

**Are causal statements reported in pharmacovigilance disproportionality analyses using individual case safety reports exaggerated in related citations? A meta-epidemiological study**

Claire Bernardeau, Bruno Revol, Francesco Salvo, Michele Fusaroli, Emanuel Raschi, Jean-Luc Cracowski, Matthieu Roustit, Charles Khouri

Supplementary material

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**Supplementary Table 1.** Characteristics of included source studies on March 2022

Article	Altmetric Attention Score	Number of citation	Journal type	Journal Impact factor at publication date	Year of publication	Last author gender	Level of causal statements in Title	Level of causal statements in conclusion	Clinical recommendations	Description of limitations
1	3742	34	Clinical	13.310	2021	M	1	1	0	0
2	1201	15	Pharmacological	6.889	2020	M	1	1	1	0
3	712	9	Clinical	4.380	2020	M	4	2	0	0
4	725	5	Clinical	7.064	2021	M	2	1	0	0
5	111	38	Clinical	1.696	2014	M	4	4	0	0
6	492	67	Pharmacological	3.435	2016	M	1	1	0	1
7	389	35	Pharmacological	NI	2017	M	4	2	0	0
8	336	20	Clinical	5.359	2019	F	3	2	0	0
9	329	43	Clinical	44.424	2021	M	1	1	0	0
10	329	15	Pharmacological	4.340	2020	M	2	2	1	0
11	314	68	Clinical	4.411	2010	M	1	2	0	0
12	307	70	Clinical	4.169	2021	F	3	1	0	0
13	292	216	Clinical	13.116	2014	M	1	2	1	0
14	288	6	Pharmacological	7.051	2021	M	2	4	1	0
15	285	2	Clinical	4.997	2021	M	4	4	1	0
16	276	28	Clinical	11.816	2021	M	2	1	0	1
17	269	76	Clinical	33.801	2021	F	3	4	0	0
18	264	19	Clinical	3.508	2021	M	4	4	1	0
19	257	9	Pharmacological	NI	2015	M	4	4	0	0
20	243	19	Pharmacological	3.526	2018	M	1	1	0	0
21	180	13	Clinical	4.781	2021	M	2	2	0	0
22	167	2	Pharmacological	2.870	2018	F	4	1	0	0

23	158	2	Clinical	4.997	2021	M	2	2	0	0
24	142	52	Clinical	20.589	2019	M	2	4	1	0
25	130	160	Clinical	31.777	2020	M	1	4	1	0
26	129	253	Clinical	35.386	2018	M	1	3	1	0
27	125	44	Clinical	2.145	2021	M	1	1	1	1
28	116	41	Clinical	16.102	2019	M	4	4	1	0
29	101	42	Clinical	17.659	2020	M	1	3	1	0
30	100	30	Pharmacological	5.606	2020	M	2	2	1	0

**Supplementary Table 2.** Characteristics of source articles according to level of causal statements in titles.

	Appropriate interpretation (n=11)	Ambiguous interpretation (n=8)	Conditionally causal (n=3)	Unconditionally causal (n=8)	Test p-value
Number of citations per year	17.00 (8.54- 23.00)	5.75 (2.88- 10.75)	35.00 (20.00- 36.50)	3.67 (1.50- 8.21)	<b>0.0466</b>
Journal Impact factor	13.10 (3.95- 24.75)	6.25 (4.95- 8.27)	5.40 (4.80- 19.60)	3.95 (3.05- 4.85)	0.119
Altmetric Attention Score	292.00 (129.50- 410.50)	228.00 (154.00- 298.25)	307.00 (288.00- 321.50)	215.50 (128.75- 279.75)	0.274
Years since publication	3.00 (2.00- 6.00)	2.00 (2.00- 3.00)	2.00 (2.00- 3.00)	3.50 (2.25- 4.75)	0.957
Last author gender (Female/Male)	0%/100%	0%/100%	100%/0%	12.5%/87.5%	<b>0.000</b>
Type of journal (Clinical/pharmacological)	72.7%/27.3%	62.5/37.5%	100%/0%	62.5/37.5%	0.837

\*Fisher exact test for categorical variables and Anova test for continuous variables

**Supplementary Table 3.** Results of the multinomial model exploring the association between the level of causal statements in citations (dependent variable) and the level of causal statements in abstract conclusions of source articles.

Causal claims in citations	Variable	Contrast	Estimate	Standard Error	Odds Ratio	Lower 95% CI	Upper 95% CI	z	p-values
<b>Level 2 -1</b>	(Intercept)		-0.24	0.16					
	Conclusion	Level 2 -1	0.62	0.30	1.86	1.03	3.34	2.06	<b>0.04</b>
	Conclusion	Level 3 -1	0.43	0.55	1.54	0.52	4.55	0.78	0.43
	Conclusion	Level 4 -1	0.25	0.30	1.28	0.71	2.32	0.82	0.41
<b>Level 3 -1</b>	(Intercept)		-1.05	0.20					
	Conclusion	Level 2 -1	1.66	0.41	5.27	2.37	11.72	4.08	<b>0.00</b>
	Conclusion	Level 3 -1	1.44	0.66	4.21	1.16	15.19	2.19	<b>0.03</b>
	Conclusion	Level 4 -1	0.32	0.49	1.38	0.53	3.58	0.65	0.51
<b>Level 4 -1</b>	(Intercept)		0.77	0.13					
	Conclusion	Level 2 -1	0.99	0.27	2.69	1.59	4.56	3.68	<b>0.00</b>
	Conclusion	Level 3 -1	2.05	0.42	7.74	3.38	17.71	4.84	<b>&lt; .00001</b>
	Conclusion	Level 4 -1	1.21	0.25	3.36	2.05	5.51	4.81	<b>&lt; .00001</b>

**Supplementary Table 4.** Results of the multinomial model exploring the association between the level of causal statements in citations (dependent variable) and the level of causal statements in titles of source articles.

Causal claims in citations	Variable	Contrast	Estimate	Standard Error	Odds Ratio	Lower 95% CI	Upper 95% CI	z	p-values
Level 2 -1	(Intercept)		-0.32	0.14					
	Title	Level 2 -1	-0.02	0.38	0.98	0.47	2.06	-0.04	0.97
	Title	Level 3 -1	-0.51	0.32	0.60	0.32	1.12	-1.61	0.11
	Title	Level 4 -1	0.08	0.34	1.08	0.56	2.10	0.23	0.82
Level 3 -1	(Intercept)		-1.29	0.21					
	Title	Level 2 -1	0.19	0.44	1.21	0.51	2.88	0.43	0.67
	Title	Level 3 -1	-1.78	0.63	0.17	0.05	0.59	-2.81	<b>0.01</b>
	Title	Level 4 -1	-0.03	0.43	0.97	0.42	2.25	-0.08	0.94
Level 4 -1	(Intercept)		0.52	0.11					
	Title	Level 2 -1	0.12	0.30	1.13	0.62	2.04	0.39	0.70
	Title	Level 3 -1	-0.90	0.27	0.41	0.24	0.69	-3.35	<b>0.00</b>
	Title	Level 4 -1	0.10	0.28	1.10	0.64	1.90	0.34	0.73