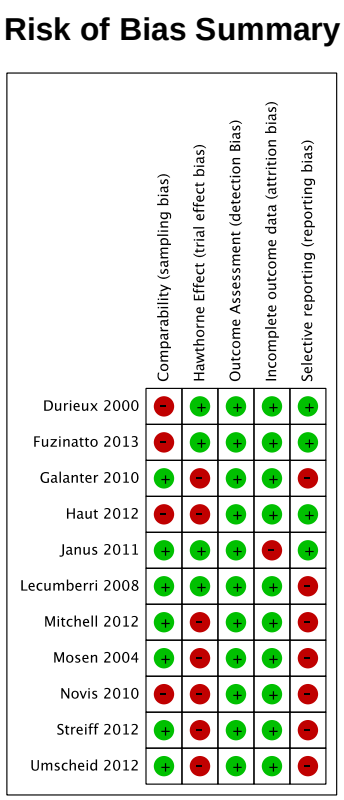
Supplementary Online Content

Borab ZM, Lanni MA, Tecce MG, Pannucci CJ, Fischer JP. Use of computerized clinical decision support systems to prevent venous thromboembolism in surgical patients: a systematic review and meta-analysis. *JAMA Surg.* Published online March 15, 2017. doi:10.1001/jamasurg.2017.0131

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

Supplemental Online Material

eTable 1. Search Strategies per database	
Pubmed	((((("Decision Support Systems, Clinical"[Mesh] OR "computerized clinical decision support systems" OR "Medical Records Systems, Computerized"[Mesh]) AND ("Risk Factors"[Mesh] OR "Risk Adjustment"[Mesh] OR "Risk Management"[Mesh] OR "Risk Assessment"[Mesh])) AND (“Venous Thromboembolism/prevention and control"[Mesh] OR "Anticoagulants"[Mesh]))
Ovid	("Decision Support Systems, Clinical" OR "computerized clinical decision support systems" OR "Medical Records Systems, Computerized") AND ("Risk Factors" OR "Risk Adjustment"OR "Risk Management"OR "Risk Assessment") AND ("Postoperative Complications" OR "Surgical Procedures, Operative" OR "Treatment Outcome") AND (“Venous Thromboembolism" OR "Anticoagulants")
Embase	decision support systems/ and surgery/ and (risk factor or risk management or risk adjustment) and (postoperative complication or reoperation or treatment outcome)- remove abstracts
Scopus	("Decision Support Systems, Clinical" OR "computerized clinical decision support systems" OR "Medical Records Systems, Computerized") AND (thromboembolism OR Venous thrombosis)
Cochrane	venous thromboembolism and prophylaxis
Clinicaltrials.gov	clinical decision support and venous thromboembolism



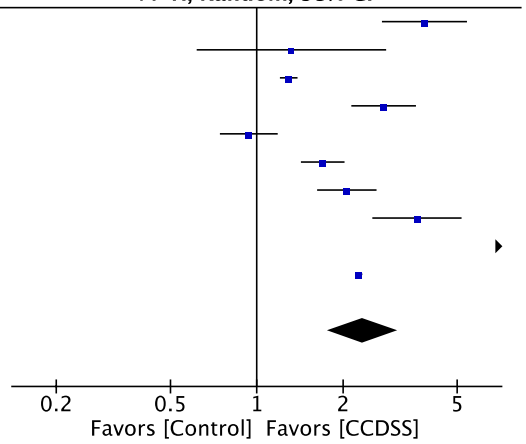
eFigure 1. Summary of risk of bias assessment.

VTE Prophylaxis Ordering

Study or Subgroup	With CCDSS Events	With CCDSS Total	Without CCDSS Events	Without CCDSS Total	Weight	Odds Ratio M-H, Random, 95% CI
Durieux 2000	815	859	921	1112	9.7%	3.84 [2.73, 5.40]
Fuzinatto 2013	32	53	30	56	6.1%	1.32 [0.62, 2.83]
Galanter 2010	2983	6632	2428	6267	11.3%	1.29 [1.20, 1.39]
Haut 2012	1013	1200	264	399	10.4%	2.77 [2.14, 3.59]
Janus 2011	608	799	621	804	10.6%	0.94 [0.74, 1.18]
Mitchell 2012	586	960	535	1115	10.9%	1.70 [1.43, 2.02]
Mosen 2004	1983	2093	1864	2077	10.5%	2.06 [1.62, 2.62]
Novis 2010	137	377	53	389	9.6%	3.62 [2.53, 5.18]
Streiff 2012	4146	5233	42	161	9.6%	10.81 [7.55, 15.46]
Umscheid 2012	34408	80433	9362	37795	11.4%	2.27 [2.21, 2.33]
Total (95% CI)		**98639**		**50175**	**100.0%**	**2.35 [1.78, 3.10]**
Total events	46711		16120			

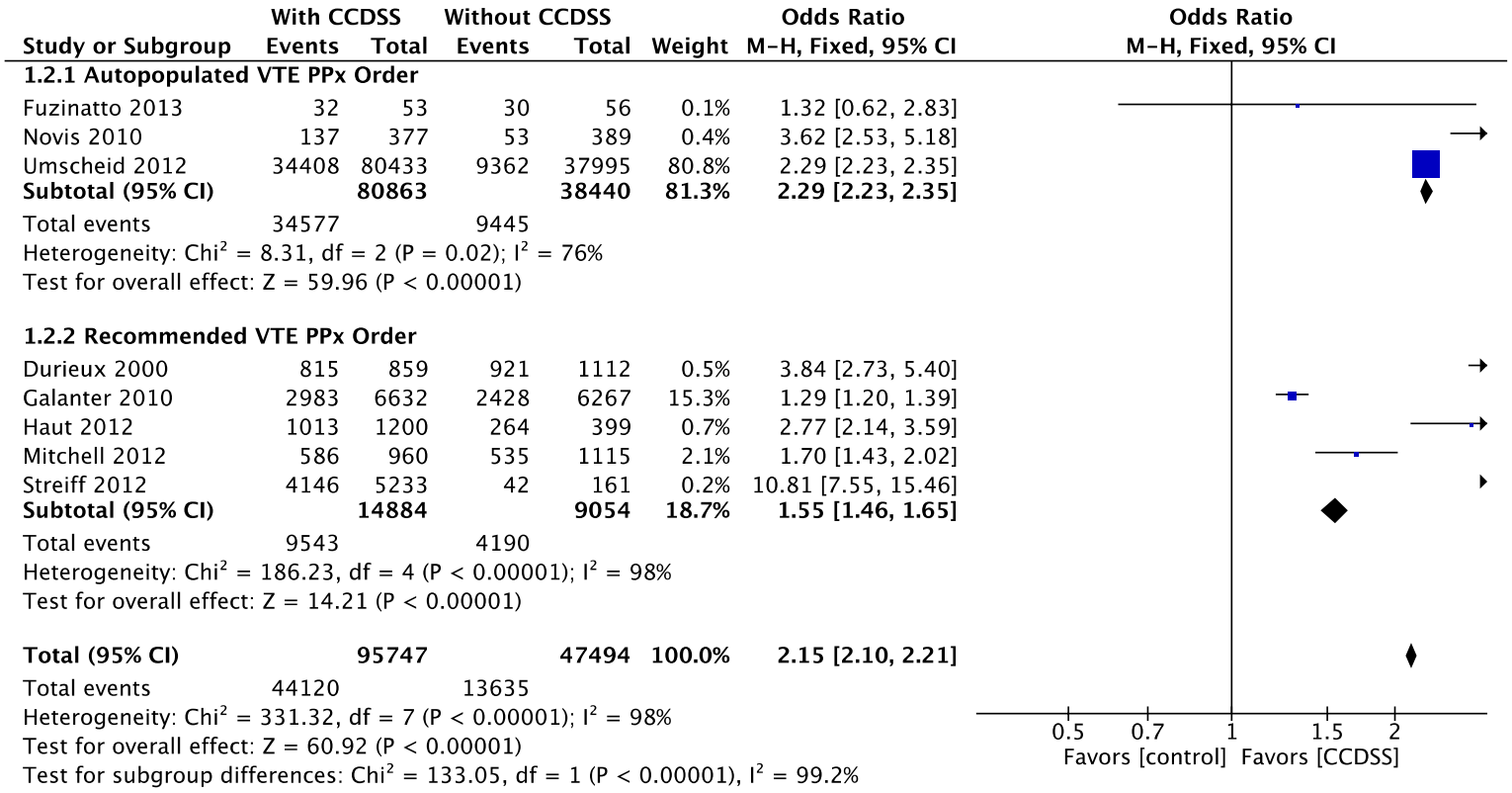
Heterogeneity: $Tau^2 = 0.18$; $Chi^2 = 374.58$, df = 9 ($P < 0.00001$); $I^2 = 98\%$

Test for overall effect: $Z = 6.03$ ($P < 0.00001$)



eFigure 2- Forest plot comparing overall rate of ordering VTE prophylaxis using CCDSSs versus routine care. A Mantel-Haenszel random effects model was used to conduct the meta-analysis and odds ratios are presented with 95% confidence intervals.

VTE Prophylaxis Ordering Subgrouped By Feature



eFigure 3- Forest plot comparing rate of ordering VTE prophylaxis using CDSSs versus routine care subgrouped by CDSSs that featured order autopopulation and those that recommended but could not autopopulate the order. A Mantel-Haenszel fixed effects model was used to conduct the meta-analysis and odds ratios are presented with 95% confidence intervals.

eTable 2- MOOSE Checklist		
Item No	**Recommendation**	**Reported on Page No**
Reporting of background should include		
1	Problem definition	3-4
2	Hypothesis statement	4
3	Description of study outcome(s)	4
4	Type of exposure or intervention used	4
5	Type of study designs used	4
6	Study population	4
Reporting of search strategy should include		
7	Qualifications of searchers (eg, librarians and investigators)	1
8	Search strategy, including time period included in the synthesis and key words	5
9	Effort to include all available studies, including contact with authors	5
10	Databases and registries searched	5
11	Search software used, name and version, including special features used (eg, explosion)	eTable 1
12	Use of hand searching (eg, reference lists of obtained articles)	5
13	List of citations located and those excluded, including justification	figure 1
14	Method of addressing articles published in languages other than English	5
15	Method of handling abstracts and unpublished studies	5-6
16	Description of any contact with authors	5-6
Reporting of methods should include		
17	Description of relevance or appropriateness of studies assembled for assessing the hypothesis to be tested	5-6
18	Rationale for the selection and coding of data (eg, sound clinical principles or convenience)	5-6
19	Documentation of how data were classified and coded (eg, multiple raters, blinding and interrater reliability)	7
20	Assessment of confounding (eg, comparability of cases and controls in studies where appropriate)	x

21	Assessment of study quality, including blinding of quality assessors, stratification or regression on possible predictors of study results	5-6
22	Assessment of heterogeneity	6-7
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	6-7
24	Provision of appropriate tables and graphics	x
Reporting of results should include		
25	Graphic summarizing individual study estimates and overall estimate	eFigure 2,3 Figure 2
26	Table giving descriptive information for each study included	table 1
27	Results of sensitivity testing (eg, subgroup analysis)	9
28	Indication of statistical uncertainty of findings	x

Item No	Recommendation	Reported on Page No
Reporting of discussion should include		
29	Quantitative assessment of bias (eg, publication bias)	eFigure2, eTable2
30	Justification for exclusion (eg, exclusion of non-English language citations)	x
31	Assessment of quality of included studies	11-13
Reporting of conclusions should include		
32	Consideration of alternative explanations for observed results	10-12
33	Generalization of the conclusions (ie, appropriate for the data presented and within the domain of the literature review)	13
34	Guidelines for future research	13

eTable 3. NOS score for observational studies									
	Selection				Comparability	Outcome			
	Representativeness of exposed cohort	Selection of non-exposed cohort	Ascertainment of exposure	Demonstration that outcome was not KNOWN at start of study	Comparability of groups on the basis of analysis	Assessment of outcome	Was follow up long enough for outcomes to occur?	Adequacy of follow up of cohorts	Total
	Variety of surgical patients	Variety of surgical patients	EHR	Stated in article	Controlled for patient VTE risk factor between groups	blinded or record linkage	3 months	90-100% complete follow up	
Durieux 2000	0	0	1	1	1	1	0	1	5
Fuzinatto 2013	0	0	1	1	1	1	0	1	5
Galanter 2010	1	1	1	1	1	1	0	1	7
Haut 2012	0	0	1	1	1	1	0	1	5
Janus 2011	1	0	1	1	0	1	1	1	7
Lecumberri 2008	1	1	1	1	0	0	1	1	7
Mitchel 2012	1	1	1	1	1	1	1	1	8
Mosen 2004	1	1	1	1	1	1	1	1	8
Novis 2010	0	0	1	1	1	1	1	1	6
Streiff 2012	1	1	1	1	1	1	1	1	8
Umscheid 2012	1	1	1	1	1	1	0	1	7