0.38				121	−0.50		
	Benralizumab 30 mg Q4W		99	−1.66	0.17	−0.74 to 1.08		99	−26%	4%	−4% to 12%		99	−0.40	−0.02	−0.20 to 0.15		99	−0.40	0.11	−0.12 to 0.33
	Benralizumab 30 mg Q8W		103	−2.04	−0.21	−1.11 to 0.69		104	−32%	−2%	−10% to 6%		104	−0.64	−0.26	−0.44 to −0.08		104	−0.69	−0.19	−0.41 to 0.03