Time to onset of action for biologics and targeted treatments in psoriasis: systematic targeted literature review and network meta-analysis (supplementary material)

Authors: Kim A Papp[1, 2, 3], Ron Vender[4, 5], Kerri Purdy[6], Fiona Lovegrove[7], Irina Oroz[8], Parbeer Grewal[9], Perla Lansang[3, 10], Laura Park-Wyllie[11], Nastaran Abbarin[11], Ya-Wen Yang[12], Becky Hooper[13], Sandra Vigelis[13], Tim Disher[13], Richard G Langley[6]

Affiliations: [1]Probity Medical Research Inc., Waterloo, ON, Canada; [2]Alliance Clinical Trials, Waterloo, ON, Canada; [3]Division of Dermatology, Temerty Faculty of Medicine, University of Toronto, Toronto, ON, Canada; [4]McMaster University, Hamilton, ON, Canada; [5]Dermatrials Research Inc., Hamilton, ON, Canada; [6]Dalhousie University, Halifax, NS, ON, Canada; [7]Western University, London, ON, Canada; [8]University of Saskatchewan, Saskatoon, SK, Canada; [9]University of Alberta, Edmonton, AB, Canada; [10]Sunnybrook Health Sciences Centre, Toronto, ON, Canada; [11]Johnson & Johnson (Canada) Inc., Toronto, ON, Canada, [12]Immunology Global Medical Affairs, Janssen Pharmaceutical Companies of Johnson & Johnson, Horsham, USA, [13]EVERSANA, Burlington, ON, Canada

Corresponding author:

Richard Langley, MD, FRCPC
6054 Coburg Road
Halifax, NS B3H 1Z2
Email: richardgblangley@gmail.com

Table S1: Full eligibility criteria for the systematic targeted literature review

Item	Inclusion Criteria	Exclusion Criteria
Population	Study populations or subgroups: • Humans only (men or women) • Age ≥18 years • Diagnosed with moderate-to-severe psoriasis and are candidates for systemic therapy or phototherapy	Study populations or subgroups: • Non-human • Age <18 years • No confirmation of psoriasis • Diagnosis of mild psoriasis or other forms of psoriasis (ie, psoriatic arthritis, generalized pustular psoriasis, etc.) • Studies limited to patients with specific co-morbidities (eg, obesity, fatty liver disease)
Interventions/ Comparators	Any of the following treatments indicated for moderate-to-severe psoriasis: • IL-23 inhibitors: – Guselkumab (100 mg) – Risankizumab (150 mg) – Tildrakizumab (100 mg or 200 mg) • IL-12/23 inhibitors: – Ustekinumab (45 mg, 45/90 mg,[a] or 90 mg) • IL-17 inhibitors: – Bimekizumab (320 mg) – Brodalumab (210 mg) – Ixekizumab (80 mg) – Secukinumab (150 mg or 300 mg) • JAK inhibitors: – Deucravacitinib (6 mg) • PDE-4 inhibitors: – Apremilast (30 mg)	Treatments not listed in the *Inclusion criteria* **(**including biosimilars)
Outcomes	Reports at least one of the following clinical efficacy outcomes: • Patients achieving a PASI 90 response at visits up to week 16 • Patients achieving a PASI 75 response at visits up to week 16	Outcomes not listed in the *Inclusion Criteria*
Study Design	Phase III or IV[b] randomised, double-blinded (patient and investigator blinded to study drug assignment) studies	Study types not listed in the *Inclusion criteria*, including any of the following: • Phase I, I/II, II, II/III trials, or LTE studies • Pre-clinical or pharmacokinetic/ pharmacodynamic studies • Pilot studies • Observational studies (eg, registry studies, prospective and retrospective cohort studies, cross-sectional studies) • Case studies, series, or reports • Expert opinion articles, letters, editorials • Narrative (non-systematic) and systematic literature reviews, MAs • Conference abstracts (due to insufficient information on methods) and studies without full-text available • Protocols
Language	Articles in English	All non-English articles

[a] The 45/90 mg dose indicates that a study treatment arm where patients received a dose of 45 mg or 90 mg.
[b] As reported within the study publication or trial registry record.
Abbreviations: IL = interleukin; JAK = Janus kinase; LTE = long-term extension; MA = meta-analysis; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

Table S2: Concept framework of search strategy for study identification and publication retrieval through MEDLINE® and Trialtrove

Concept	Search Terms by Category
Concept #1	**Disease Population:** Psoriasis
Concept #2	**Interventions (tested drug):** • Ustekinumab • Bimekizumab • Brodalumab • Ixekizumab • Secukinumab • Guselkumab • Risankizumab • Tildrakizumab • Tofacitinib • Deucravacitinib • Apremilast
Concept #3	**Trial Phase:** Phase III or IV

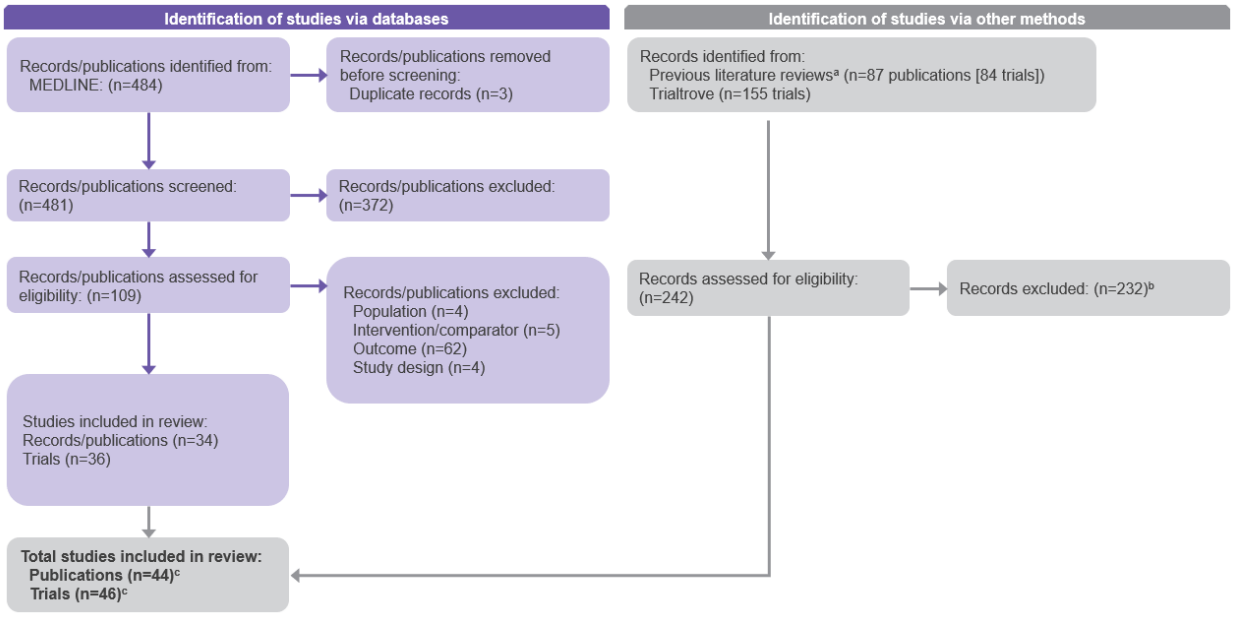
Table S3: Full MEDLINE search strategy employed October 21, 2022

#	Searches	Results
1	Psoriasis/	40677
2	(psoriasis or psoriatic).tw,kw,kf.	56343
3	(psoriasiform or psoriasi-form).tw,kw,kf.	1384
4	or/1-3 [PSORIASIS]	62529
5	("IL-12/23" adj inhibitor*).tw,kw,kf.	80
6	Ustekinumab/	1605
7	(ustekinumab$2 or abp 654 or abp654 or "avt 04" or avt04 or cnto 1275 or cnto1275 or ct p43 or ctp43 or fyb 202 or fyb 202 or sb 17 or sb17 or Stelara$2 or FU77B4U5Z0 or 815610-63-0).tw,kw,kf,rn.	2881
8	("IL-17" adj inhibitor?).tw,kw,kf.	298
9	(bimekizumab$2 or bimzelx$2 or cdp 4940 or cdp4940 or ucb 4940 or ucb4940 or 09495UIM6V or 1418205-77-2).tw,kw,kf,rn.	90
10	(brodalumab$2 or AMG 827 or AMG827 or KHK-4827 or KHK4827 or Siliq$2 or kyntheum$2 or 1174395-19-7 or 6ZA31Y954Z).tw,kw,kf,rn.	1304
11	(ixekizumab$2 or LY-2439821 or LY2439821 or Taltz or 1143503-69-8 or BTY153760O).tw,kw,kf,rn.	901
12	(secukinumab$2 or AIN 457 or AIN457 or bat 2306 or bat2306 or cosentyx$2 or kb 03303a or kb03303a or scapho$2 or ts 1808 or ts1808 or 1229022-83-6 or DLG4EML025).tw,kw,kf,rn.	7205
13	("IL-23" adj inhibitor?).tw,kw,kf.	185
14	(guselkumab$2 or cnto 1959 or cnto1959 or tremfya$2 or 1350289-85-8 or 089658A).tw,kw,kf,rn.	494
15	(risankizumab$2 or ABBV-066 or ABBV066 or BI 655066 or BI655066 or skyrizi$2 or 1612838-76-2 or 90ZX3Q3FR7).tw,kw,kf,rn.	314
16	(tildrakizumab$2 or ilumetri$2 or ilumya$2 or mk 3222 or mk3222 or sch 900222 or sch900222 or sunpg 1622 or sunpg1622 or sunpg 1623 or sunpg1623 or 1326244-10-3 or DEW6X41BEK).tw,kw,kf,rn.	233
17	Janus Kinase Inhibitors/	1250
18	(JAK inhibitor? or (janus adj2 kinase inhibitor?)).tw,kw,kf.	3846
19	(tofacitinib$2 or "CP 690,550" or CP 690550 or CP-690550 or CP690550 or jaquinus$2 or pgn 600 or pgn600 or xeljanz$2 or tasocitinib$2 or 477600-75-2 or 87LA6FU830).tw,kw,kf,rn.	2514
20	(deucravacitinib$2 or bms 986165 or bms 98616501 or bms986165 or bms98616501 or "tyk2-in-4" or 1609392-27-9 or N0A21N6RAU).tw,kw,kf,rn.	37
21	Phosphodiesterase 4 Inhibitors/	1378
22	(PDE-4 Inhibitor? or PDE4 Inhibitor? or ((Phosphodiesterase or PDE) adj2 (IV inhibitor? or 4 inhibitor?))).tw,kw,kf.	2579
23	(apremilast$2 or ap 506 or ap506 or cc 10004 or cc10004 or otezla$2 or 608141-41-9 or UP7QBP99PN).tw,kw,kf,rn.	1004
24	or/5-23 [DRUGS OF INTEREST]	20310
25	4 and 24 [PSORIASIS - DRUGS OF INTEREST]	4702
26	(exp Child/ or exp Infant/) not (Adolescent/ or Adult/)	1436274
27	25 not 26 [CHILD-, INFANT-ONLY REMOVED]	4649
28	exp Animals/ not Humans/	5057267
29	27 not 28 [ANIMAL-ONLY REMOVED]	4624
30	(controlled clinical trial or randomized controlled trial or pragmatic clinical trial or equivalence trial).pt.	670827
31	"Clinical Trials as Topic"/	200471
32	exp "Controlled Clinical Trials as Topic"/	167802
33	(randomi#ed or randomi#ation? or randomly or RCT or placebo*).tw,kw,kf.	1163577
34	((singl* or doubl* or trebl* or tripl*) adj (mask* or blind* or dumm*)).tw,kw,kf.	192372
35	trial.ti.	272243
36	or/30-35 [RCT FILTER - COCHRANE HSSS - BEST BALANCE - SMALL AMENDMENTS]	1617871
37	"Clinical Trial, Phase III"/	21026
38	(Phase 3 or phase iii).tw,kw,kf.	57949
39	37 or 38	64935
40	36 and 39 [PHASE 3 RCTs]	40493
41	29 and 40 [PSORIASIS - DRUGS OF INTEREST - PHASE 3 RCTs]	515
42	limit 41 to english	513
43	**limit 42 to yr="2014-current"**	**471**

#	Searches	Results
44	Psoriasis/	40677
45	(psoriasis or psoriatic).tw,kw,kf.	56343
46	(psoriasiform or psoriasi-form).tw,kw,kf.	1384
47	or/44-46 [PSORIASIS]	62529
48	("IL-12/23" adj inhibitor*).tw,kw,kf.	80
49	Ustekinumab/	1605
50	(ustekinumab$2 or abp 654 or abp654 or "avt 04" or avt04 or cnto 1275 or cnto1275 or ct p43 or ctp43 or fyb 202 or fyb 202 or sb 17 or sb17 or Stelara$2 or FU77B4U5Z0 or 815610-63-0).tw,kw,kf,rn.	2881
51	("IL-17" adj inhibitor?).tw,kw,kf.	298
52	(bimekizumab$2 or bimzelx$2 or cdp 4940 or cdp4940 or ucb 4940 or ucb4940 or 09495UIM6V or 1418205-77-2).tw,kw,kf,rn.	90
53	(brodalumab$2 or AMG 827 or AMG827 or KHK-4827 or KHK4827 or Siliq$2 or kyntheum$2 or 1174395-19-7 or 6ZA31Y954Z).tw,kw,kf,rn.	1304
54	(ixekizumab$2 or LY-2439821 or LY2439821 or Taltz or 1143503-69-8 or BTY153760O).tw,kw,kf,rn.	901
55	(secukinumab$2 or AIN 457 or AIN457 or bat 2306 or bat2306 or cosentyx$2 or kb 03303a or kb03303a or scapho$2 or ts 1808 or ts1808 or 1229022-83-6 or DLG4EML025).tw,kw,kf,rn.	7205
56	("IL-23" adj inhibitor?).tw,kw,kf.	185
57	(guselkumab$2 or cnto 1959 or cnto1959 or tremfya$2 or 1350289-85-8 or 089658A).tw,kw,kf,rn.	494
58	(risankizumab$2 or ABBV-066 or ABBV066 or BI 655066 or BI655066 or skyrizi$2 or 1612838-76-2 or 90ZX3Q3FR7).tw,kw,kf,rn.	314
59	(tildrakizumab$2 or ilumetri$2 or ilumya$2 or mk 3222 or mk3222 or sch 900222 or sch900222 or sunpg 1622 or sunpg1622 or sunpg 1623 or sunpg1623 or 1326244-10-3 or DEW6X41BEK).tw,kw,kf,rn.	233
60	Janus Kinase Inhibitors/	1250
61	(JAK inhibitor? or (janus adj2 kinase inhibitor?)).tw,kw,kf.	3846
62	(tofacitinib$2 or "CP 690,550" or CP 690550 or CP-690550 or CP690550 or jaquinus$2 or pgn 600 or pgn600 or xeljanz$2 or tasocitinib$2 or 477600-75-2 or 87LA6FU830).tw,kw,kf,rn.	2514
63	(deucravacitinib$2 or bms 986165 or bms 98616501 or bms986165 or bms98616501 or "tyk2-in-4" or 1609392-27-9 or N0A21N6RAU).tw,kw,kf,rn.	37
64	Phosphodiesterase 4 Inhibitors/	1378
65	(PDE-4 Inhibitor? or PDE4 Inhibitor? or ((Phosphodiesterase or PDE) adj2 (IV inhibitor? or 4 inhibitor?))).tw,kw,kf.	2579
66	(apremilast$2 or ap 506 or ap506 or cc 10004 or cc10004 or otezla$2 or 608141-41-9 or UP7QBP99PN).tw,kw,kf,rn.	1004
67	or/48-66 [DRUGS OF INTEREST]	20310
68	47 and 67 [PSORIASIS - DRUGS OF INTEREST]	4702
69	(exp Child/ or exp Infant/) not (Adolescent/ or Adult/)	1436274
70	68 not 69 [CHILD-, INFANT-ONLY REMOVED]	4649
71	exp Animals/ not Humans/	5057267
72	70 not 71 [ANIMAL-ONLY REMOVED]	4624
73	(controlled clinical trial or randomized controlled trial or pragmatic clinical trial or equivalence trial).pt.	670827
74	"Clinical Trials as Topic"/	200471
75	exp "Controlled Clinical Trials as Topic"/	167802
76	(randomi#ed or randomi#ation? or randomly or RCT or placebo*).tw,kw,kf.	1163577
77	((singl* or doubl* or trebl* or tripl*) adj (mask* or blind* or dumm*)).tw,kw,kf.	192372
78	trial.ti.	272243
79	or/73-78 [RCT FILTER - COCHRANE HSSS - BEST BALANCE - SMALL AMENDMENTS]	1617871
80	"Clinical Trial, Phase IV"/	2364
81	(Phase 4 or phase iv).tw,kw,kf.	5030
82	80 or 81	6254
83	79 and 82 [PHASE 4 RCTs]	2516
84	**72 and 83 [PSORIASIS - DRUGS OF INTEREST - PHASE 4 RCTs]**	**19**
85	limit 84 to english	19
86	**43 or 85 [PSORIASIS - DRUGS OF INTEREST - PHASE 3, & 4 RCTs]**	**484**

Notes: Ovid MEDLINE® and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations and Daily 1946 to October 20, 2022.

Figure S1: PRISMA flow diagram of study selection for systematic targeted literature review and hand-search



[a] Included Egeberg 2020 [1], Johnson 2021 [2], and Sbidian 2022 [3].

[b] Reasons included duplicate of database record or not meeting study eligibility criteria.

[c] Although the IMMpress trial (Odnopozova 2022; NCT03518047 [4]) was included in the review, qualitative assessment raised questions regarding the data (ie, placebo crossover timepoint), therefore it was excluded from the analysis.

Abbreviations: n = number; PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Table S4: Summary of outcome data available for included studies (N = 46 trials)

Trial	Publication	Phase	Treatments	Treatment Class (inhibitor type)	N	# of Missing Patients (for extracted time period)	% of Missing Patients	Discontinuation Timepoint (weeks)	Imputation Method	Reported Outcomes	
										PASI 75	PASI 90
ALLURE	Sigurgeirsson 2022 [5]	III	SEC 300 mg	IL-17	71	2	2.8	12	MI	**X**	**X**
			PBO	N/A	71	3	4.2				
AMAGINE-1	Papp 2015 [6]	III	BRO 210 mg	IL-17	222	10	4.5	12	NRI	**X**	**X**
			PBO	N/A	220	11[a]	5.0				
AMAGINE-2	Lebwohl 2015 [7]; Papp 2018 [8] (pooled with AMAGINE-3)	III	BRO 210 mg	IL-17	612	15	2.5	12	NRI	**X**	**X**
			UST 45/90 mg	IL-12/23	300	9	3.0				
			PBO	N/A	309	9	2.9				
AMAGINE-3	Lebwohl 2015 [7]; Papp 2018 [8] (pooled with AMAGINE-2)	III	BRO 210 mg	IL-17	624	16	2.6	12	NRI	**X**	**X**
			UST 45/90 mg	IL-12/23	313	10	3.2				
			PBO	N/A	315	14	4.4				
BE RADIANT	Reich 2021 [9]	III	BIM 320 mg	IL-17	373	11	2.9	16	NRI	**X**	**X**
			SEC 300 mg	IL-17	370	16	4.3				
BE READY	Gordon 2021 [10]	III	BIM 320 mg	IL-17	349	9	2.6	16	NRI	**X**	**X**
			PBO	N/A	86	4	4.7				
BE VIVID	Reich 2021 [11]	III	BIM 320 mg	IL-17	321	15	4.7	16	NRI	**X**	**X**
			UST 45/90 mg	IL-12/23	163	6	3.7				
			PBO	N/A	83	9	10.8				
Blauvelt 2022 (NCT03875482)	Blauvelt 2022 [12]	III	RIS 150 mg	IL-23	105	13[b]	12.4	16	NRI		**X**
			PBO	N/A	52	20[b]	38.5[c]				
Cai 2020 (NCT03066609)	Cai 2020 [13]	III	SEC 150 mg	IL-17	110	1	0.9	12	MI	**X**	**X**
			SEC 300 mg	IL-17	221	2	0.9				
			PBO	N/A	110	1	0.9				
CLARITY	Bagel 2018 [14]; Bagel 2021 [15]	III	SEC 300 mg	IL-17	550	18	3.3	16	MI	**X**	**X**
			UST 45/90 mg	IL-12/23	552	17	3.1				
CLEAR	Thaci 2015 [16]	III	SEC 300 mg	IL-17	335	8	2.4	16	MI; NRI[d]	**X**	**X**
			UST 45/90 mg	IL-12/23	336	17	5.1				

Trial	Publication	Phase	Treatments	Treatment Class (inhibitor type)	N	# of Missing Patients (for extracted time period)	% of Missing Patients	Discontinuation Timepoint (weeks)	Imputation Method	Reported Outcomes	
										PASI 75	PASI 90
ECLIPSE	Reich 2019 [17]; CSR [18]	III	GUS 100 mg	IL-23	534	13[e]	2.4	16	NRI	**X**	**X**
			SEC 300 mg	IL-17	514	17[e]	3.3				
ERASURE	Langley 2014 [19]	III	SEC 150 mg	IL-17	245	7	2.9	12	NRI	**X**	**X**
			SEC 300 mg	IL-17	245	15	6.1				
			PBO	N/A	248	16	6.5				
ESTEEM-1	Papp 2015 [20]	III	APR 30 mg	PDE-4	562	59	10.5	16	LOCF; NRI[f]	**X**	**X**
			PBO	N/A	282	33	11.7				
ESTEEM-2	Paul 2015 [21]	III	APR 30 mg	PDE-4	274	35	12.8	16	LOCF; NRI[f]	**X**	**X**
			PBO	N/A	137	25	18.2				
FEATURE	Blauvelt 2015 [22]	III	SEC 150 mg	IL-17	59	2	3.4	12	NRI	**X**	**X**
			SEC 300 mg	IL-17	59	3	5.1				
			PBO	N/A	59	3	5.1				
FIXTURE	Langley 2014 [19]	III	SEC 150 mg	IL-17	327	12	3.7	12	NRI	**X**	**X**
			SEC 300 mg	IL-17	327	15	4.6				
			PBO	N/A	326	21	6.4				
IMMhance	Blauvelt 2020 [23]	III	RIS 150 mg	IL-23	407	4	1.0	16	NRI	**X**	**X**
			PBO	N/A	100	3	3.0				
IMMpress (sensitivity analysis only)	Odnopozova 2022 [4]	III	RIS 150 mg	IL-23	41	2	4.9	16	NRI	**X**	**X**
			PBO	N/A	9	0	0				
IXORA-R	Blauvelt 2020 [24]	IV	GUS 100 mg	IL-23	507	25	4.9	12	NRI	**X**	**X**
			IXE 80 mg	IL-17	520	32	6.2				
IXORA-S	Reich 2017 [25]	III	IXE 80 mg	IL-17	136	4	2.9	16	NRI	**X**	**X**
			UST 45/90 mg	IL-12/23	166	2	1.2				
JUNCTURE	Lacour 2017 [26]; Paul 2015 [27]	III	SEC 150 mg	IL-17	61	3	4.9	12	MI; NRI[g]	**X**	**X**
			SEC 300 mg	IL-17	60	0	0				
			PBO	N/A	61	2	3.3				
Li 2021 (NCT03364309)	Li 2021 [28]	III	IXE 80 mg	IL-17	176	1	0.6	12	MMRM	**X**	**X**
			PBO	N/A	88	6	6.8				

Trial	Publication	Phase	Treatments	Treatment Class (inhibitor type)	N	# of Missing Patients (for extracted time period)	% of Missing Patients	Discontinuation Timepoint (weeks)	Imputation Method	Reported Outcomes	
										PASI 75	PASI 90
LIBERATE	Reich 2017 [29]	III	APR 30 mg	PDE-4	83	6	7.2	16	LOCF; NRI[h]	**X**	**X**
			PBO	N/A	84	9	10.7				
LOTUS	Zhu 2013 [30]	III	UST 45 mg	IL-12/23	160	3	1.9	12	NRI	**X**	**X**
			PBO	N/A	162	3	1.9				
MATURE	Sigurgeirsson 2022 [31]	III	SEC 300 mg	IL-17	41	2	4.9	12	MI	**X**	**X**
			PBO	N/A	40	3	7.5				
Ohtsuki 2018 (NCT02325219)	Ohtsuki 2018 [32]	III	GUS 100 mg	IL-23	63	1	1.6	16	LOCF	**X**	**X**
			PBO	N/A	64	12	18.8				
ORION	Ferris 2020 [33]	III	GUS 100 mg	IL-23	62	1[i]	1.6	16	NRI	**X**	**X**
			PBO	N/A	16	1[i]	6.3				
PEARL	Tsai 2011 [34]	III	UST 45 mg	IL-12/23	61	4	6.6	12	NRI	**X**	**X**
			PBO	N/A	60	5	8.3				
PHOENIX 1	Leonardi 2008 [35]	III	UST 45 mg	IL-12/23	255	1	0.4	12	NRI; None[j]	**X**	**X**
			UST 90 mg	IL-12/23	256	11	4.3				
			PBO	N/A	255	12	4.7				
PHOENIX 2	Papp 2008 [36]	III	UST 45 mg	IL-12/23	409	6	1.5	12	NRI; None[j]	**X**	**X**
			UST 90 mg	IL-12/23	411	9	2.2				
			PBO	N/A	410	18	4.4				
POETYK PSO-1	Armstrong 2022 [37]	III	APR 30 mg	PDE-4	168	23	13.7	16	NRI	**X**	**X**
			DEU 6 mg	JAK	332	25	7.5				
			PBO	N/A	166	21	12.7				
POETYK PSO-2	Strober 2022 [38]	III	APR 30 mg	PDE-4	254	37	14.6	16	NRI	**X**	**X**
			DEU 6 mg	JAK	511	55	10.8				
			PBO	N/A	255	43	16.9				
reSURFACE 1	Reich 2017 [39]	III	TIL 100 mg	IL-23	309	9	2.9	12	NRI	**X**	**X**
			TIL 200 mg	IL-23	308	10	3.2				
			PBO	N/A	154	9	5.8				

Trial	Publication	Phase	Treatments	Treatment Class (inhibitor type)	N	# of Missing Patients (for extracted time period)	% of Missing Patients	Discontinuation Timepoint (weeks)	Imputation Method	Reported Outcomes	
										PASI 75	PASI 90
reSURFACE 2	Reich 2017 [39]	III	TIL 100 mg	IL-23	307	12	3.9	12	NRI	**X**	**X**
			TIL 200 mg	IL-23	314	14	4.5				
			PBO	N/A	156	14	9.0				
SCULPTURE	Mrowietz 2015 [40]	III	SEC 150 mg	IL-17	482	18	3.7	12	NRI	**X**	
			SEC 300 mg	IL-17	484	20	4.1				
Seo 2021 (NCT02982005)	Seo 2021 [41]	III	BRO 210 mg	IL-17	40	2	5.0	12	NRI	**X**	**X**
			PBO	N/A	22	3	13.6				
UltIMMa-1	Gordon 2018 [42]	III	RIS 150 mg	IL-23	304	5	1.6	16	NRI	**X**	**X**
			UST 45/90 mg	IL-12/23	100	1	1.0				
			PBO	N/A	102	4	3.9				
UltIMMa-2	Gordon 2018 [42]	III	RIS 150 mg	IL-23	294	2	0.7	16	NRI	**X**	**X**
			UST 45/90 mg	IL-12/23	99	3	3.0				
			PBO	N/A	98	4	4.1				
UNCOVER-1	Gordon 2016 [43]	III	IXE 80 mg	IL-17	433	18	4.2	12	NRI	**X**	**X**
			PBO	N/A	431	24	5.6				
UNCOVER-2	Griffiths 2015 [44]	III	IXE 80 mg	IL-17	351	9	2.6	12	NRI	**X**	**X**
			PBO	N/A	168	10	6.0				
UNCOVER-3	Griffiths 2015 [44]	III	IXE 80 mg	IL-17	385	22	5.7	12	NRI	**X**	**X**
			PBO	N/A	193	10	5.2				
VIP-S	Gelfand 2020 [45]	IV	SEC 300 mg	IL-17	46	2	4.3	12	NRI		**X**
			PBO	N/A	45	3	6.7				
VIP-U	Gelfand 2020 [46]	IV	UST 45/90 mg	IL-12/23	22	2	9.1	12	None	**X**	**X**
			PBO	N/A	21	2	9.5				
VOYAGE 1	Blauvelt 2017 [47]	III	GUS 100 mg	IL-23	329	7	2.1	16	NRI	**X**	**X**
			PBO	N/A	174	7	4.0				
VOYAGE 2	Reich 2017 [48]; CSR [49]	III	GUS 100 mg	IL-23	496	18	3.6	16	NRI	**X**	**X**
			PBO	N/A	248	15	6.0				

[a] There was a discrepancy in the placebo arm for the number of patients that discontinued treatment (ie,12 patients) versus those that completed the study (ie, 209 patients) in the study publication [6].

[b] It was unclear if discontinued patients included up to week 16 (ie, last timepoint measured) or week 28 (ie, follow-up safety call [12]).

[c] This placebo arm had >20% of missing patients by the discontinuation timepoint (most patients discontinued due to lack of efficacy); although there is an imbalance between the arms, since these patients are not likely to respond and are being imputed as NRI, this was not an issue for the analyses [12].

[d] Missing data were handled using NRI for PASI 75 and PASI 90 assessed at weeks 2, 4, 8, 12, 16; these outcomes were also reported using MI to handle missing data assessed at weeks 4, 12, and 16 (outcomes using both imputation methods at all available timepoints were extracted [16].

[e] Obtained from the CSR (discontinuations before week 16 for each individual patient were added up [18]) as discontinuations in the study publication [17] were only reported for the entire study period (ie, not up to week 16).

[f] Missing data were handled with the LOCF methodology for the primary (PASI 75 at week 16) and major secondary end points; multiple sensitivity analyses (including NRI) were conducted to confirm the robustness of the study results (outcomes using both imputation methods at all available timepoints were extracted [20, 27]).

[g] NRI methodology was used in Paul 2015 [27], while MI methodology was used in Lacour 2017 [26] (both publications were extracted).

[h] NRI methodology was only used for PASI 75 at week 16; LOCF methodology was used for all outcomes extracted (ie, PASI 75 and PASI 90 at week 16; outcomes using both imputation methods at all available timepoints were extracted [29]).

[i] Only consists of AE-related discontinuations up to week 16 (total discontinuations were only reported up to week 40 [33]).

[j] NRI was only used for week 12 outcomes; no imputation method was used for all other extracted timepoints [35, 36].

Abbreviations: AE = adverse event; APR = apremilast; BIM = bimekizumab; BRO = brodalumab; CSR = clinical study report; DEU = deucravacitinib; GUS = guselkumab; IL = interleukin; IXE = ixekizumab; JAK = Janus kinase; LOCF = last observation carried forward; MI = multiple imputation; MMRM = mixed model for repeated measures; N = number; N/A = not applicable; NRI = non-responder imputation; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PBO = placebo; PDE = phosphodiesterase; RIS = risankizumab; SEC = secukinumab; TIL = tildrakizumab; UST = ustekinumab.

Table S5: Study and patient baseline characteristics of studies included in analyses (N = 43 publications [45 trials])

Trial	Arms	N	Age, Years	% Female	% Caucas-ian	Weight, kg	BMI	Disease Duration, Years	PASI Score	% BSA	% PsA	% IGA 3	% IGA 4	% Previous Biologic Use	% Previous Systemics Use
ALLURE [5]	SEC 300 mg	71	46.2 (13.9)	39.4	90.1	93.2 (22.45)	31.6 (7.8)	14.8 (11.4)	20.1 (6.5)	27.4 (14.4)	22.5	63.4	36.6	NR	NR
	PBO	71	41.4 (12.9)	35.2	93.0	88.3 (20.64)	29.3 (6.6)	17.7 (13.0)	19.8 (10.0)	26.7 (15.9)	16.9	73.2	26.8	NR	NR
AMAGINE-1 [6]	BRO 210 mg	222	46.0 (12.0)	27.5	91.4	91.4 (23.4)	31.0 (7.7)	20.0 (13.0)	19.4 (6.6)	25.1 (15.3)	26.1	NR	NR	47.3	NR
	PBO	220	47.0 (13.0)	26.8	91.8	90.4 (20.1)	30.3 (6.6)	21.0 (12.0)	19.7 (7.7)	26.9 (17.1)	28.6	NR	NR	45.9	NR
AMAGINE-2 [7]	BRO 210 mg	612	45.0 (13.0)	31.2	90.0	91.0 (23.0)	30.5 (7.2)	19.0 (12.0)	20.3 (8.3)	26.0 (16.0)	18.6	NR	NR	28.9	NR
	UST 45/90 mg	300	45.0 (13.0)	31.7	90.3	91.0 (24.0)	30.6 (7.1)	19.0 (13.0)	20.0 (8.4)	27.0 (19.0)	16.7	NR	NR	28.0	NR
	PBO	309	44.0 (13.0)	29.1	88.3	92.0 (23.0)	30.5 (7.0)	18.0 (12.0)	20.4 (8.2)	28.0 (17.0)	16.5	NR	NR	29.1	NR
AMAGINE-3 [7]	BRO 210 mg	624	45.0 (13.0)	30.9	90.5	90.0 (23.0)	30.3 (7.3)	18.0 (12.0)	20.4 (8.3)	28.0 (18.0)	20.4	NR	NR	25.2	NR
	UST 45/90 mg	313	45.0 (13.0)	32.3	89.5	90.0 (22.0)	30.4 (6.8)	18.0 (12.0)	20.1 (8.4)	28.0 (18.0)	20.4	NR	NR	24.0	NR
	PBO	315	44.0 (13.0)	34.0	93.3	89.0 (22.0)	29.9 (6.7)	18.0 (12.0)	20.1 (8.7)	28.0 (17.0)	18.7	NR	NR	24.1	NR
BE RADIANT [9]	BIM 320 mg	373	45.9 (14.2)	32.7	93.0	90.1 (21.3)	NR	18.4 (13.1)	20.2 (7.5)	24.8 (15.5)	NR	64.3	35.1	33.5	NR
	SEC 300 mg	370	44.0 (14.7)	36.5	94.1	88.8 (20)	NR	17.2 (12.3)	19.7 (6.7)	23.8 (14.3)	NR	72.4	27.6	32.2	NR
BE READY [10]	BIM 320 mg	349	44.5 (12.9)	26.9	92.8	88.7 (20.6)	29.4 (6.2)	19.6 (13.3)	20.4 (7.6)	24.6 (15.2)	NR	69.3	30.7	44.1	NR
	PBO	86	43.5 (13.1)	32.6	91.9	91.7 (22.2)	30.4 (7.0)	19.1 (12.8)	20.1 (7.6)	24.4 (16.0)	NR	72.1	27.9	43.0	NR
BE VIVID [11]	BIM 320 mg	321	45.2 (14.0)	28.7	73.8	88.7 (23.1)	29.6 (7.0)	16.0 (11.6)	22.0 (8.6)	29.0 (17.1)	NR	62.6	37.1	38.9	NR
	UST 45/90 mg	163	46.0 (13.6)	28.2	73.6	87.2 (21.1)	29.4 (6.4)	17.8 (11.6)	21.3 (8.3)	27.3 (16.7)	NR	58.9	40.5	38.7	NR
	PBO	83	49.7 (13.6)	27.7	75.9	89.1 (26.4)	30.0 (7.6)	19.7 (13.8)	20.1 (6.8)	27.0 (16.3)	NR	65.1	33.7	39.8	NR
Blauvelt 2022 [12] (NCT03875482)	RIS 150 mg	105	49.3 (15.1)	43.8	82.9	96.9 (28.9)	33.3 (8.7)	20.9 (13.8)	21.5 (9.6)	28.3 (16.4)	24.8	NR	NR	44.8	NR
	PBO	52	48.8 (15.5)	46.2	84.6	91.7 (23.5)	31.6 (7.4)	15.8 (11.8)	21.1 (10.3)	28.2 (18.5)	21.2	NR	NR	44.2	NR
Cai 2020 [13] (NCT03066609)	SEC 150 mg	110	40.5 (10.8)	23.6	0	72.71 (15.5)	NR	16.2 (9.6)	26.5 (10.6)	44.8 (19.9)	10.0	58.2	41.8	21.8	NR
	SEC 300 mg	221	39.0 (11.6)	19.9	0	73.25 (14.2)	NR	15.0 (9.2)	27.3 (10.9)	46.5 (20.7)	10.4	52.9	47.1	14.9	NR
	PBO	110	38.7 (10.3)	19.1	0	72.63 (13.3)	NR	14.8 (9.2)	26.2 (9.3)	44.0 (19.2)	10.0	57.3	42.7	20.9	NR

Trial	Arms	N	Age, Years	% Female	% Caucas-ian	Weight, kg	BMI	Disease Duration, Years	PASI Score	% BSA	% PsA	% IGA 3	% IGA 4	% Previous Biologic Use	% Previous Systemics Use
CLARITY [14, 15]	SEC 300 mg	550	45.4 (14.1)	35.3	75.3	91 (24.9)	NR	16.8 (11.9)	20.8 (9.0)	29.2 (17.9)	NR	NR	38.0	20.0	NR
	UST 45/90 mg	552	45.3 (14.2)	31.9	74.3	93 (24.9)	NR	17.3 (13.3)	21.3 (9.2)	29.5 (17.7)	NR	NR	43.3	23.6	NR
CLEAR [16]	SEC 300 mg	335	45.2 (14.0)	32.0	88.7	87.4 (20.0)	29.1 (5.9)	19.6 (12.9)	21.7 (8.5)	32.6 (17.8)	20.5	61.4	38.6	14.2	6.2
	UST 45/90 mg	336	44.6 (13.7)	25.7	85.0	87.2 (22.1)	29.0 (6.7)	16.1 (11.2)	21.5 (8.1)	32.0 (16.8)	15.9	63.1	36.9	13.0	65.8
ECLIPSE [17]	GUS 100 mg	534	46.3 (13.7)	31.6	93.4	NR	29.8 (7.1)	18.5 (12.2)	20.0 (7.4)	23.7 (12.9)	18.2	76.4	23.8	29.3	51.8
	SEC 300 mg	514	45.3 (13.6)	33.5	93.4	NR	30.0 (6.3)	18.3 (12.7)	20.1 (7.6)	24.5 (14.6)	15.5	76.5	23.9	29.2	56.2
ERASURE [19]	SEC 150 mg	245	44.9 (13.3)	31.4	69.8	87.1 (22.3)	29.8 (6.8)	17.5 (12.0)	22.3 (9.8)	33.3 (19.2)	18.8	65.7	34.3	29.8	51.0
	SEC 300 mg	245	44.9 (13.5)	31.0	69.8	88.8 (24)	30.3 (7.2)	17.4 (11.1)	22.5 (9.2)	32.8 (19.3)	23.3	62.9	37.1	28.6	52.2
	PBO	248	45.4 (12.6)	30.6	71.0	89.7 (25)	30.3 (7.8)	17.3 (12.4)	21.4 (9.1)	29.7 (15.9)	27.4	60.9	39.1	29.4	43.5
ESTEEM-1 [20]	APR 30 mg	562	45.8 (13.1)	32.6	90.2	93.2 (21.4)	31.2 (6.7)	19.8 (13.0)	18.7 (7.2)	24.4 (14.7)	NR	NR	NR	28.8	37.7
	PBO	282	46.5 (12.7)	31.2	88.7	93.7 (23.2)	31.3 (7.4)	18.7 (12.4)	19.4 (7.4)	25.3 (14.6)	NR	NR	NR	28.4	36.2
ESTEEM-2 [21]	APR 30 mg	274	45.3 (13.1)	35.8	91.2	91.4 (23)	30.9 (6.7)	17.9 (11.4)	18.9 (7.1)	25.5 (15.4)	NR	NR	NR	33.6	38.7
	PBO	137	45.7 (13.4)	27.0	93.4	90.5 (22.5)	30.7 (7.1)	18.7 (12.1)	20.0 (8.0)	27.6 (15.8)	NR	NR	NR	32.1	38.7
FEATURE [22]	SEC 150 mg	59	46.0 (15.1)	32.2	86.4	93.7 (25.64)	NR	20.4 (13.0)	20.5 (8.3)	30.6 (16.6)	NR	62.7	37.3	47.5	66.1
	SEC 300 mg	59	45.1 (12.6)	35.6	91.5	92.6 (25.94)	NR	18.0 (11.9)	20.7 (8.0)	33.3 (18.0)	NR	67.8	32.2	39.0	33.9
	PBO	59	46.5 (14.1)	33.9	96.6	88.4 (21.55)	NR	20.2 (14.2)	21.1 (8.5)	32.2 (17.4)	NR	57.6	42.4	44.1	49.2
FIXTURE [19]	SEC 150 mg	327	45.4 (12.9)	27.8	67.0	83.6 (20.8)	28.4 (5.9)	17.3 (12.2)	23.7 (10.5)	34.5 (19.4)	15.0	63.0	37.0	13.8	60.6
	SEC 300 mg	327	44.5 (13.2)	31.5	68.5	83 (21.6)	28.4 (6.4)	15.8 (12.3)	23.9 (9.9)	34.3 (19.2)	15.3	62.1	37.9	11.6	59.6
	PBO	326	44.1 (12.6)	30.4	66.9	82 (20.4)	27.9 (6.1)	16.6 (11.6)	24.1 (10.5)	35.2 (19.1)	15.0	62.0	38.0	10.7	61.0
IMMhance [23]	RIS 150 mg	407	51 (40-60)[a]	30.5	78.6	88.6 (75.9-103.8)[a]	30 (26.1-35.3)[a]	NR	17.2 (14.3-22.1)[a]	NR	NR	NR	NR	56.5	46.9
	PBO	100	48 (37-57)[a]	27.0	82.0	92.4 (77.5-103.2)[a]	30.9 (25.5-35.2)[a]	NR	18.9 (15.8-22.5)[a]	NR	NR	NR	NR	51.0	42.0

Trial	Arms	N	Age, Years	% Female	% Caucas-ian	Weight, kg	BMI	Disease Duration, Years	PASI Score	% BSA	% PsA	% IGA 3	% IGA 4	% Previous Biologic Use	% Previous Systemics Use
IXORA-R [24]	IXE 80 mg	520	49.0 (13.9)	35.0	84.4	96.6 (24.9)	32.9 (7.9)	17.5 (13.8)	19.5 (7.9)	24.1 (16.1)	NR	NR	NR	26.3	32.7
	GUS 100 mg	507	49.0 (14.9)	38.1	85.0	94.6 (24.9)	32.8 (7.9)	16.3 (13.8)	19.3 (7.1)	23.8 (15.4)	NR	NR	NR	26.2	27.6
IXORA-S [25]	IXE 80 mg	136	42.7 (12.7)	33.8	91.9	85.8 (20.3)	28.8 (5.6)	18.0 (11.1)	19.9 (8.2)	26.7 (16.5)	NR	NR	NR	13.2	92.6
	UST 45/90 mg	166	44.0 (13.3)	32.5	94.6	89.4 (24.8)	29.7 (7.0)	18.2 (12.0)	19.8 (9.0)	27.5 (16.7)	NR	NR	NR	15.1	91.6
JUNCTURE [26, 27]	SEC 150 mg	61	43.9 (14.4)	32.8	95.1	93.7 (31.71)	30.6 (9.5)	20.6 (14.5)	22.0 (8.9)	30.1 (16.7)	26.2	57.4	42.6	24.6	50.8
	SEC 300 mg	60	46.6 (14.2)	23.3	93.3	91 (23.1)	30.0 (6.9)	21.0 (13.5)	18.9 (6.4)	26.4 (12.8)	23.3	65.0	35.0	25.0	50.0
	PBO	61	43.7 (12.7)	37.7	96.7	90.2 (21.2)	30.0 (6.8)	19.9 (12.2)	19.4 (6.7)	25.7 (14.7)	19.7	62.3	37.7	21.3	47.5
Li 2021 [28] (NCT03364309)	IXE 80 mg	176	39.2 (10.5)	19.3	0	74.2 (14.3)	25.3 (3.8)	15.2 (8.2)	26.3 (10.5)	43.4 (21.0)	NR	NR	NR	8.0	71.6
	PBO	88	41.9 (12.4)	27.3	0	72.9 (14.4)	25.5 (3.9)	18.8 (10.6)	24.7 (10.6)	41.9 (21.6)	NR	NR	NR	12.5	75.0
LIBERATE [29]	APR 30 mg	83	46.0 (13.6)	41.0	95.2	88.5 (19.8)	29.2 (5.8)	19.7 (12.7)	19.3 (7.0)	27.1 (15.6)	NR	NR	NR	NR	79.5
	PBO	84	43.4 (14.9)	29.8	95.2	89.5 (23.1)	29.5 (6.6)	16.6 (12.1)	19.4 (6.8)	27.3 (16.1)	NR	NR	NR	NR	83.3
LOTUS [30]	UST 45 mg	160	40.1 (12.4)	21.9	0	69.9 (11.9)	NR	14.6 (8.9)	23.2 (9.5)	35.1 (18.5)	8.8	NR	NR	11.9	NR
	PBO	162	39.2 (12.2)	24.1	0	70 (12.6)	NR	14.2 (8.6)	22.7 (9.5)	35.1 (19.6)	8.6	NR	NR	6.8	NR
MATURE [31]	SEC 300 mg	41	44.7 (12.8)	29.3	95.1	90.94 (15.1)	30.3 (5.1)	19.6 (10.7)	19.5 (7.1)	26.6 (15.7)	19.5	61.0	39.0	NR	NR
	PBO	40	43.6 (14.1)	30.0	92.5	91.96 (18.9)	30.1 (5.8)	17.6 (12.1)	18.6 (5.6)	25.6 (12.1)	12.5	72.5	27.5	NR	NR
Ohtsuki 2018 [32] (NCT02325219)	GUS 100 mg	63	47.8 (11.1)	25.4	0	74.27 (16.0)	26.3 (5.0)	14.4 (9.2)	26.7 (12.2)	37.9 (21.5)	15.9	81.0	19.0	17.5	58.7
	PBO	64	48.3 (10.6)	15.6	0	71.56 (14.0)	25.4 (4.8)	13.7 (10.3)	25.9 (12.3)	33.6 (18.4)	15.6	81.3	18.8	15.6	59.4
ORION [33]	GUS 100 mg	62	46.2 (12.9)	33.9	NR	NR	31.4 (6.6)	19.1 (12.6)	17.9 (4.5)	20.1 (9.2)	NR	83.9	16.1	NR	NR
	PBO	16	45.4 (15.7)	25.0	NR	NR	31.5 (7.2)	17.4 (10.3)	18.4 (3.2)	18.6 (7.6)	NR	87.5	12.5	NR	NR
PEARL [34]	UST 45 mg	61	40.9 (12.7)	18.0	0	73.1 (12.7)	NR	11.9 (7.5)	25.2 (11.9)	41.8 (24.4)	16.4	NR	NR	21.3	NR
	PBO	60	40.4 (10.1)	11.7	0	74.6 (13)	NR	13.9 (7.3)	22.9 (8.6)	35.8 (21.4)	11.7	NR	NR	15.0	NR

Trial	Arms	N	Age, Years	% Female	% Caucas-ian	Weight, kg	BMI	Disease Duration, Years	PASI Score	% BSA	% PsA	% IGA 3	% IGA 4	% Previous Biologic Use	% Previous Systemics Use
PHOENIX 1 [35]	UST 45 mg	255	44.8 (12.5)	31.4	NR	93.7 (23.8)	NR	19.7 (11.7)	20.5 (8.6)	27.2 (17.5)	29.0	NR	NR	52.5	NR
	UST 90 mg	256	46.2 (11.3)	32.4	NR	93.8 (23.9)	NR	19.6 (11.1)	19.7 (7.6)	25.2 (15.0)	36.7	NR	NR	50.8	NR
	PBO	255	44.8 (11.3)	28.2	NR	94.2 (23.5)	NR	20.4 (11.7)	20.4 (8.6)	27.7 (17.4)	35.3	NR	NR	50.2	NR
PHOENIX 2 [36]	UST 45 mg	409	45.1 (12.1)	30.8	NR	90.3 (21)	NR	19.5 (11.7)	19.4 (6.8)	25.9 (15.5)	26.2	NR	NR	38.4	NR
	UST 90 mg	411	46.6 (12.1)	33.3	NR	91.5 (21.3)	NR	20.3 (12.3)	20.1 (7.5)	27.1 (17.4)	22.9	NR	NR	36.5	NR
	PBO	410	47.0 (12.5)	31.0	NR	91.1 (21.6)	NR	20.8 (12.2)	19.4 (7.5)	26.1 (17.4)	25.6	NR	NR	38.8	NR
POETYK PSO-1 [37]	APR 30 mg	168	44.7 (12.1)	34.5	82.7	87.5 (21.1)	29.6 (6.7)	17.7 (11.8)	21.4 (9.0)	26.6 (16.1)	18.5	NR	NR	39.3	25.6
	DEU 6 mg	332	45.9 (13.7)	30.7	80.4	87.9 (21.8)	29.8 (7.0)	17.1 (12.4)	21.8 (8.6)	26.6 (15.9)	19.3	NR	NR	39.2	21.1
	PBO	166	47.9 (14.0)	31.9	77.1	89.1 (22.3)	30.2 (7.4)	17.3 (12.8)	20.7 (8.0)	25.3 (16.9)	15.7	NR	NR	38.0	27.7
POETYK PSO-2 [38]	APR 30 mg	254	46.4 (13.3)	38.2	90.2	93.5 (22.2)	31.6 (7.2)	18.9 (12.4)	21.6 (8.4)	28.3 (16.5)	17.7	NR	NR	31.1	24.0
	DEU 6 mg	511	46.9 (13.4)	34.2	92.8	92.3 (21.9)	31.0 (6.8)	19.6 (12.9)	20.7 (7.5)	26.3 (15.8)	19.6	NR	NR	32.3	21.3
	PBO	255	47.3 (13.6)	29.0	91.0	91.5 (20.2)	30.4 (6.3)	19.9 (12.9)	21.1 (9.0)	25.3 (15.7)	17.6	NR	NR	32.5	22.0
reSURFACE 1 [39]	TIL 100 mg	309	46.4 (13.1)	33.0	70.2	88.53 (23.87)	NR	NR	20.0 (7.9)	29.7 (17.4)	NR	NR	NR	23.0	NR
	TIL 200 mg	308	46.9 (13.2)	26.6	67.9	88.87 (24.09)	NR	NR	20.7 (8.5)	30.9 (17.8)	NR	NR	NR	23.1	NR
	PBO	154	47.9 (13.5)	35.5	65.2	87.5 (26.04)	NR	NR	19.3 (7.1)	29.6 (17.3)	NR	NR	NR	22.6	NR
reSURFACE 2 [39]	TIL 100 mg	307	44.6 (13.6)	27.4	90.9	89.35 (22.12)	NR	NR	20.5 (7.6)	34.2 (18.4)	NR	NR	NR	12.7	NR
	TIL 200 mg	314	44.6 (13.6)	28.3	90.4	88.35 (21.23)	NR	NR	19.8 (7.5)	31.8 (17.2)	NR	NR	NR	12.1	NR
	PBO	156	46.4 (12.2)	28.2	92.3	88.74 (22.73)	NR	NR	20.0 (7.6)	31.3 (14.8)	NR	NR	NR	12.8	NR
SCULPTURE [40]	SEC 150 mg	482	45.3 (12.8)	36.7	72.4	85.2 (22.75)	29.1 (6.7)	17.2 (12.7)	24.0 (10.4)	35.7 (21.1)	21.6	60.0	39.8	26.8	56.4
	SEC 300 mg	484	46.7 (12.8)	31.2	70.9	85.1 (23.2)	29.0 (6.9)	17.4 (12.9)	23.3 (9.6)	33.7 (19.6)	19.4	58.7	41.3	29.1	53.3
Seo 2021 [41] (NCT02982005)	BRO 210 mg	40	43.5 (14.3)	42.5	0	70.97 (15)	25.8 (4.4)	10.9 (9.8)	23.3 (9.9)	33.5 (19.4)	NR	NR	NR	10.0	NR
	PBO	22	43.7 (15.8)	31.8	0	72.76 (13.6)	25.5 (4.6)	13.6 (10.0)	26.0 (11.0)	37.1 (21.2)	NR	NR	NR	36.4	NR

Trial	Arms	N	Age, Years	% Female	% Caucas-ian	Weight, kg	BMI	Disease Duration, Years	PASI Score	% BSA	% PsA	% IGA 3	% IGA 4	% Previous Biologic Use	% Previous Systemics Use
UltIMMa-1 [42]	RIS 150 mg	304	48.3 (13.4)	30.3	65.8	87.8 (22.9)	29.9 (6.9)	NR	20.6 (7.7)	26.2 (15.4)	28.0	NR	NR	34.2	NR
	UST 45/90 mg	100	46.5 (3.4)	30.0	74.0	88.9 (22.9)	29.8 (6.9)	NR	20.1 (6.8)	25.2 (14.7)	23.0	NR	NR	30.0	NR
	PBO	102	49.3 (13.6)	22.5	69.6	88.8 (20.2)	29.5 (6.4)	NR	20.5 (6.7)	27.9 (17.2)	35.3	NR	NR	39.2	NR
UltIMMa-2 [42]	RIS 150 mg	294	46.2 (13.7)	31.0	86.7	92.2 (21.7)	31.1 (7.1)	NR	20.5 (7.8)	26.2 (15.9)	25.2	NR	NR	40.1	NR
	UST 45/90 mg	99	48.6 (14.8)	33.3	91.9	91.9 (21.4)	30.9 (6.8)	NR	18.2 (5.9)	20.9 (12.1)	27.3	NR	NR	43.4	NR
	PBO	98	46.3 (13.3)	31.6	88.8	92.2 (20.0)	31.0 (5.8)	NR	18.9 (7.3)	23.9 (15.7)	32.7	NR	NR	42.9	NR
UNCOVER-1 [43]	IXE 80 mg	433	45.0 (12.0)	32.8	92.6	92 (23)	NR	20.0 (12.0)	20.0 (8.0)	28.0 (18.0)	NR	NR	NR	40.0	57.0
	PBO	431	46.0 (13.0)	29.7	93.0	92 (25)	NR	20.0 (12.0)	20.0 (9.0)	27.0 (18.0)	NR	NR	NR	42.0	52.0
UNCOVER-2 [44]	IXE 80 mg	351	45.0 (13.0)	37.0	94.0	89 (22)	30.0 (7.0)	18.0 (12.0)	19.0 (7.0)	25.0 (16.0)	NR	NR	NR	23.9	50.7
	PBO	168	45.0 (12.0)	28.6	88.7	92 (22)	31.0 (7.0)	19.0 (13.0)	21.0 (8.0)	27.0 (18.0)	NR	NR	NR	25.6	47.6
UNCOVER-3 [44]	IXE 80 mg	385	46.0 (13.0)	34.0	93.8	90 (23)	30.0 (7.0)	18.0 (12.0)	21.0 (8.0)	28.0 (17.0)	NR	NR	NR	15.1	44.2
	PBO	193	46.0 (12.0)	29.0	91.2	91 (21)	30.0 (6.0)	18.0 (13.0)	21.0 (8.0)	29.0 (17.0)	NR	NR	NR	17.1	42.5
VIP-S [45]	SEC 300 mg	46	47.9 (12.7)	28.3	78.3	NR	31.1 (6.8)	16.3 (12.3)	22.5 (12.0)	27.6 (19.3)	13.0	67.4	32.6	43.5	28.3
	PBO	45	47.0 (14.7)	37.8	80.0	NR	32.8 (7.8)	15.4 (12.5)	21.4 (9.9)	30.1 (18.7)	24.4	62.2	37.8	35.6	31.1
VIP-U [46]	UST 45/90 mg	22	39.5 (13.6)	27.3	86.4	NR	33.2 (8.0)	16.5 (11.0)	20.0 (7.5)	26.2 (17.5)	4.5	NR	NR	45.5	NR
	PBO	21	45.3 (12.8)	33.3	57.1	NR	33.3 (6.3)	20.3 (14.4)	19.8 (7.6)	23.7 (15.6)	28.6	NR	NR	42.9	NR
VOYAGE 1 [47]	GUS 100 mg	329	43.9 (12.7)	27.1	79.6	NR	29.7 (6.2)	17.9 (12.3)	22.1 (9.5)	28.3 (17.1)	19.5	76.6	23.4	21.6	63.8
	PBO	174	44.9 (12.9)	31.6	83.3	NR	28.9 (6.9)	17.6 (12.4)	20.4 (8.7)	25.8 (15.9)	17.2	75.3	24.7	19.5	52.9
VOYAGE 2 [48]	GUS 100 mg	496	43.7 (12.2)	29.6	82.3	NR	29.6 (6.5)	17.9 (12.0)	21.9 (8.8)	28.5 (16.4)	17.9	76.6	23.2	20.4	66.7
	PBO	248	43.3 (12.4)	30.2	83.1	NR	29.6 (6.6)	17.9 (11.9)	21.5 (8.0)	28.0 (16.5)	18.5	77.0	23.0	21.8	60.1

[a] Reported as median (IQR), as mean (SD) values were not reported in the IMMhance publication (Blauvelt 2020 [23]).

Note: Values are reported as either mean (SD) or %, unless otherwise stated.

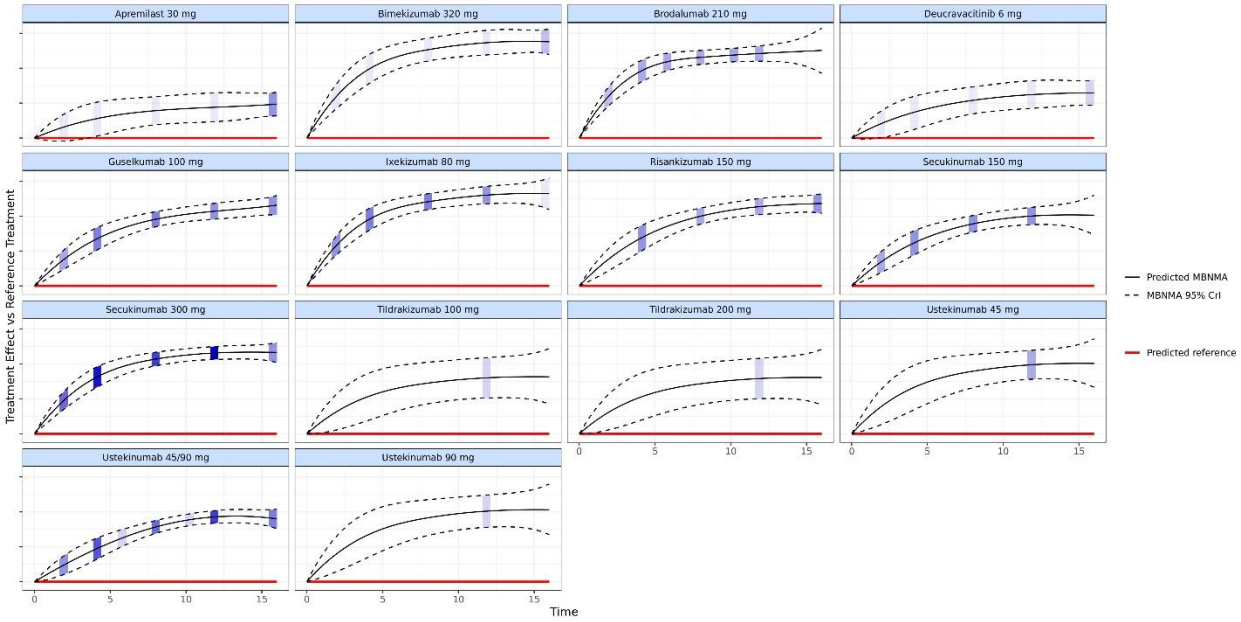
Abbreviations: APR = apremilast; BIM = bimekizumab; BRO = brodalumab; BMI = body mass index; BSA = body surface area; DEU = deucravacitinib; GUS = guselkumab; IGA = Investigator's Global Assessment; IXE = ixekizumab; N = number; NR = not reported; PASI = Psoriasis Area and Severity Index; PBO = placebo; PsA = psoriatic arthritis; RIS = risankizumab; SD = standard deviation; SEC = secukinumab; TIL = tildrakizumab; UST = ustekinumab.

Table S6: Included data per treatment up to week 16 for PASI 90 or PASI 75 responses (main analysis)

Treatment	# of Studies with Responses Reported by Week						
	2	4	6	8	10	12	16
PASI 90							
Apremilast 30 mg	1	1	0	1	0	1	5
Bimekizumab 320 mg	1	1	0	1	0	1	3
Brodalumab 210 mg	3	4	4	4	4	4	0
Deucravacitinib 6 mg	1	1	0	1	0	1	2
Guselkumab 100 mg	4	6	0	6	0	5	5
Ixekizumab 80 mg	5	6	0	6	0	5	1
Placebo	17	25	4	23	4	32	15
Risankizumab 150 mg	0	5	0	4	0	4	5
Secukinumab 150 mg	4	5	0	5	0	5	0
Secukinumab 300 mg	7	11	0	9	0	12	5
Tildrakizumab 100 mg	0	0	0	0	0	2	0
Tildrakizumab 200 mg	0	0	0	0	0	2	0
Ustekinumab 45 mg	0	0	0	0	0	4	0
Ustekinumab 45/90 mg	5	8	2	7	2	9	6
Ustekinumab 90 mg	0	0	0	0	0	2	0
PASI 75							
Apremilast 30 mg	2	2	0	2	0	2	5
Bimekizumab 320 mg	1	3	0	1	0	1	2
Brodalumab 210 mg	3	4	4	4	4	4	0
Deucravacitinib 6 mg	1	1	0	1	0	1	2
Guselkumab 100 mg	4	4	0	4	0	5	5
Ixekizumab 80 mg	6	5	0	5	0	5	1
Placebo	18	30	4	28	4	32	12
Risankizumab 150 mg	0	4	0	4	0	4	3
Secukinumab 150 mg	4	5	0	5	0	6	0
Secukinumab 300 mg	6	11	0	8	0	12	5
Tildrakizumab 100 mg	0	2	0	2	0	2	0
Tildrakizumab 200 mg	0	2	0	2	0	2	0
Ustekinumab 45 mg	0	2	0	2	0	4	0
Ustekinumab 45/90 mg	5	8	2	7	2	9	5
Ustekinumab 90 mg	0	0	0	0	0	2	0

Abbreviations: PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

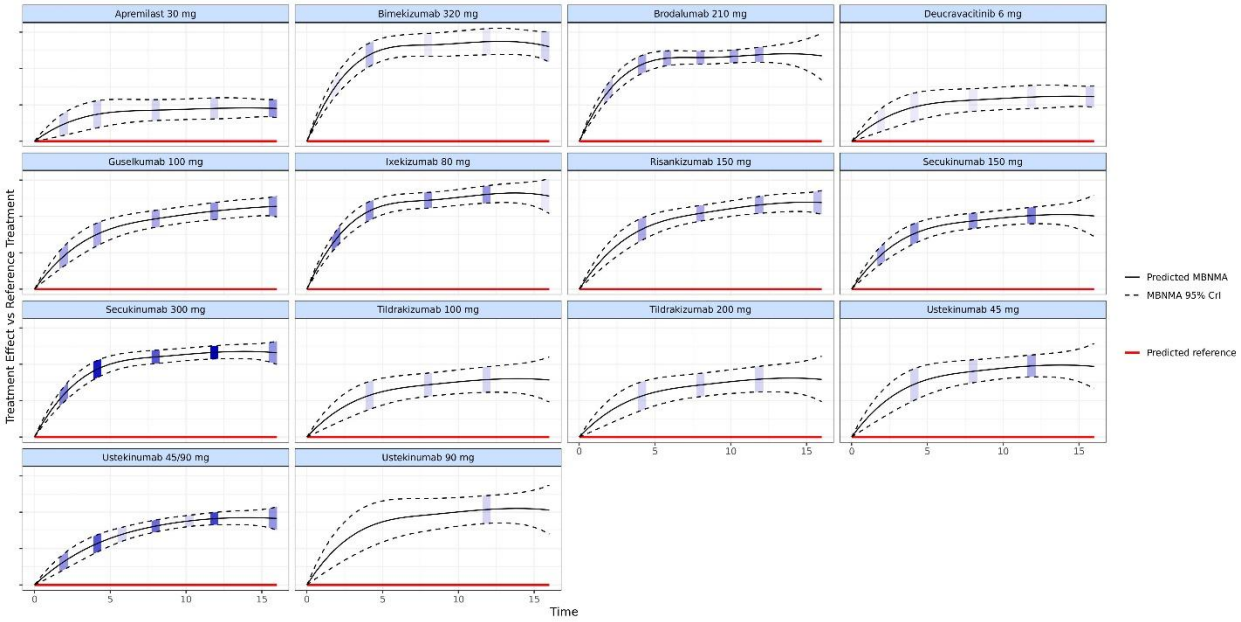
Figure S2: Treatment diagnostic plots for patients achieving a PASI 90 response over time (main analysis; random effects)



Note: Vertical blue lines indicate the data points that were available at specific timepoints; colour intensity refers to the number of data points (with darker blues indicating more data points were available).

Abbreviations: CrI = credible interval; MBNMA = model-based network meta-analysis; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

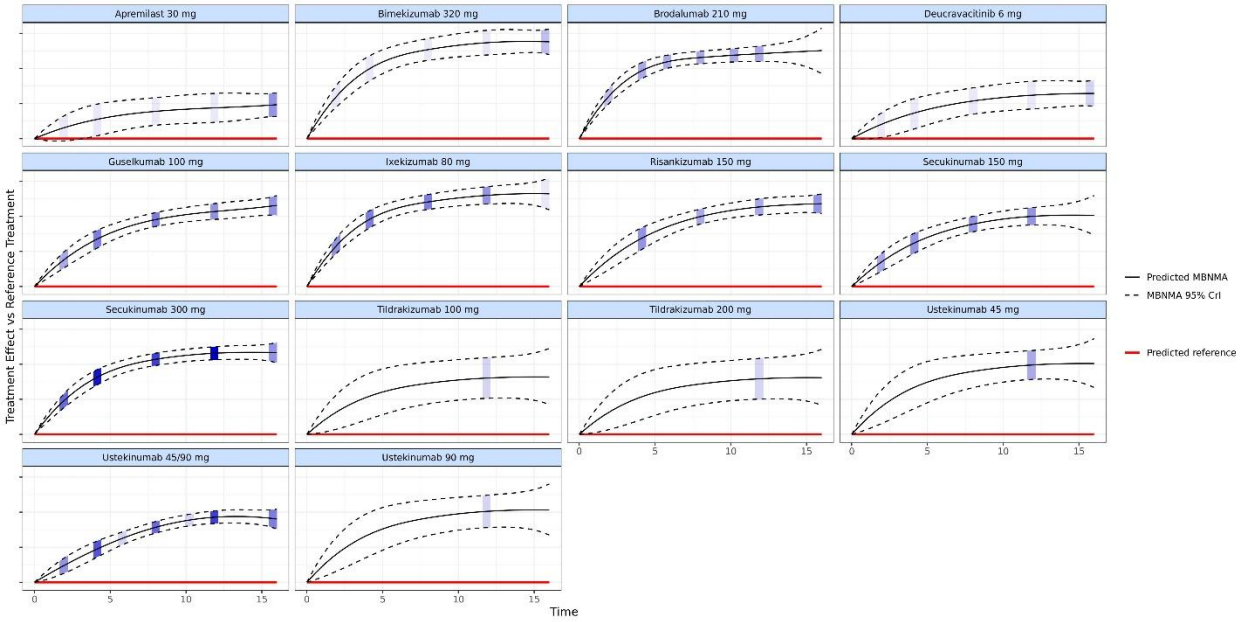
Figure S3: Treatment diagnostic plots for patients achieving a PASI 75 response over time (main analysis; random effects)



Note: Vertical blue lines indicate the data points that were available at specific timepoints; colour intensity refers to the number of data points (with darker blues indicating more data points were available).

Abbreviations: CrI = credible interval; MBNMA = model-based network meta-analysis; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score.

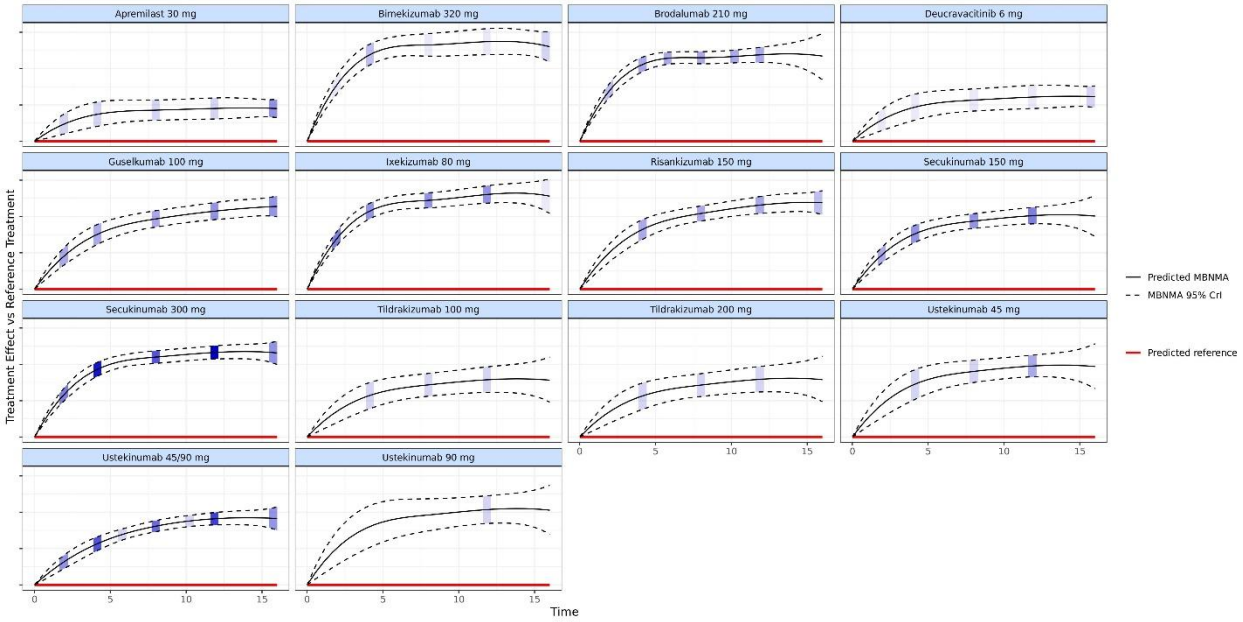
Figure S4: Treatment diagnostic plots for patients achieving a PASI 90 response over time (main analysis; fixed-effect)



Note: Vertical blue lines indicate the data points that were available at specific timepoints; colour intensity refers to the number of data points (with darker blues indicating more data points were available).

Abbreviations: CrI = credible interval; MBNMA = model-based network meta-analysis; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

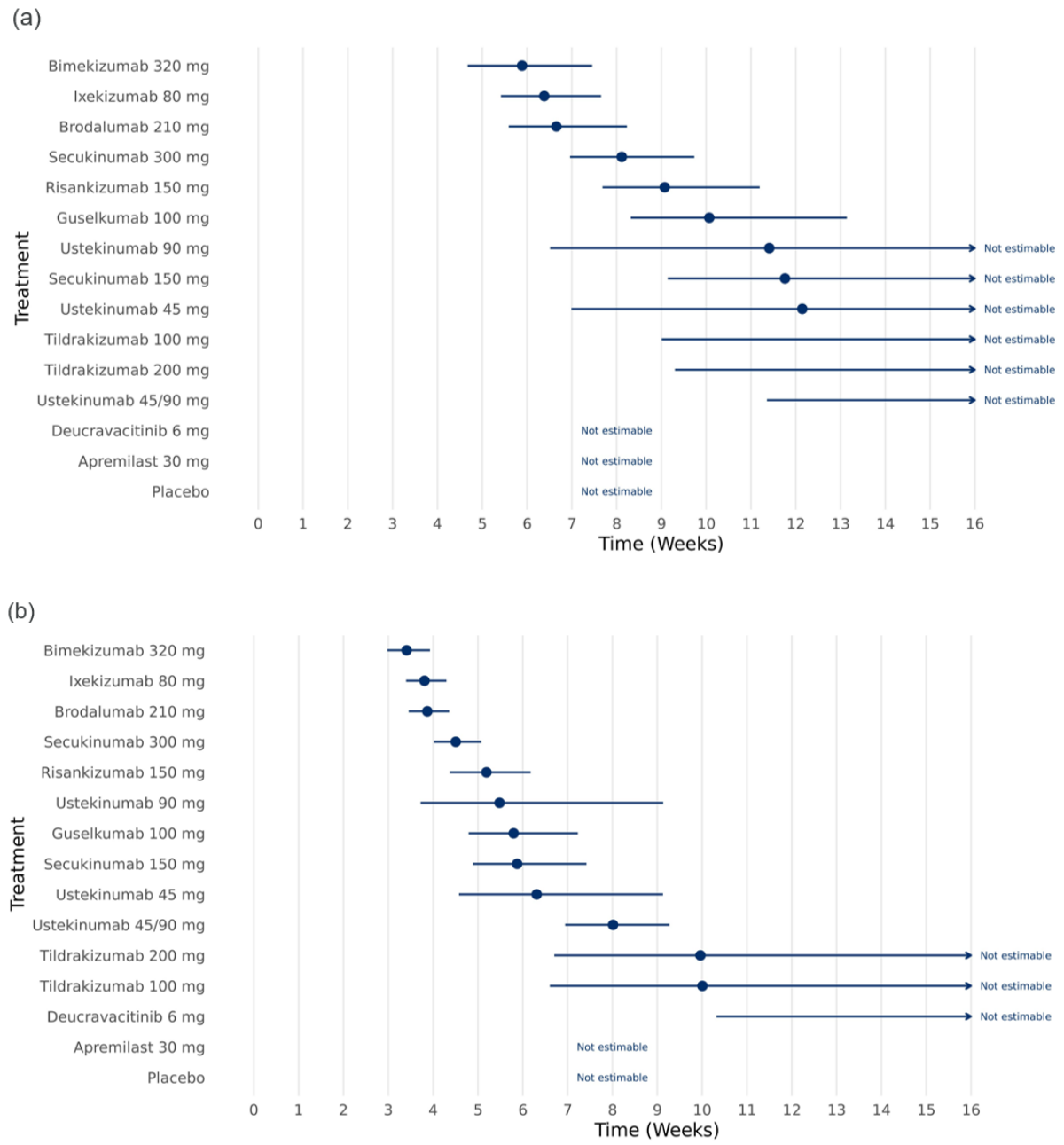
Figure S5: Treatment diagnostic plots for patients achieving a PASI 75 response over time (main analysis; fixed-effect)



Note: Vertical blue lines indicate the data points that were available at specific timepoints; colour intensity refers to the number of data points (with darker blues indicating more data points were available).

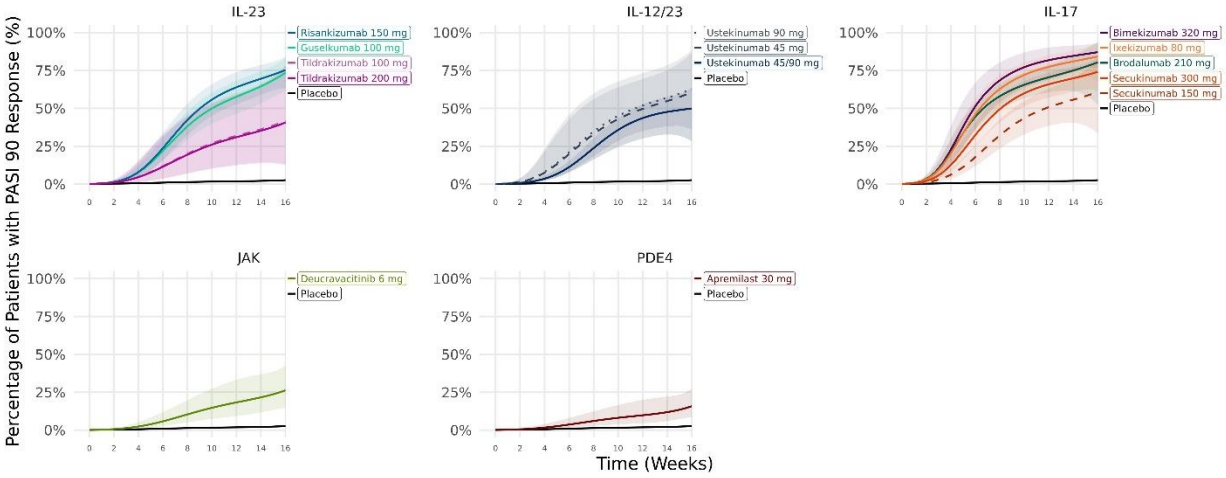
Abbreviations: CrI = credible interval; MBNMA = model-based network meta-analysis; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score.

Figure S6: Forest plots for (a) time for the average patient to achieve a PASI 90 response; (b) time for the average patient to achieve a PASI 75 response (main analysis; fixed-effect)



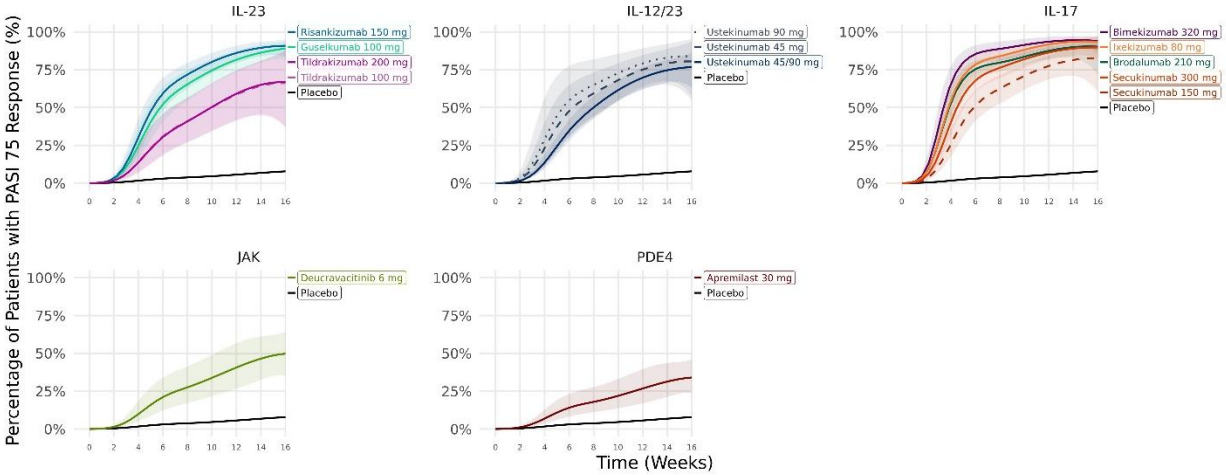
Abbreviations: PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

Figure S7: PASI 90 response curves over time up to week 16 (main analysis; fixed-effect)



Abbreviations: IL = interleukin; JAK = Janus kinase; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

Figure S8: PASI 75 response curves over time up to week 16 (main analysis; fixed-effect)



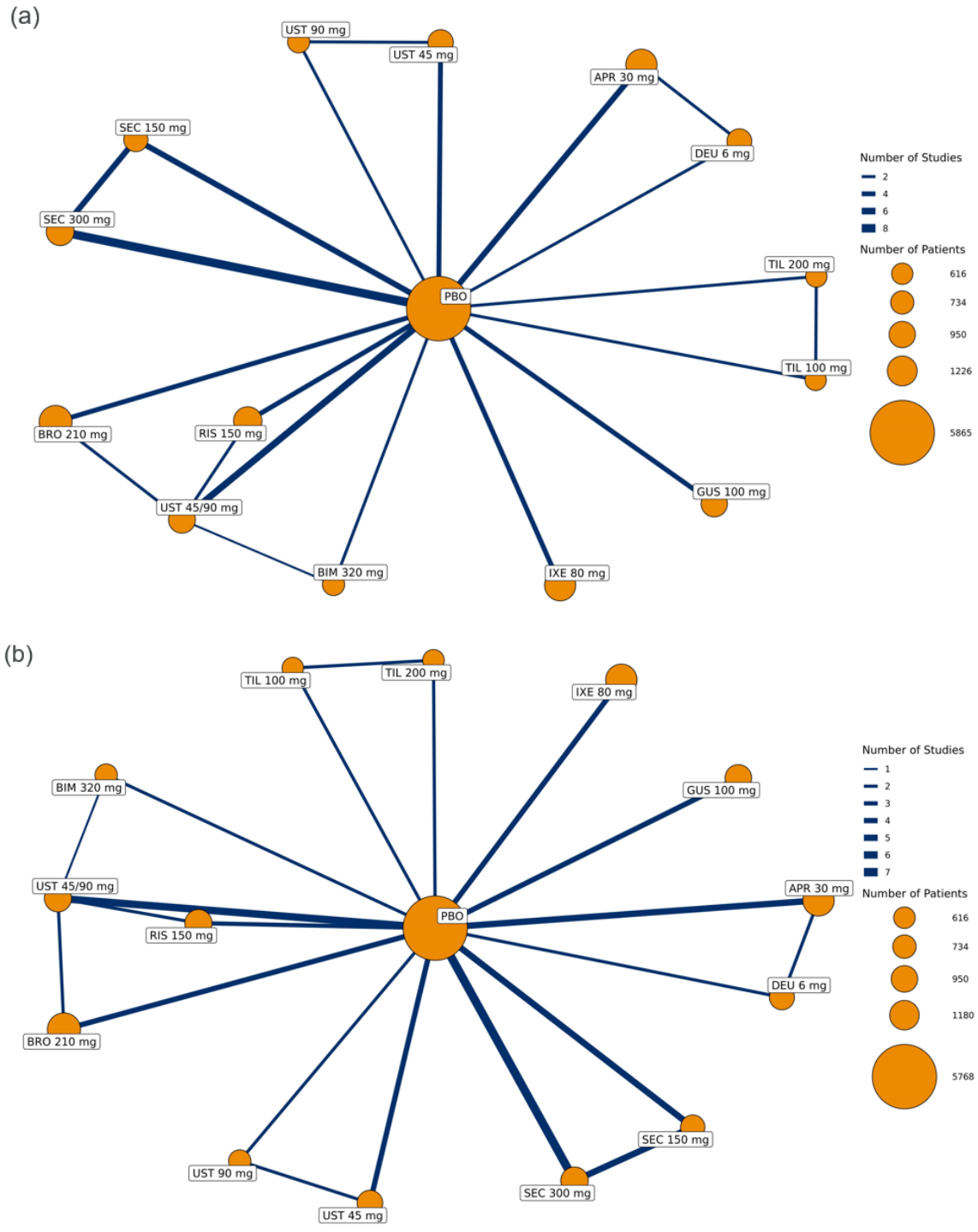
Abbreviations: IL = interleukin; JAK = Janus kinase; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

Table S8: Estimated time for the average patient to achieve a PASI 90 response or PASI 75 response by treatment (main analysis; fixed-effect)

Treatment	Drug class	Estimated median time (95% CrI)	
		Days	Weeks
PASI 90			
Bimekizumab 320 mg	IL-17	41.3 (32.8, 52.0)	5.9 (4.7, 7.4)
Ixekizumab 80 mg	IL-17	44.7 (38.0, 53.4)	6.4 (5.4, 7.6)
Brodalumab 210 mg	IL-17	46.5 (39.2, 57.3)	6.6 (5.6, 8.2)
Secukinumab 300 mg	IL-17	56.6 (48.7, 67.8)	8.1 (7.0, 9.7)
Risankizumab 150 mg	IL-23	63.2 (53.7, 78.1)	9.0 (7.7, 11.2)
Guselkumab 100 mg	IL-23	70.1 (58.0, 92.0)	10.0 (8.3, 13.1)
Ustekinumab 90 mg	IL-12/23	79.6 (45.6, NE)	11.4 (6.5, NE)
Secukinumab 150 mg	IL-17	82.1 (63.7, NE)	11.7 (9.1, NE)
Ustekinumab 45 mg	IL-12/23	84.9 (48.8, NE)	12.1 (7.0, NE)
Tildrakizumab 100 mg	IL-23	NE (62.6, NE)	NE (9.0, NE)
Tildrakizumab 200 mg	IL-23	NE (64.7, NE)	NE (9.2, NE)
Ustekinumab 45/90 mg	IL-12/23	NE (79.3, NE)	NE (11.3, NE)
Apremilast 30 mg	PDE-4	NE (NE, NE)	NE (NE, NE)
Deucravacitinib 6 mg	JAK	NE (NE, NE)	NE (NE, NE)
PASI 75			
Bimekizumab 320 mg	IL-17	23.9 (20.8, 27.5)	3.4 (3.0, 3.9)
Ixekizumab 80 mg	IL-17	26.7 (23.8, 30.1)	3.8 (3.4, 4.3)
Brodalumab 210 mg	IL-17	27.1 (24.2, 30.5)	3.9 (3.5, 4.4)
Secukinumab 300 mg	IL-17	31.5 (28.1, 35.5)	4.5 (4.0, 5.1)
Risankizumab 150 mg	IL-23	36.3 (30.6, 43.2)	5.2 (4.4, 6.2)
Ustekinumab 90 mg	IL-12/23	38.4 (26.1, 63.7)	5.5 (3.7, 9.1)
Guselkumab 100 mg	IL-23	40.6 (33.6, 50.5)	5.8 (4.8, 7.2)
Secukinumab 150 mg	IL-17	41.1 (34.3, 51.8)	5.9 (4.9, 7.4)
Ustekinumab 45 mg	IL-12/23	44.1 (32.1, 63.6)	6.3 (4.6, 9.1)
Ustekinumab 45/90 mg	IL-12/23	55.9 (48.5, 64.7)	8.0 (6.9, 9.2)
Tildrakizumab 200 mg	IL-23	69.5 (46.8, NE)	9.9 (6.7, NE)
Tildrakizumab 100 mg	IL-23	69.8 (46.2, NE)	10.0 (6.6, NE)
Deucravacitinib 6 mg	JAK	NE (71.9, NE)	NE (10.3, NE)
Apremilast 30 mg	PDE-4	NE (NE, NE)	NE (NE, NE)

Abbreviations: CrI = credible interval; IL = interleukin; JAK = Janus kinase; NE = not estimable; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

Figure S9: Evidence networks for (a) time for the average patient to achieve a PASI 90 response; (b) time for the average patient to achieve a PASI 75 response (sensitivity analysis – placebo-controlled trials)



Abbreviations: APR = apremilast; BIM = bimekizumab; BRO = brodalumab; DEU = deucravacitinib; GUS = guselkumab; IXE = ixekizumab; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score PBO = placebo; RIS = risankizumab; SEC = secukinumab; TIL = tildrakizumab; UST = ustekinumab.

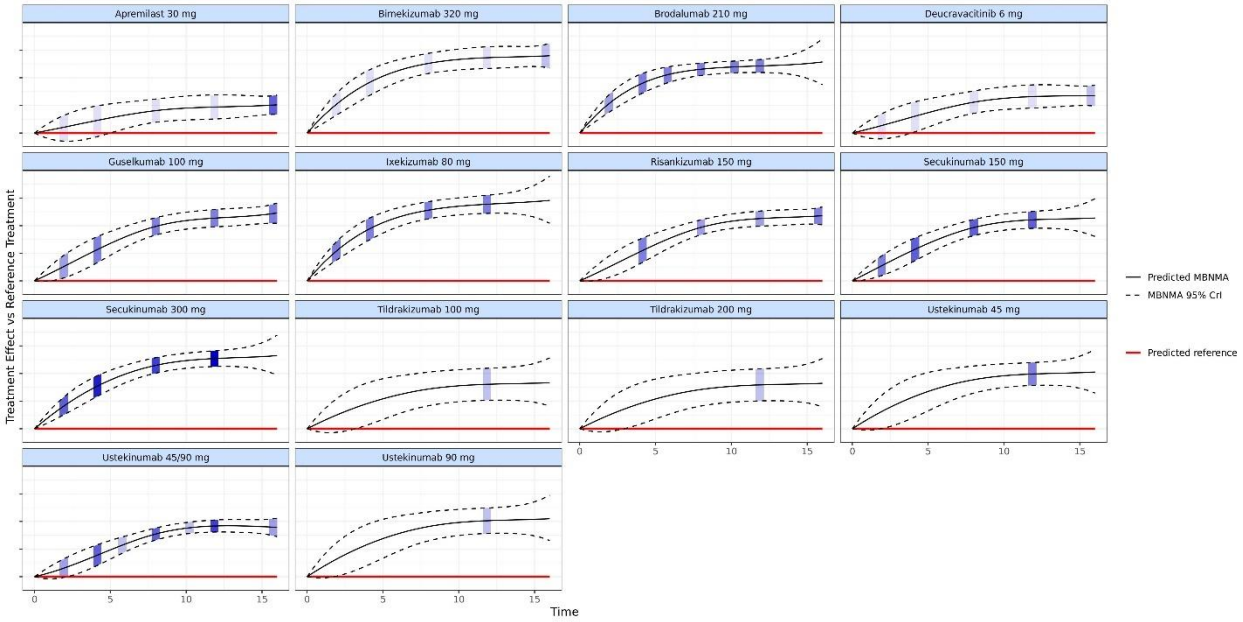
Table S9: Included data per treatment up to week 16 for PASI 90 or PASI 75 responses (sensitivity analysis – placebo-controlled trials)

Treatment	# of Studies with Responses Reported by Week						
	2	4	6	8	10	12	16
PASI 90							
Apremilast 30 mg	1	1	0	1	0	1	5
Bimekizumab 320 mg	1	1	0	1	0	1	2[a]
Brodalumab 210 mg	3	4	4	4	4	4	0
Deucravacitinib 6 mg	1	1	0	1	0	1	2
Guselkumab 100 mg	3[a]	4[a]	0	4	0	4[a]	4[a]
Ixekizumab 80 mg	4[a]	4[a]	0	4[a]	0	4[a]	0[a]
Placebo	17	25	4	23	4	32	15
Risankizumab 150 mg	0	4[a]	0	3[a]	0	3[a]	4[a]
Secukinumab 150 mg	4	5	0	5	0	5	0
Secukinumab 300 mg	5[a]	7[a]	0	6[a]	0	8[a]	0[a]
Tildrakizumab 100 mg	0	0	0	0	0	2	0
Tildrakizumab 200 mg	0	0	0	0	0	2	0
Ustekinumab 45 mg	0	0	0	0	0	4	0
Ustekinumab 45/90 mg	3[a]	5[a]	2	5[a]	2	6[a]	3[a]
Ustekinumab 90 mg	0	0	0	0	0	2	0
PASI 75							
Apremilast 30 mg	2	2	0	2	0	2	5
Bimekizumab 320 mg	1	2[a]	0	1	0	1	1[a]
Brodalumab 210 mg	3	4	4	4	4	4	0
Deucravacitinib 6 mg	1	1	0	1	0	1	2
Guselkumab 100 mg	3[a]	4	0	4	0	4[a]	4[a]
Ixekizumab 80 mg	4[a]	4[a]	0	4[a]	0	4[a]	0[a]
Placebo	18	30	4	28	4	32	12
Risankizumab 150 mg	0	3[a]	0	3[a]	0	3[a]	2[a]
Secukinumab 150 mg	4	5	0	5	0	5[a]	0
Secukinumab 300 mg	5[a]	7[a]	0	6[a]	0	7[a]	0[a]
Tildrakizumab 100 mg	0	2	0	2	0	2	0
Tildrakizumab 200 mg	0	2	0	2	0	2	0
Ustekinumab 45 mg	0	2	0	2	0	4	0
Ustekinumab 45/90 mg	3[a]	5[a]	2	5[a]	2	6[a]	2[a]
Ustekinumab 90 mg	0	0	0	0	0	2	0

[a] Less data were available than in the main analysis.

Abbreviations: PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

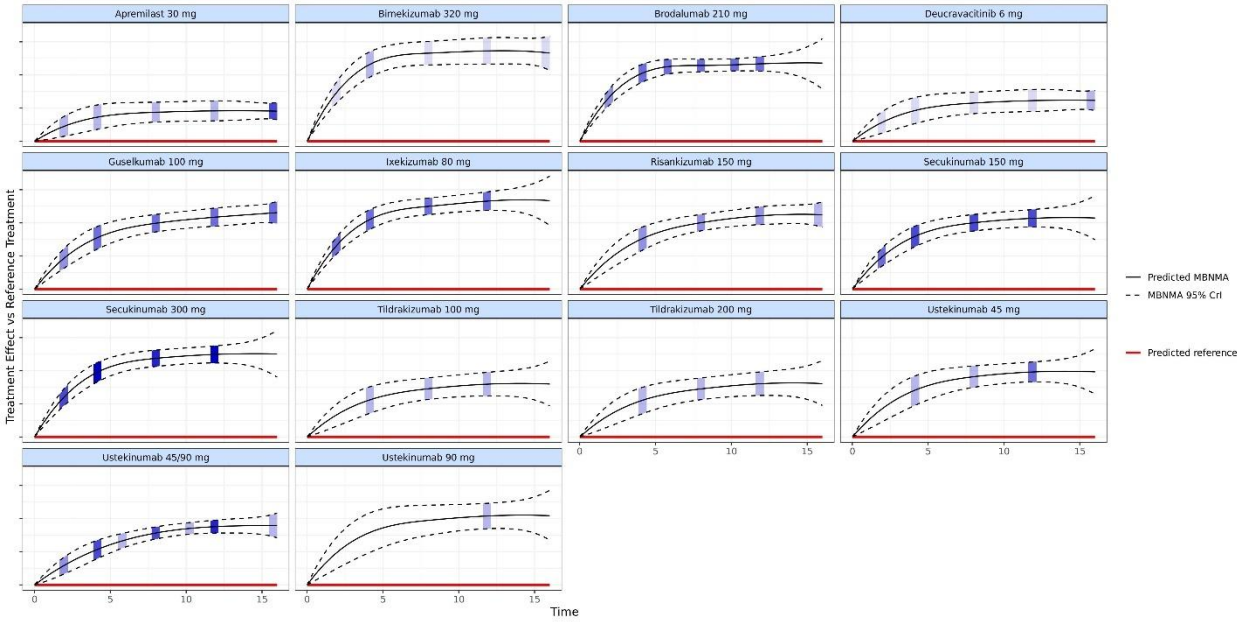
Figure S10: Treatment diagnostic plots for patients achieving a PASI 90 response over time (sensitivity analysis – placebo-controlled trials; random effects)



Note: Vertical blue lines indicate the data points that were available at specific timepoints; colour intensity refers to the number of data points (with darker blues indicating more data points were available).

Abbreviations: CrI = credible interval; MBNMA = model-based network meta-analysis; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

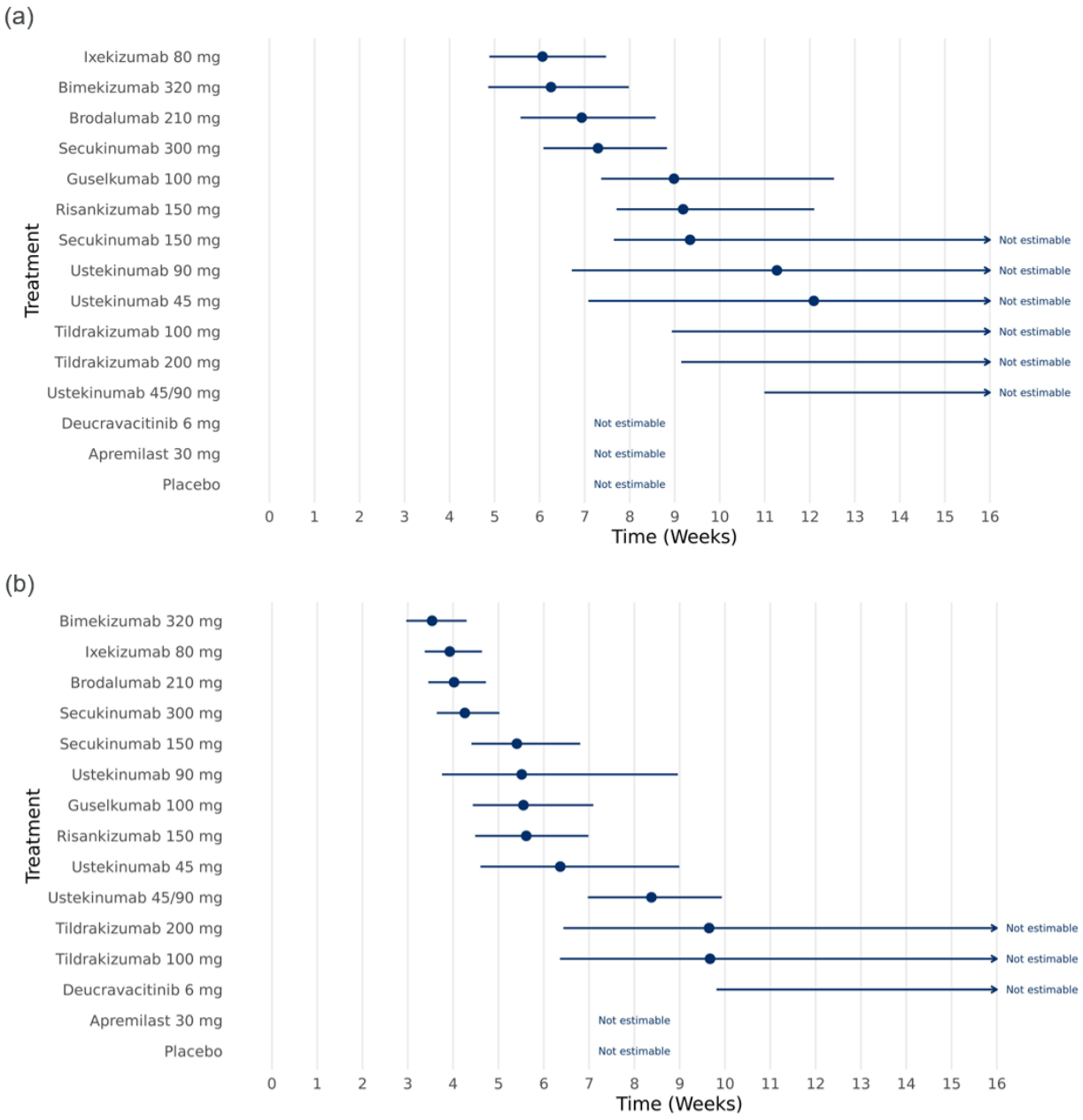
Figure S11: Treatment diagnostic plots for patients achieving a PASI 75 response over time (sensitivity analysis – placebo-controlled trials; random effects)



Note: Vertical blue lines indicate the data points that were available at specific timepoints; colour intensity refers to the number of data points (with darker blues indicating more data points were available).

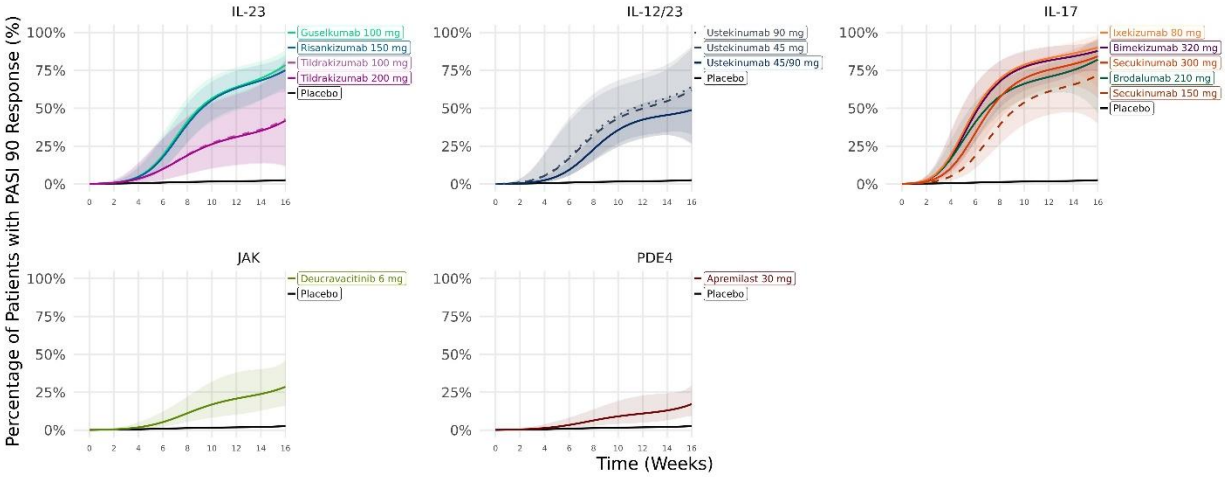
Abbreviations: CrI = credible interval; MBNMA = model-based network meta-analysis; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score.

Figure S12: Forest plots for (a) time for the average patient to achieve a PASI 90 response; (b) time for the average to achieve a PASI 75 response (sensitivity analysis – placebo-controlled trials; random effects)



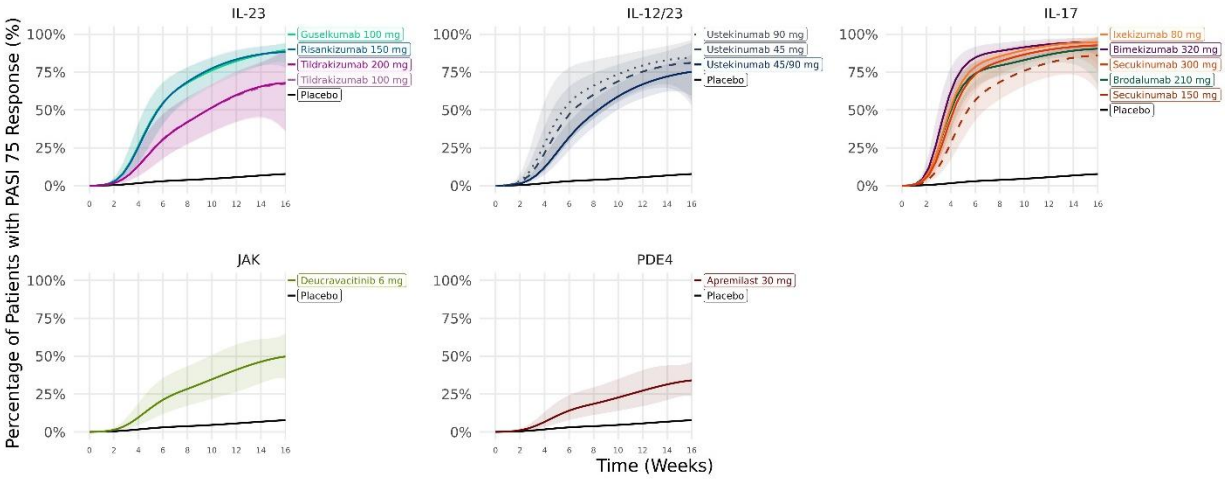
Abbreviations: PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

Figure S13: PASI 90 response curves over time up to week 16 (sensitivity analysis – placebo-controlled trials; random effects)



Abbreviations: IL = interleukin; JAK = Janus kinase; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

Figure S14: PASI 75 response curves over time up to week 16 (sensitivity analysis – placebo-controlled trials; random effects)



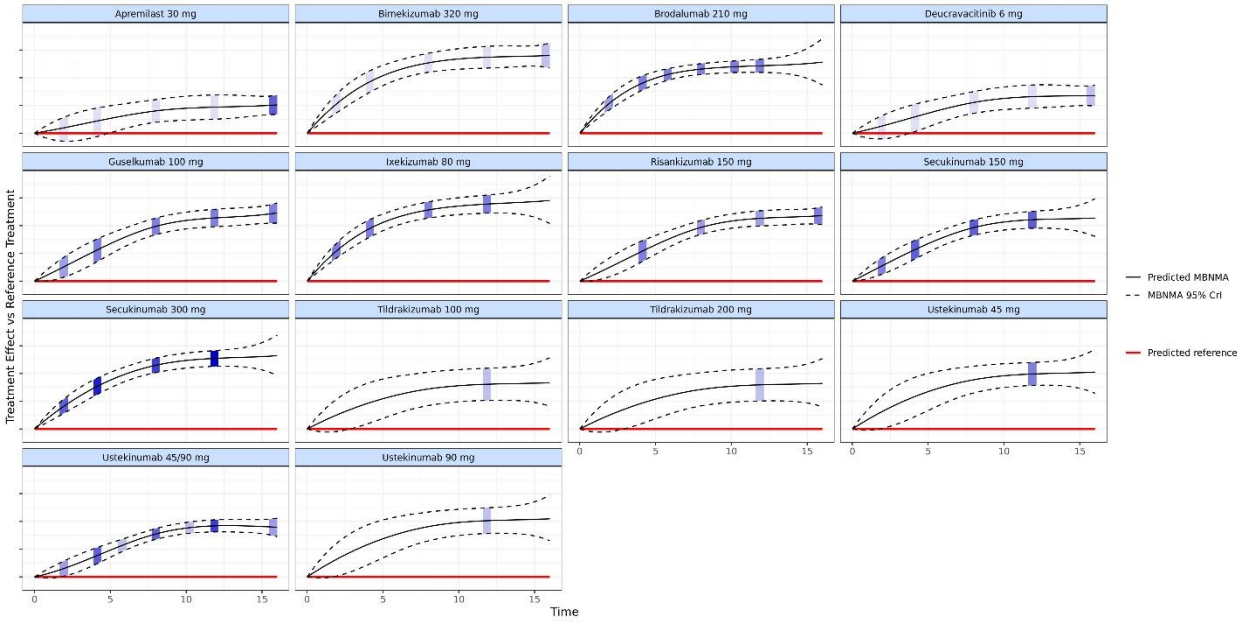
Abbreviations: IL = interleukin; JAK = Janus kinase; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

Table S10: Estimated time for the average patient to achieve a PASI 90 response or PASI 75 response by treatment (sensitivity analysis – placebo-controlled trials; random effects)

Treatment	Drug class	Estimated median time (95% CrI)	
		Days	Weeks
PASI 90			
Ixekizumab 80 mg	IL-17	42.4 (34.2, 52.3)	6.1 (4.9, 7.5)
Bimekizumab 320 mg	IL-17	43.8 (34.0, 55.9)	6.3 (4.9, 8.0)
Brodalumab 210 mg	IL-17	48.5 (39.0, 60.0)	6.9 (5.6, 8.6)
Secukinumab 300 mg	IL-17	51.1 (42.6, 61.8)	7.3 (6.1, 8.8)
Guselkumab 100 mg	IL-23	62.9 (51.6, 87.8)	9.0 (7.4, 12.5)
Risankizumab 150 mg	IL-23	64.3 (54.0, 84.7)	9.2 (7.7, 12.1)
Secukinumab 150 mg	IL-17	65.4 (53.5, NE)	9.3 (7.7, NE)
Ustekinumab 90 mg	IL-12/23	78.9 (47.0, NE)	11.3 (6.7, NE)
Ustekinumab 45 mg	IL-12/23	84.6 (49.6, NE)	12.1 (7.1, NE)
Tildrakizumab 100 mg	IL-23	NE (62.6, NE)	NE (8.9, NE)
Tildrakizumab 200 mg	IL-23	NE (64.0, NE)	NE (9.2, NE)
Ustekinumab 45/90 mg	IL-12/23	NE (77.0, NE)	NE (11.0, NE)
Apremilast 30 mg	PDE-4	NE (NE, NE)	NE (NE, NE)
Deucravacitinib 6 mg	JAK	NE (NE, NE)	NE (NE, NE)
PASI 75			
Bimekizumab 320 mg	IL-17	24.7 (20.8, 30.1)	3.5 (3.0, 4.3)
Ixekizumab 80 mg	IL-17	27.5 (23.6, 32.5)	3.9 (3.4, 4.6)
Brodalumab 210 mg	IL-17	28.1 (24.2, 33.1)	4.0 (3.4, 4.7)
Secukinumab 300 mg	IL-17	29.8 (25.5, 35.2)	4.3 (3.6, 5.0)
Secukinumab 150 mg	IL-17	37.8 (30.8, 47.6)	5.4 (4.4, 6.8)
Ustekinumab 90 mg	IL-12/23	38.6 (26.3, 62.7)	5.5 (3.8, 9.0)
Guselkumab 100 mg	IL-23	38.9 (31.0, 49.7)	5.6 (4.4, 7.1)
Risankizumab 150 mg	IL-23	39.3 (31.4, 48.9)	5.6 (4.5, 7.0)
Ustekinumab 45 mg	IL-12/23	44.6 (32.2, 63.0)	6.4 (4.6, 9.0)
Ustekinumab 45/90 mg	IL-12/23	58.6 (48.8, 69.5)	8.4 (7.0, 9.9)
Tildrakizumab 200 mg	IL-23	67.5 (45.0, NE)	9.6 (6.4, NE)
Tildrakizumab 100 mg	IL-23	67.7 (44.5, NE)	9.7 (6.4, NE)
Deucravacitinib 6 mg	JAK	NE (68.7, NE)	NE (9.8, NE)
Apremilast 30 mg	PDE-4	NE (NE, NE)	NE (NE, NE)

Abbreviations: CrI = credible interval; IL = interleukin; JAK = Janus kinase; NE = not estimable; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

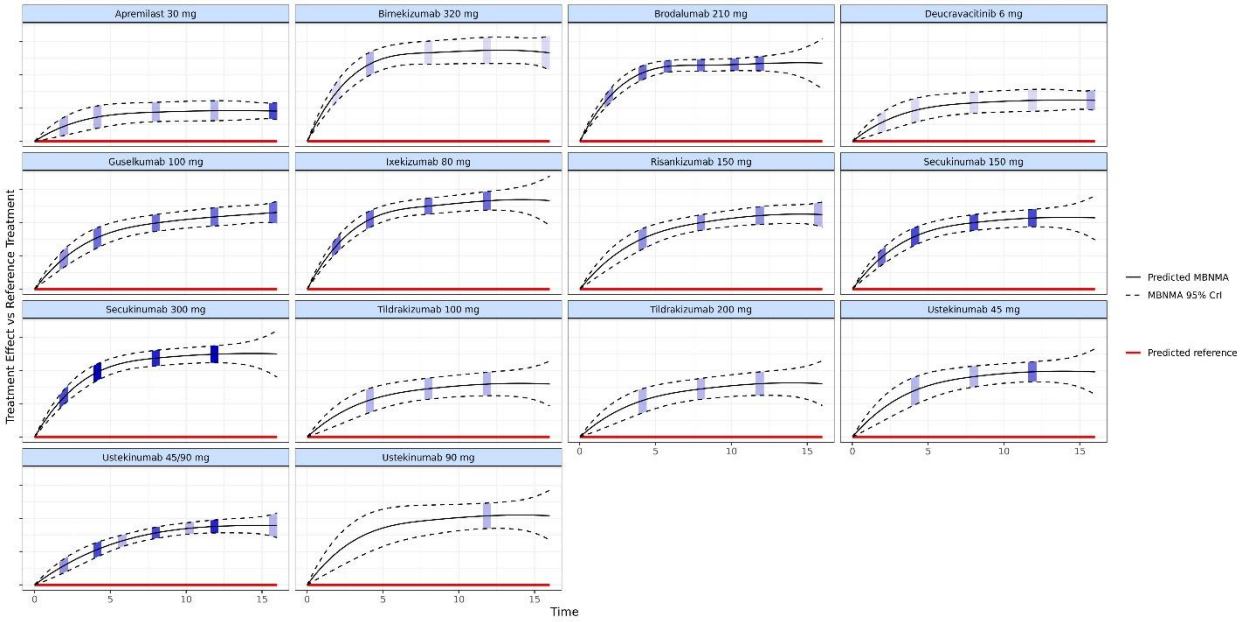
Figure S15: Treatment diagnostic plots for patients achieving a PASI 90 response over time (sensitivity analysis – placebo-controlled trials; fixed-effect)



Note: Vertical blue lines indicate the data points that were available at specific timepoints; colour intensity refers to the number of data points (with darker blues indicating more data points were available).

Abbreviations: CrI = credible interval; MBNMA = model-based network meta-analysis; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

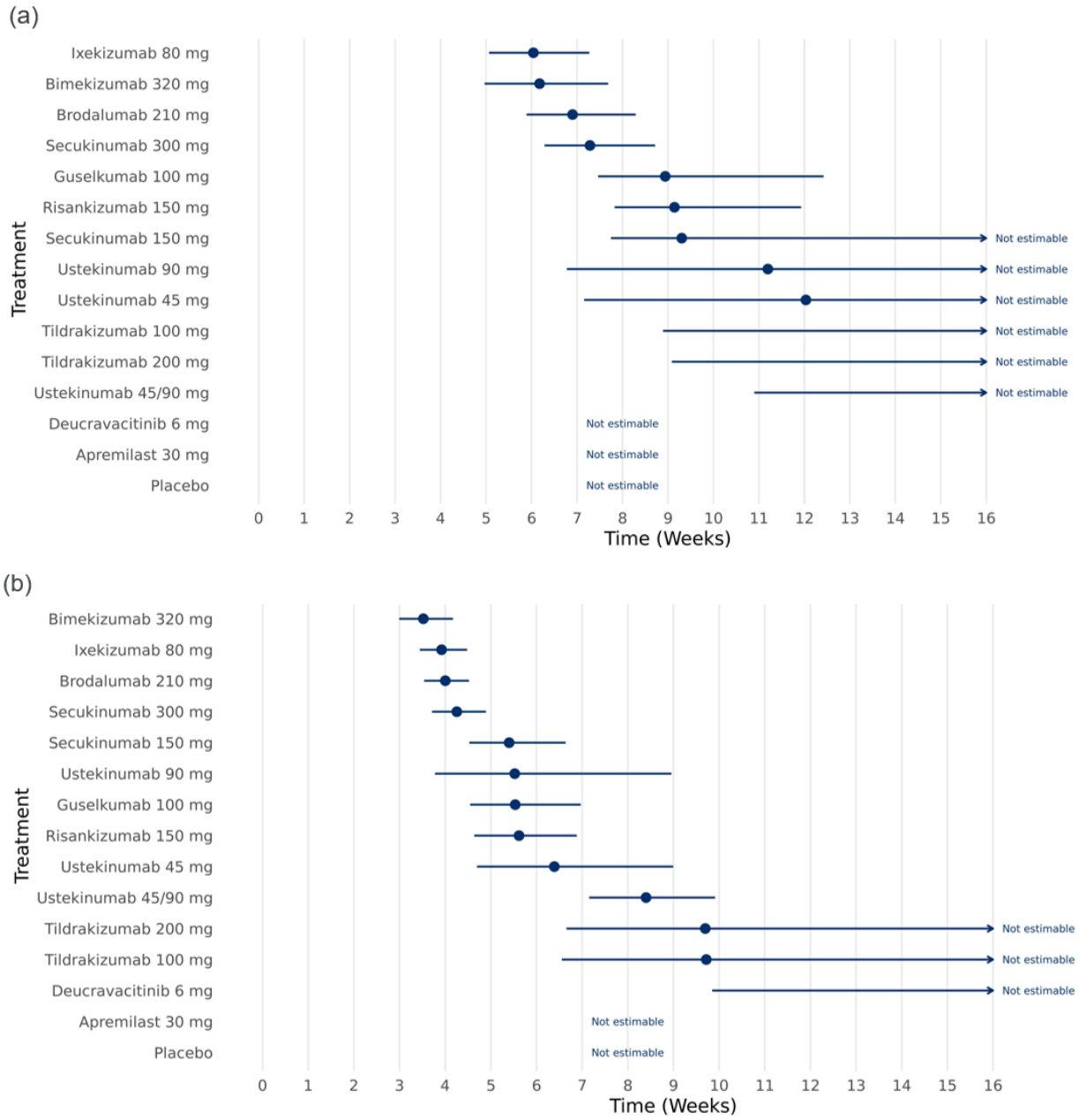
Figure S16: Treatment diagnostic plots for patients achieving a PASI 75 response over time (sensitivity analysis – placebo-controlled trials; fixed-effect)



Note: Vertical blue lines indicate the data points that were available at specific timepoints; colour intensity refers to the number of data points (with darker blues indicating more data points were available).

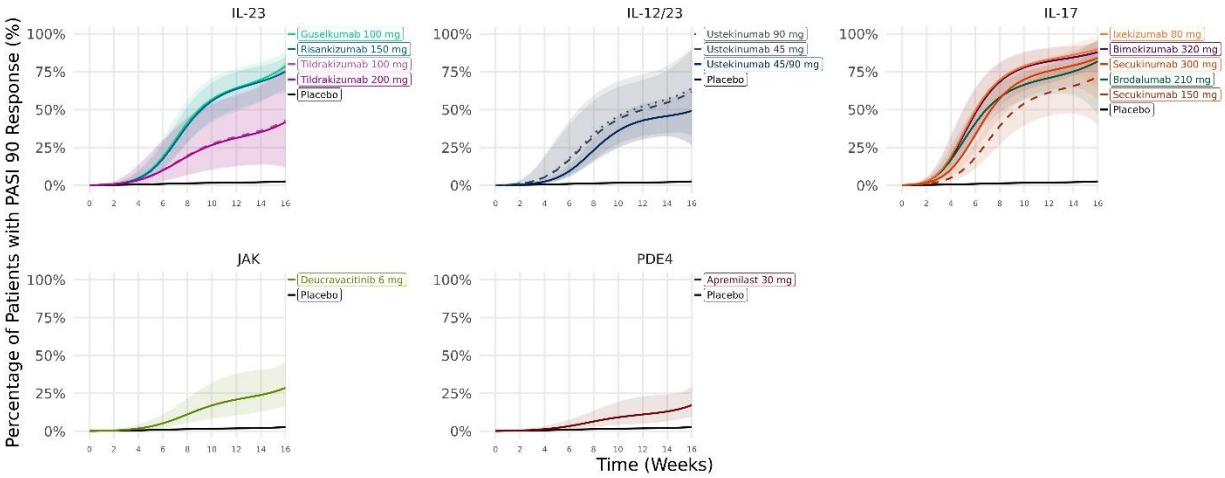
Abbreviations: CrI = credible interval; MBNMA = model-based network meta-analysis; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score.

Figure S17: Forest plots for (a) time for the average patient to achieve a PASI 90 response; (b) time for the average patient to achieve a PASI 75 response (sensitivity analysis – placebo-controlled trials; fixed-effect)



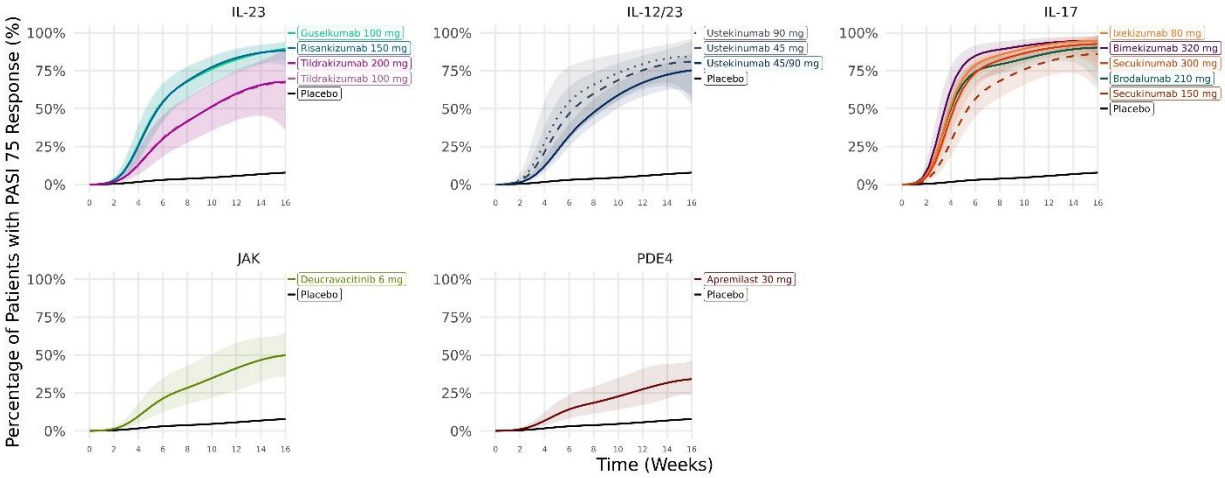
Abbreviations: PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

Figure S18: PASI 90 response curves over time up to week 16 (sensitivity analysis – placebo-controlled trials; fixed-effect)



Abbreviations: IL = interleukin; JAK = Janus kinase; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

Figure S19: PASI 75 response curves over time up to week 16 (sensitivity analysis – placebo-controlled trials; fixed-effect)



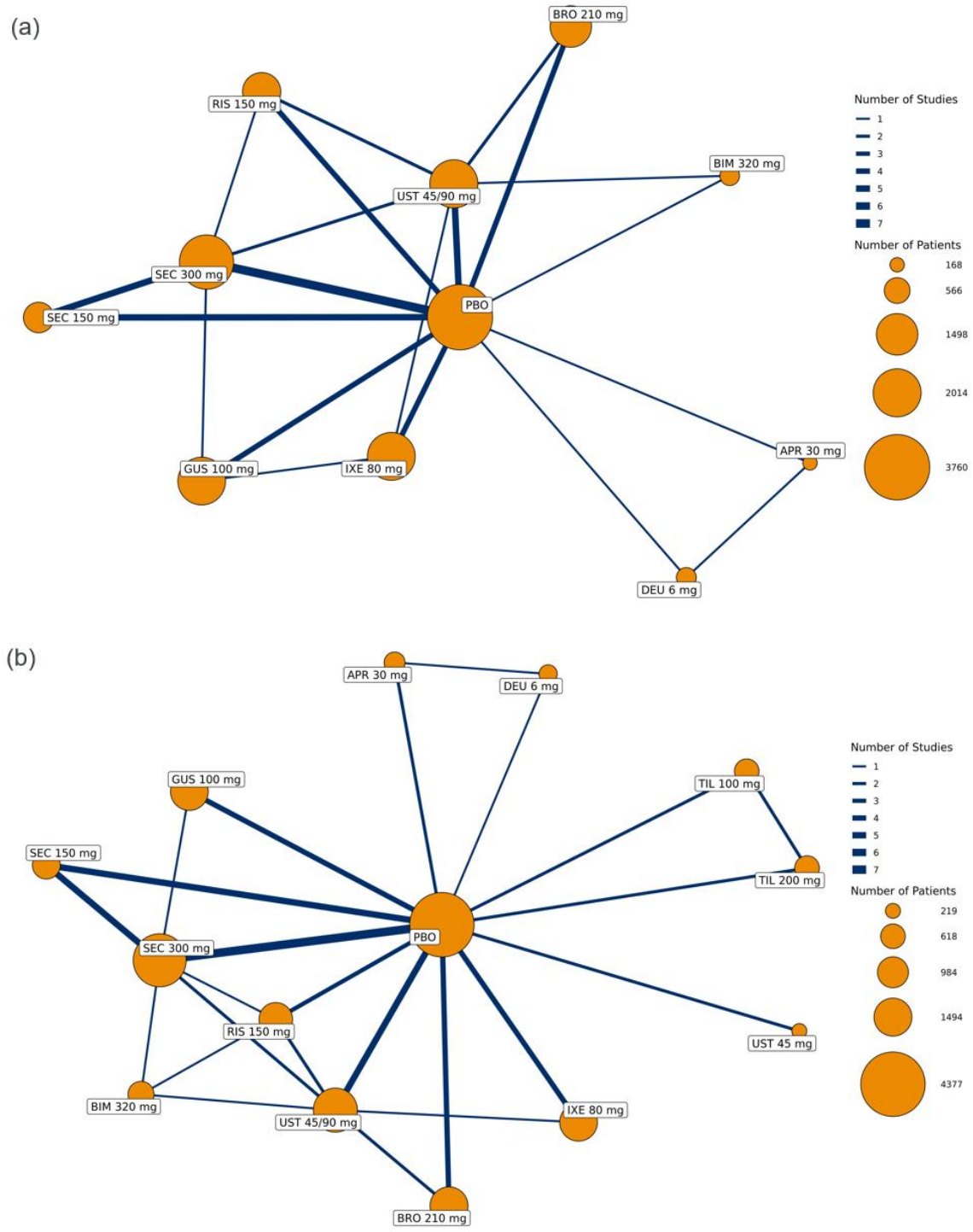
Abbreviations: IL = interleukin; JAK = Janus kinase; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

Table S12: Estimated time for the average patient to achieve a PASI 90 response or PASI 75 response by treatment (sensitivity analysis – placebo-controlled trials; fixed-effect)

Treatment	Drug class	Estimated median time (95% CrI)	
		Days	Weeks
PASI 90			
Ixekizumab 80 mg	IL-17	42.3 (35.5, 50.9)	6.0 (5.1, 7.3)
Bimekizumab 320 mg	IL-17	43.2 (34.8, 53.8)	6.2 (5.0, 7.7)
Brodalumab 210 mg	IL-17	48.3 (41.2, 58.1)	6.9 (5.9, 8.3)
Secukinumab 300 mg	IL-17	51.0 (44.0, 61.0)	7.3 (6.3, 8.7)
Guselkumab 100 mg	IL-23	62.6 (52.3, 87.0)	8.9 (7.5, 12.4)
Risankizumab 150 mg	IL-23	64.0 (54.8, 83.5)	9.1 (7.8, 11.9)
Secukinumab 150 mg	IL-17	65.1 (54.2, NE)	9.3 (7.8, NE)
Ustekinumab 90 mg	IL-12/23	78.4 (47.4, NE)	11.2 (6.8, NE)
Ustekinumab 45 mg	IL-12/23	84.2 (50.1, NE)	12.0 (7.2, NE)
Tildrakizumab 100 mg	IL-23	NE (62.3, NE)	NE (8.9, NE)
Tildrakizumab 200 mg	IL-23	NE (63.6, NE)	NE (9.1, NE)
Ustekinumab 45/90 mg	IL-12/23	NE (76.3, NE)	NE (10.9, NE)
Apremilast 30 mg	PDE-4	NE (NE, NE)	NE (NE, NE)
Deucravacitinib 6 mg	JAK	NE (NE, NE)	NE (NE, NE)
PASI 75			
Bimekizumab 320 mg	IL-17	24.6 (21.0, 29.2)	3.5 (3.0, 4.2)
Ixekizumab 80 mg	IL-17	27.5 (24.1, 31.4)	3.9 (3.4, 4.5)
Brodalumab 210 mg	IL-17	28.0 (24.8, 31.7)	4.0 (3.5, 4.5)
Secukinumab 300 mg	IL-17	29.8 (26.0, 34.2)	4.3 (3.7, 4.9)
Secukinumab 150 mg	IL-17	37.8 (31.7, 46.5)	5.4 (4.5, 6.6)
Ustekinumab 90 mg	IL-12/23	38.7 (26.4, 62.7)	5.5 (3.8, 9.0)
Guselkumab 100 mg	IL-23	38.7 (31.8, 48.8)	5.5 (4.6, 7.0)
Risankizumab 150 mg	IL-23	39.3 (32.5, 48.2)	5.6 (4.6, 6.9)
Ustekinumab 45 mg	IL-12/23	44.7 (32.9, 63.0)	6.4 (4.7, 9.0)
Ustekinumab 45/90 mg	IL-12/23	58.8 (50.1, 69.4)	8.4 (7.2, 9.9)
Tildrakizumab 200 mg	IL-23	67.9 (46.6, NE)	9.7 (6.7, NE)
Tildrakizumab 100 mg	IL-23	68.0 (45.9, NE)	9.7 (6.6, NE)
Deucravacitinib 6 mg	JAK	NE (68.9, NE)	NE (9.9, NE)
Apremilast 30 mg	PDE-4	NE (NE, NE)	NE (NE, NE)

Abbreviations: CrI = credible interval; IL = interleukin; JAK = Janus kinase; NE = not estimable; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

Figure S20: Evidence networks for (a) time for the average patient to achieve a PASI 90 response; (b) time for the average patient to achieve a PASI 75 response (sensitivity analysis – multiple timepoints)



Abbreviations: APR = apremilast; BIM = bimekizumab; BRO = brodalumab; DEU = deucravacitinib; GUS = guselkumab; IXE = ixekizumab; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PBO = placebo; RIS = risankizumab; SEC = secukinumab; TIL = tildrakizumab; UST = ustekinumab.

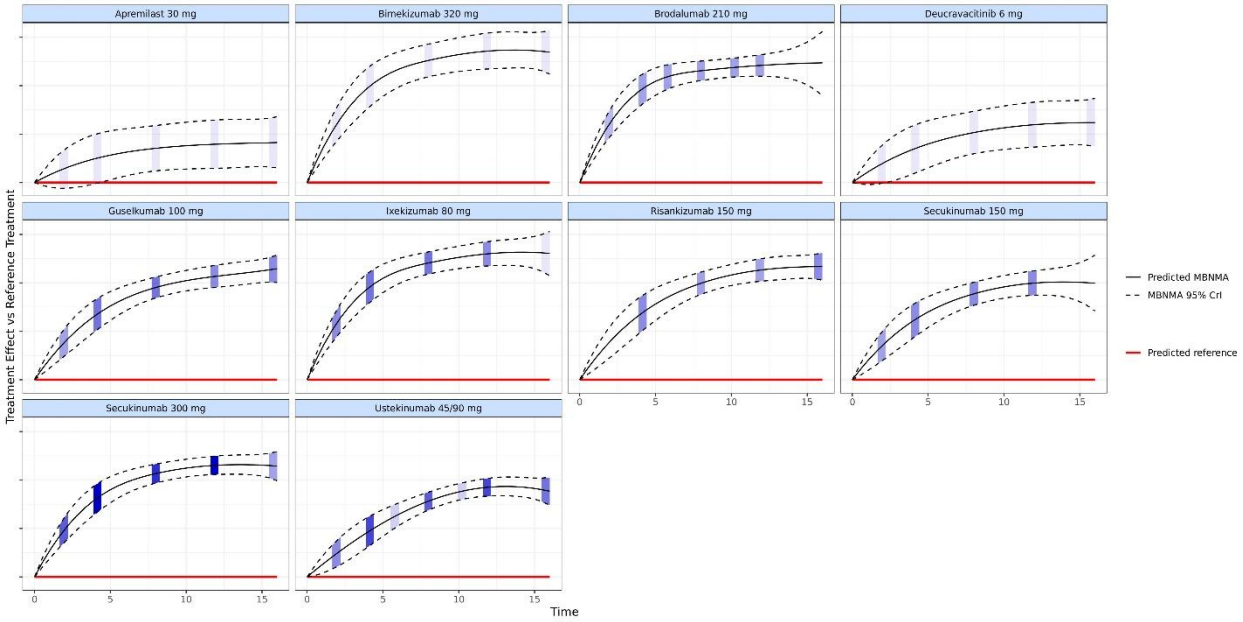
Table S13: Included data per treatment up to week 16 for PASI 90 or PASI 75 responses (sensitivity analysis – multiple timepoints)

Treatment	# of Studies with Responses Reported by Week						
	2	4	6	8	10	12	16
PASI 90							
Apremilast 30 mg	1	1	0	1	0	1	1[a]
Bimekizumab 320 mg	1	1	0	1	0	1	1[a]
Brodalumab 210 mg	3	4	4	4	4	4	0
Deucravacitinib 6 mg	1	1	0	1	0	1	1[a]
Guselkumab 100 mg	4	6	0	6	0	5	5
Ixekizumab 80 mg	5	6	0	6	0	5	1
Placebo	17	25	4	23	4	24[a]	10[a]
Risankizumab 150 mg	0	5	0	4	0	4	5
Secukinumab 150 mg	4	5	0	5	0	5	0
Secukinumab 300 mg	7	11	0	9	0	11[a]	4[a]
Tildrakizumab 100 mg	0	0	0	0	0	0[a]	0
Tildrakizumab 200 mg	0	0	0	0	0	0[a]	0
Ustekinumab 45 mg	0	0	0	0	0	0[a]	0
Ustekinumab 45/90 mg	5	8	2	7	2	8[a]	6
Ustekinumab 90 mg	0	0	0	0	0	0[a]	0
PASI 75							
Apremilast 30 mg	2	2	0	2	0	2	2[a]
Bimekizumab 320 mg	1	2[a]	0	1	0	1	2
Brodalumab 210 mg	3	4	4	4	4	4	0
Deucravacitinib 6 mg	1	1	0	1	0	1	1[a]
Guselkumab 100 mg	3[a]	4	0	4	0	5	5
Ixekizumab 80 mg	5[a]	5	0	5	0	5	1
Placebo	18	29[a]	4	28	4	29[a]	9[a]
Risankizumab 150 mg	0	4	0	4	0	4	3
Secukinumab 150 mg	4	5	0	5	0	5	0
Secukinumab 300 mg	6	11	0	8	0	11[a]	5
Tildrakizumab 100 mg	0	2	0	2	0	2	0
Tildrakizumab 200 mg	0	2	0	2	0	2	0
Ustekinumab 45 mg	0	2	0	2	0	2[a]	0
Ustekinumab 45/90 mg	5	8	2	7	2	8[a]	5
Ustekinumab 90 mg	0	0	0	0	0	0[a]	0

[a] Less data were available than in the main analysis.

Abbreviations: PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

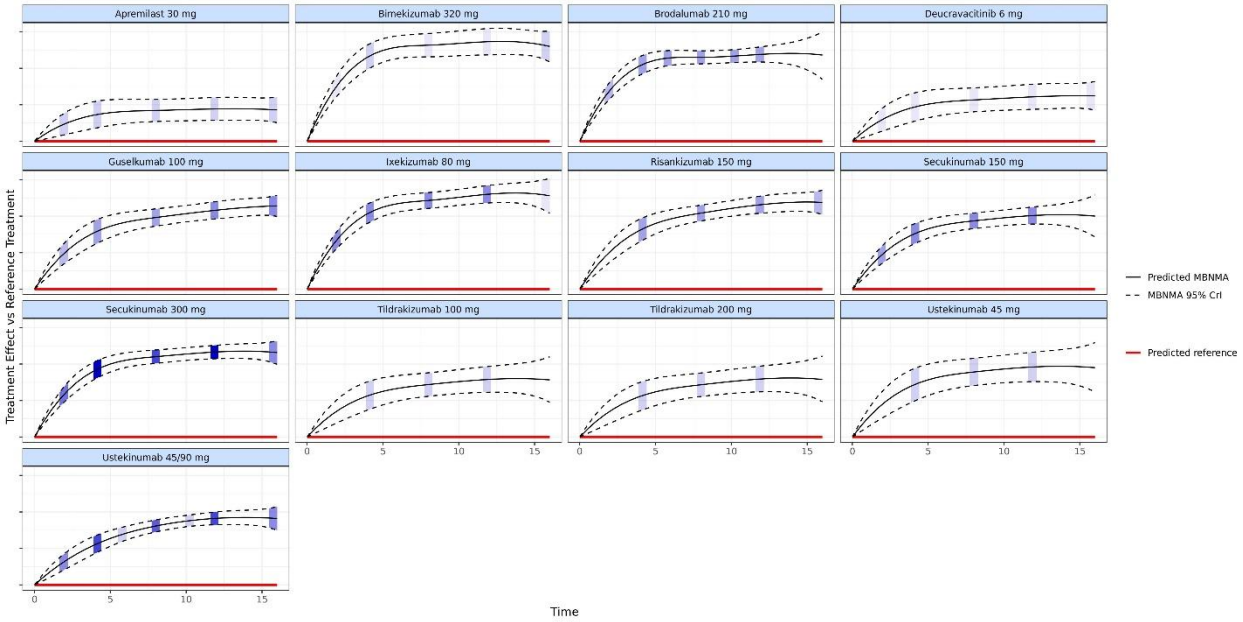
Figure S21: Treatment diagnostic plots for patients achieving a PASI 90 response over time (sensitivity analysis – multiple timepoints; random effects)



Note: Vertical blue lines indicate the data points that were available at specific timepoints; colour intensity refers to the number of data points (with darker blues indicating more data points were available).

Abbreviations: CrI = credible interval; MBNMA = model-based network meta-analysis; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

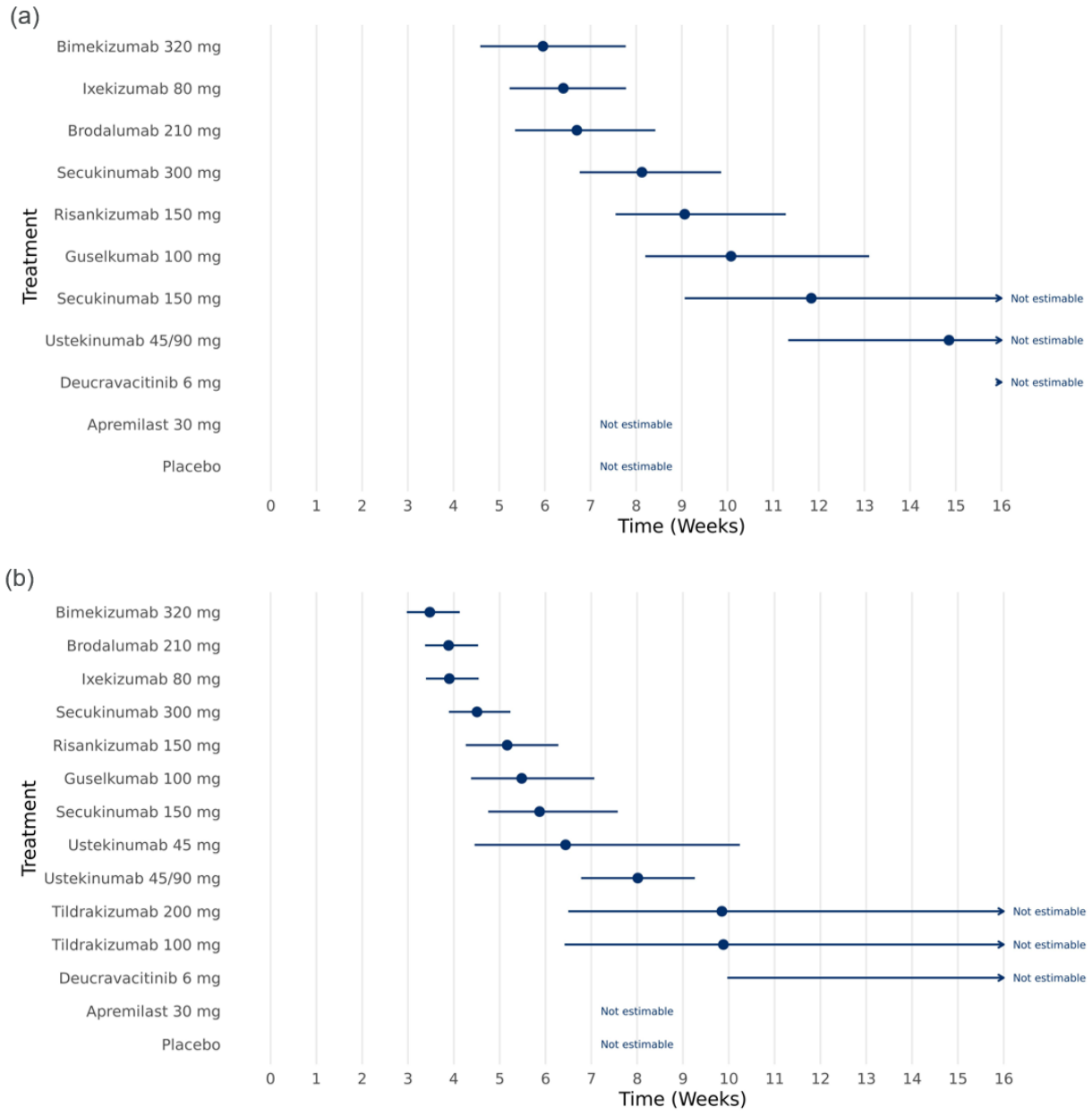
Figure S22: Treatment diagnostic plots for patients achieving a PASI 75 response over time (sensitivity analysis – multiple timepoints; random effects)



Note: Vertical blue lines indicate the data points that were available at specific timepoints; colour intensity refers to the number of data points (with darker blues indicating more data points were available).

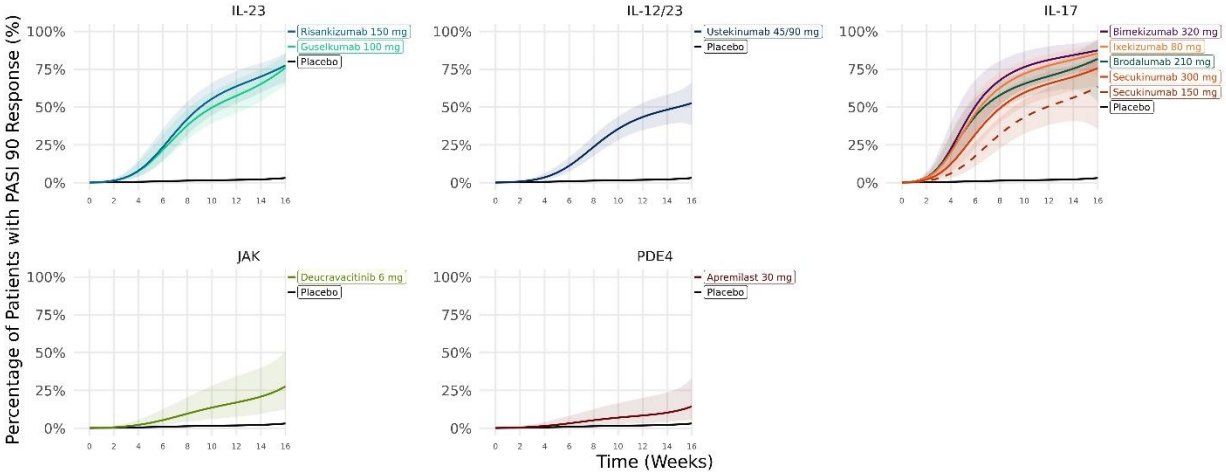
Abbreviations: CrI = credible interval; MBNMA = model-based network meta-analysis; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score.

Figure S23: Forest plots for (a) time for the average patient to achieve a PASI 90 response; (b) time for the average patient to achieve a PASI 75 response (sensitivity analysis – multiple timepoints; random effects)



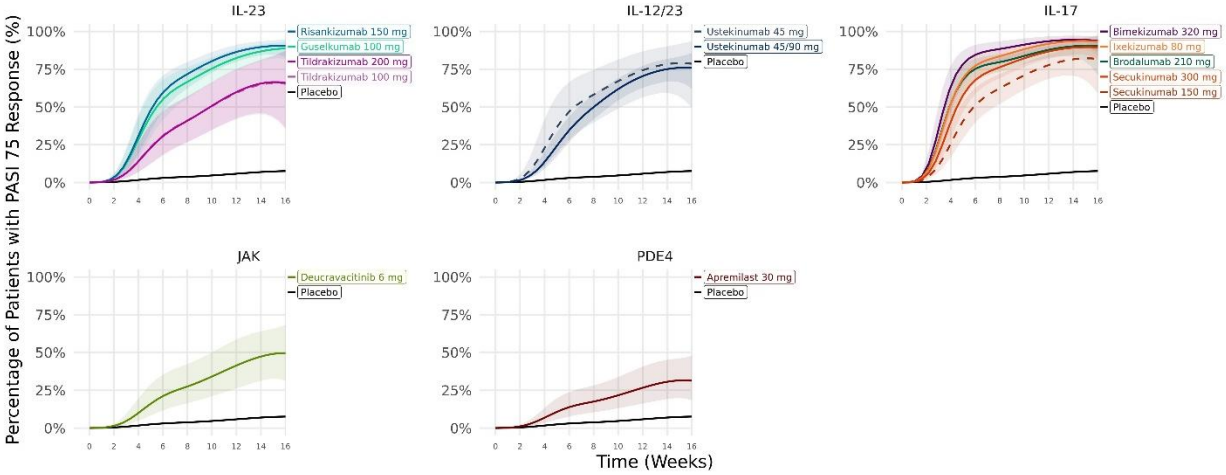
Abbreviations: PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

Figure S24: PASI 90 response curves over time up to week 16 (sensitivity analysis – multiple timepoints; random effects)



Abbreviations: IL = interleukin; JAK = Janus kinase; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

Figure S25: PASI 75 response curves over time up to week 16 (sensitivity analysis – multiple timepoints; random effects)



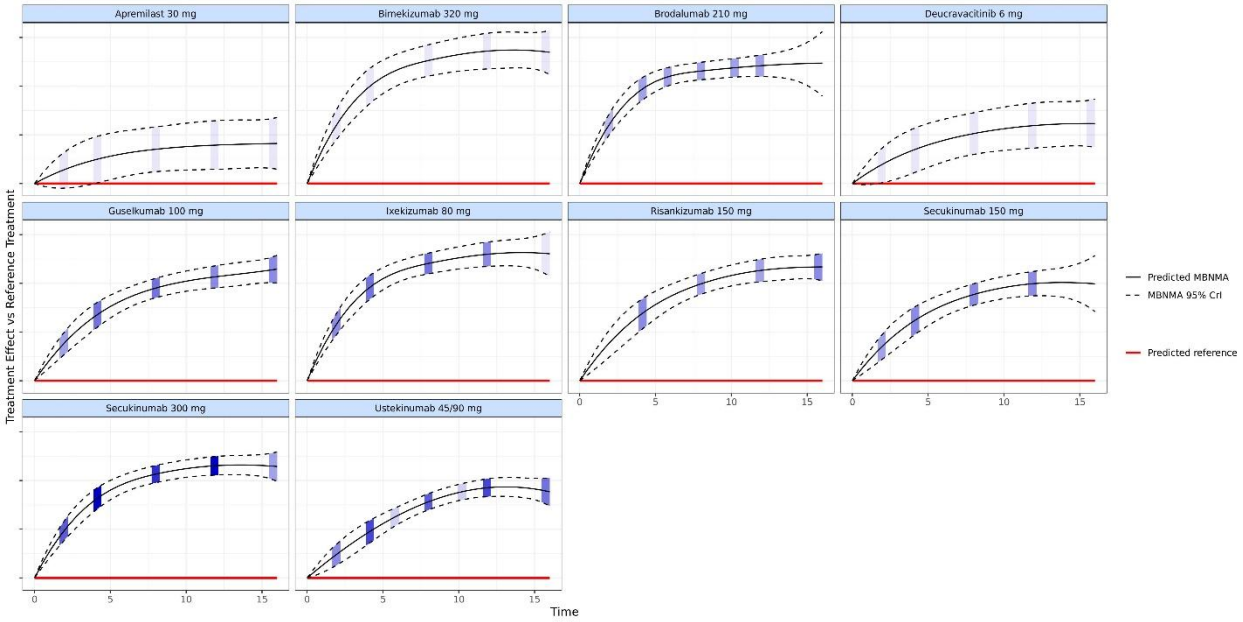
Abbreviations: IL = interleukin; JAK = Janus kinase; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

Table S14: Estimated time for the average patient to achieve a PASI 90 response or PASI 75 response by treatment (sensitivity analysis – multiple timepoints; random effects)

Treatment	Drug class	Estimated median time (95% CrI)	
		Days	Weeks
PASI 90			
Bimekizumab 320 mg	IL-17	41.7 (32.1, 54.4)	6.0 (4.6, 7.8)
Ixekizumab 80 mg	IL-17	44.8 (36.6, 54.5)	6.4 (5.2, 7.8)
Brodalumab 210 mg	IL-17	46.9 (37.4, 58.9)	6.7 (5.4, 8.4)
Secukinumab 300 mg	IL-17	56.9 (47.4, 69.0)	8.1 (6.8, 9.9)
Risankizumab 150 mg	IL-23	63.4 (52.8, 78.9)	9.1 (7.6, 11.3)
Guselkumab 100 mg	IL-23	70.5 (57.4, 91.7)	10.1 (8.2, 13.1)
Secukinumab 150 mg	IL-17	82.9 (63.4, NE)	11.8 (9.1, NE)
Ustekinumab 45/90 mg	IL-12/23	104.0 (79.3, NE)	14.9 (11.3, NE)
Deucravacitinib 6 mg	JAK	NE (111.2, NE)	NE (15.9, NE)
Apremilast 30 mg	PDE-4	NE (NE, NE)	NE (NE, NE)
PASI 75			
Bimekizumab 320 mg	IL-17	24.3 (20.8, 28.9)	3.5 (3.0, 4.1)
Brodalumab 210 mg	IL-17	27.2 (23.6, 31.7)	3.9 (3.4, 4.5)
Ixekizumab 80 mg	IL-17	27.3 (23.8, 31.8)	3.9 (3.4, 4.5)
Secukinumab 300 mg	IL-17	31.5 (27.3, 36.6)	4.5 (3.9, 5.2)
Risankizumab 150 mg	IL-23	36.1 (29.8, 44.0)	5.2 (4.3, 6.9)
Guselkumab 100 mg	IL-23	38.4 (30.6, 49.5)	5.5 (4.4, 7.1)
Secukinumab 150 mg	IL-17	41.1 (33.3, 53.1)	5.9 (4.8, 7.6)
Ustekinumab 45 mg	IL-12/23	45.1 (31.2, 71.7)	6.4 (4.5, 10.2)
Ustekinumab 45/90 mg	IL-12/23	56.1 (47.5, 64.8)	8.0 (6.8, 9.3)
Tildrakizumab 200 mg	IL-23	68.9 (45.5, NE)	9.8 (6.5, NE)
Tildrakizumab 100 mg	IL-23	69.2 (44.9, NE)	9.9 (6.4, NE)
Deucravacitinib 6 mg	JAK	NE (69.8, NE)	NE (10., NE)
Apremilast 30 mg	PDE-4	NE (NE, NE)	NE (NE, NE)

Abbreviations: CrI = credible interval; IL = interleukin; JAK = Janus kinase; NE = not estimable; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

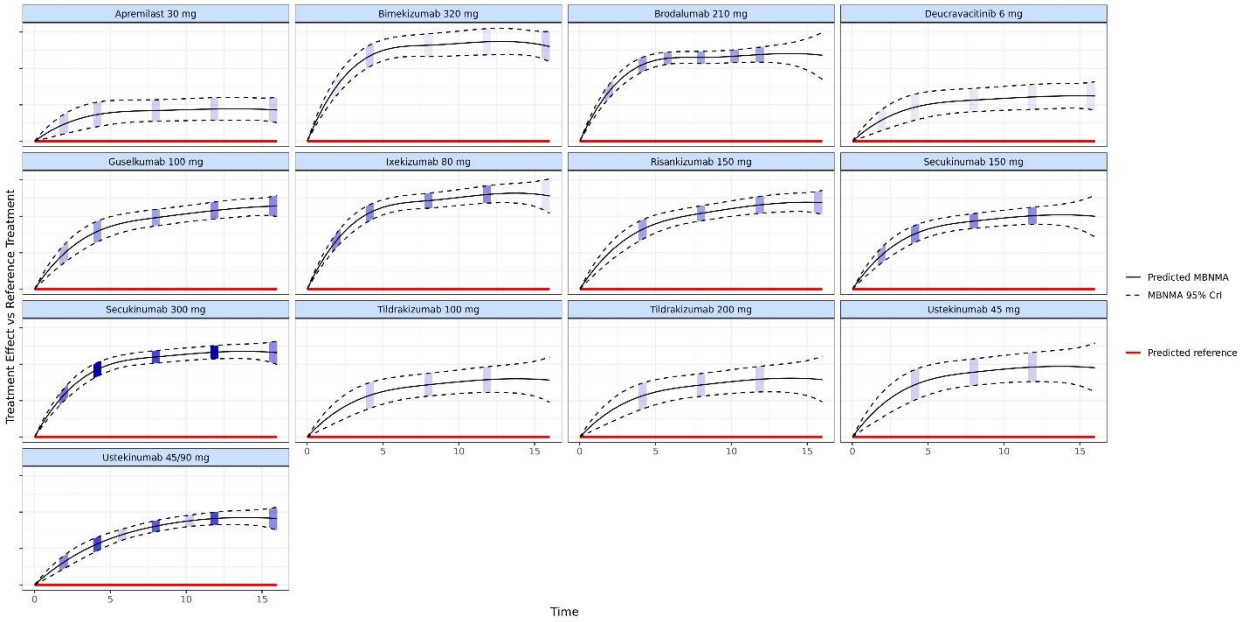
Figure S26: Treatment diagnostic plots for patients achieving a PASI 90 response over time (sensitivity analysis – multiple timepoints; fixed-effect)



Note: Vertical blue lines indicate the data points that were available at specific timepoints; colour intensity refers to the number of data points (with darker blues indicating more data points were available).

Abbreviations: CrI = credible interval; MBNMA = model-based network meta-analysis; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

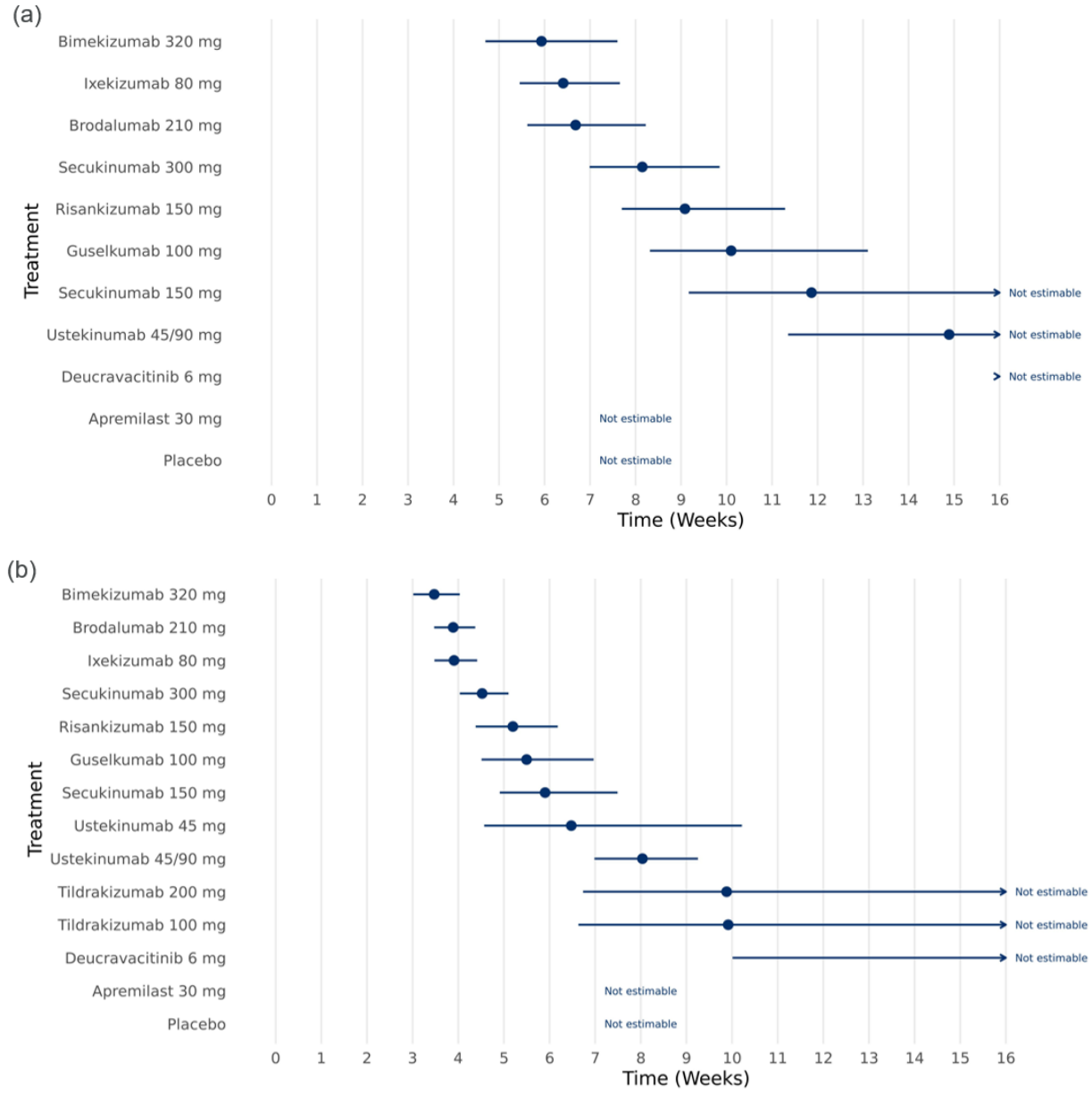
Figure S27: Treatment diagnostic plots for patients achieving a PASI 75 response over time (sensitivity analysis – multiple timepoints; fixed-effect)



Note: Vertical blue lines indicate the data points that were available at specific timepoints; colour intensity refers to the number of data points (with darker blues indicating more data points were available).

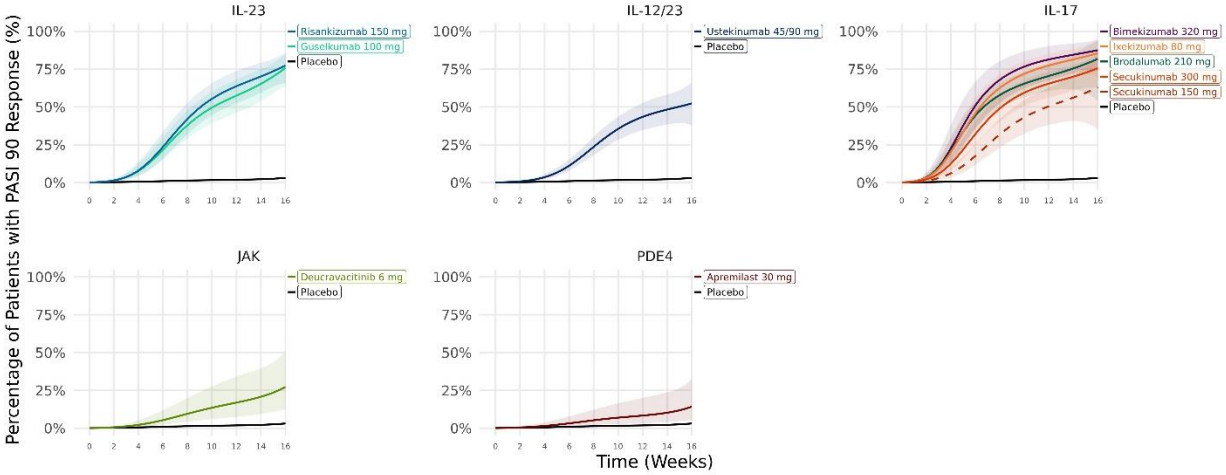
Abbreviations: CrI = credible interval; MBNMA = model-based network meta-analysis; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score.

Figure S28: Forest plots for (a) time for the average patient to achieve a PASI 90 response; (b) time for the average patient to achieve a PASI 75 response (sensitivity analysis – multiple timepoints; fixed-effect)



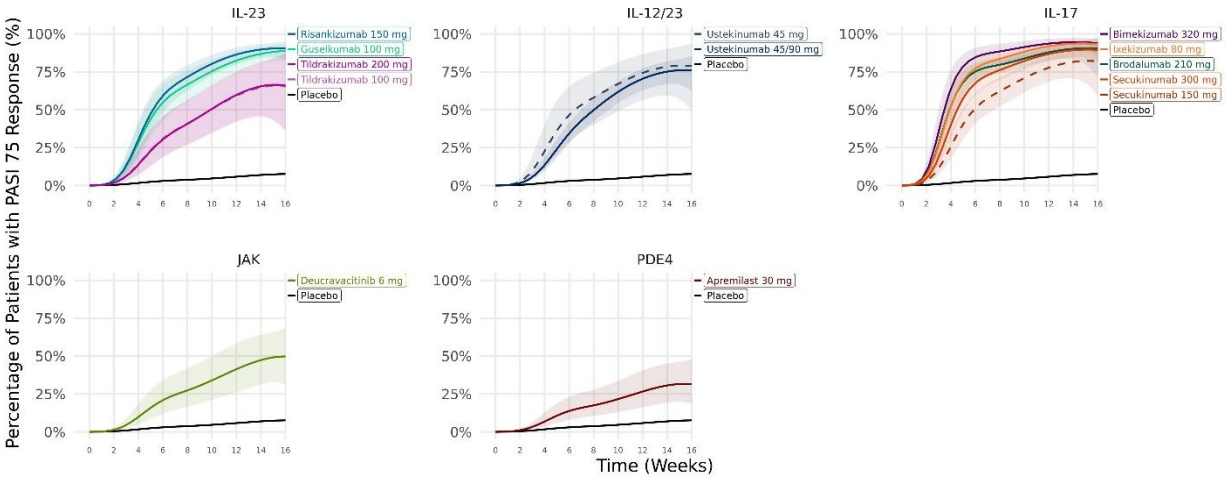
Abbreviations: PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score.

Figure S29: PASI 90 response curves over time up to week 16 (sensitivity analysis – multiple timepoints; fixed-effect)



Abbreviations: IL = interleukin; JAK = Janus kinase; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

Figure S30: PASI 75 response curves over time up to week 16 (sensitivity analysis – multiple timepoints; fixed-effect)



Abbreviations: IL = interleukin; JAK = Janus kinase; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

Table S16: Estimated time for the average patient to achieve a PASI 90 response or PASI 75 response by treatment (sensitivity analysis – multiple timepoints; fixed-effect)

Treatment	Drug class	Estimated median time (95% CrI)	
		Days	Weeks
PASI 90			
Bimekizumab 320 mg	IL-17	41.5 (32.9, 53.2)	5.9 (4.7, 7.6)
Ixekizumab 80 mg	IL-17	44.9 (38.2, 53.6)	6.4 (5.5, 7.7)
Brodalumab 210 mg	IL-17	46.8 (39.4, 57.6)	6.7 (5.6, 8.2)
Secukinumab 300 mg	IL-17	57.0 (48.9, 68.9)	8.1 (7.0, 9.9)
Risankizumab 150 mg	IL-23	63.6 (53.9, 79.0)	9.1 (7.7, 11.3)
Guselkumab 100 mg	IL-23	70.7 (58.2, 91.7)	10.1 (8.3, 13.1)
Secukinumab 150 mg	IL-17	83.1 (64.2, NE)	11.9 (9.2, NE)
Ustekinumab 45/90 mg	IL-12/23	104.2 (79.5, NE)	14.9 (11.4, NE)
Deucravacitinib 6 mg	JAK	NE (111.5, NE)	NE (15.9, NE)
Apremilast 30 mg	PDE-4	NE (NE, NE)	NE (NE, NE)
PASI 75			
Bimekizumab 320 mg	IL-17	24.3 (21.1, 28.2)	3.5 (3.0, 4.0)
Brodalumab 210 mg	IL-17	27.2 (24.3, 30.6)	3.9 (3.5, 4.4)
Ixekizumab 80 mg	IL-17	27.4 (24.4, 30.9)	3.9 (3.5, 4.4)
Secukinumab 300 mg	IL-17	31.7 (28.2, 35.7)	4.5 (4.0, 5.1)
Risankizumab 150 mg	IL-23	36.4 (30.7, 43.3)	5.2 (4.4, 6.2)
Guselkumab 100 mg	IL-23	38.5 (31.6, 48.8)	5.5 (4.5, 7.0)
Secukinumab 150 mg	IL-17	41.3 (34.4, 52.4)	5.9 (4.9, 7.5)
Ustekinumab 45 mg	IL-12/23	45.3 (32.0, 71.5)	6.5 (4.6, 10.2)
Ustekinumab 45/90 mg	IL-12/23	56.3 (48.9, 64.8)	8.0 (7.0, 9.3)
Tildrakizumab 200 mg	IL-23	69.2 (47.2, NE)	9.9 (6.7, NE)
Tildrakizumab 100 mg	IL-23	69.4 (46.4, NE)	9.9 (6.6, NE)
Deucravacitinib 6 mg	JAK	NE (70.1, NE)	NE (10.0, NE)
Apremilast 30 mg	PDE-4	NE (NE, NE)	NE (NE, NE)

Abbreviations: CrI = credible interval; IL = interleukin; JAK = Janus kinase; NE = not estimable; PASI 75 = 75% reduction in Psoriasis Area and Severity Index score; PASI 90 = 90% reduction in Psoriasis Area and Severity Index score; PDE = phosphodiesterase.

References

1. Egeberg A, Andersen YMF, Halling-Overgaard AS, Alignahi F, Thyssen JP, Burge R, et al. Systematic review on rapidity of onset of action for interleukin-17 and interleukin-23 inhibitors for psoriasis. J Eur Acad Dermatol Venereol. 2020;34(1):39-46.
2. Johnson MC, Heron CE, Ghamrawi RI, Balogh EA, Feldman SR. Speed of Psoriasis Treatment Response for Biologic Agents: A Review of Phase III Clinical Trials. Journal of Psoriasis and Psoriatic Arthritis. 2021;6(2):99-105.
3. Sbidian E, Chaimani A, Garcia-Doval I, Doney L, Dressler C, Hua C, et al. Systemic pharmacological treatments for chronic plaque psoriasis: a network meta-analysis. Cochrane Database Syst Rev. 2022;5(5):Cd011535.
4. Odnopozova L, Edin A, Sukharev A, Wu T, Aydin K, Kelly M, et al. Risankizumab for the Treatment of Moderate to Severe Plaque Psoriasis in the Russian Federation. Dermatol Ther (Heidelb). 2022;12(9):2063-75.
5. Sigurgeirsson B, Schäkel K, Hong C-H, Effendy I, Placek W, Rich P, et al. Efficacy, tolerability, patient usability, and satisfaction with a 2 mL pre-filled syringe containing secukinumab 300 mg in patients with moderate to severe plaque psoriasis: results from the phase 3 randomized, double-blind, placebo-controlled ALLURE study. J Dermatolog Treat. 2022;33(3):1718-26.
6. Papp KA, Reich K, Paul C, Blauvelt A, Baran W, Bolduc C, et al. A prospective phase III, randomized, double-blind, placebo-controlled study of brodalumab in patients with moderate-to-severe plaque psoriasis. Br J Dermatol. 2016;175(2):273-86.
7. Lebwohl M, Strober B, Menter A, Gordon K, Weglowska J, Puig L, et al. Phase 3 Studies Comparing Brodalumab with Ustekinumab in Psoriasis. N Engl J Med. 2015;373(14):1318-28.
8. Papp KA, Gordon KB, Langley RB, Lebwohl MG, Gottlieb AB, Rastogi S, et al. Impact of previous biologic use on the efficacy and safety of brodalumab and ustekinumab in patients with moderate-to-severe plaque psoriasis: integrated analysis of the randomized controlled trials AMAGINE-2 and AMAGINE-3. Br J Dermatol. 2018;179(2):320-8.
9. Reich K, Warren RB, Lebwohl M, Gooderham M, Strober B, Langley RG, et al. Bimekizumab versus Secukinumab in Plaque Psoriasis. N Engl J Med. 2021;385(2):142-52.
10. Gordon KB, Foley P, Krueger JG, Pinter A, Reich K, Vender R, et al. Bimekizumab efficacy and safety in moderate to severe plaque psoriasis (BE READY): a multicentre, double-blind, placebo-controlled, randomised withdrawal phase 3 trial. Lancet. 2021;397(10273):475-86.
11. Reich K, Papp KA, Blauvelt A, Langley RG, Armstrong AW, Warren RB, et al. Bimekizumab versus ustekinumab for the treatment of moderate to severe plaque psoriasis (BE VIVID): efficacy and safety from a 52-week, multicentre, double-blind, active comparator and placebo controlled phase 3 trial. Lancet. 2021;397(10273):487-98.
12. Blauvelt A, Gordon KB, Lee P, Bagel J, Sofen H, Lockshin B, et al. Efficacy, safety, usability, and acceptability of risankizumab 150 mg formulation administered by prefilled syringe or by an autoinjector for moderate to severe plaque psoriasis. J Dermatolog Treat. 2022;33(4):2085-93.
13. Cai L, Zhang J-Z, Yao X, Gu J, Liu Q-Z, Zheng M, et al. Secukinumab demonstrates high efficacy and a favorable safety profile over 52 weeks in Chinese patients with moderate to severe plaque psoriasis. Chin Med J (Engl). 2020;133(22):2665-73.
14. Bagel J, Nia J, Hashim PW, Patekar M, de Vera A, Hugot S, et al. Secukinumab is Superior to Ustekinumab in Clearing Skin in Patients with Moderate to Severe Plaque Psoriasis (16-Week CLARITY Results). Dermatol Ther (Heidelb). 2018;8(4):571-9.
15. Bagel J, Blauvelt A, Nia J, Hashim P, Patekar M, de Vera A, et al. Secukinumab maintains superiority over ustekinumab in clearing skin and improving quality of life in patients with moderate to severe plaque psoriasis: 52-week results from a double-blind phase 3b trial (CLARITY). J Eur Acad Dermatol Venereol. 2021;35(1):135-42.
16. Thaçi D, Blauvelt A, Reich K, Tsai T-F, Vanaclocha F, Kingo K, et al. Secukinumab is superior to ustekinumab in clearing skin of subjects with moderate to severe plaque psoriasis: CLEAR, a randomized controlled trial. J Am Acad Dermatol. 2015;73(3):400-9.
17. Reich K, Armstrong AW, Langley RG, Flavin S, Randazzo B, Li S, et al. Guselkumab versus secukinumab for the treatment of moderate-to-severe psoriasis (ECLIPSE): results from a phase 3, randomised controlled trial. Lancet. 2019;394(10201):831-9.

18. Janssen Research & Development (Data on File). Final Clinical Study Report (56 Weeks) CNTO1959PSO3009 (ECLIPSE). 21 March 2019.
19. Langley RG, Elewski BE, Lebwohl M, Reich K, Griffiths CEM, Papp KA, et al. Secukinumab in plaque psoriasis--results of two phase 3 trials. N Engl J Med. 2014;371(4):326-38.
20. Papp KA, Reich K, Leonardi CL, Kircik L, Chimenti S, Langley RGB, et al. Apremilast, an oral phosphodiesterase 4 (PDE4) inhibitor, in patients with moderate to severe plaque psoriasis: Results of a phase III, randomized, controlled trial (Efficacy and Safety Trial Evaluating the Effects of Apremilast in Psoriasis [ESTEEM] 1). J Am Acad Dermatol. 2015;73(1):37-49.
21. Paul C, Cather J, Gooderham M, Poulin Y, Mrowietz U, Ferrandiz C, et al. Efficacy and safety of apremilast, an oral phosphodiesterase 4 inhibitor, in patients with moderate-to-severe plaque psoriasis over 52 weeks: a phase III, randomized controlled trial (ESTEEM 2). Br J Dermatol. 2015;173(6):1387-99.
22. Blauvelt A, Prinz JC, Gottlieb AB, Kingo K, Sofen H, Ruer-Mulard M, et al. Secukinumab administration by pre-filled syringe: efficacy, safety and usability results from a randomized controlled trial in psoriasis (FEATURE). Br J Dermatol. 2015;172(2):484-93.
23. Blauvelt A, Leonardi CL, Gooderham M, Papp KA, Philipp S, Wu JJ, et al. Efficacy and Safety of Continuous Risankizumab Therapy vs Treatment Withdrawal in Patients With Moderate to Severe Plaque Psoriasis: A Phase 3 Randomized Clinical Trial. JAMA Dermatol. 2020;156(6):349-658.
24. Blauvelt A, Leonardi C, Elewski B, Crowley JJ, Guenther LC, Gooderham M, et al. A head-to-head comparison of ixekizumab vs. guselkumab in patients with moderate-to-severe plaque psoriasis: 24-week efficacy and safety results from a randomized, double-blinded trial. Br J Dermatol. 2021;184(6):1047-58.
25. Reich K, Pinter A, Lacour J-P, Ferrandiz C, Micali G, French LE, et al. Comparison of ixekizumab with ustekinumab in moderate-to-severe psoriasis: 24-week results from IXORA-S, a phase III study. Br J Dermatol. 2017;177(4):1014-23.
26. Lacour J-P, Paul C, Jazayeri S, Papanastasiou P, Xu C, Nyirady J, et al. Secukinumab administration by autoinjector maintains reduction of plaque psoriasis severity over 52 weeks: results of the randomized controlled JUNCTURE trial. J Eur Acad Dermatol Venereol. 2017;31(5):847-56.
27. Paul C, Lacour J-P, Tedremets L, Kreutzer K, Jazayeri S, Adams S, et al. Efficacy, safety and usability of secukinumab administration by autoinjector/pen in psoriasis: a randomized, controlled trial (JUNCTURE). J Eur Acad Dermatol Venereol. 2015;29(6):1082-90.
28. Li X, Zheng J, Pan WL, Zheng M, Lu Y, Li F-Q, et al. Efficacy and Safety of Ixekizumab in Chinese Patients With Moderate-to-Severe Plaque Psoriasis: 60-Week Results From a Phase 3 Study. Int J Dermatol Venereol. 2022;5(4):181-90.
29. Reich K, Gooderham M, Green L, Bewley A, Zhang Z, Khanskaya I, et al. The efficacy and safety of apremilast, etanercept and placebo in patients with moderate-to-severe plaque psoriasis: 52-week results from a phase IIIb, randomized, placebo-controlled trial (LIBERATE). J Eur Acad Dermatol Venereol. 2017;31(3):507-17.
30. Zhu X, Zheng M, Song M, Shen Y-K, Chan D, Szapary PO, et al. Efficacy and safety of ustekinumab in Chinese patients with moderate to severe plaque-type psoriasis: results from a phase 3 clinical trial (LOTUS). J Drugs Dermatol. 2013;12(2):166-74.
31. Sigurgeirsson B, Browning J, Tyring S, Szepietowski JC, Rivera-Díaz R, Effendy I, et al. Secukinumab demonstrates efficacy, safety, and tolerability upon administration by 2 ml autoinjector in adult patients with plaque psoriasis: 52-week results from MATURE, a randomized, placebo-controlled trial. Dermatol Ther. 2022;35(3):e15285.
32. Ohtsuki M, Kubo H, Morishima H, Goto R, Zheng R, Nakagawa H. Guselkumab, an anti-interleukin-23 monoclonal antibody, for the treatment of moderate to severe plaque-type psoriasis in Japanese patients: Efficacy and safety results from a phase 3, randomized, double-blind, placebo-controlled study. J Dermatol. 2018;45(9):1053-62.
33. Ferris LK, Ott E, Jiang J, Hong HC-H, Li S, Han C, et al. Efficacy and safety of guselkumab, administered with a novel patient-controlled injector (One-Press), for moderate-to-severe psoriasis: results from the phase 3 ORION study. J Dermatolog Treat. 2020;31(2):152-9.
34. Tsai T-F, Ho J-C, Song M, Szapary P, Guzzo C, Shen Y-K, et al. Efficacy and safety of ustekinumab for the treatment of moderate-to-severe psoriasis: a phase III, randomized, placebo-controlled trial in Taiwanese and Korean patients (PEARL). J Dermatol Sci. 2011;63(3):154-63.

35. Leonardi CL, Kimball AB, Papp KA, Yeilding N, Guzzo C, Wang Y, et al. Efficacy and safety of ustekinumab, a human interleukin-12/23 monoclonal antibody, in patients with psoriasis: 76-week results from a randomised, double-blind, placebo-controlled trial (PHOENIX 1). Lancet. 2008;371(9625):1665-74.
36. Papp KA, Langley RG, Lebwohl M, Krueger GG, Szapary P, Yeilding N, et al. Efficacy and safety of ustekinumab, a human interleukin-12/23 monoclonal antibody, in patients with psoriasis: 52-week results from a randomised, double-blind, placebo-controlled trial (PHOENIX 2). Lancet. 2008;371(9625):1675-84.
37. Armstrong AW, Gooderham M, Warren RB, Papp KA, Strober B, Thaçi D, et al. Deucravacitinib versus placebo and apremilast in moderate to severe plaque psoriasis: Efficacy and safety results from the 52-week, randomized, double-blinded, placebo-controlled phase 3 POETYK PSO-1 trial. J Am Acad Dermatol. 2023 (epub 2022);88(1):29-39.
38. Strober B, Thaçi D, Sofen H, Kircik L, Gordon KB, Foley P, et al. Deucravacitinib versus placebo and apremilast in moderate to severe plaque psoriasis: Efficacy and safety results from the 52-week, randomized, double-blinded, phase 3 Program fOr Evaluation of TYK2 inhibitor psoriasis second trial. J Am Acad Dermatol. 2023 (epub 2022);88(1):40-51.
39. Reich K, Papp KA, Blauvelt A, Tyring SK, Sinclair R, Thaçi D, et al. Tildrakizumab versus placebo or etanercept for chronic plaque psoriasis (reSURFACE 1 and reSURFACE 2): results from two randomised controlled, phase 3 trials. Lancet. 2017;390(10091):276-88.
40. Mrowietz U, Leonardi CL, Girolomoni G, Toth D, Morita A, Balki SA, et al. Secukinumab retreatment-as-needed versus fixed-interval maintenance regimen for moderate to severe plaque psoriasis: A randomized, double-blind, noninferiority trial (SCULPTURE). J Am Acad Dermatol. 2015;73(1):27-36.
41. Seo SJ, Shin BS, Lee J-H, Jeong H. Efficacy and safety of brodalumab in the Korean population for the treatment of moderate to severe plaque psoriasis: A randomized, phase III, double-blind, placebo-controlled study. J Dermatol. 2021;48(6):807-17.
42. Gordon KB, Strober B, Lebwohl M, Augustin M, Blauvelt A, Poulin Y, et al. Efficacy and safety of risankizumab in moderate-to-severe plaque psoriasis (UltIMMa-1 and UltIMMa-2): results from two double-blind, randomised, placebo-controlled and ustekinumab-controlled phase 3 trials. Lancet. 2018;392(10148):650-61.
43. Gordon KB, Blauvelt A, Papp KA, Langley RG, Luger T, Ohtsuki M, et al. Phase 3 Trials of Ixekizumab in Moderate-to-Severe Plaque Psoriasis. N Engl J Med. 2016;375(4):345-56.
44. Griffiths CEM, Reich K, Lebwohl M, van de Kerkhof P, Paul C, Menter A, et al. Comparison of ixekizumab with etanercept or placebo in moderate-to-severe psoriasis (UNCOVER-2 and UNCOVER-3): results from two phase 3 randomised trials. Lancet. 2015;386(9993):541-51.
45. Gelfand JM, Shin DB, Duffin KC, Armstrong AW, Blauvelt A, Tyring SK, et al. A Randomized Placebo-Controlled Trial of Secukinumab on Aortic Vascular Inflammation in Moderate-to-Severe Plaque Psoriasis (VIP-S). J Invest Dermatol. 2020;140(9):1784-93.
46. Gelfand JM, Shin DB, Alavi A, Torigian DA, Werner T, Papadopoulos M, et al. A Phase IV, Randomized, Double-Blind, Placebo-Controlled Crossover Study of the Effects of Ustekinumab on Vascular Inflammation in Psoriasis (the VIP-U Trial). J Invest Dermatol. 2020;140(1):85-93.
47. Blauvelt A, Papp KA, Griffiths CEM, Randazzo B, Wasfi Y, Shen Y-K, et al. Efficacy and safety of guselkumab, an anti-interleukin-23 monoclonal antibody, compared with adalimumab for the continuous treatment of patients with moderate to severe psoriasis: Results from the phase III, double-blinded, placebo- and active comparator-controlled VOYAGE 1 trial. J Am Acad Dermatol. 2017;76(3):405-17.
48. Reich K, Armstrong AW, Foley P, Song M, Wasfi Y, Randazzo B, et al. Efficacy and safety of guselkumab, an anti-interleukin-23 monoclonal antibody, compared with adalimumab for the treatment of patients with moderate to severe psoriasis with randomized withdrawal and retreatment: Results from the phase III, double-blind, placebo- and active comparator-controlled VOYAGE 2 trial. J Am Acad Dermatol. 2017;76(3):418-31.
49. Janssen Research & Development (Data on File). 48-Week Clinical Study Report CNTO1959PSO3002 (VOYAGE 2). 21 October 2016.