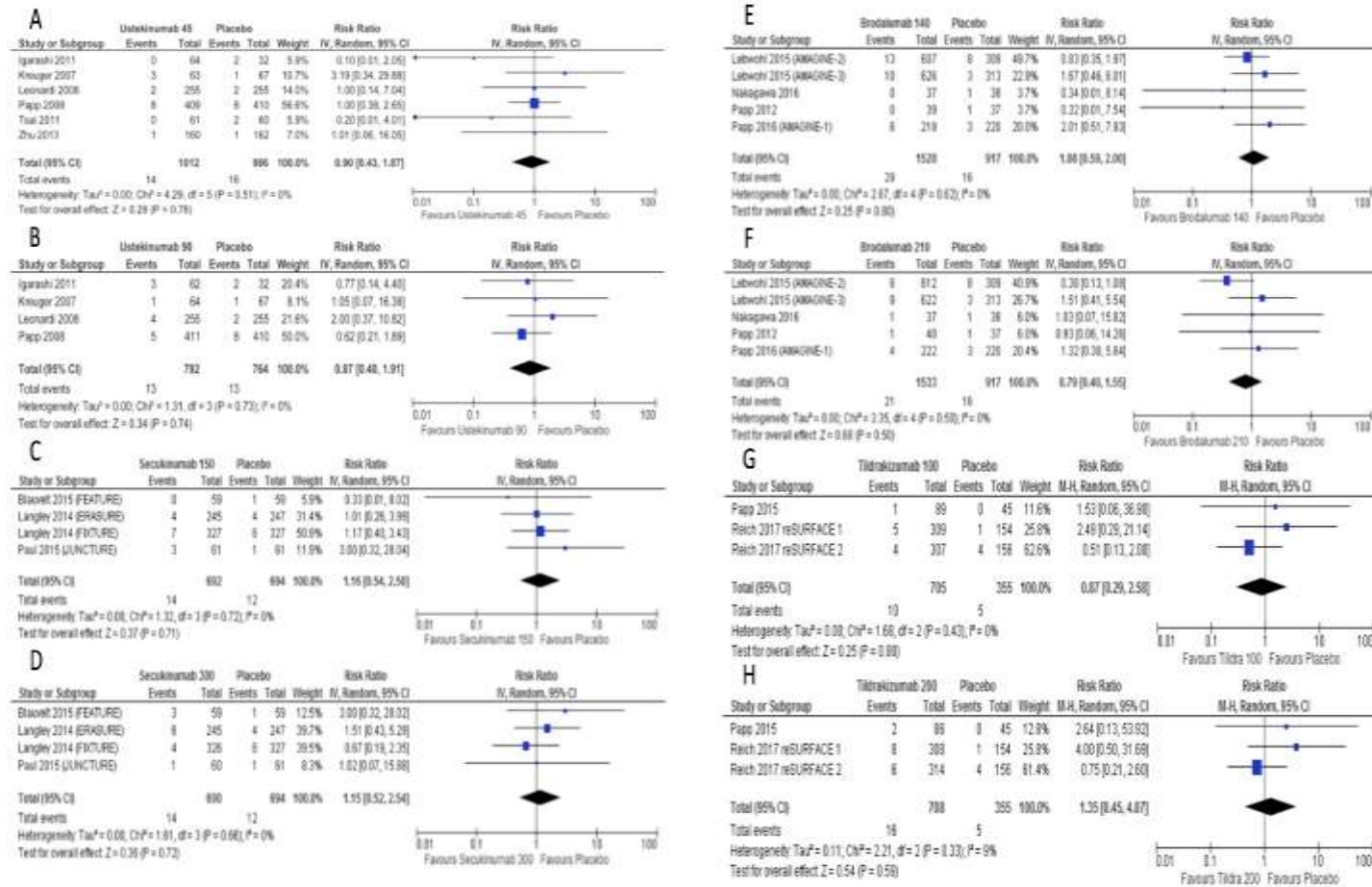
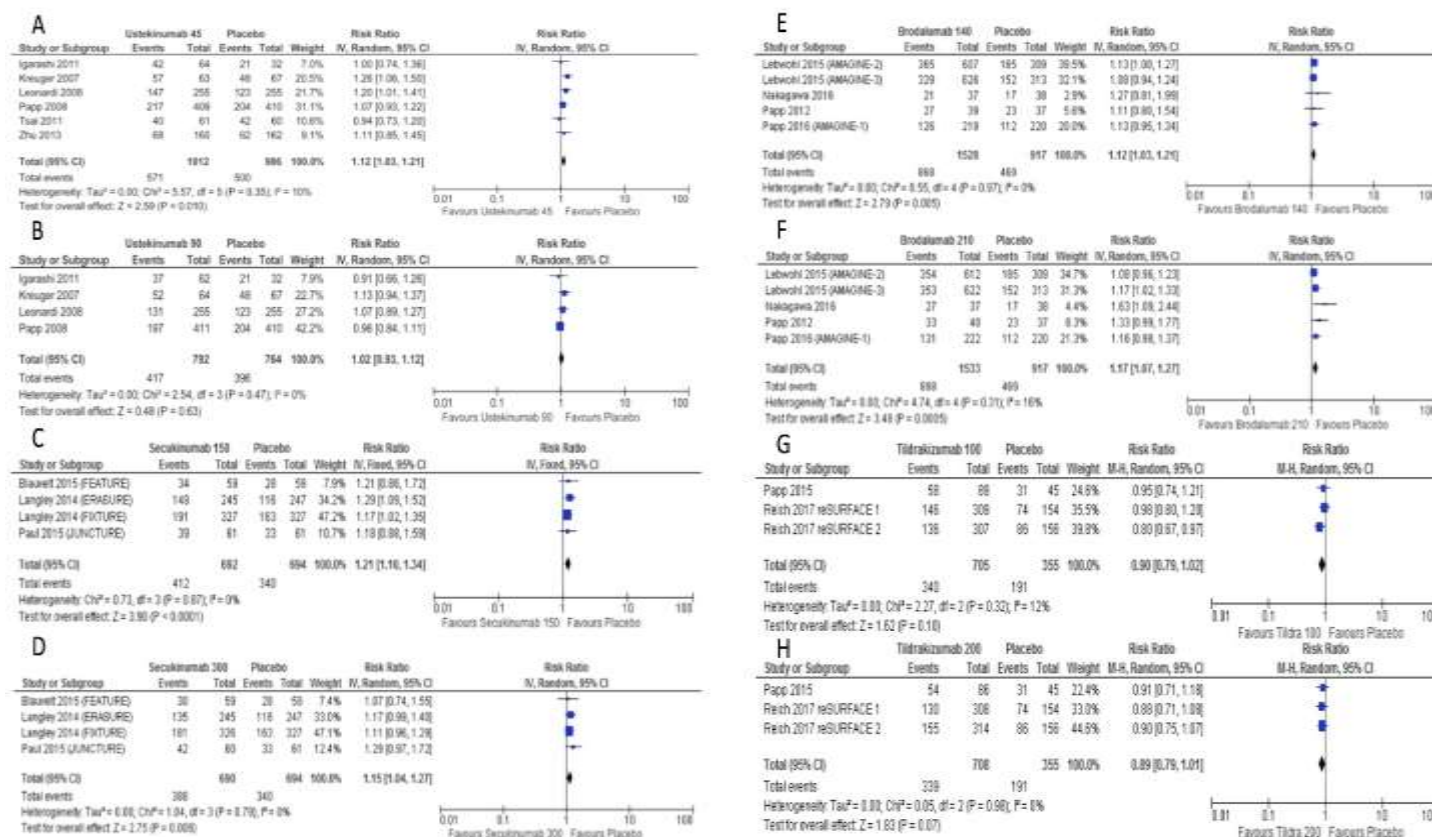


Supplementary Figure 1. Relative risk (RR) of achieving PASI-90 at 12 weeks (UST45 vs Placebo) (Figure S1-A). RR of achieving PASI-90 at 12 weeks (UST90 vs Placebo) (Figure S1-B). RR of achieving PASI-90 at 12 weeks (SEC150 vs Placebo) (Figure S1-C). RR of achieving PASI-90 at 12 weeks (SEC300 vs Placebo) (Figure S1-D). RR of achieving PASI-90 at 12 weeks (Ixekizumab 4 week vs Placebo) (Figure S1-E). RR of achieving PASI-90 at 12 weeks (Ixekizumab 2 week vs Placebo) (Figure S1-F). RR of achieving PASI-90 at 12 weeks (Brodalumab 140 mg vs Placebo) (Figure S1-G). RR of achieving PASI-90 at 12 weeks (Brodalumab 210 mg vs Placebo) (Figure S1-H). RR of achieving PASI-90 at 12 weeks (Tildrakizumab 100 mg vs Placebo) (Figure S1-I). RR of achieving PASI-90 at 12 weeks (Tildrakizumab 200 mg vs Placebo) (Figure S1-J). RR of achieving PASI-90 at 12 weeks (Guselkumab 100 mg vs Placebo) (Figure S1-K). Event is defined as number of patients achieving the outcome of interest. UST, ustekinumab; SEC, secukinumab.

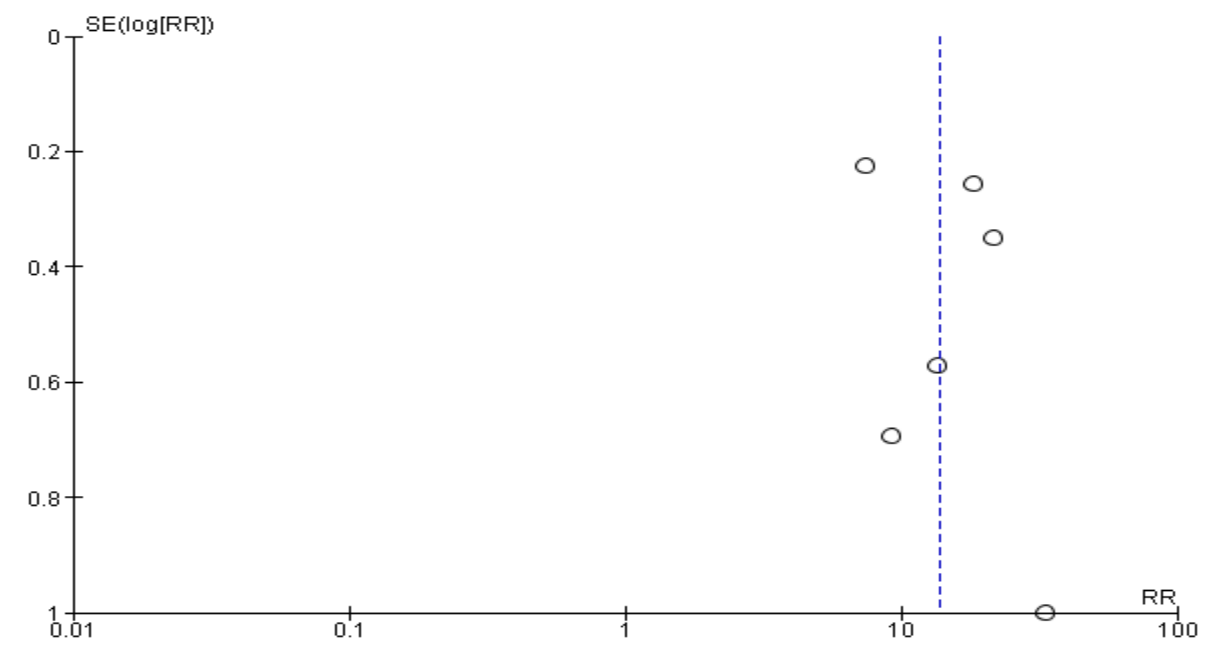


Supplementary Figure 2. Relative risk (RR) of serious adverse events at 12 weeks (UST45 vs Placebo) (Figure S2-A). RR of serious adverse events at 12 weeks (UST90 vs Placebo) (Figure S2-B). RR of serious adverse events at 12 weeks (SEC150 vs Placebo) (Figure S2-C). RR of serious adverse events at 12 weeks (SEC300 vs Placebo) (Figure S2-D). RR of serious adverse events at 12 weeks (Brodalumab 140 mg vs Placebo) (Figure S2-E). RR of serious adverse events at 12 weeks (Brodalumab 210 mg vs Placebo) (Figure S2-F). RR of serious adverse events at 12 weeks (Tildrakizumab 100 mg vs Placebo) (Figure S2-G). RR of serious adverse events at 12 weeks (Tildrakizumab 200 mg vs Placebo) (Figure S2-H). Event is defined as number of patients achieving the outcome of interest. UST, ustekinumab; SEC, secukinumab.

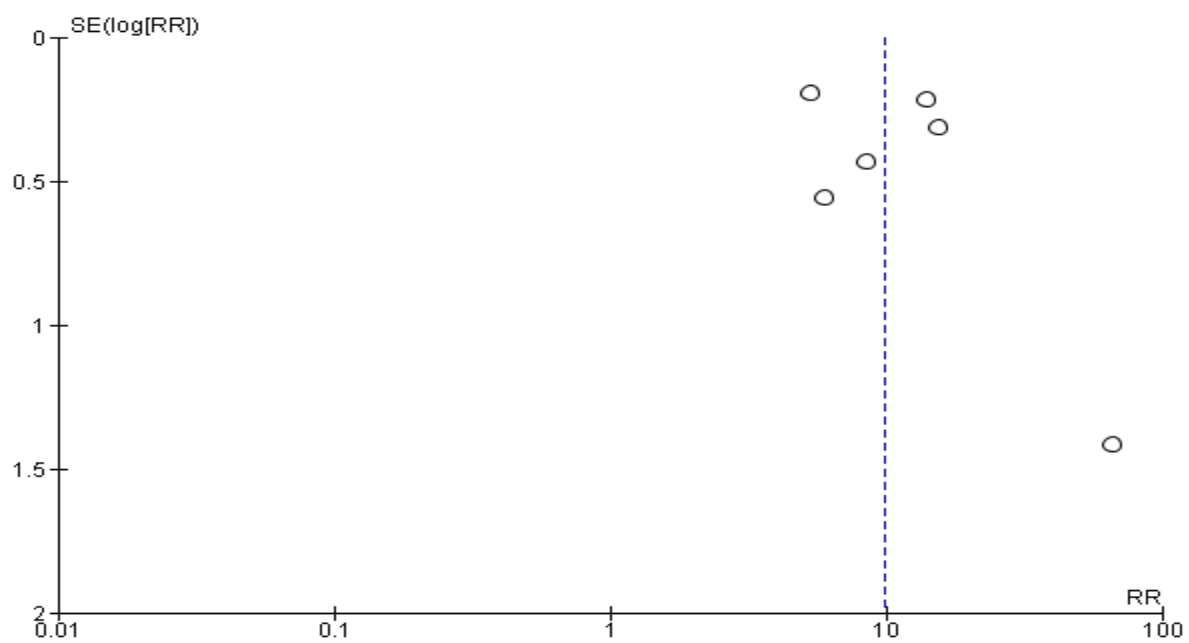


Supplementary Figure 3. Relative risk (RR) of adverse events at 12 weeks (UST45 vs Placebo) (Figure S3-A). RR of adverse events at 12 weeks (UST90 vs Placebo) (Figure S3-B). RR of adverse events at 12 weeks (SEC150 vs Placebo) (Figure S3-C). RR of adverse events at 12 weeks (SEC300 vs Placebo) (Figure S3-D). RR of adverse events at 12 weeks (Brodalumab 140 mg vs Placebo) (Figure S3-E). RR of adverse events at 12 weeks (Brodalumab 210 mg vs Placebo) (Figure S3-F). RR of adverse events at 12 weeks (Tildrakizumab 100 mg vs Placebo) (Figure S3-G). RR of adverse events at 12 weeks (Tildrakizumab 200mg vs Placebo) (Figure S3-H). Event is defined as number of patients achieving the outcome of interest. UST, ustekinumab; SEC, secukinumab.

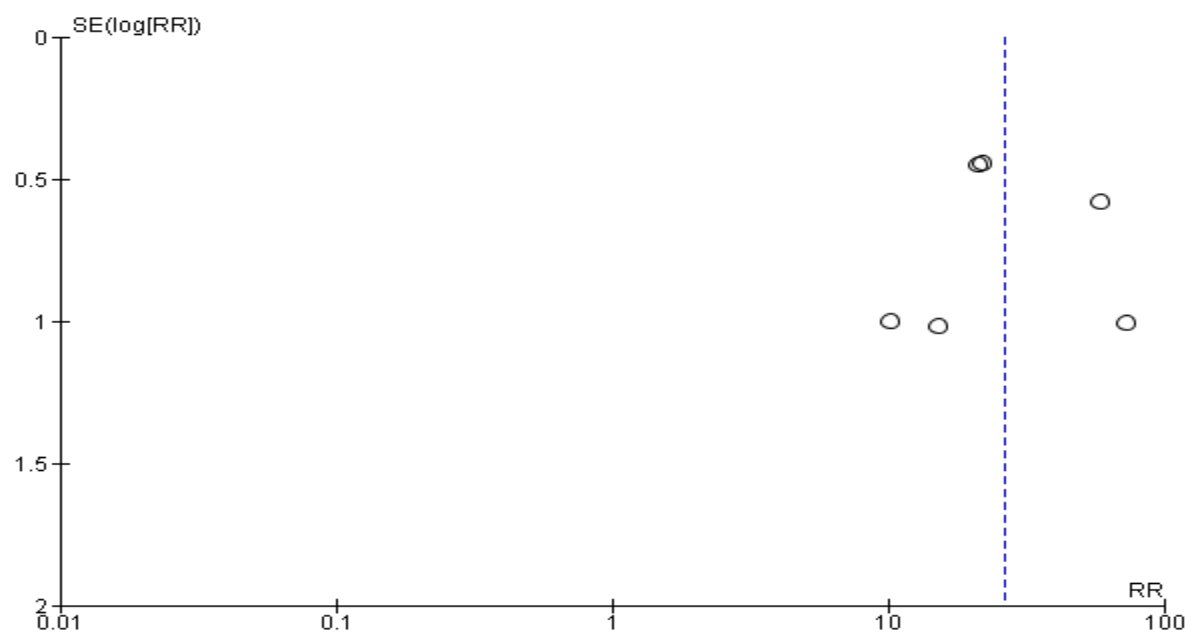
**Usteminumab 45 compared to placebo on PASI 75**



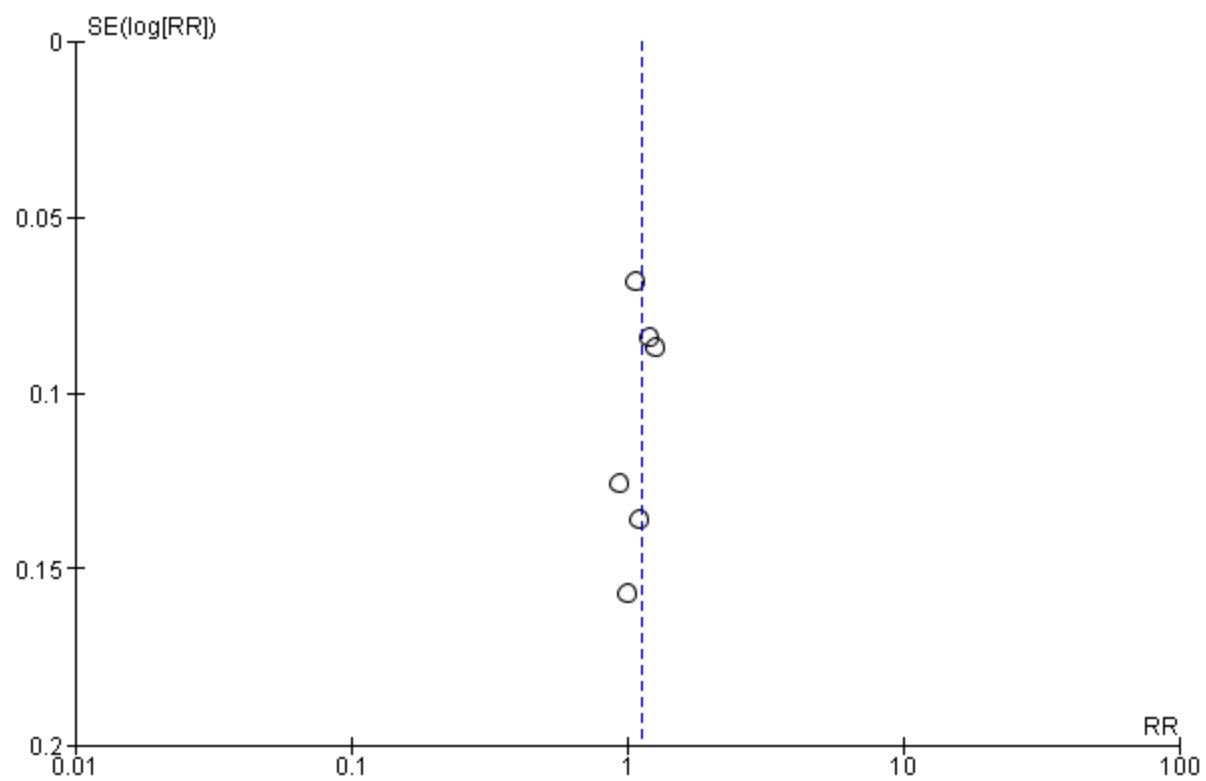
**Usteminumab 45 compared to placebo on PGA 0/1**



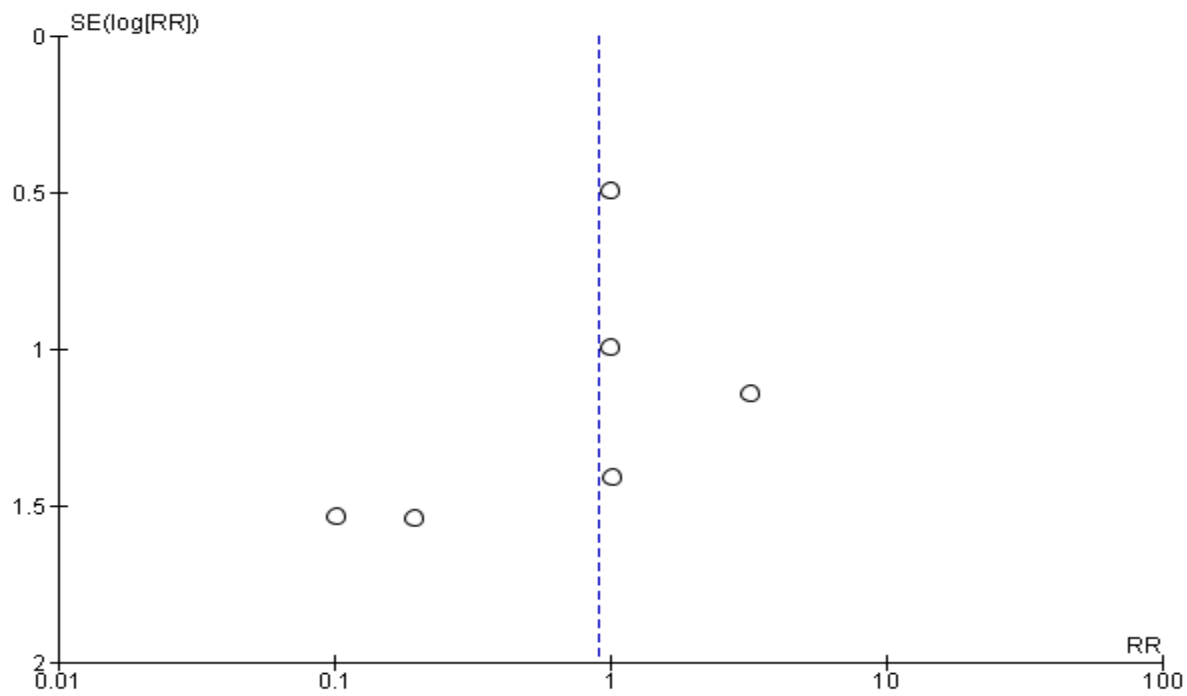
**Usteminumab 45 compared to placebo on PASI 90**



Usteminumab 45 compared to placebo on number of Adverse Events

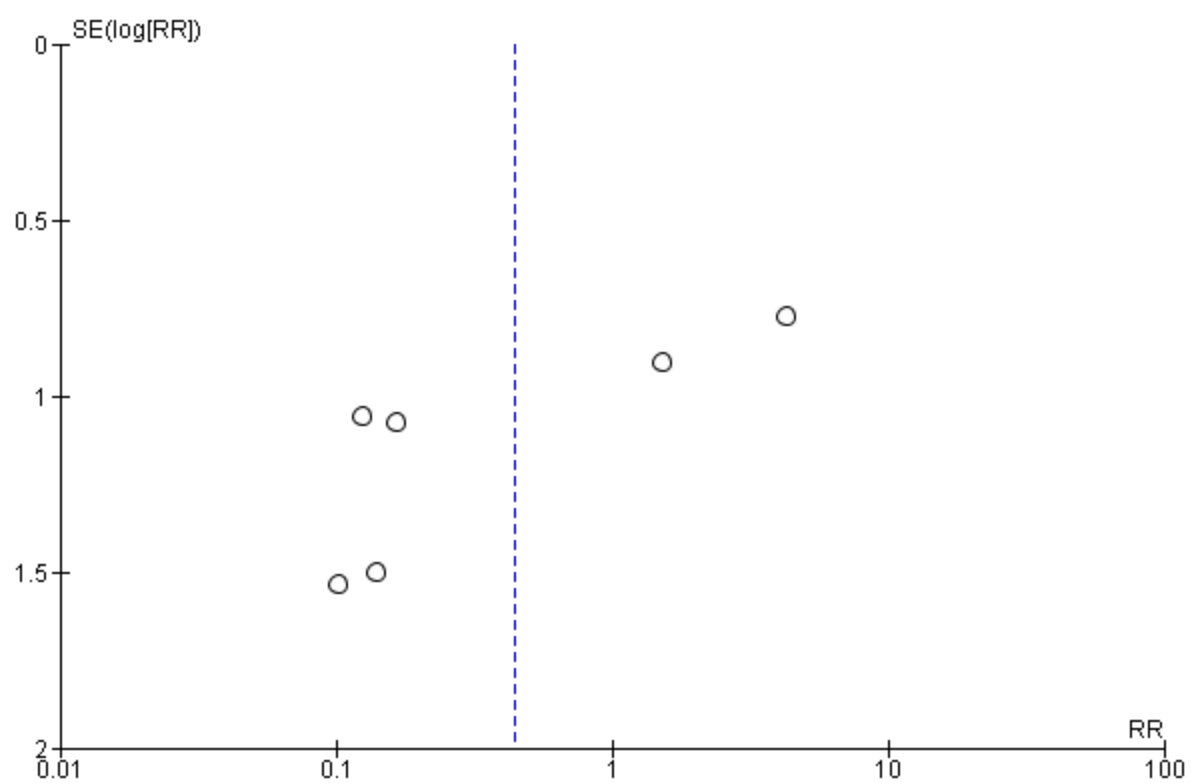


**Usteminumab 45 compared to placebo on number of Serious Adverse Events**

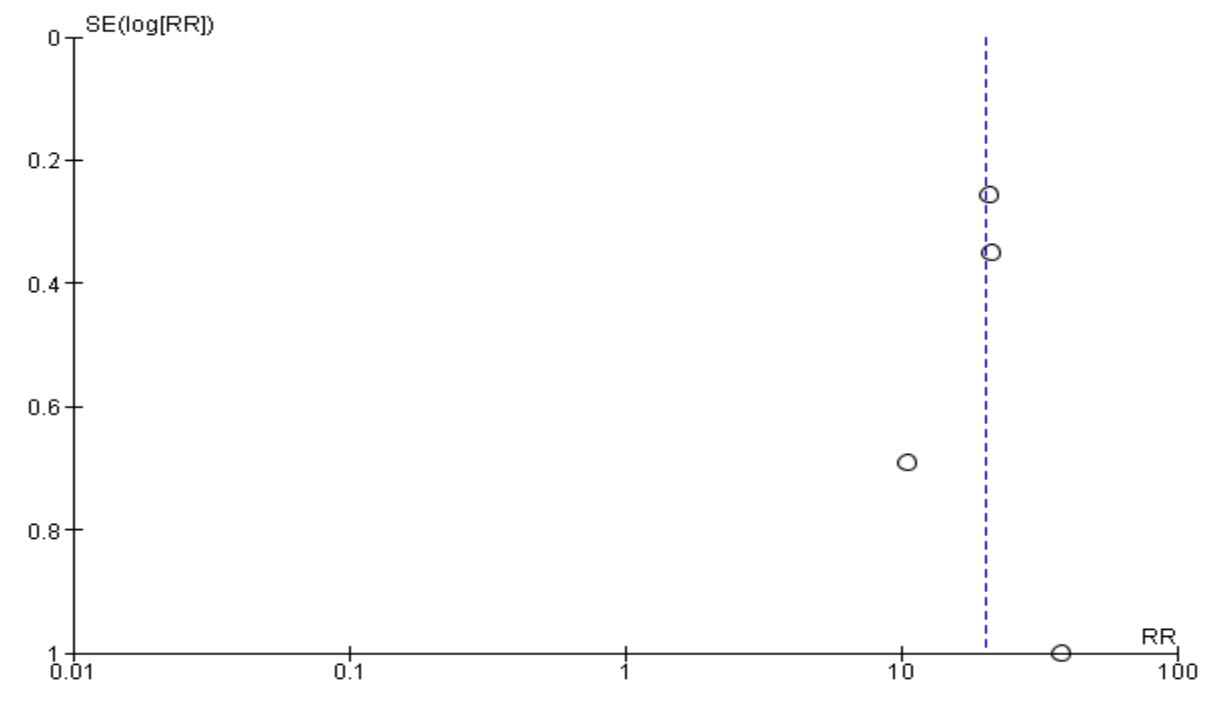


**Usteminumab 45 compared to placebo on toxicity withdrawals**

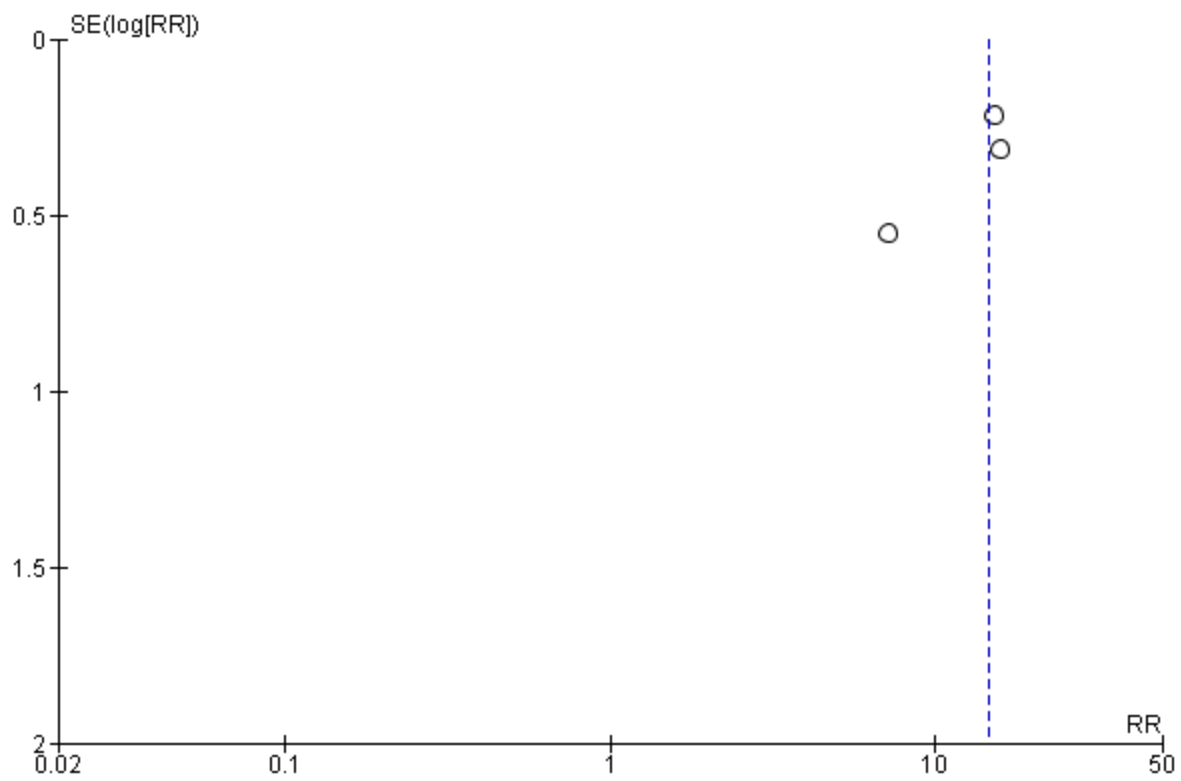




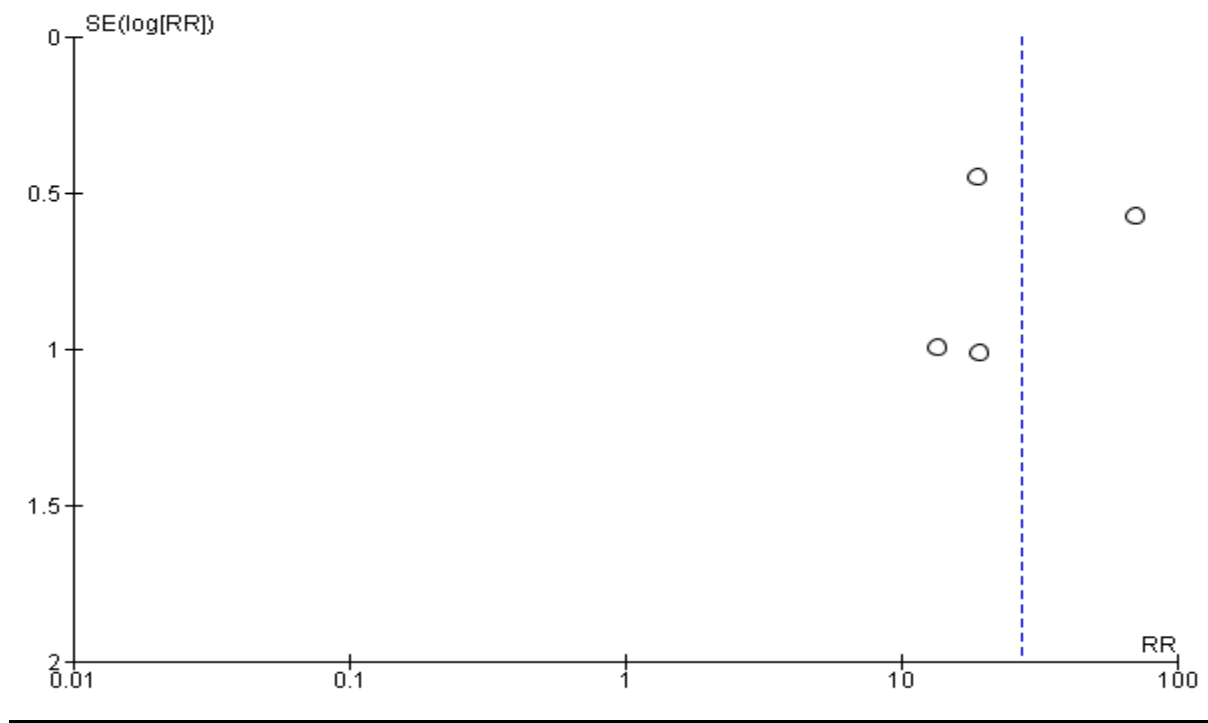
### Usteminumab 90 compared to placebo on PASI 75



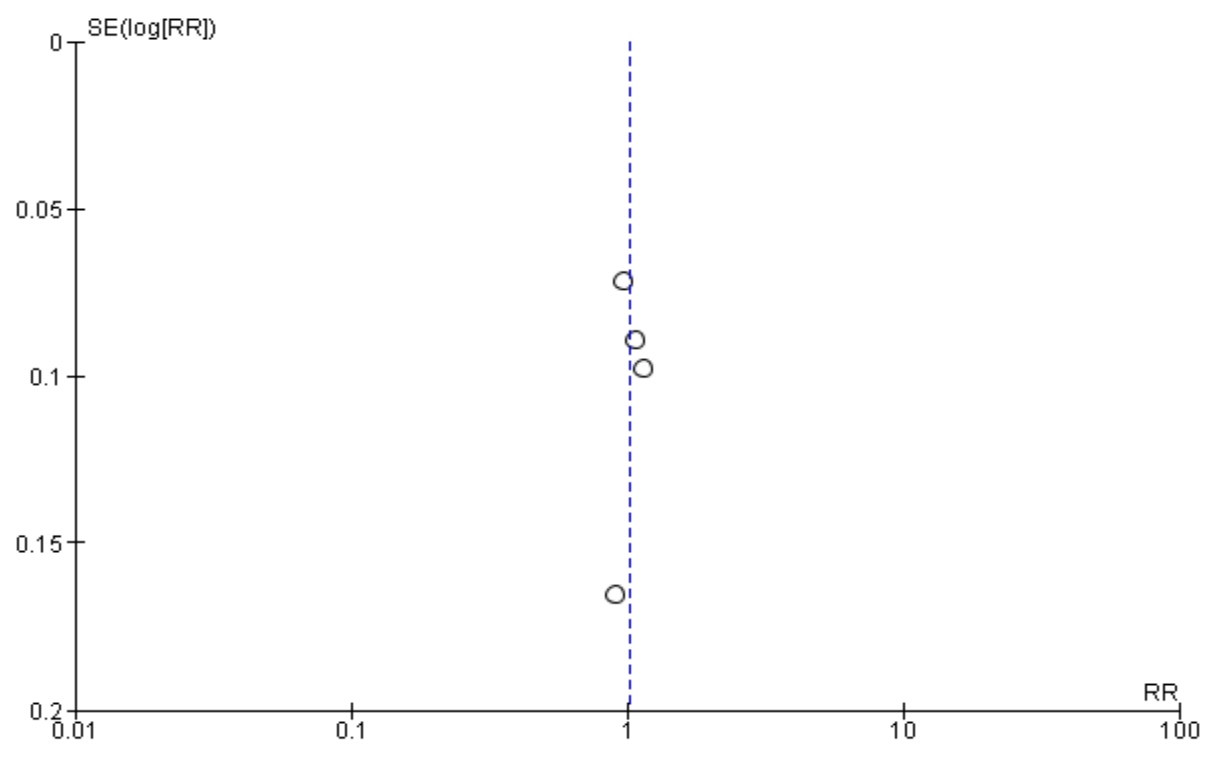
### Usteminumab 90 compared to placebo on PGA 0/1



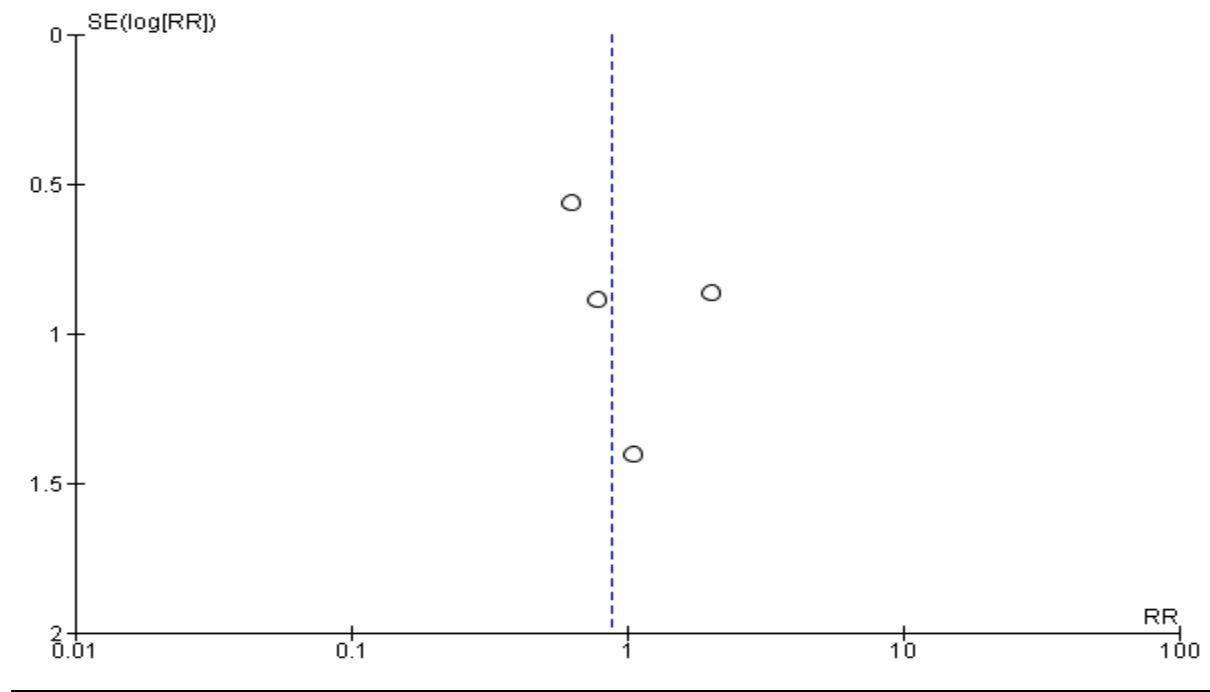
**Usteminumab 90 compared to placebo on PASI 90**



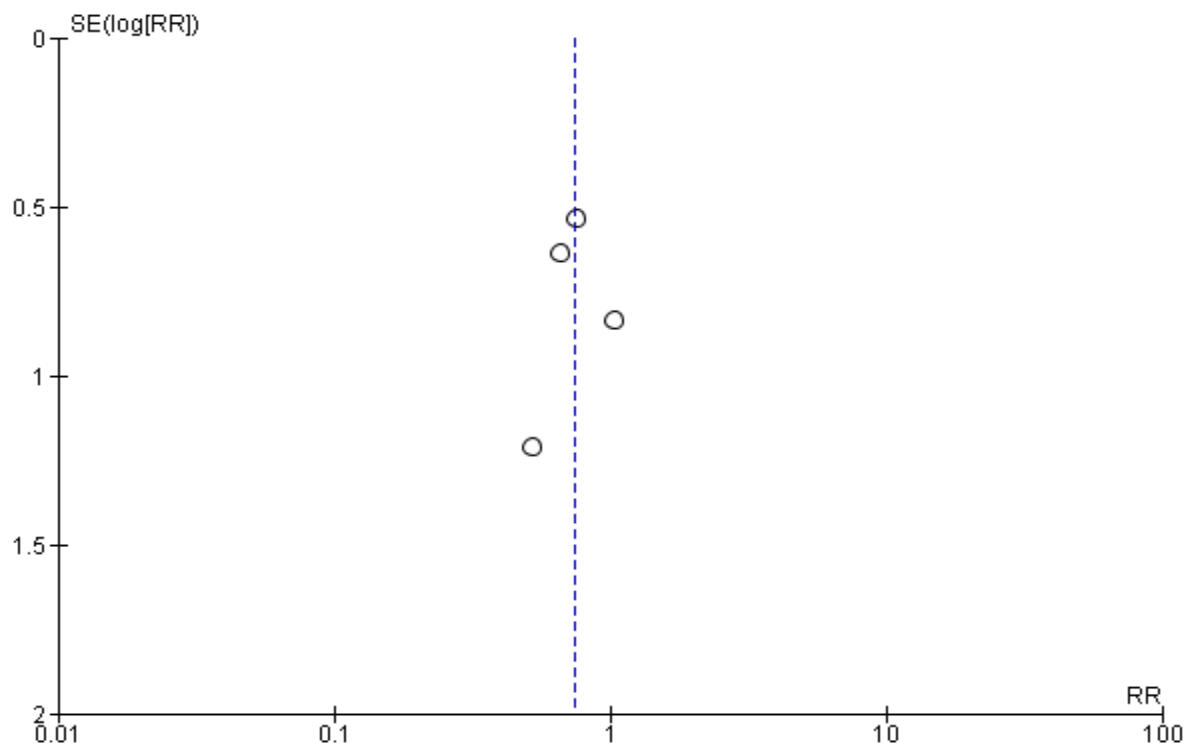
**Usteminumab 90 compared to placebo on number of Adverse Events**



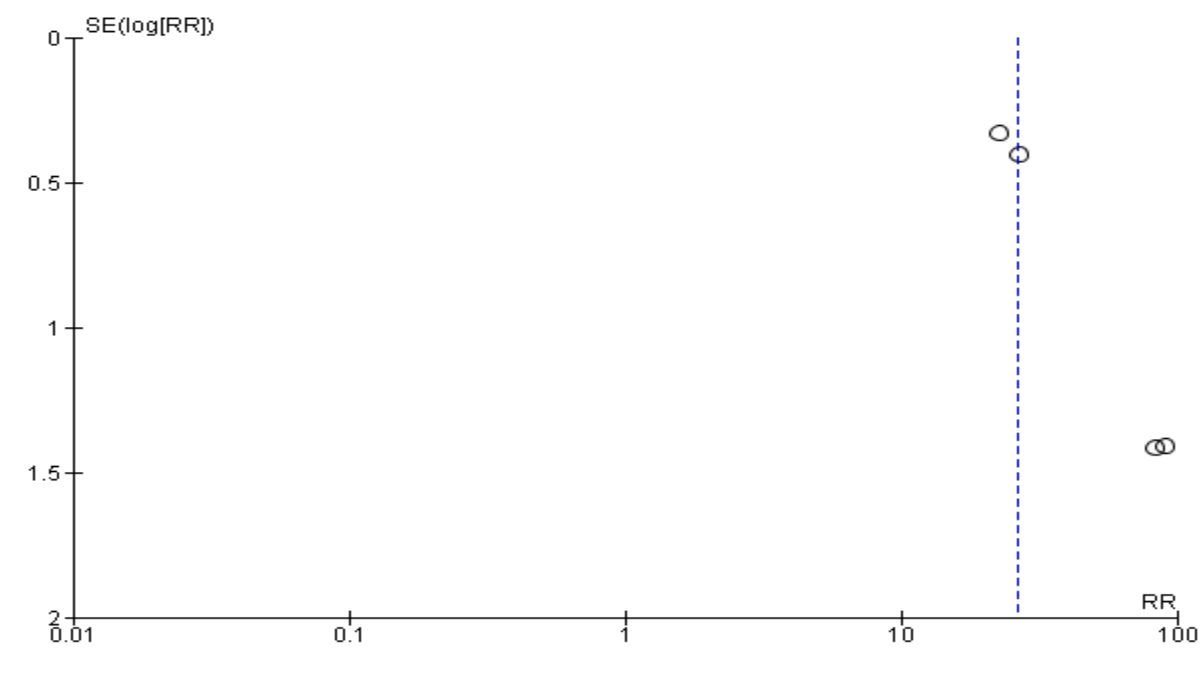
**Usteminumab 90 compared to placebo on number of Serious Adverse Events**



**Usteminumab 90 compared to placebo on toxicity withdrawals**

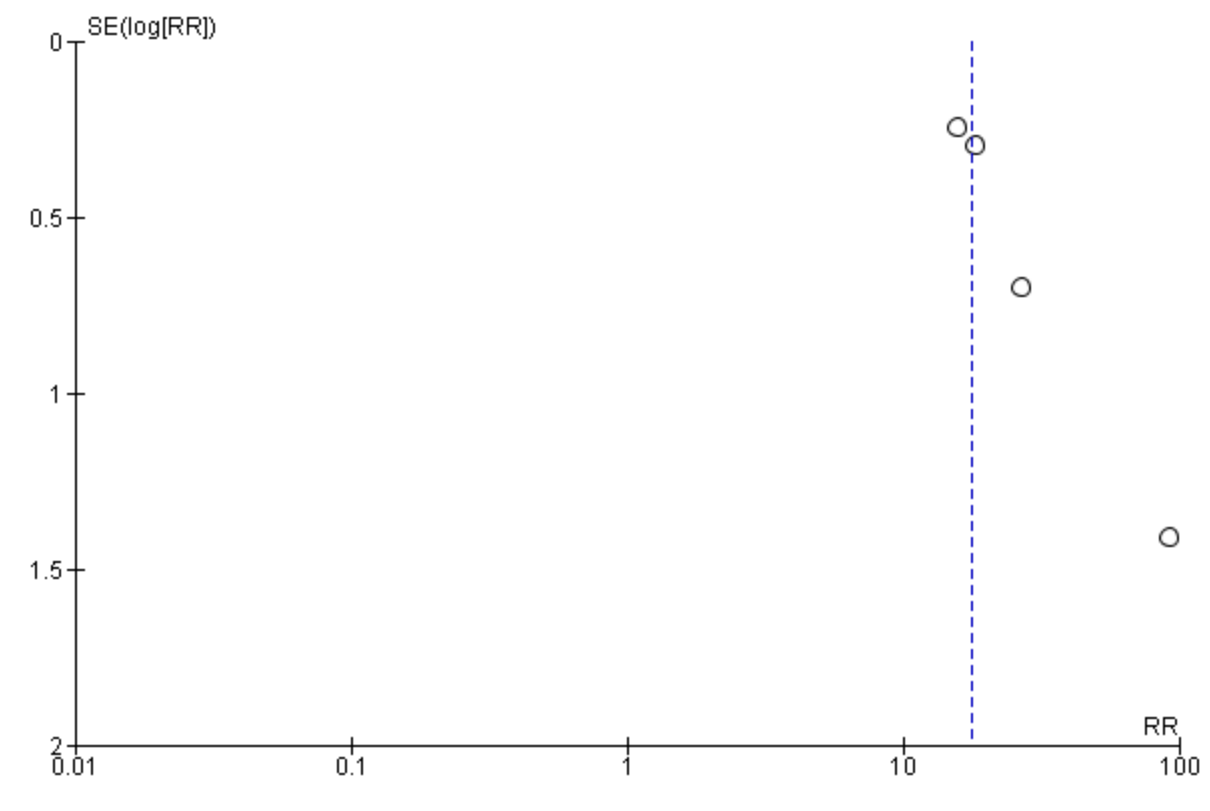


**Secukinumab 300 compared to placebo on IGA 0/1**

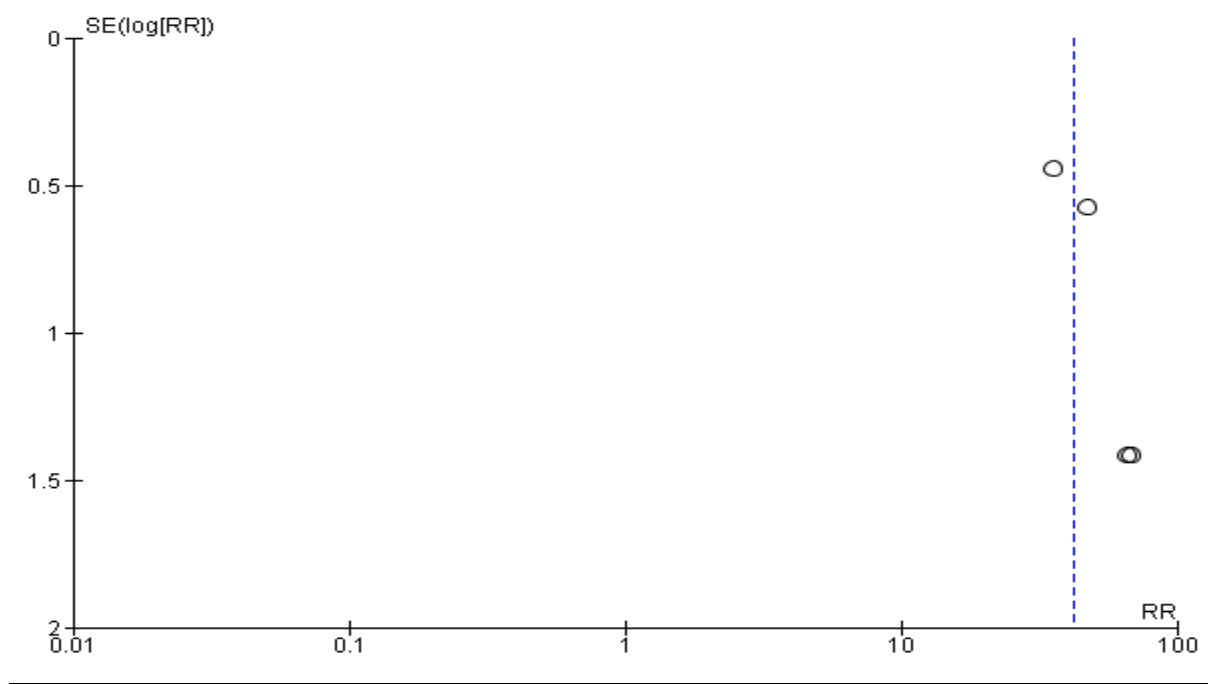


**Secukinumab 300 compared to placebo on PASI-75**

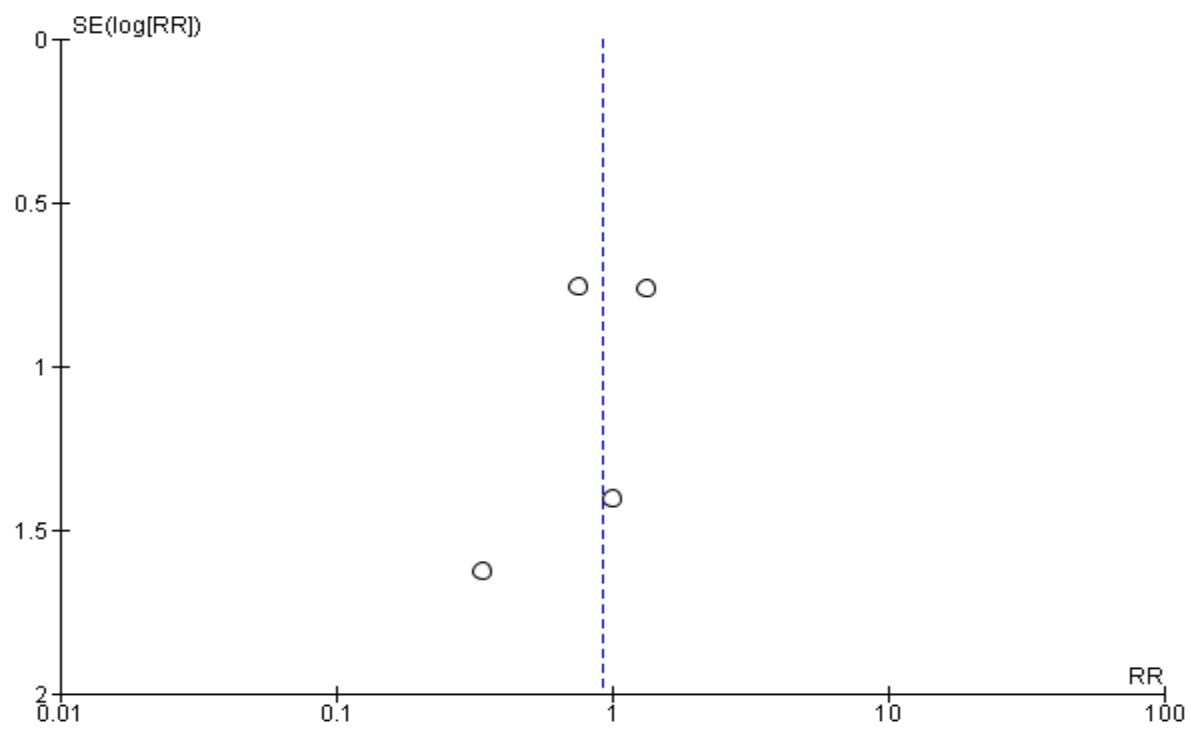




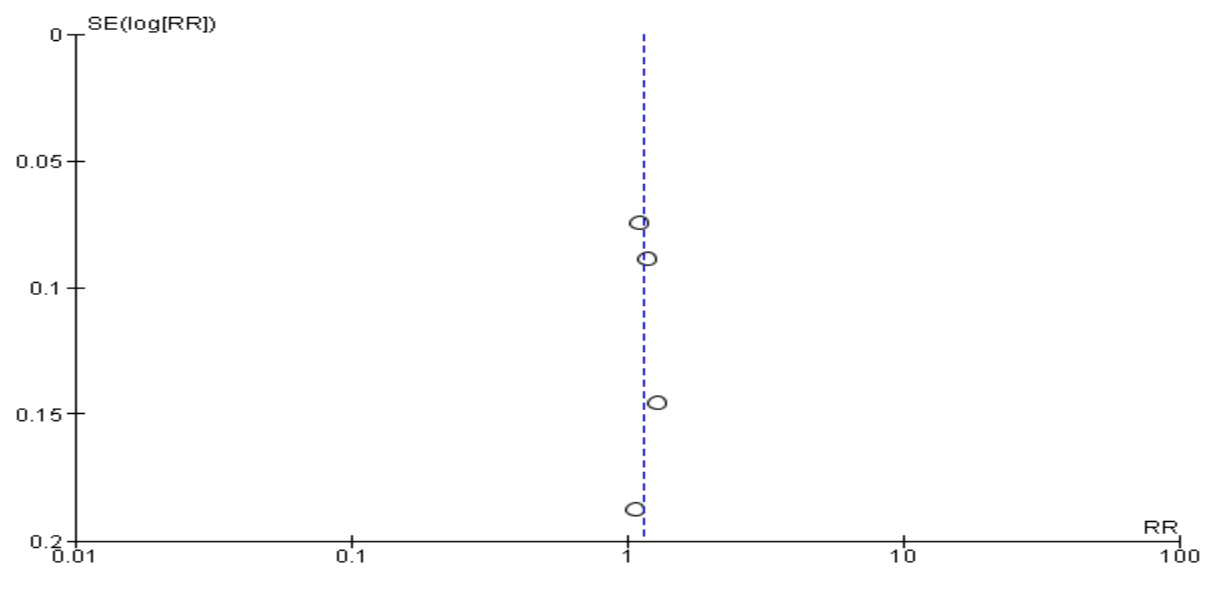
**Secukinumab 300 compared to placebo on PASI-90**



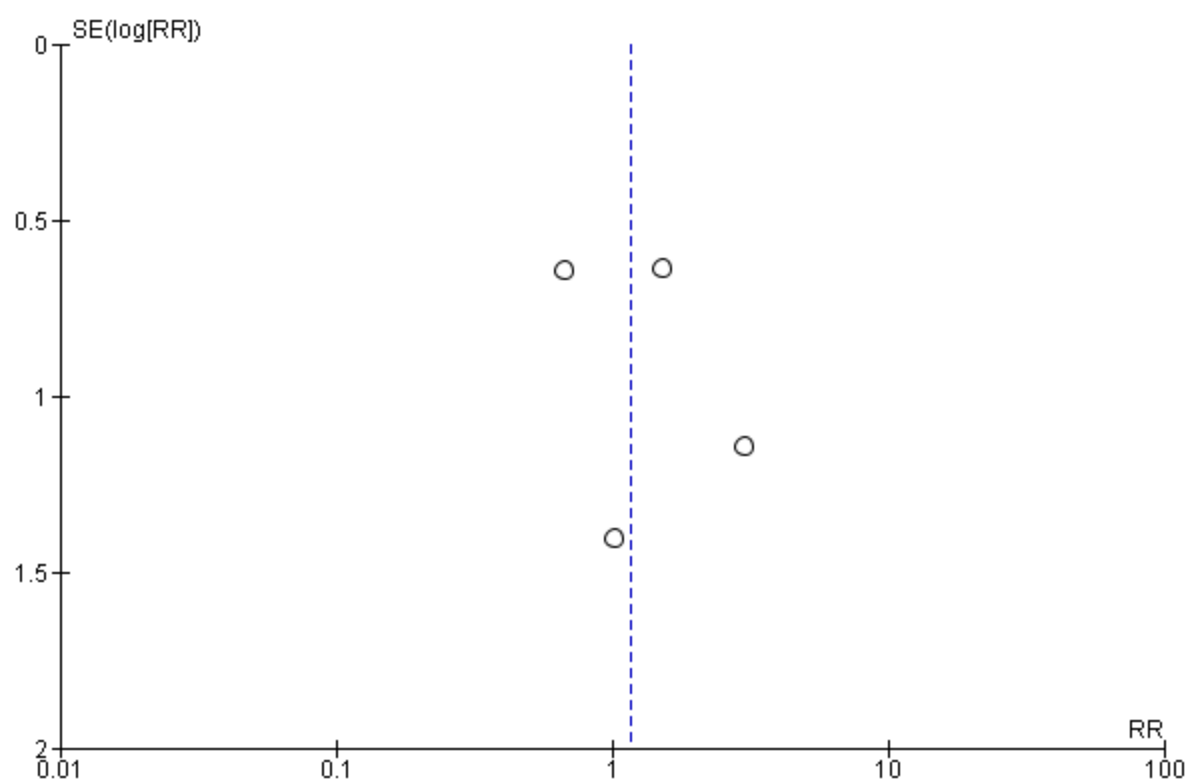
**Secukinumab 300 compared to placebo on toxicity withdrawals**



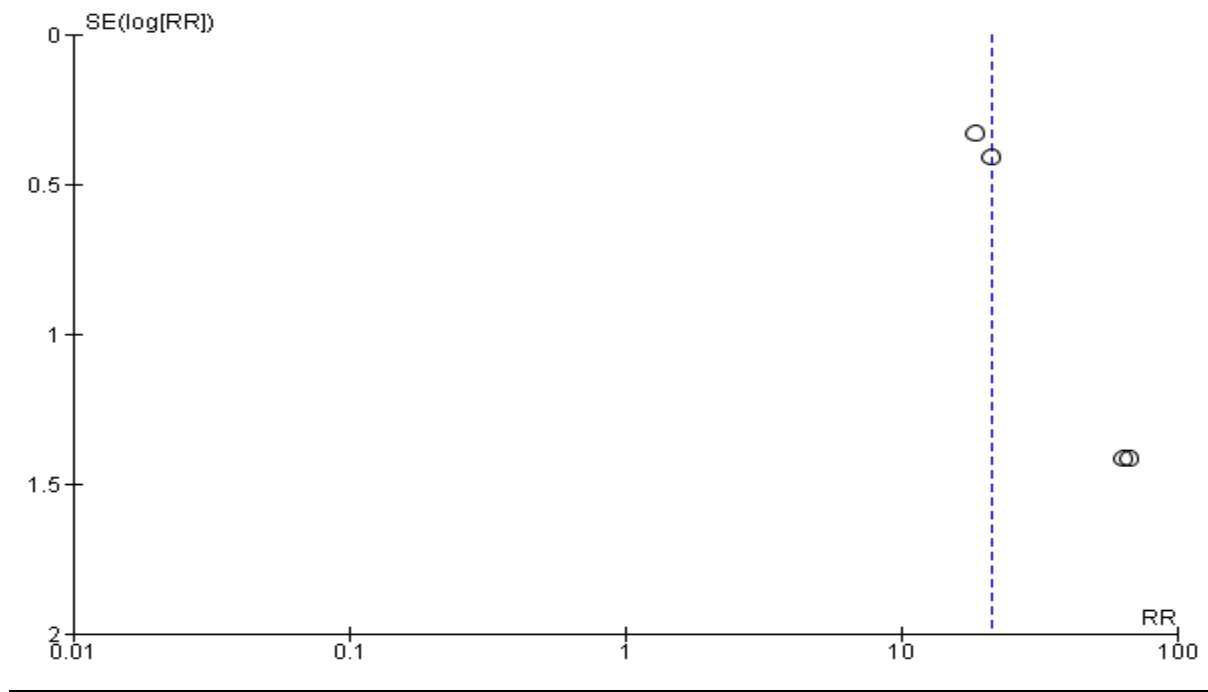
**Secukinumab 300 compared to placebo on number of Adverse Events**



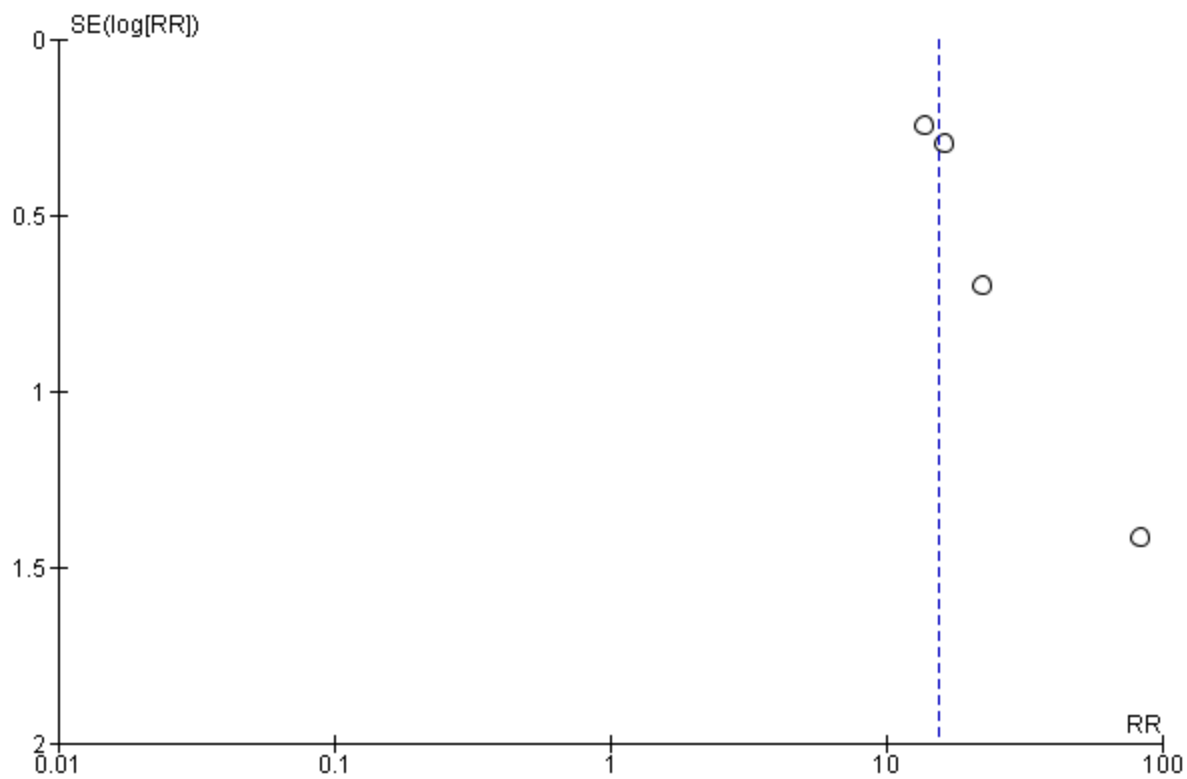
**Secukinumab 300 compared to placebo on number of Serious Adverse Events**



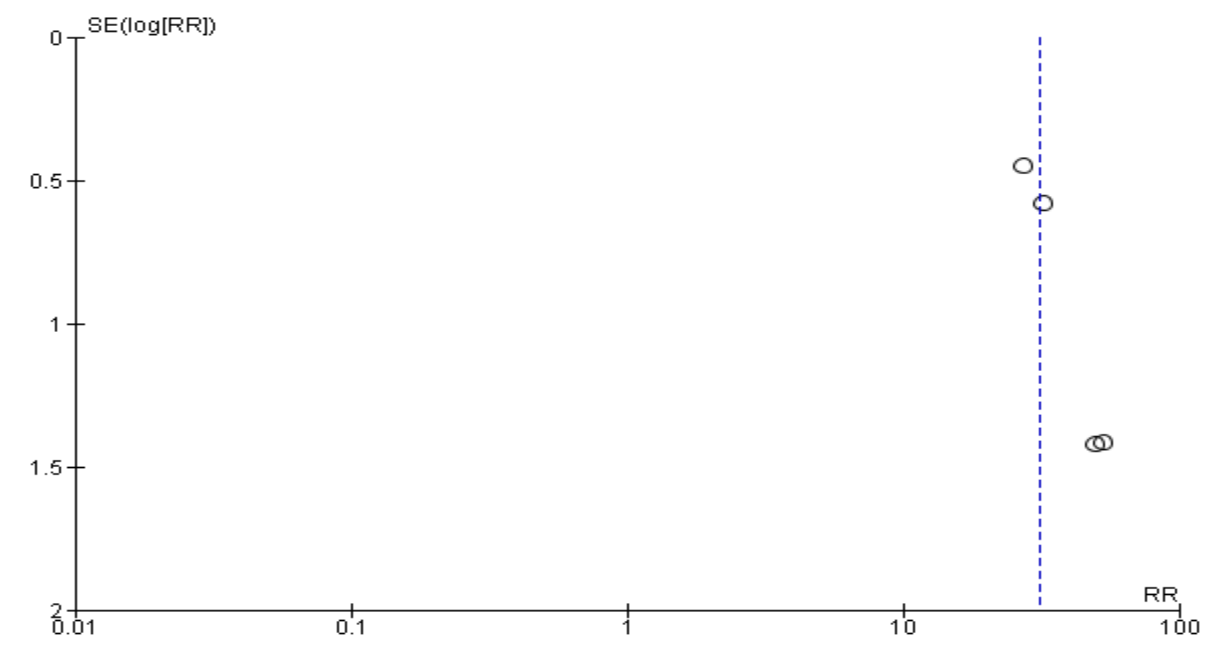
**Secukinumab 150 compared to placebo on IGA 0/1**



**Secukinumab 150 compared to placebo on PASI-75**

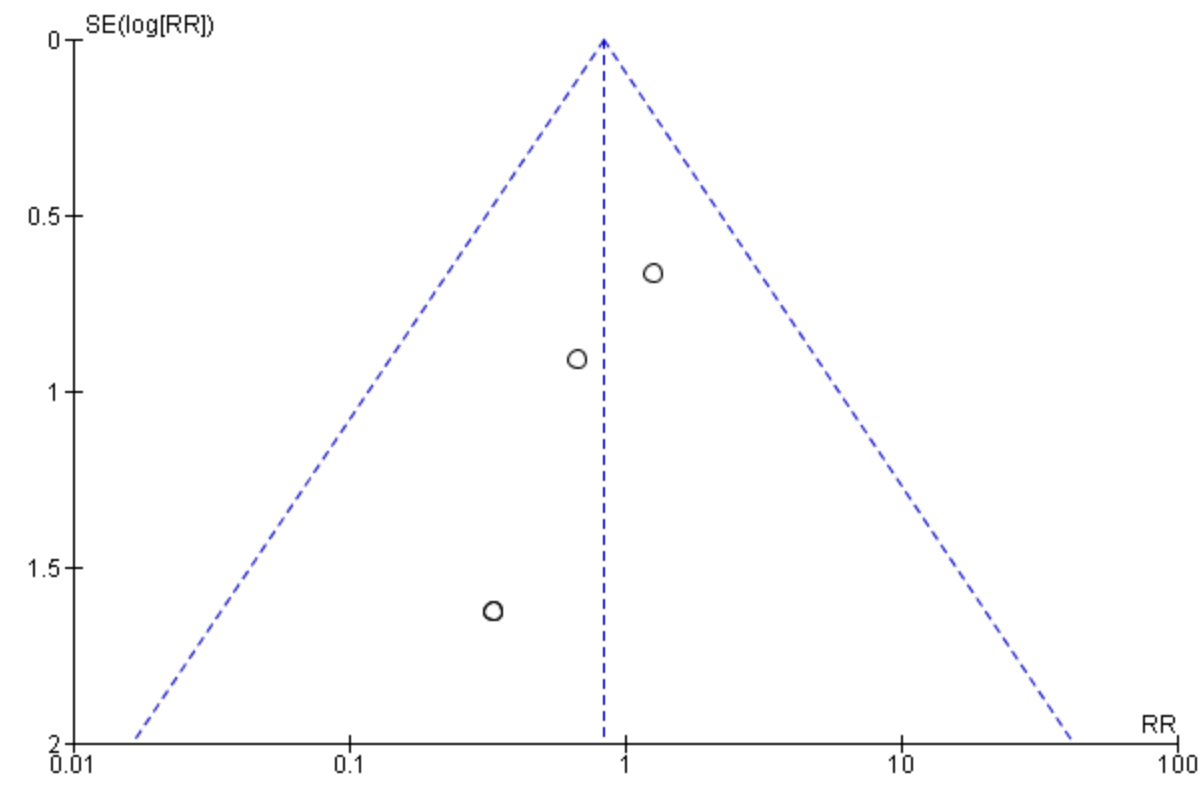


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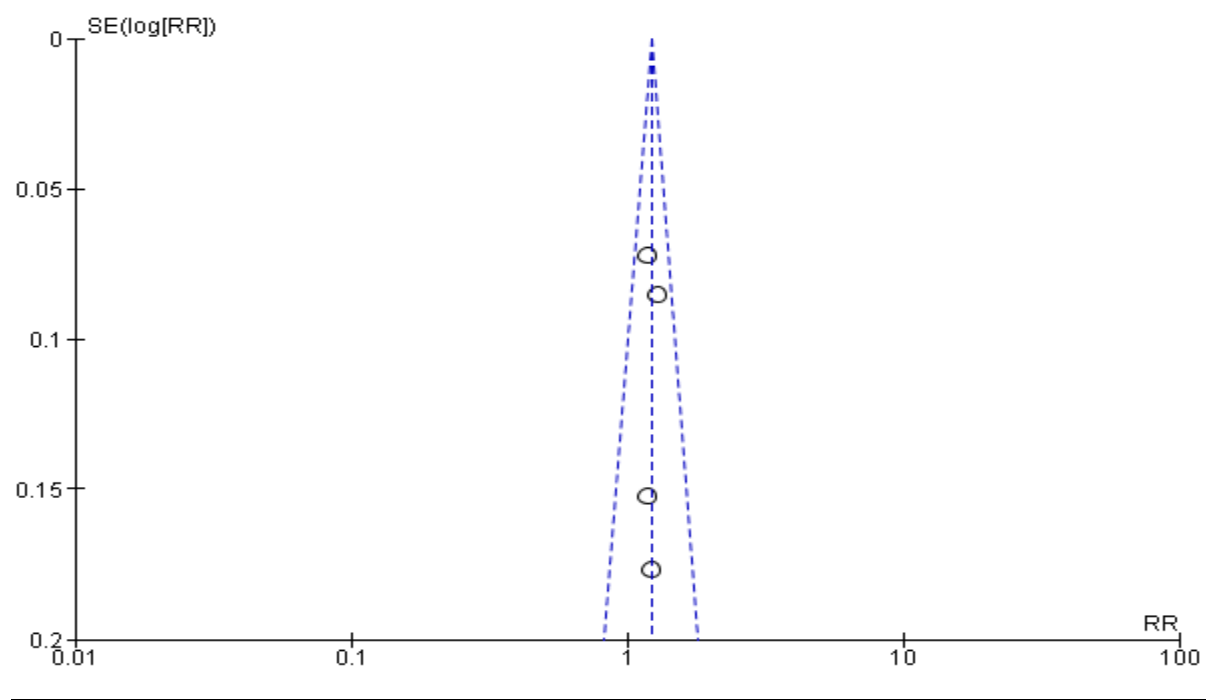


**Secukinumab 150 compared to placebo on toxicity withdrawals**

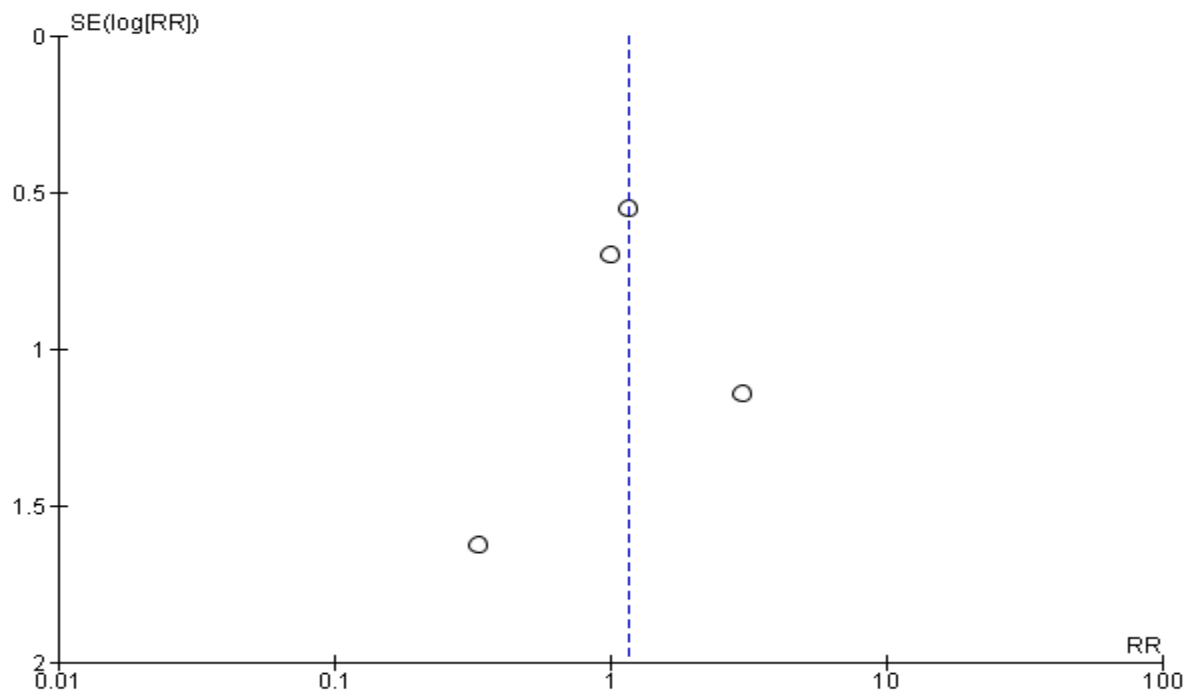




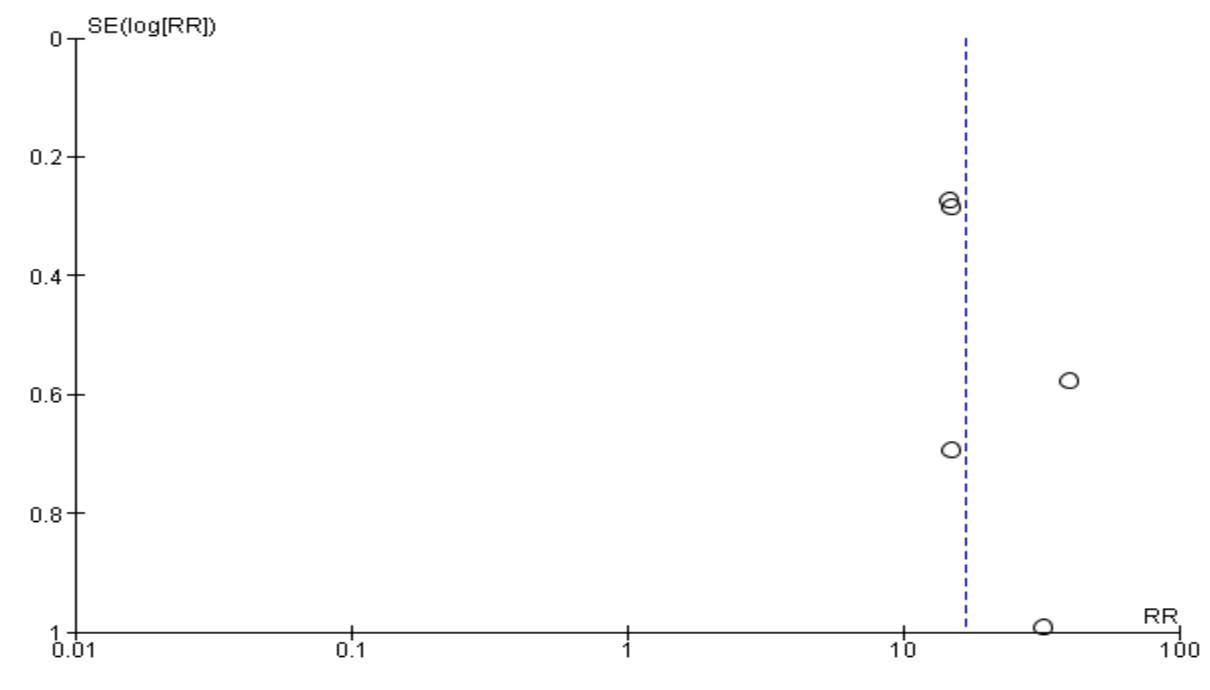
**Secukinumab 150 compared to placebo on number of Adverse Events**



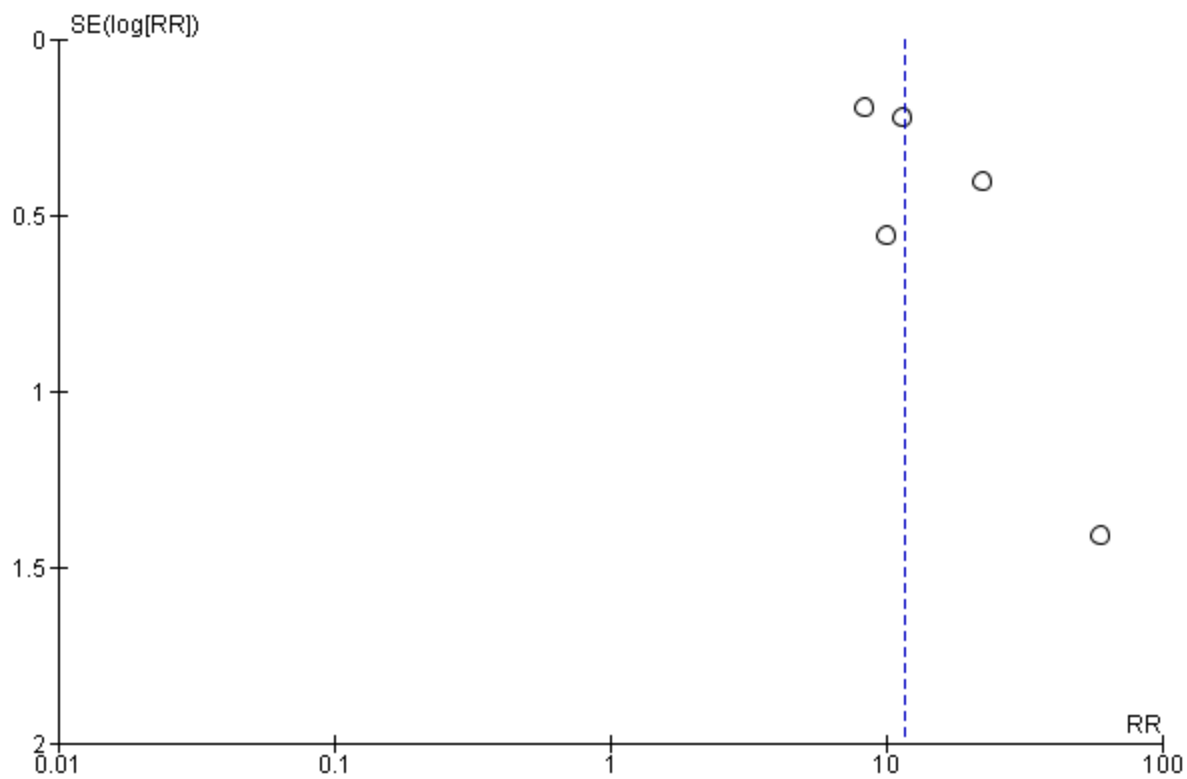
**Secukinumab 150 compared to placebo on number of Serious Adverse Events**



**Brodalumab 140 compared to placebo on PGA 0/1**

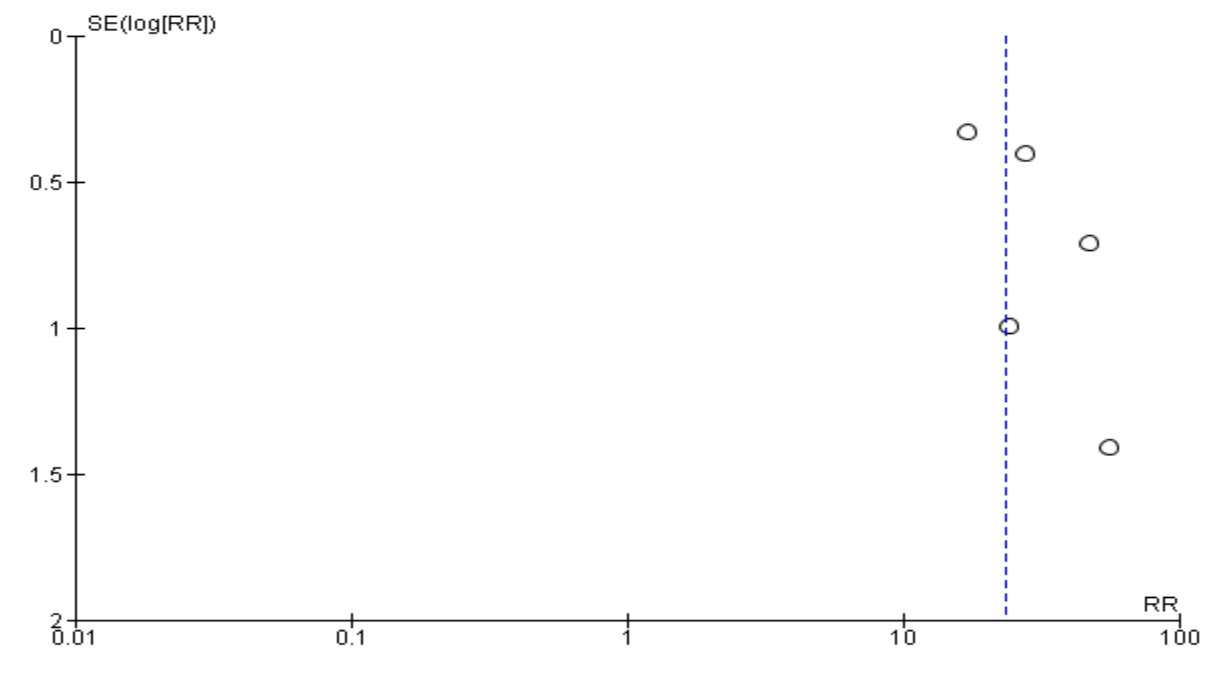


**Brodalumab 140 compared to placebo on PASI-75**

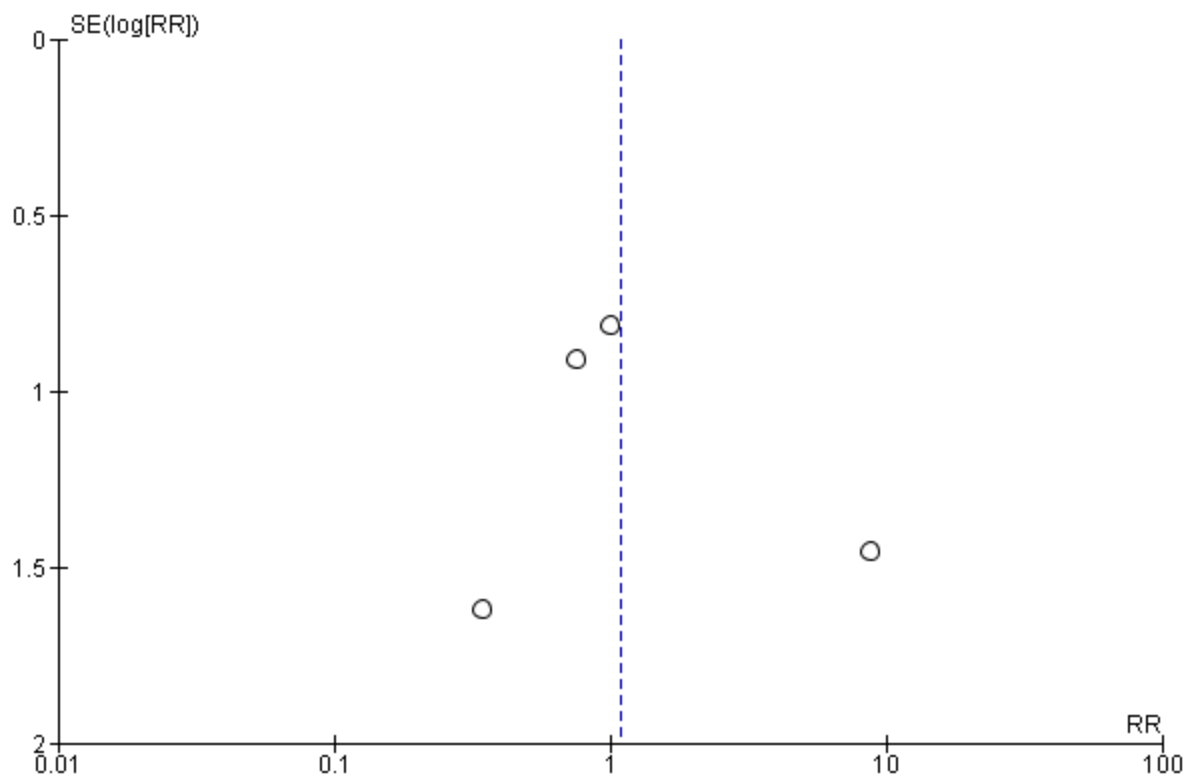


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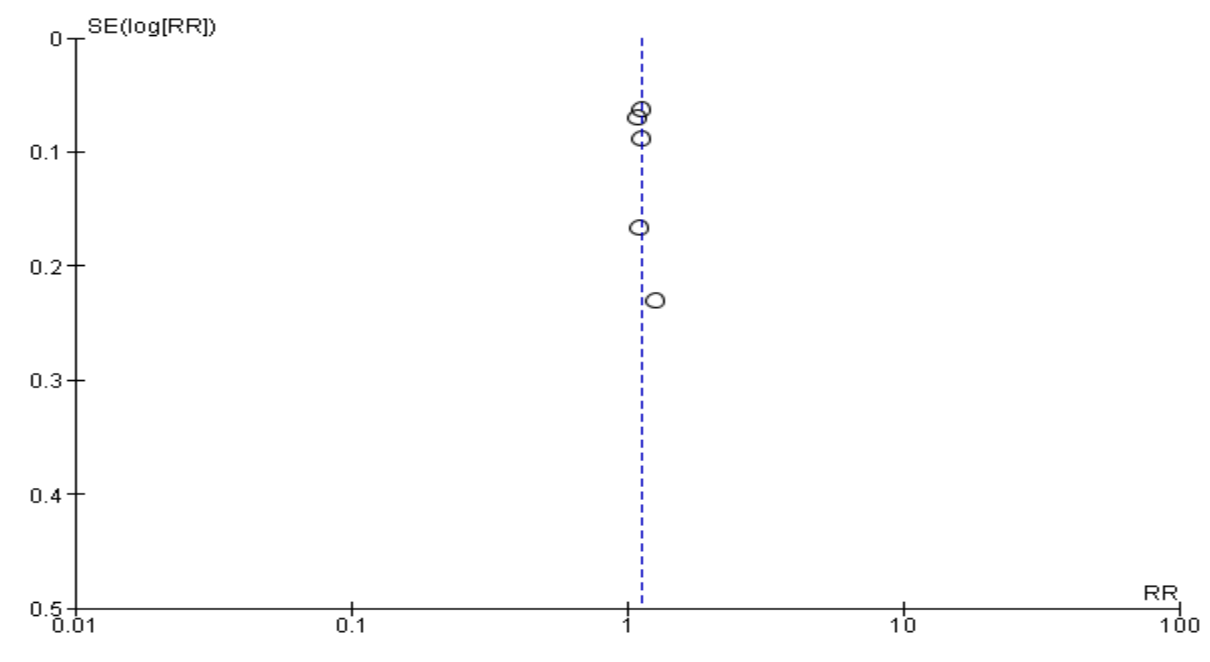
**Brodalumab 140 compared to placebo on PASI-90**



**Brodalumab 140 compared to placebo on toxicity withdrawals**

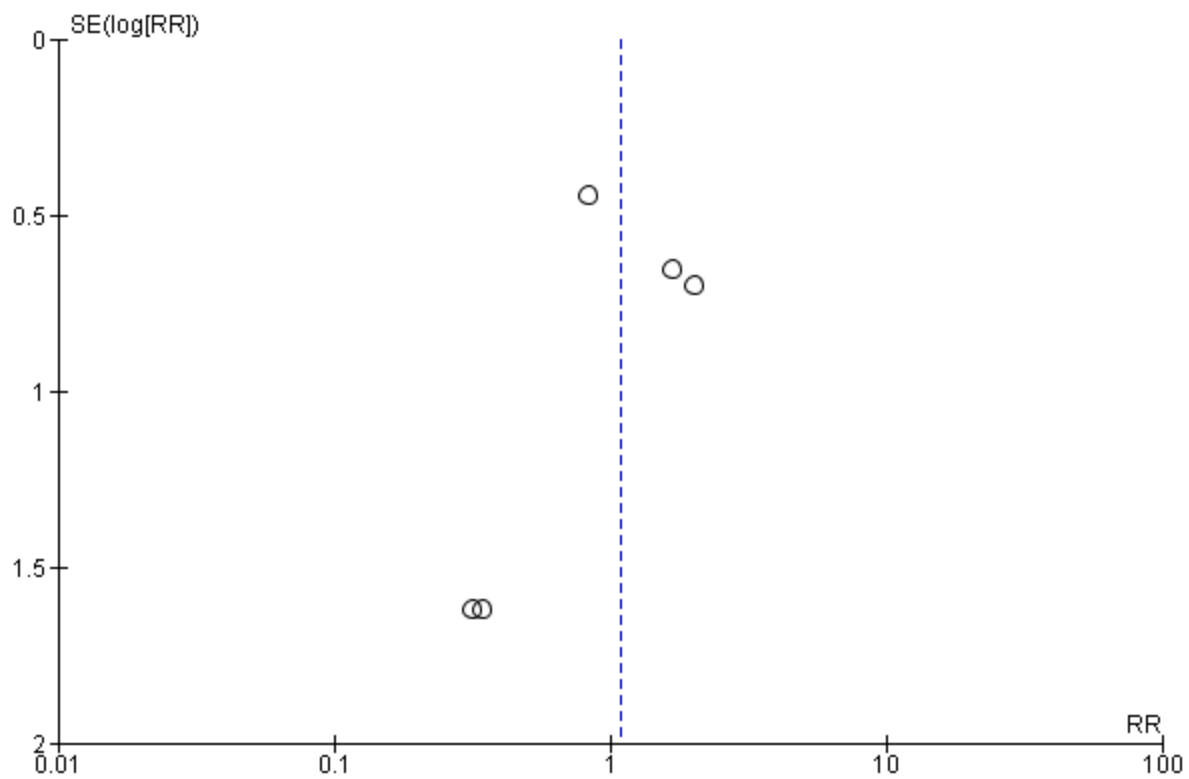


**Brodalumab 140 compared to placebo on number of Adverse Events**



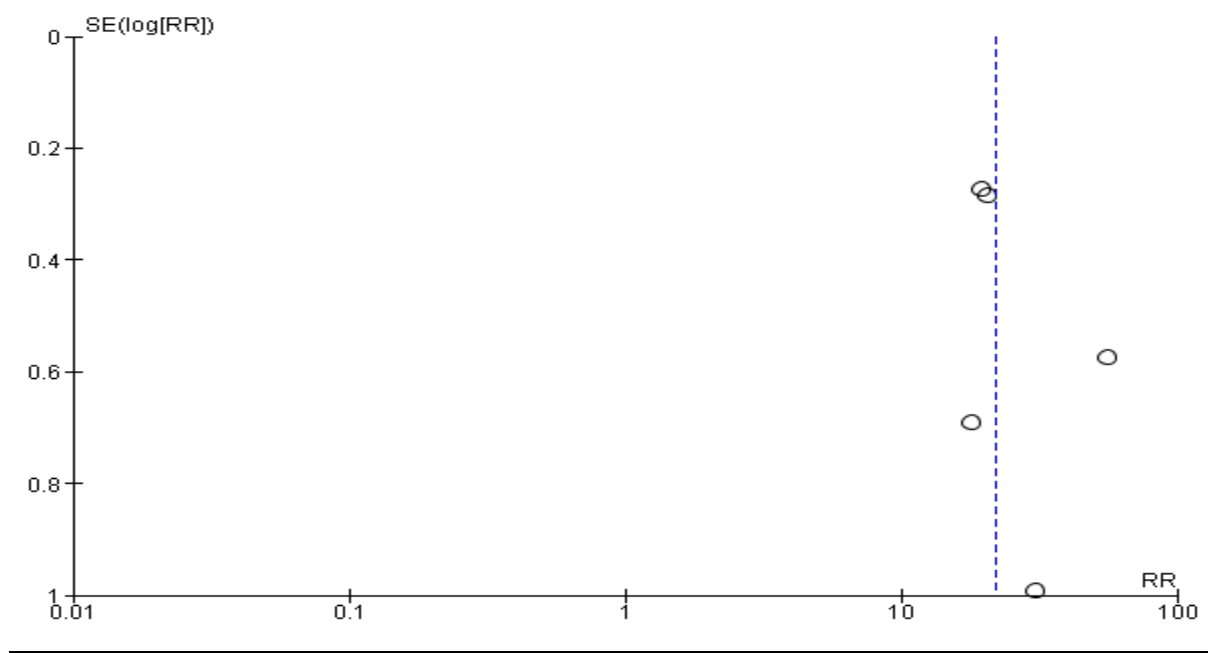
**Brodalumab 140 compared to placebo on number of Serious Adverse Events**



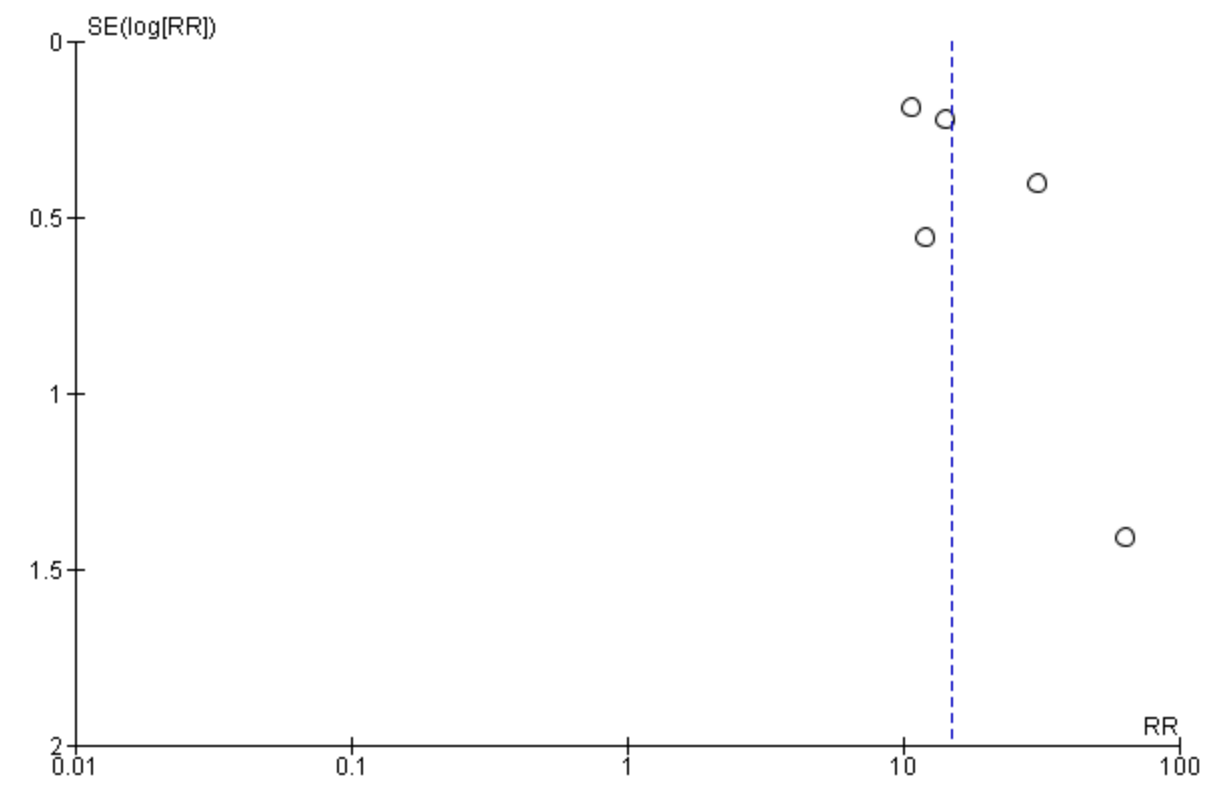


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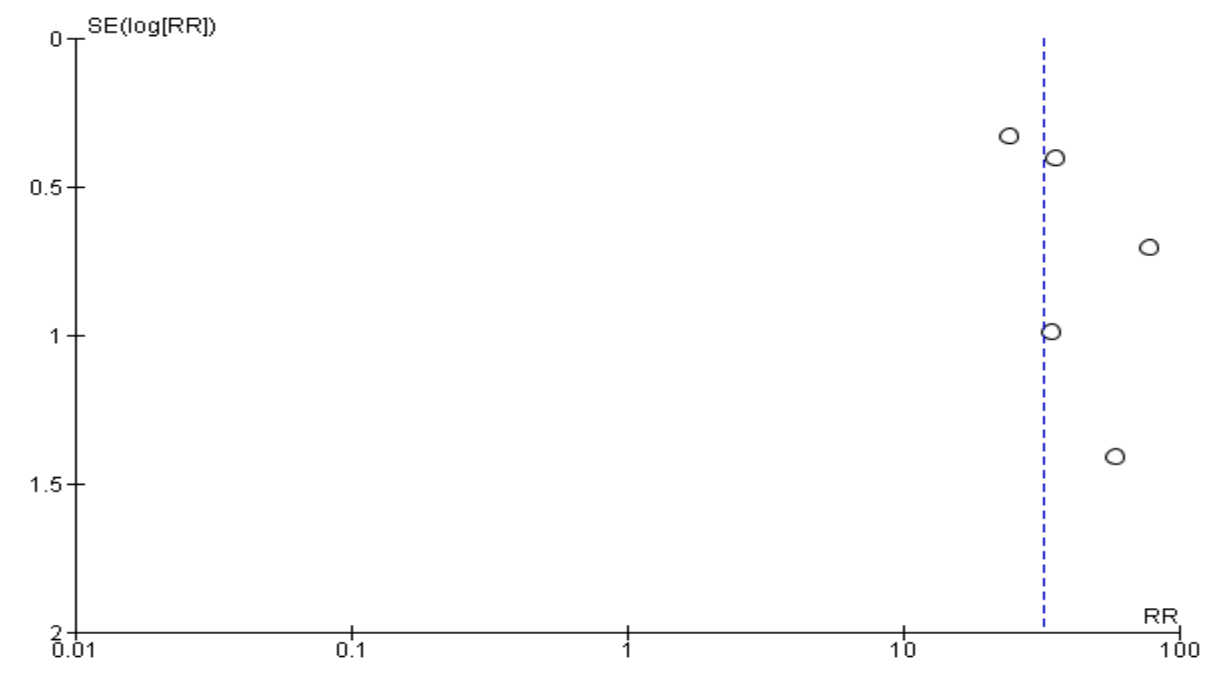
**Brodalumab 210 compared to placebo on PGA 0/1**



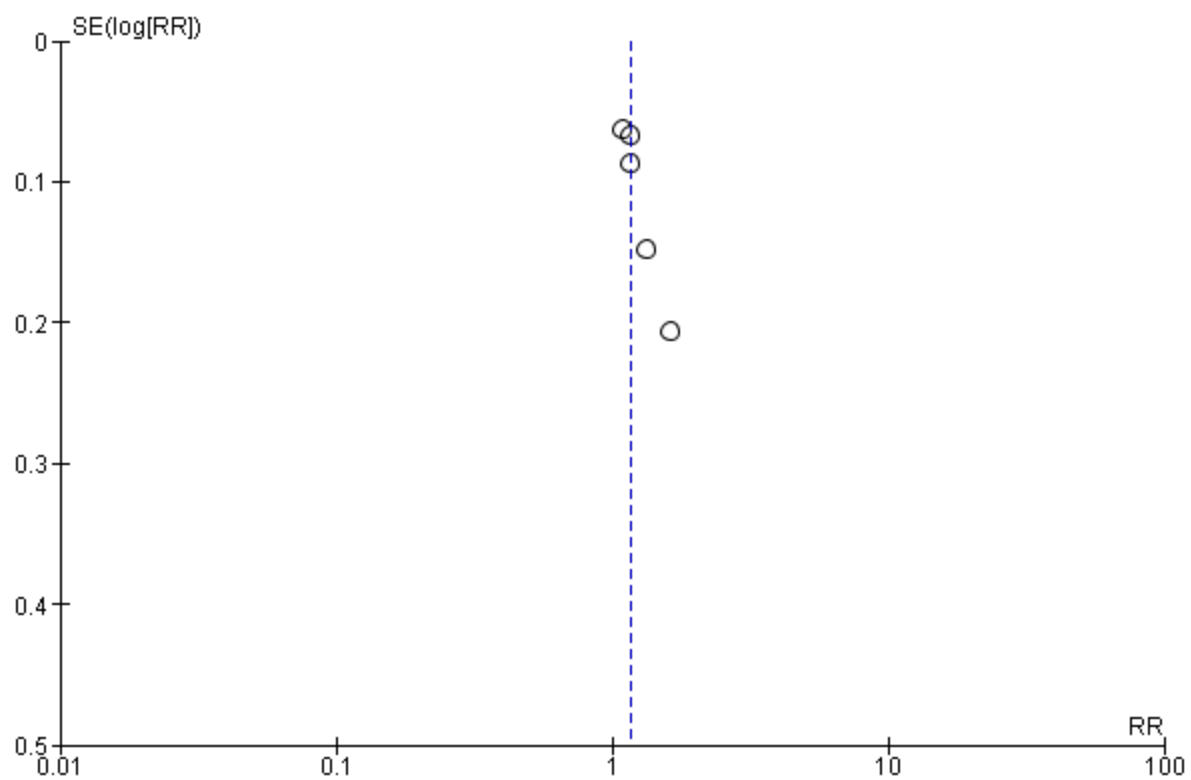
**Brodalumab 210 compared to placebo on PASI-75**



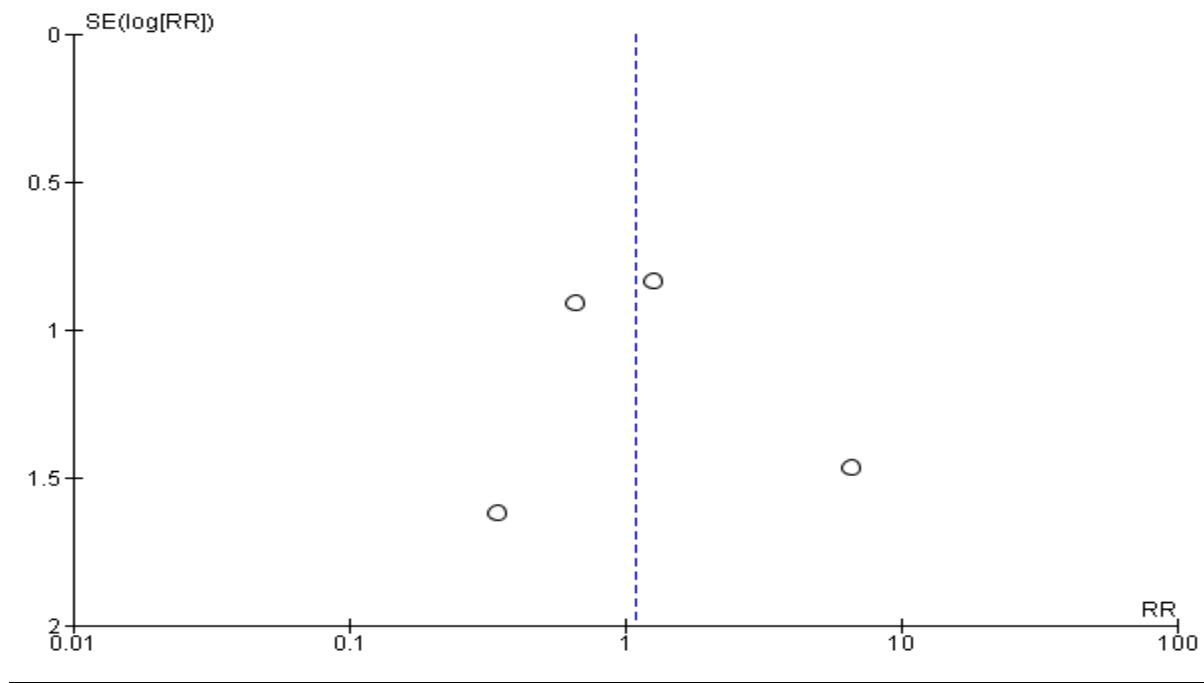
**Brodalumab 210 compared to placebo on PASI-90**



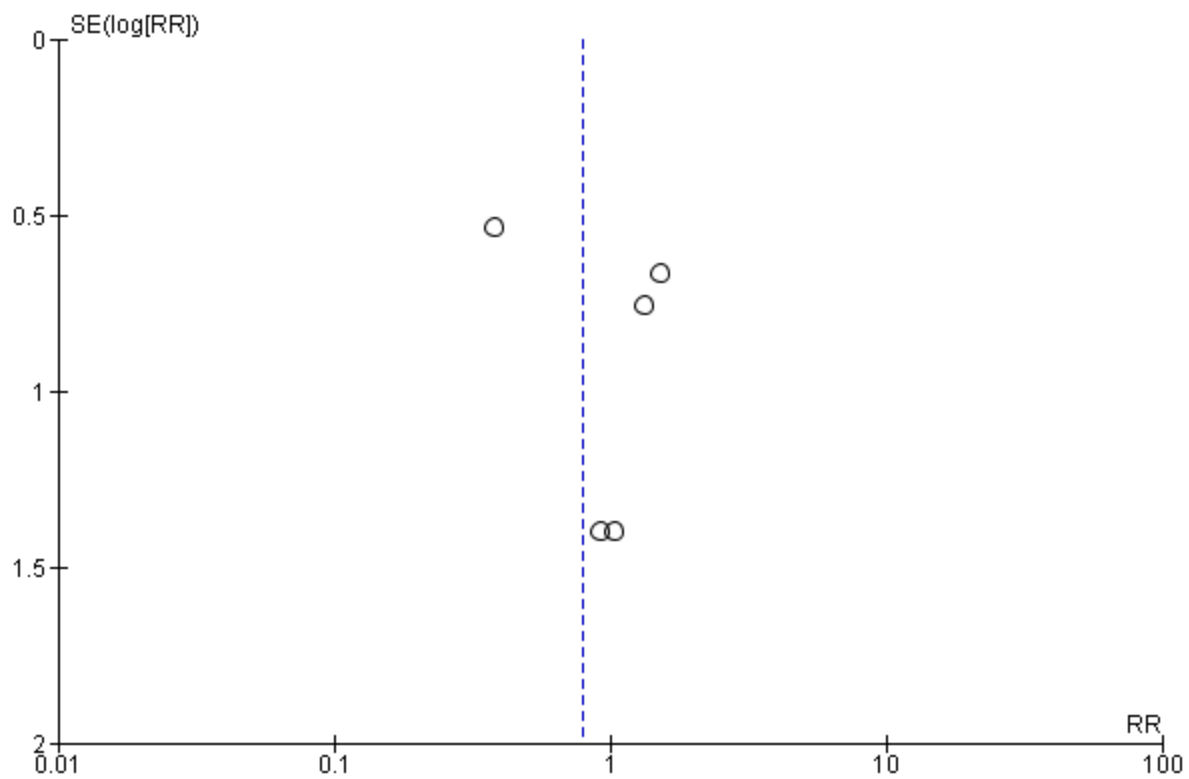
**Brodalumab 210 compared to placebo on number of Adverse Events**



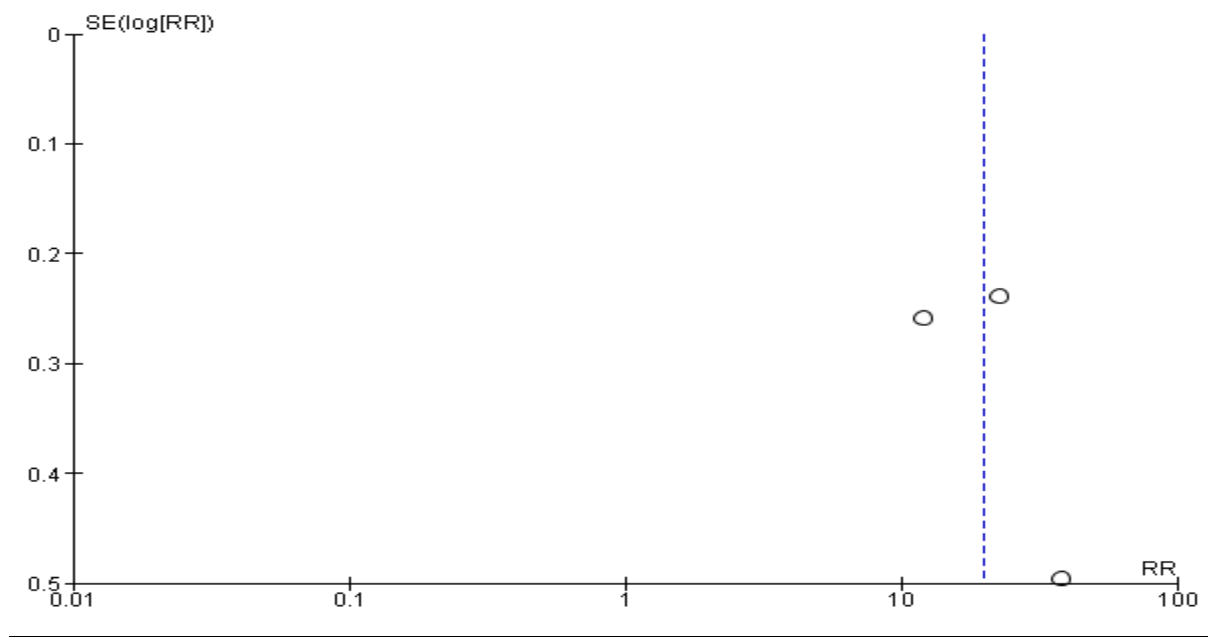
**Brodalumab 210 compared to placebo on toxicity withdrawals**



**Brodalumab 210 compared to placebo on number of Serious Adverse Events**

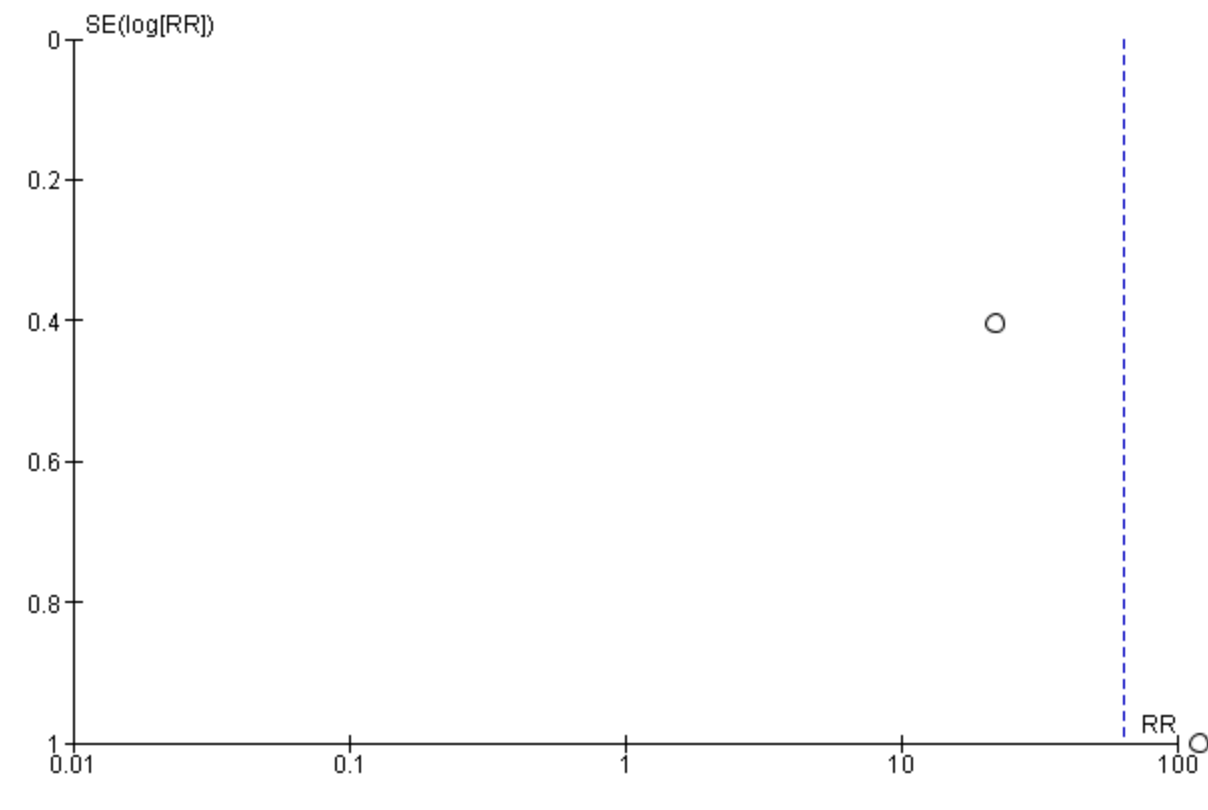


**Ixekizumab 2 week compared to placebo on PASI-75**

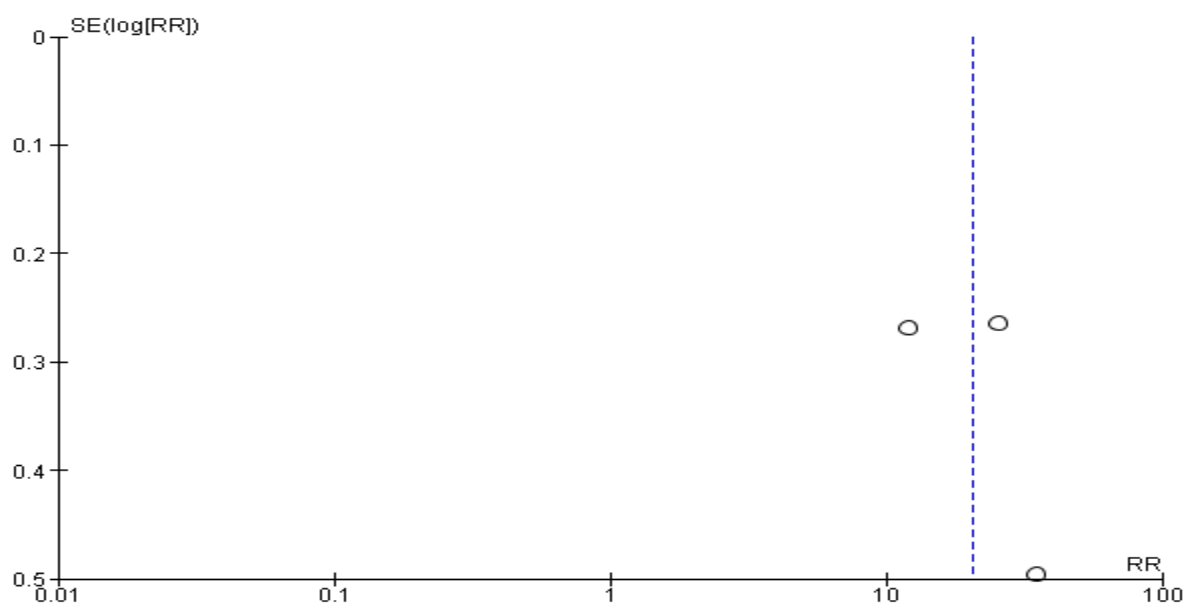


**Ixekizumab 2 week compared to placebo on PASI-90**

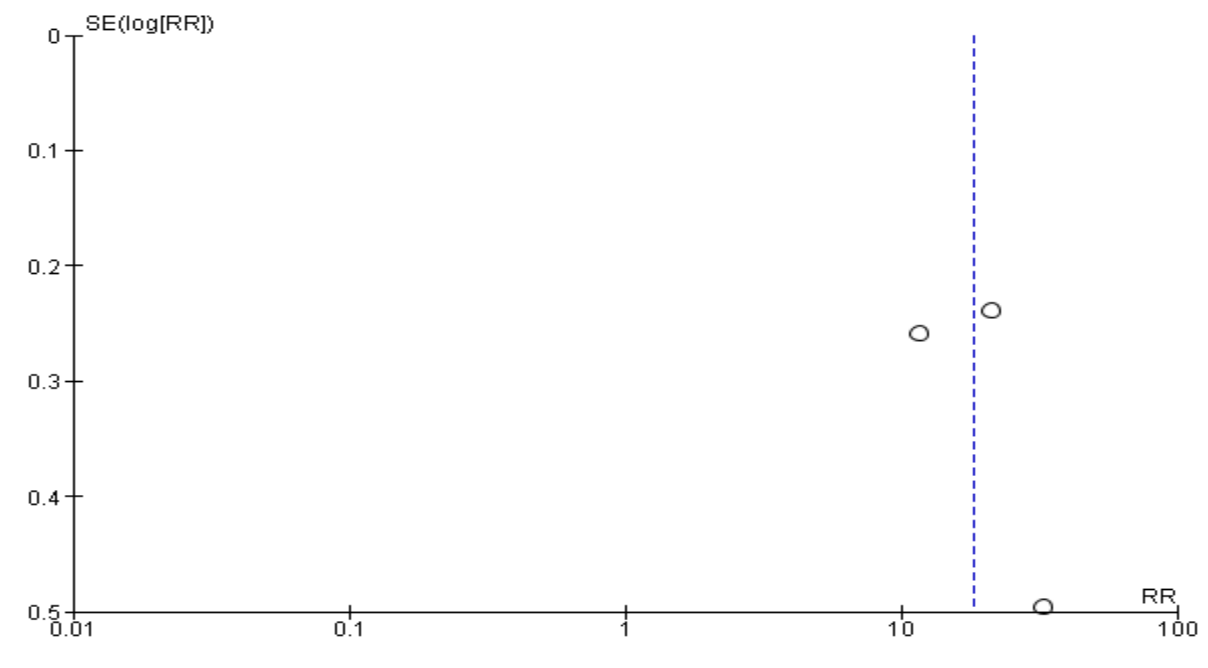




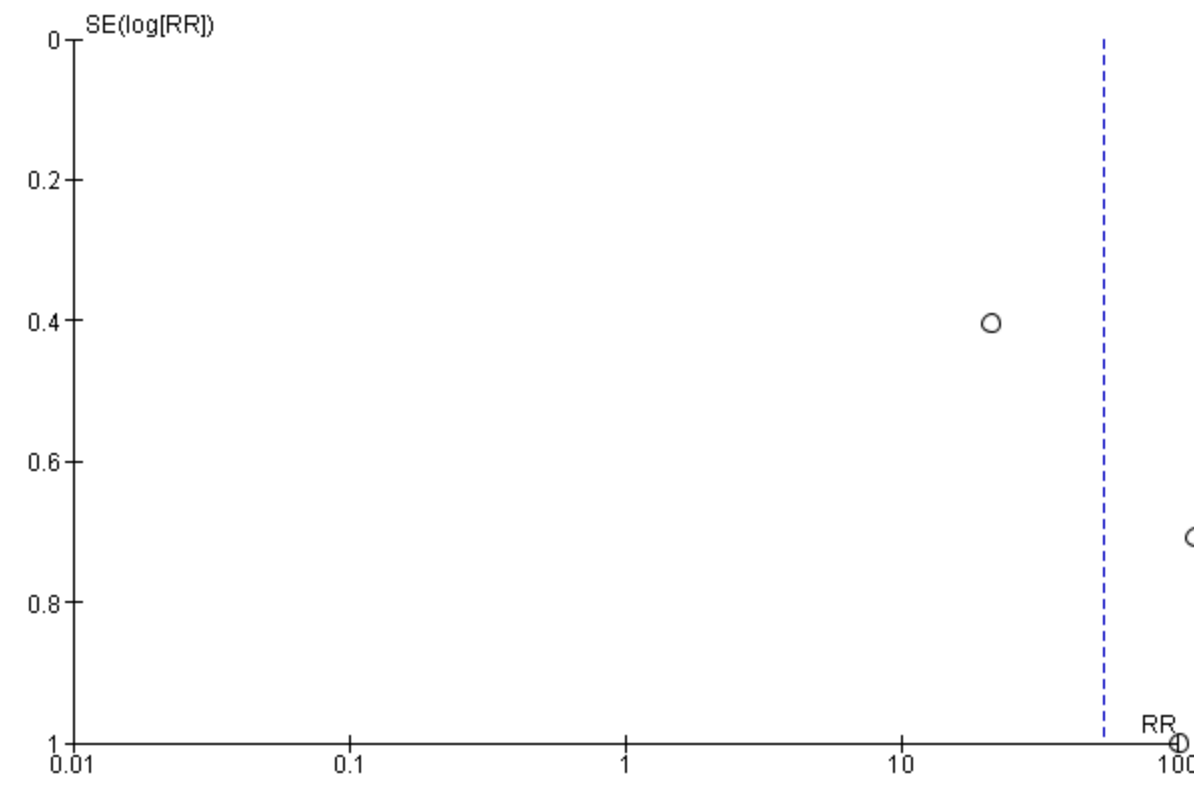
**Ixekizumab 2 week compared to placebo on PGA 0/1**



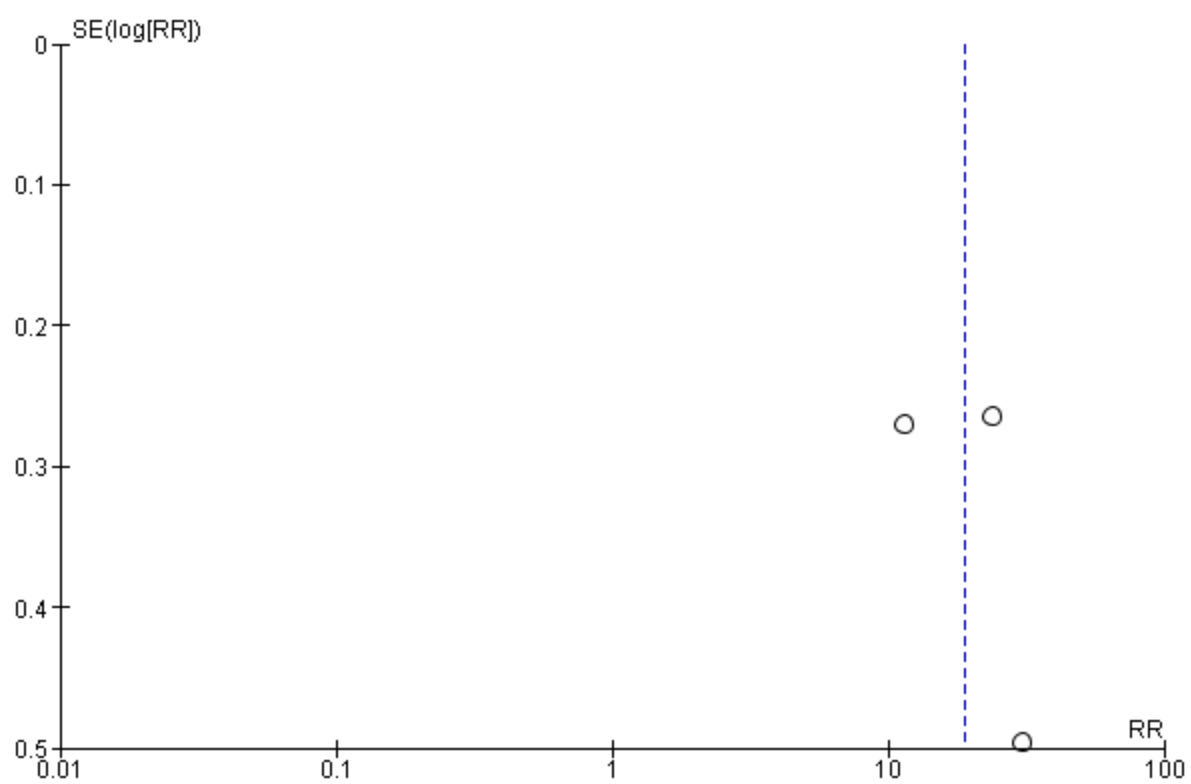
**Ixekizumab 4 week compared to placebo on PASI-75**



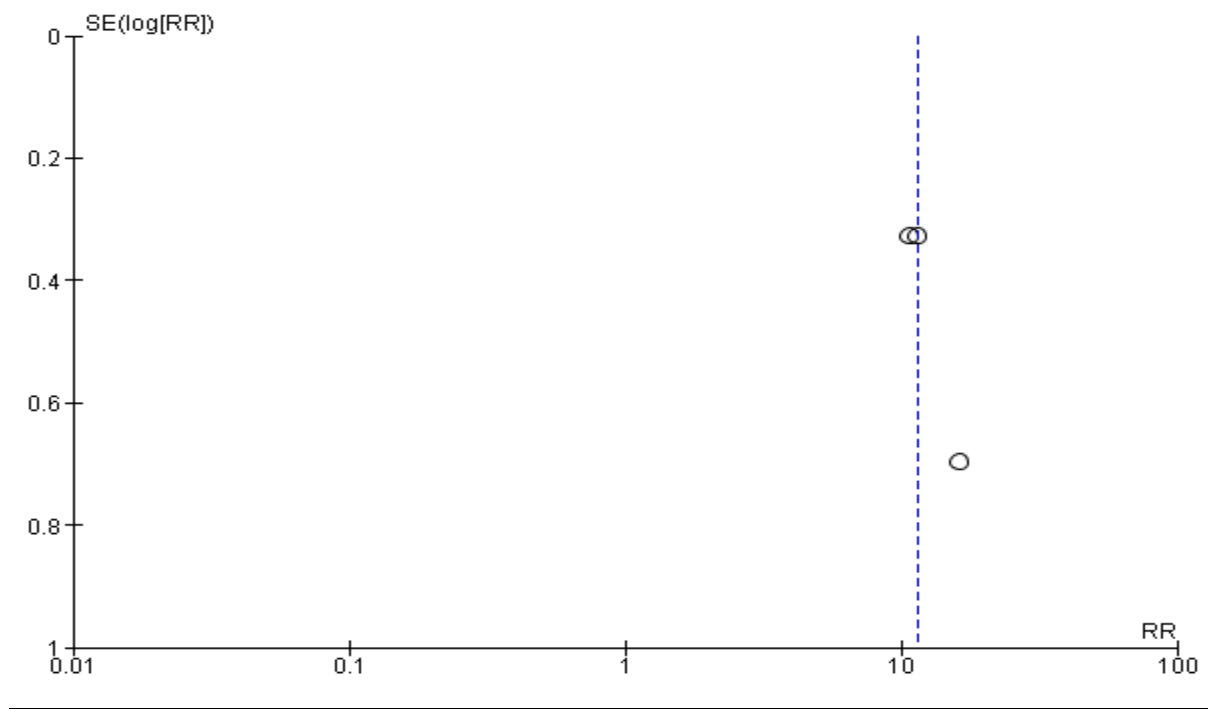
**Ixekizumab 4 week compared to placebo on PASI-90**



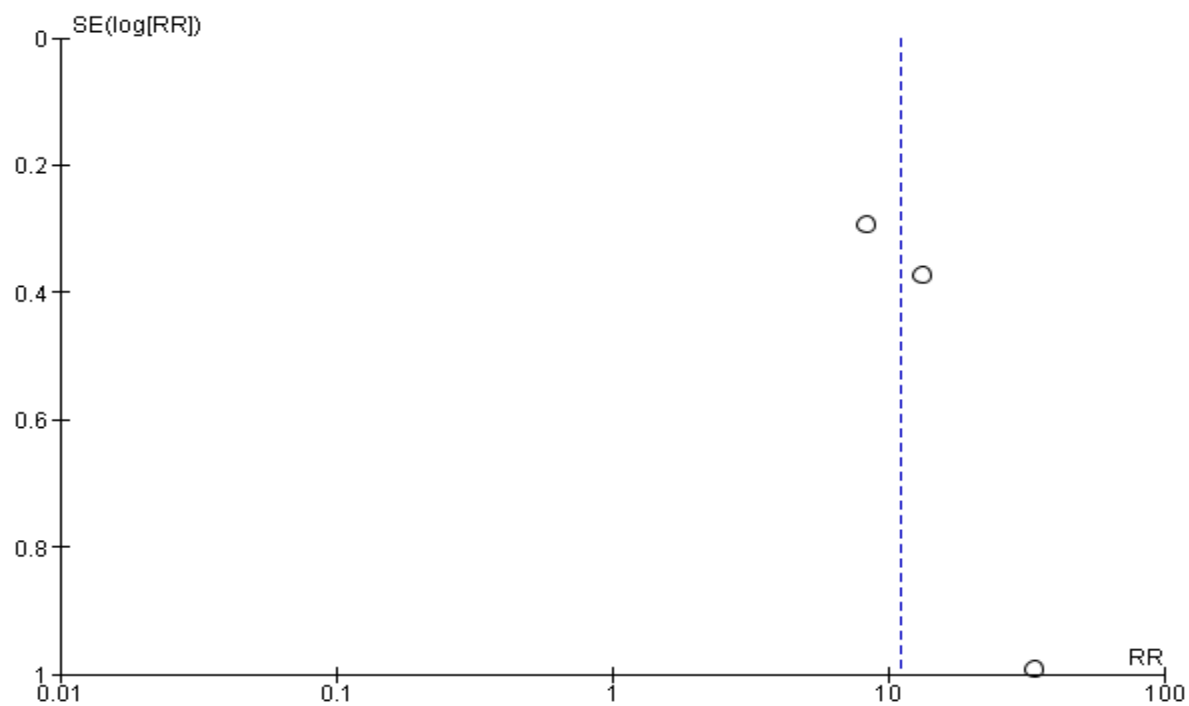
**Ixekizumab 4 week compared to placebo on PGA 0/1**



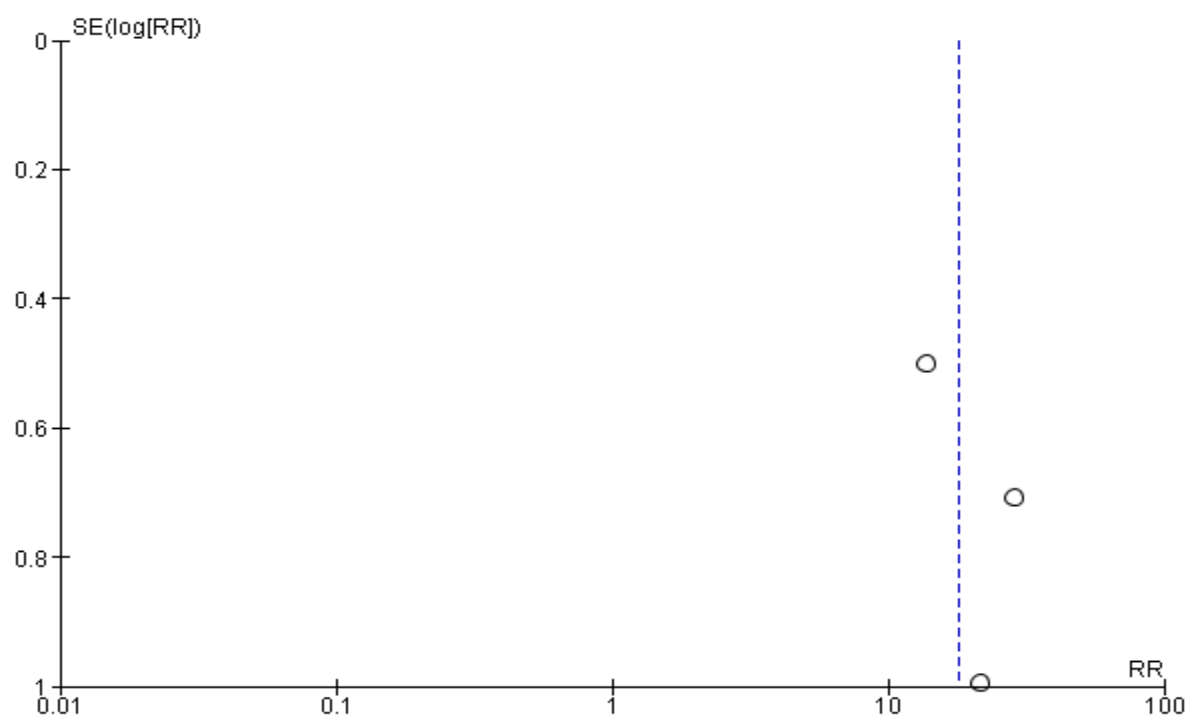
**Tildrakizumab 200 compared to placebo on PASI 75**



**Tildrakizumab 200 compared to placebo on PGA 0/1**

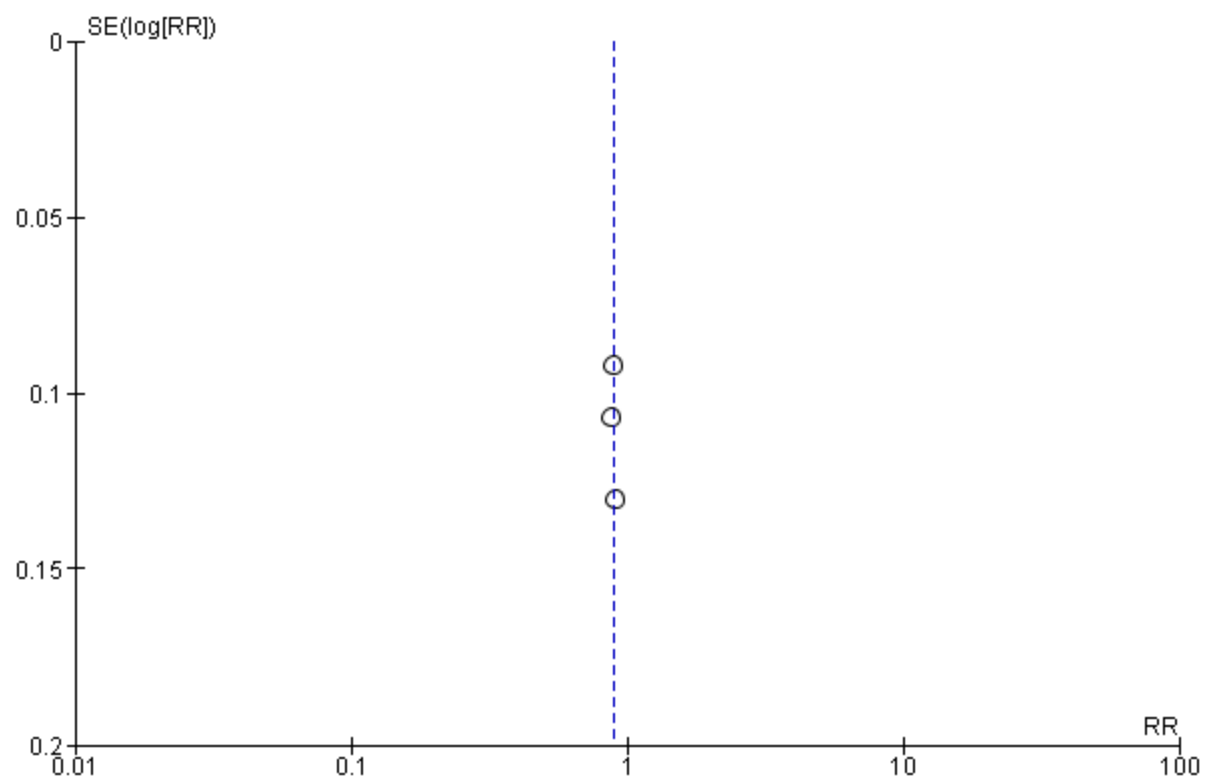


**Tildrakizumab 200 compared to placebo on PASI 90**

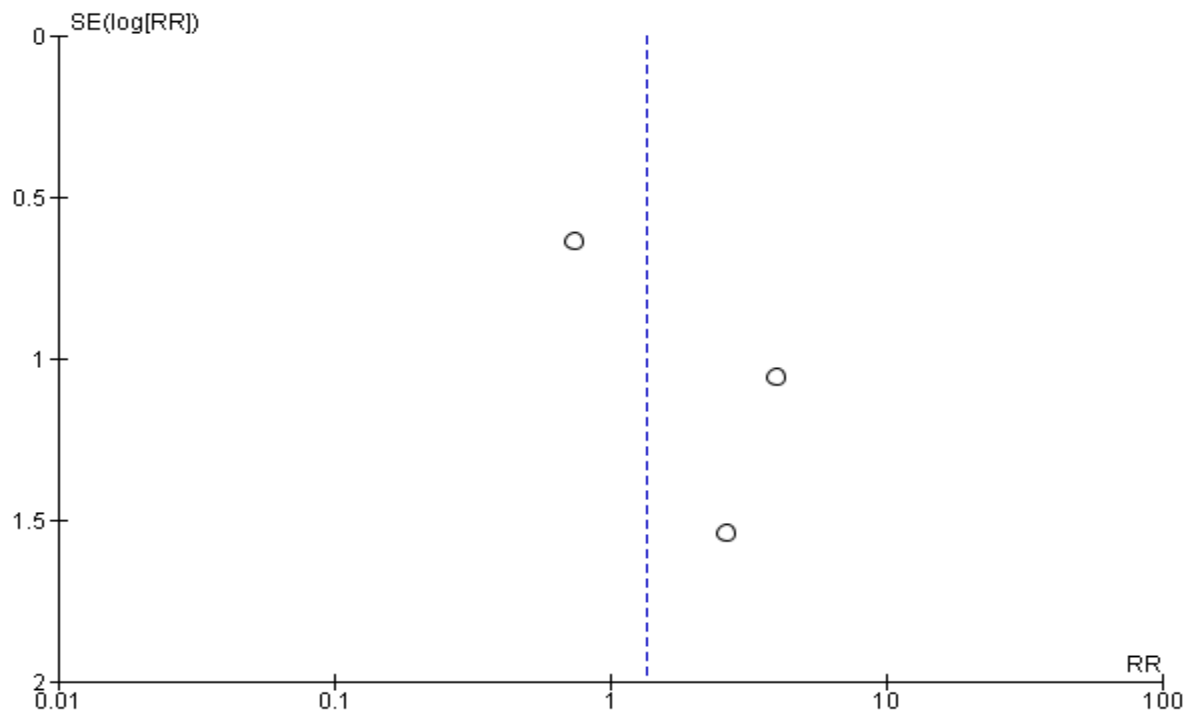


**Tildrakizumab 200 compared to placebo on number of Adverse Events**

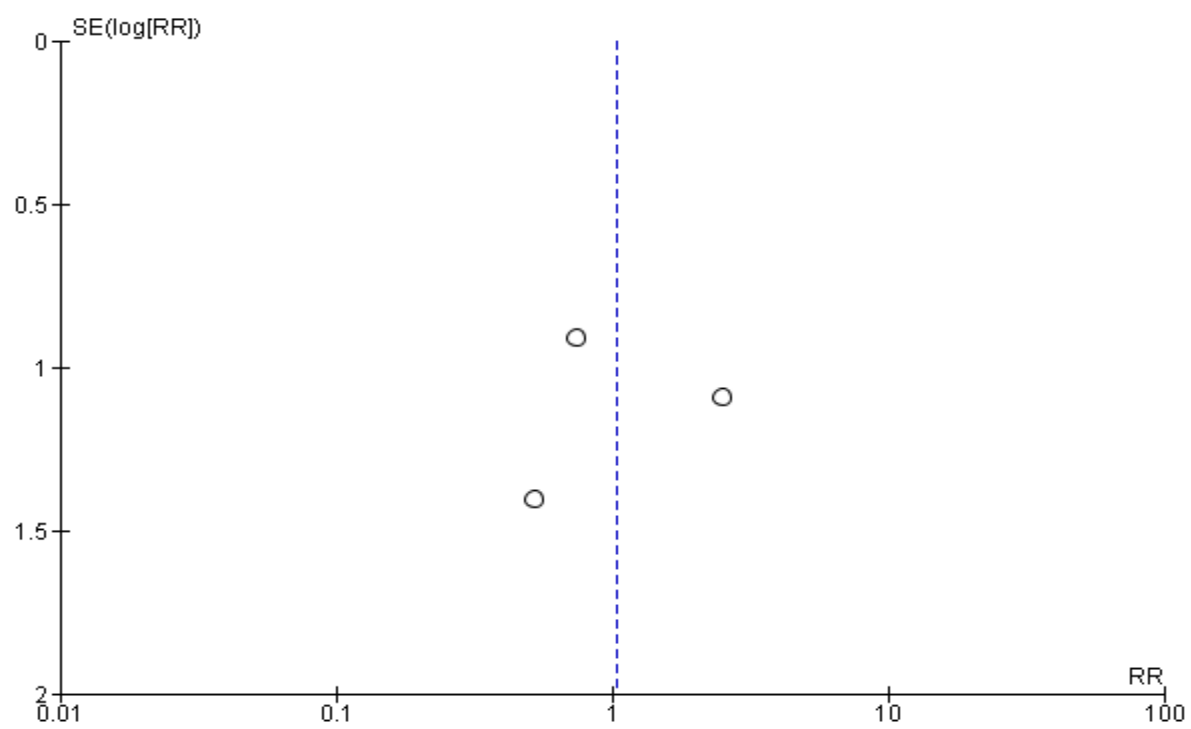




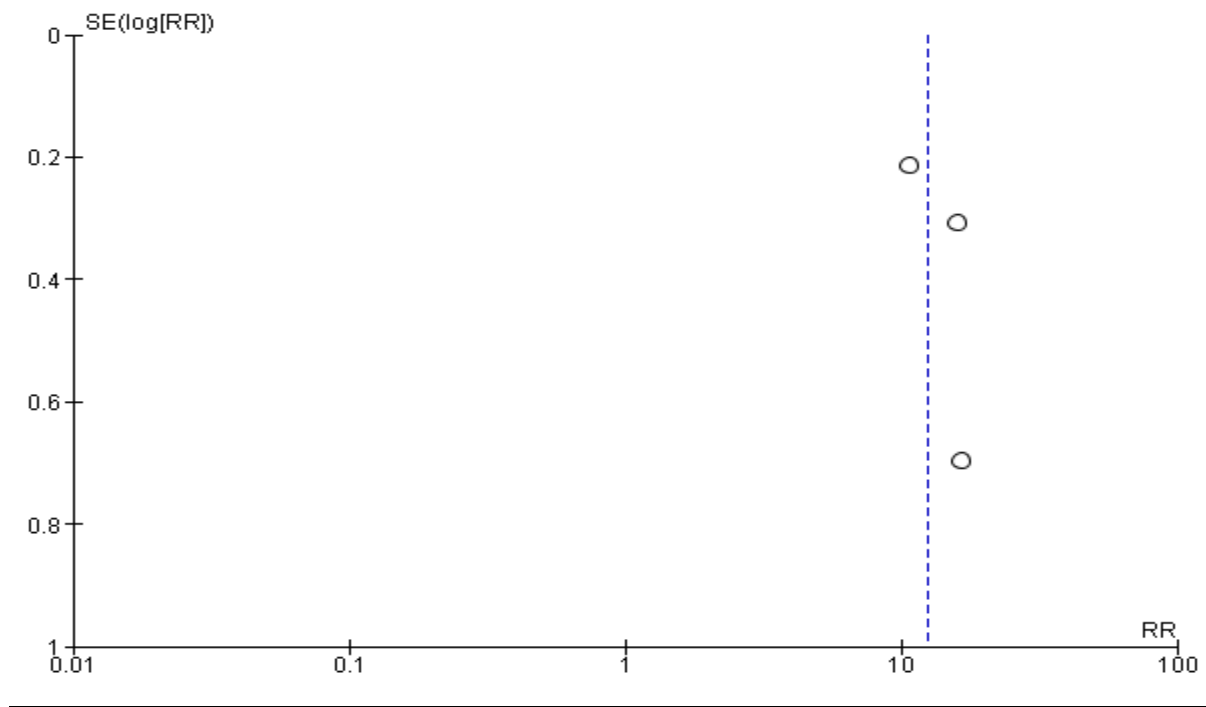
**Tildrakizumab 200 compared to placebo on number of Serious Adverse Events**



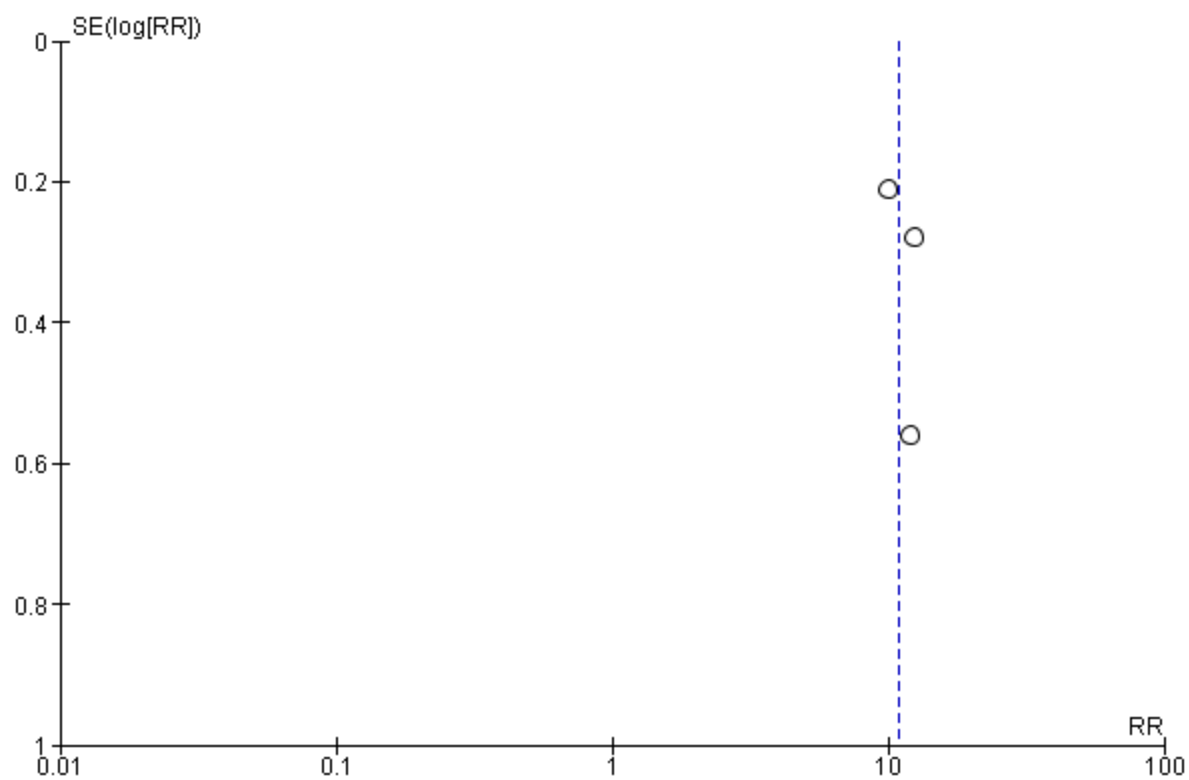
**Tildrakizumab 200 compared to placebo on toxicity withdrawals**



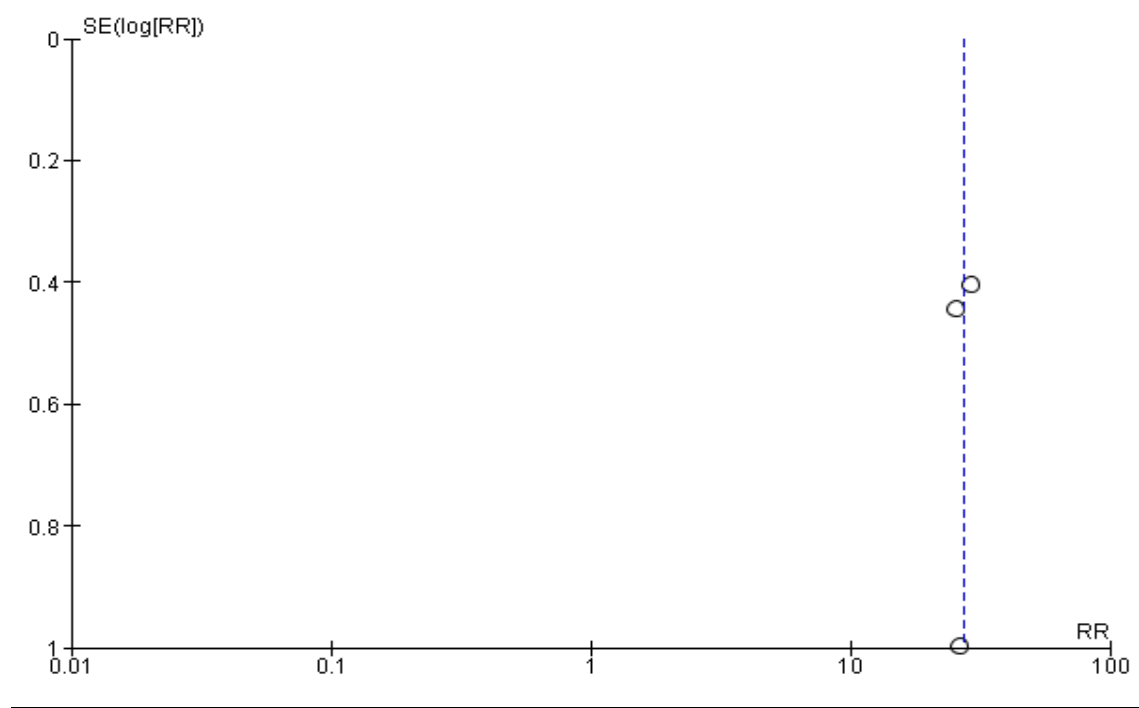
### Guselkumab 100 compared to placebo on PASI 75



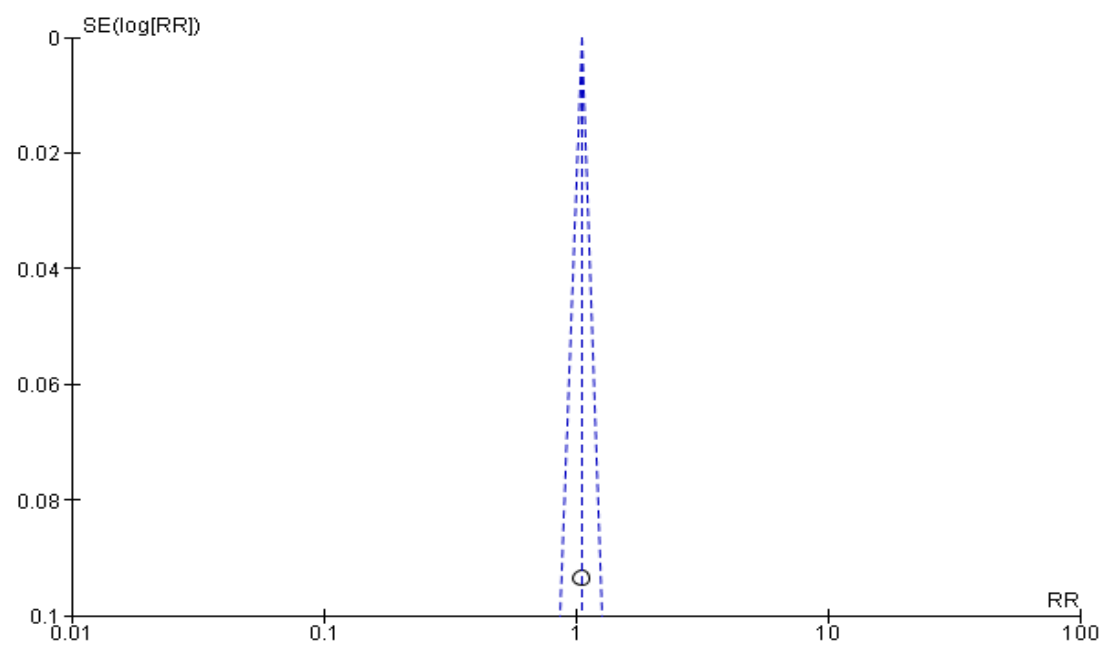
### Guselkumab 100 compared to placebo on IGA 0/1



**Guselkumab 100 compared to placebo on PASI 90**



**Guselkumab 100 compared to placebo on number of Adverse Events**



Supplementary Figure 4. Funnel plots to detect publication bias associated with each study outcome.

Table S1: Quality assessment of randomized controlled trials.

Study, year, phase	Funding	Treatment vs Control	Patient no. (treatment/ placebo)	Study duration (weeks)	Age (years)	Disease duration (years)	Male (%)	Psoriatic arthritis (%)	Involved body surface area (%)	PASI	PGA marked or severe (%)
Krueger, 2007  Phase II trial	Yes, Centocor Inc.	Ustekinumab vs Placebo	320 (256 vs 64)	16	46, 46, 45, 44 vs 44	19.1, 17.9, 19.8, 17.3 vs 16.9	59, 73, 61, 81 vs 72	20, 19, 19, 20 vs 19	28.5, 26.3, 27.4, 27.4 vs 26.6	19.0, 18.8, 18.9, 19.0 vs 19.9	NR
Papp, 2008  Phase III trial	Yes, Abbott labs	Ustekinumab vs Placebo	1230 (820 vs 410)	12	45.1, 46.6 vs 47.0	19.3, 20.3 vs 20.8	69.2, 66.7 vs 69.0	26.2, 22.9 vs 25.6	25.9, 27.1 vs 26.1	19.4, 20.1 vs 19.4	41.3, 38.7 vs 39.0
Leonardi, 2008  Phase III trial	Yes, Centocor Inc.	Ustekinumab vs Placebo	766 (511 vs 255)	12	44.8, 46.2 vs 44.8	19.7, 19.6 vs 20.4	68.6, 67.6 vs 71.8	29.0, 36.7 vs 35.3	27.2, 25.2 vs 27.7	20.5, 19.7 vs 20.4	44.7, 42.6 vs 43.9
Igarashi, 2011  Phase III trial	Yes, Janssen Pharmaceuticals	Ustekinumab vs Placebo	158 (126 vs 32)	12	45.0, 44.0 vs 49.0	15.8, 17.3 vs 16.0	82.8, 75.8 vs 83.9	9.4, 11.3 vs 3.1	47.0, 46.6 vs 49.8	30.1, 28.7 vs 30.3	NR
Tsai, 2011  Phase III trial	Yes, Centocor Inc.	Ustekinumab vs Placebo	121 (61 vs 60)	12	40.9, 40.6 vs 40.4	11.9, 12.9 vs 13.9	82.0, 85.1 vs 88.3	16.4, 14.0 vs 11.7	41.8, 38.8 vs 35.8	25.2, 24.1 vs 22.9	26.2, 29.8 vs 33.3



Zhu, 2013 Phase III trial	Yes, Janssen Research & Development	Ustekinumab vs Placebo	322 (160 vs 162)	12	40.1 vs 39.2	14.6 vs 14.2	78.1 vs 75.9	8.8 vs 8.6	35.1 vs 35.1	23.2 vs 22.7	23.1 vs 26.7
Papp, 2013 Phase II trial	Yes, Novartis	Secukinumab vs Placebo	125 (103 vs 22)	12	46.1, 46.3, 45.8, 45.4 vs 45.9	19.8, 17.7, 17.1, 16.2 vs 21.4	69.0, 84.6, 66.7, 77.8 vs 63.6	31.0, 11.5, 4.8, 18.5 vs 27.3	26.0, 20.7, 19.4, 24.5 vs 26.0	21.6, 20.5, 19.7, 21.3 vs 21.7	NR
Langley, 2014 Phase III trial	Yes, Novartis	Secukinumab vs Placebo	738 (490 vs 248)	12	44.9, 44.9, 45.4	17.4, 17.5 vs 17.3	69.0, 68.6 vs 69.4	23.3, 18.8 vs 27.4	32.8, 33.3 vs 29.7	22.5, 22.3 vs 21.4	NR
Blauvelt, 2015 Phase III trial	Yes, Novartis	Secukinumab vs Placebo	177 (118 vs 59)	12	45.1, 46.0 vs 46.5	18.0, 20.4 vs 20.2	64.4, 67.8 vs 66.1	NR	33.3, 30.6 vs 32.2	20.7, 20.5 vs 21.1	NR
Paul, 2015 Phase III trial	Yes, Eli Lilly and Co.	Secukinumab vs Placebo	182 (121 vs 61)	12	43.9, 46.6 vs 43.7	20.6, 21.0 vs 19.9	67.2, 76.7 vs 62.3	26.2, 23.3 vs 19.7	30.1, 26.4 vs 25.7	22.0, 18.9 vs 19.4	NR
Papp, 2012 Phase II trial	Yes, Centocor	Brodalumab vs Placebo	198 (160 vs 38)	16	42.1, 44.0, 42.1, 42.3 vs 42.6	20.7, 19.2, 17.1, 19.3, 19.1 vs 18.3	56, 72, 62, 71, 66 vs 58	21, 28, 30, 19, 24 vs 18	24.1, 24.9, 25.0, 21.3, 23.8 vs 23.5	18.8, 19.4, 20.6, 17.9, 19.2 vs 18.9	36, 41, 48, 36, 40 vs 26
Lebwohl, 2015 Phase III trial	Yes, Novartis	Brodalumab vs Placebo, Ustekinumab	1831 (1222 vs 609)	12	45, 45 vs 44, 45	19, 19 vs 18, 19	68, 69 vs 71, 68	21, 19 vs 17, 17	27, 26 vs 28, 27	20.5, 20.3 vs 20.4, 20.0	NR
Lebwohl, 2015 Phase III trial	Yes, Novartis	Brodalumab vs Placebo, Ustekinumab	1881 (1253 vs 628)	12	45, 45 vs 44, 45	17, 18 vs 18, 18	70, 69 vs 66, 68	21, 20 vs 19, 20	29, 28 vs 28, 28	20.1, 20.4 vs 20.1, 20.1	NR

Papp, 2016  Phase III trial	Yes, Amgen Inc. & AstraZeneca/ModImmune	Brodalumab vs Placebo	661 (441 vs 220)	12	46, 46 vs 47	19, 20 vs 21	74, 73 vs 73	27, 26 vs 29	27.4, 25.1 vs 26.9	20.0, 19.4 vs 19.7	NR
Nakagawa, 2016  Phase II trial	Yes, Kyowa Hakko Kirin Co., Ltd.	Brodalumab vs Placebo	151 (113 vs 38)	12	43.4, 46.4, 46.4 vs 46.6	13.3, 14.5, 14.9 vs 16.9	87.2, 81.1, 78.4 vs 71.1	15.4, 16.2, 13.5 vs 18.4	39.7, 42.7, 43.7 vs 37.8	27.6, 28.5, 27.9 vs 23.9	NR
Griffiths, 2015  Phase III trial	Yes, Eli Lilly	Ixekizumab vs Placebo, Etanercept	866 (698 vs 168)	12	45, 45 vs 45	19, 18 vs 19	70.3, 63.0 vs 71.4	NR	27, 25 vs 27	20, 19 vs 21	52.2, 49.3 vs 48.8
Griffiths, 2015  Phase III trial	Yes, Eli Lilly	Ixekizumab vs Placebo, Etanercept	964 (771 vs 193)	12	46, 46 vs 46	18, 18 vs 18	66.8, 66.0 vs 71.0	NR	28, 28 vs 29	21, 21 vs 21	46.2, 46.2 vs 52.3
Gordon, 2016  Phase III trial	Yes, Eli Lilly	Ixekizumab vs Placebo	1296 (865 vs 431)	12	46, 45 vs 46	19, 20 vs 20	66.9, 67.2 vs 70.3	NR	28, 27 vs 27	20, 20 vs 20	54.5, 46.7 vs 52.7
Papp, 2015, Phase II trial	Yes, Merck & Co.	Tildrakizumab vs Placebo	355 (309 vs 46)	12	43.2, 46.3, 45.5, 34.2 vs 45.9	NR	31, 60, 76, 65 vs 38	8, 15, 15, 15 vs 11	NR	NR	NR
Reich, 2017, Phase III trial	Yes, Janssen Research and Development LLC	Tildrakizumab vs Placebo	772 (617 vs 155)	12	46.9, 46.4 vs 47.9	NR	73, 67 vs 65	NR	30.9, 29.7 vs 29.6	20.7, 20.0 vs 19.3	NR
Reich, 2017, Phase III trial	Yes, Janssen Research and Development LLC	Tildrakizumab vs Placebo, Etanercept	777 (621 vs 156)	12	44.6, 44.6 vs 45.8	NR	72, 72 vs 71	NR	31.8, 34.2 vs 31.6	19.8, 20.5 vs 20.2	NR

Gordon, 2015, Phase II trial	Yes, Janssen Research and Development	Guselkumab vs Placebo, Adalimumab	250 (208 vs 42)	16	44.0 vs 46.5	18.5 vs 18.0	72 vs 67	25 vs 29	24.6 vs 27.5	20.9 vs 21.8	NR
Blauvelt, 2017, Phase III trial	Yes, Janssen Scientific Affairs, LLC	Guselkumab vs Placebo, Adalimumab	503 (329 vs 174)	16	43..9 vs 44.9	17.9 vs 17.6	72.9 vs 68.4	19.5 vs 17.2	28.3 vs 25.8	22.1 vs 20.4	NR
Reich, 2017, Phase III trial	Yes, Janssen Scientific Affairs, LLC	Guselkumab vs Placebo, Adalimumab	744 (496 vs 248)	16	43.7 vs 43.3	17.9 vs 17.9	70.4 vs 69.8	17.9 vs 18.5	28.5 vs 28.0	21.9 vs 21.5	56.5 vs 56.0

Table 1: Patient Demographics

NR= not reported, PASI= psoriasis area severity index, PGA=physician global assessment. All the studies were randomized control trials.

Trial	Random sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcome assessment
Blauvelt A, 2015	+	+	+	+
Gordon, 2015	+	?	+	+
Gordon, 2015	?	?	+	?
Igarashi A, 2012	+	?	+	?
Krueger GG, 2007	?	?	+	+
Langley RG, 2014	?	?	+	?
Lebwohl M, 2015	+	?	+	?
Nakagawa H, 2016	?	?	+	?
Papp KA, 2012	+	?	+	+
Papp KA, 2013	+	+	+	?
Papp KA, 2016	+	+	+	?
Paul C, 2015	?	?	+	+
Papp K, 2015	+	+	+	+
Reich K, 2017	+	+	+	+
Tsai TF, 2011	?	+	+	?
Blauvelt A, 2011	+	?	+	+
Reich K, 2011	?	?	+	+
Papp KA, 2008	+	+	+	+
Griffiths CE, 2015	+	+	+	?
Leonardi CL, 2008	+	+	+	?
Zhu, 2013	?	?	?	?
Papp, 2015	+	+	+	+
Reich, 2017 (RESURFACE 1)	+	+	+	+
Reich, 2017 (RESURFACE 2)	+	+	+	+
Gordon, 2015 (X-PLORE)	+	+	+	+
Reich, 2017 (Voyage 2)	+	+	+	+
Blauvelt, 2017	+	+	+	+

Supplemental table 2. Data quality assessment using RobotReviewer software.



