Supplementary Online Content

Panagioti M, Geraghty K, Johnson J, et al. Association between physician burnout and patient safety, professionalism, and patient satisfaction: a systematic review and meta-analysis. *JAMA Intern Med*. Published online September 4, 2018. doi:10.1001/jamainternmed.2018.3713

This supplementary material has been provided by the authors to give readers additional information about their work.

eTable 1. MOOSE Checklist for Meta-analyses of Observational Studies

Item No	Recommendation	Reported on Page No
Reporting of background should include		
1	Problem definition	6-7
2	Hypothesis statement	-
3	Description of study outcome(s)	7
4	Type of exposure or intervention used	-
5	Type of study designs used	6-7
6	Study population	6
Reporting of search strategy should include		
7	Qualifications of searchers (eg, librarians and investigators)	7
8	Search strategy, including time period included in the synthesis and key words	7, appendix
9	Effort to include all available studies, including contact with authors	7
10	Databases and registries searched	7
11	Search software used, name and version, including special features used (eg, explosion)	7
12	Use of hand searching (eg, reference lists of obtained articles)	7
13	List of citations located and those excluded, including justification	Fig 1
14	Method of addressing articles published in languages other than English	8
15	Method of handling abstracts and unpublished studies	-
16	Description of any contact with authors	7
Reporting of methods should include		
17	Description of relevance or appropriateness of studies assembled for assessing the hypothesis to be tested	7
18	Rationale for the selection and coding of data (eg, sound clinical principles or convenience)	8
19	Documentation of how data were classified and coded (eg, multiple raters, blinding and interrater reliability)	9-10
20	Assessment of confounding (eg, comparability of cases and controls in studies where appropriate)	9
21	Assessment of study quality, including blinding of quality assessors, stratification or regression on possible predictors of study results	9
22	Assessment of heterogeneity	10
23	Description of statistical methods (eg, complete description of fixed or random effects models, justification of whether the chosen models account for predictors of study results, dose-response models, or cumulative meta-analysis) in sufficient detail to be replicated	10-11
24	Provision of appropriate tables and graphics	Tables 1, Figs 1-4
Reporting of results should include		
25	Graphic summarizing individual study estimates and overall estimate	Figs 2-4
26	Table giving descriptive information for each study included	Table 1
27	Results of sensitivity testing (eg, subgroup analysis)	Fig 5; appendix

28	Indication of statistical uncertainty of findings	13-14

Item No	Recommendation	Reported on Page No
Reporting of discussion should include		
29	Quantitative assessment of bias (eg, publication bias)	17
30	Justification for exclusion (eg, exclusion of non-English language citations)	17
31	Assessment of quality of included studies	17-18
Reporting of conclusions should include		
32	Consideration of alternative explanations for observed results	16-18
33	Generalization of the conclusions (ie, appropriate for the data presented and within the domain of the literature review)	17-18
34	Guidelines for future research	18
35	Disclosure of funding source	18

From: Stroup DF, Berlin JA, Morton SC, et al, for the Meta-analysis Of Observational Studies in Epidemiology (MOOSE) Group. Meta-analysis of Observational Studies in Epidemiology. A Proposal for Reporting. *JAMA*. 2000;283(15):2008-2012. doi: 10.1001/jama.283.15.2008.

eTable 2: Search strategy

# ▲	MEDLINE Searches	Results
1	exp patient safety/	8183
2	exp adverse drug reaction/	12925
3	exp iatrogenic disease/	7435
4	exp medical error/	16224
5	exp malpractice/	1634
6	patient safety.tw.	5394
7	safety culture.tw.	409
8	(safe$ adj2 (practice$ or manage$)).tw.	1933
9	iatrogenic disease$.tw.	19
10	malpractice$.tw.	631
11	(patient adj2 harm$).tw.	435
12	human error$.tw.	299
13	((service$ or system$ or communication$ or organisation$ or organization$) adj2 (weak$ or fail$)).tw.	1318
14	(latent adj1 (threat$ or cause$ or fail$)).tw.	28
15	((adverse or avoidable or preventable or unsafe or safet$) adj2 (event$ or outcome$ or complication$ or death$ or effect$ or reaction$ or accident$ or injur$)).tw.	79169
16	((medica$ or diagnostic or therapeautic or administration or dispensing or prescri$) adj2 (error$ or mistake$ or fault$)).tw.	2075
17	(patient$ adj2 (risk$ or incident$ or accident$)).tw.	20007
18	near miss$.tw.	380
19	never event$.tw.	80
20	untoward incident*.tw.	6
21	serious incident*.tw.	31
22	serious report* event*.tw.	7
23	((Quality & safety in health care or International Journal for Quality in Health Care).jn. or (Qual Saf Health Care or IJQHC).ja.) and safe$2.mp.	118

24	polypharmacy/	1227
25	polypharmacy.tw.	1356
26	(patient adj1 satisf*).tw.	5513
27	"Quality of Health Care"/ or quality of care.mp.	14612
28	Patient Compliance/ or Prescription Drugs/ or Drug Prescriptions/	11290
29	continuity of care.mp. or "Continuity of Patient Care"/	3234
30	Physician-Patient Relations/ or Patient-Centered Care/	11499
31	patient-centered care.tw.	913
32	(physician-patient adj (relation* or communicat* or interact*)).tw.	331
33	(doctor-patient adj (relation* or communicat* or interact*)).tw.	515
34	(general practitioner adj (relation* or communicat* or interact*)).tw.	4
35	medication adherence.mp. or Medication Adherence/	6980
36	Quality Indicators, Health Care/	3228
37	Patient Satisfaction/ or patient satisfact*.mp.	14787
38	Quality Improvement/ or patient experience.mp.	10862
39	(patient adj1 trust*).tw.	70
40	((psychological or emotion*) adj1 harm).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	65
41	Interpersonal Relations/ or relational continuity.mp. or Health Services Accessibility/	21109
42	Burnout, Professional/ or Stress, Psychological/	19965
43	burnout.mp.	2388
44	((work or job) adj (stress or distress)).tw.	478
45	((emotional or psychological) adj distress).tw.	4051
46	well being.mp.	11774
47	physician.mp. or Physicians/	33763
48	doctor.mp.	5452
49	general practitioner.mp. or General Practitioners/	3694
50	mental health.mp. or Mental Health/	26169
51	Depression/	21464

52	42 or 43 or 44 or 45 or 46 or 50 or 51	69473
53	47 or 48 or 49	40443
54	52 and 53	2474
55	or/1-41	217125
56	54 and 55	1065

eTable 3: Critical appraisal ratings

Study	Response rate	Coding (1=>70%; 0=<70%	Controlling Confounders	Coding (1=Yes; 0=No)	Research design		Total score
Anagnostopoulos,[1] 2012	86%	1	Yes	1	Cross-sectional	0	2
Asai,[2] 2013	50%	0	Yes	1	Cross-sectional	0	1
Baer,[3] 2017	53%	0	Yes	1	Cross-sectional	0	1
Balch,[4] 2011	29%	0	Yes	1	Cross-sectional	0	1
Bourne,[5] 2015	11%	0	No	0	Cross-sectional	0	0
Brazeau,[6] 2010	72%	1	Yes	1	Cross-sectional	0	2
Brown,[7] 2009	n/r	0	Yes	1	Cross-sectional	0	1
Chen,[8] 2013	76%	1	Yes	1	Cross-sectional	0	2
Cooke,[9] 2013	90%	1	No	0	Cross-sectional	0	1
de Oliveira,[10] 2013	54%	0	Yes	1	Cross-sectional	0	1
Dollarhide,[11] 2014	7580%	1	No	0	Cross-sectional	0	1
Eckleberry-Hunt,[12] 2017	22%	0	yes	1	Cross-sectional	0	1
Fahrenkopf,[13] 2008	50%	0	No	0	Prospective	1	1
Garrouste-Orgeas,[14] 2015	77%	1	Yes	1	Prospective	1	3
Halbesleben,[15] 2008	n/r	0	yes	1	Cross-sectional	0	1
Hansen,[16] 2011	83%	1	Yes	1	Cross-sectional	0	2
Hayashino,[17] 2012	70%	1	Yes	1	Prospective	1	3
Kalmbach,[18] 2017	91%	1	yes	1	Prospective	1	3
Kang,[19] 2013	58%	0	Yes	1	Cross-sectional	0	1
Klein,[20] 2010	n/r	0	Yes	1	Cross-sectional	0	1
Krebs,[21] 2006	50%	0	Yes	1	Cross-sectional	0	1
Kwah,[22] 2017	98%	1	No	0	Prospective	1	2
Lafreniere,[23] 2016	100%	1	yes	1	Cross-sectional	0	2
Linzer,[24] 2009	60%	0	Yes	1	Cross-sectional	0	1
Lu,[25] 2015	49%	0	No	0	Cross-sectional	0	0
O'Connor,[26] 2017	29%	0	yes	1	Prospective	1	2
Ozvacic Adzic,[27] 2012	36%	0	No	0	Cross-sectional	0	0
Park,[28] 2016	42%	0	no		Cross-sectional	0	0
Passalacqua,[29] 2012	n/r	0	No	0	Cross-sectional	0	0
Pedersen,[30] 2016	72%	1	yes	1	Cross-sectional	0	2
Prins,[31] 2009	41%	0	Yes	1	Cross-sectional	0	1
Qureshi,[32] 2015	29%	0	Yes	1	Prospective	1	2
Ratanawongsa,33 2008	n/r	0	Yes	1	Prospective	1	2
Shanafelt,[35] 2002	76%	1	Yes	1	Cross-sectional	0	2
Shanafelt,[36] 2005	76%	1	Yes	1	Cross-sectional	0	2
Shanafelt,[34] 2010	76%	1	Yes	1	Cross-sectional	0	2
Toral-Villanueva,[37] 2009	65%	0	Yes	1	Cross-sectional	0	1

Torres,[38] 2015	62%	0	No	0	Cross-sectional	0	0
Travado,[39] 2005	n/r	0	Yes	1	Cross-sectional	0	1
van der Hombergh,[40] 2009	n/r	0	Yes	1	Cross-sectional	0	1
Walocha,[41] 2013	n/r	0	no	0	Cross-sectional	0	0
Weigl,[42] 2015	74%	1	Yes	1	Cross-sectional	0	2
Welp,[43] 2014	n/r	0	Yes	1	Cross-sectional	0	1
Wen,[44] 2016	89%	1	yes	1	Cross-sectional	0	2
Weng,[45] 2011	n/r	0	Yes	1	Cross-sectional	0	1
West,[46] 2006	84%	1	Yes	1	Prospective	1	3
West,[47] 2009	88%	1	Yes	1	Prospective	1	3

eFigure 1: Forest plot of the association between depression/emotional distress and patient safety incidents.

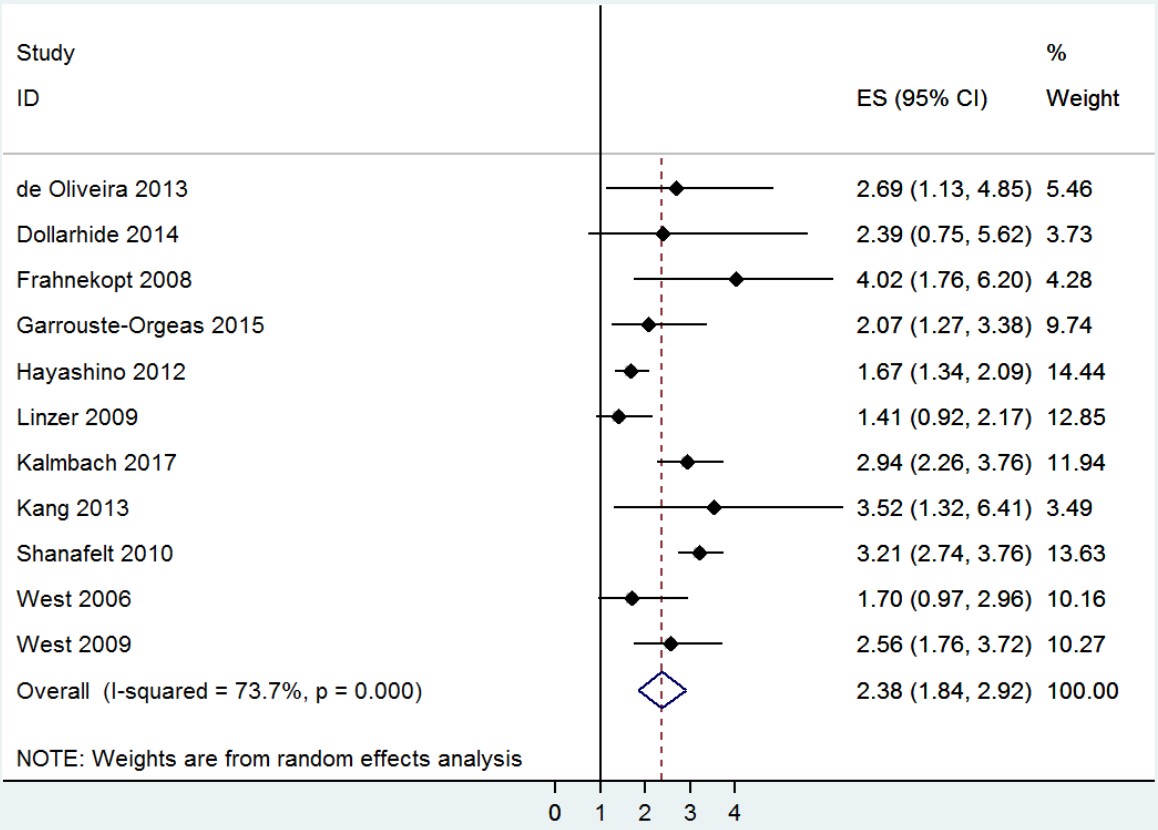


Figure legend: Meta-analysis of individual study and pooled effects. Each line represents one study in the meta-analysis, plotted according to the odds ratio (OR). The black box on each line shows the OR for each study and the blue box represents the pooled OR. 95% CI = 95% confidence intervals; ES = Odds ratio.

eFigure 2: Forest plot of the association between depression/emotional distress and low professionalism.

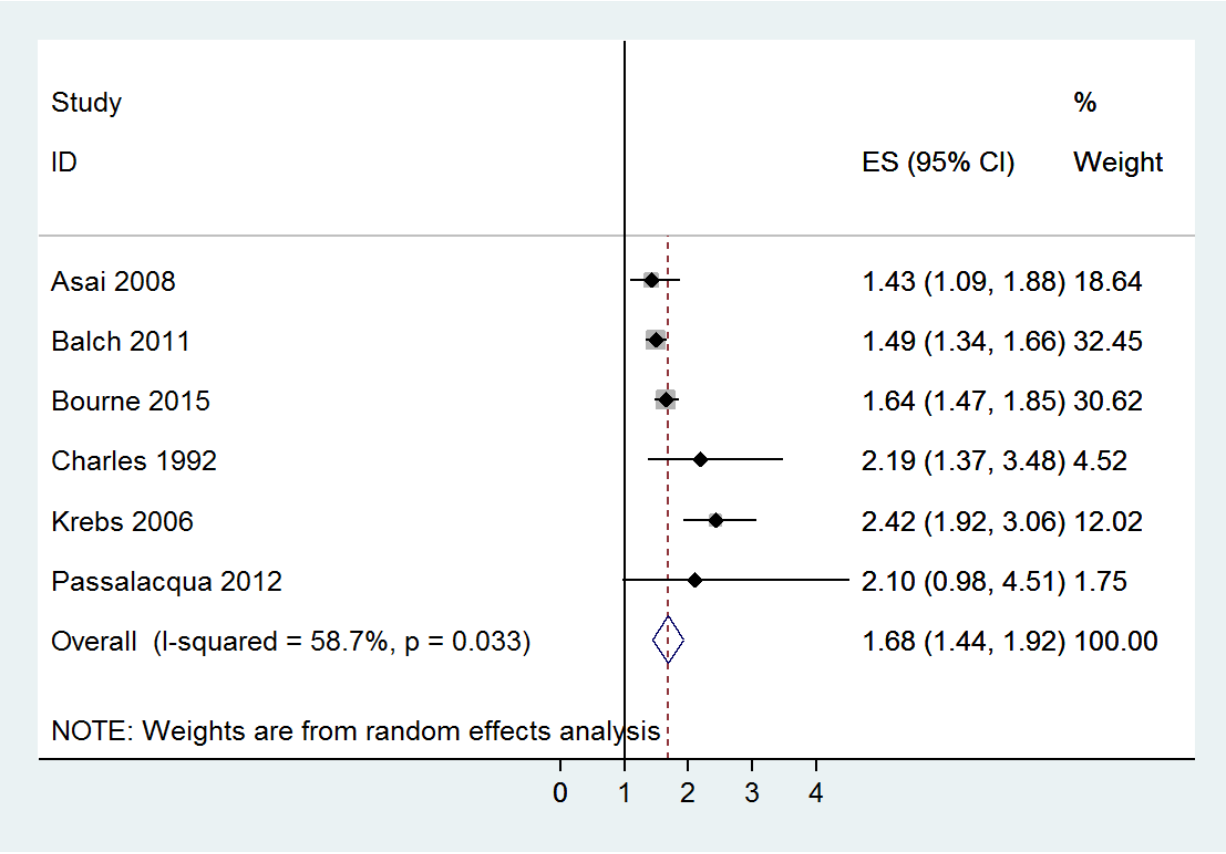
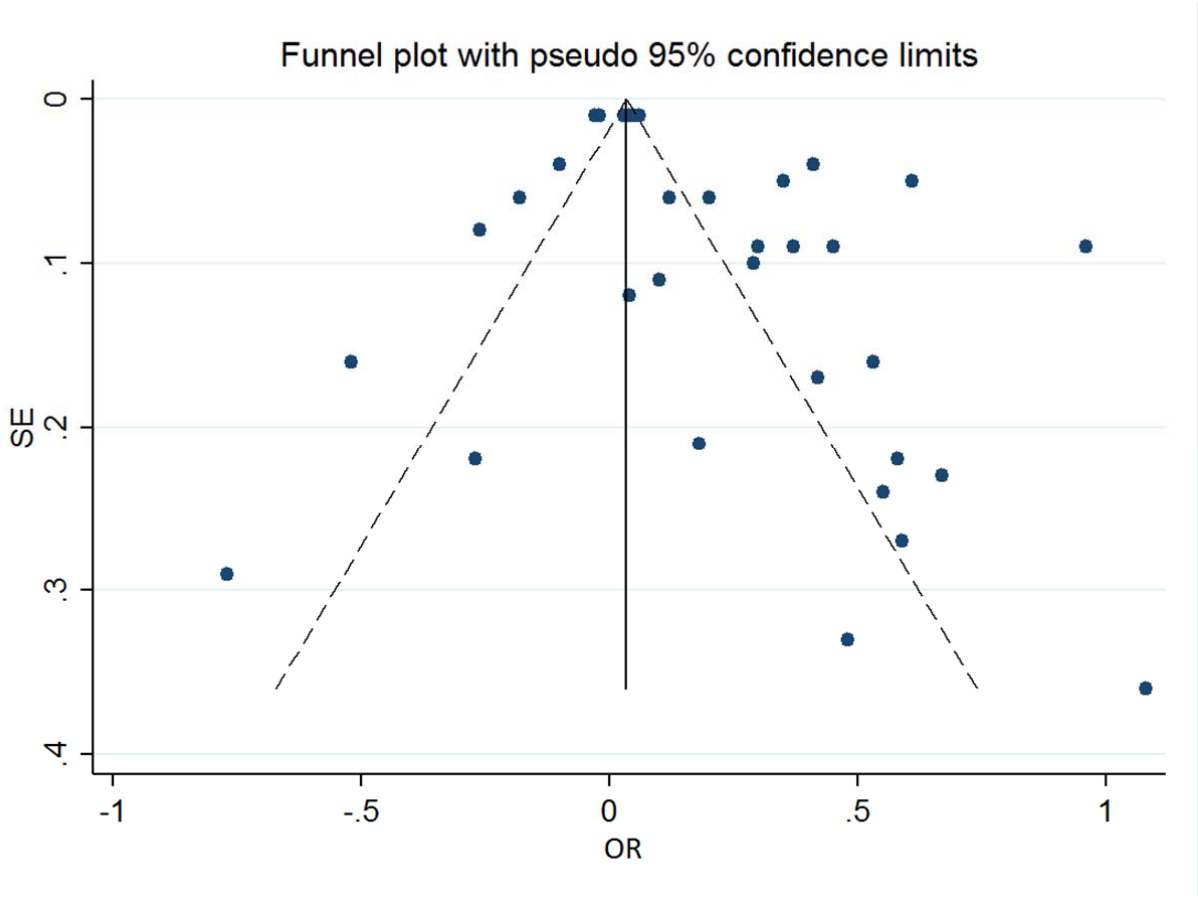


Figure legend: Meta-analysis of individual study and pooled effects. Each line represents one study in the meta-analysis, plotted according to the odds ratio (OR). The black box on each line shows the OR for each study and the blue box represents the pooled OR. 95% CI = 95% confidence intervals; ES = Odds ratio.

eFigure 3: Funnel plot of odds ratios of the association between burnout and patient safety versus the standard error for this association



Funnel plot with pseudo 95% confidence intervals. The outer lines indicate the triangular region within which 95% of studies are expected to lie in the absence of both biases and heterogeneity. Funnel plot shows no substantial asymmetry

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