Supplementary Online Content

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

eTable 1. Univariate and Multivariable Analysis of Factors Associated With the Development of VTE Within 30 Days Postoperatively in Patients Undergoing Surgical Procedures

Explanatory Variable	No. Patients (N=750 937)	%	OR (95%CI)	AOR (95% CI)
Perioperative RBC Transfusion				
No	703,527	0.7	Ref.	Ref.
Yes	47,410	3.4	5.2 (4.9-5.5)	2.1 (2.0-2.3)
Age (per 10 years)	750,937	-	1.3 (1.3-1.3)	1.1 (1.1-1.1)
Sex				
Female	426,727	0.8	Ref.	Ref.
Male	324,209	0.9	1.2 (1.1-1.3)	1.1 (1.1-1.2)
Race				
White	551,935	0.9	Ref.	Ref.
Black or African American	75,885	1.0	1.2 (1.1-1.3)	1.1 (1.0-1.2)
Asian	21,081	0.4	0.5 (0.4-0.6)	0.5 (0.4-0.7)
Other	8,494	0.4	0.5 (0.4-0.7)	0.6 (0.4-0.8)
Body Mass Index				
Underweight	12,357	1.1	1.5 (1.2-1.8)	1.0 (0.8-1.2)
Normal weight	179,533	0.7	Ref.	Ref.
Overweight	230,320	0.8	1.1 (1.0-1.2)	1.2 (1.1-1.3)
Class 1 Obesity	155,134	0.9	1.2 (1.1-1.3)	1.4 (1.3-1.5)
Class 2 Obesity	81,949	0.9	1.2 (1.1-1.3)	1.4 (1.3-1.6)
Class 3 Obesity	76,632	0.9	1.2 (1.1-1.3)	1.5 (1.3-1.6)
Functional Health Status Prior to Surgery				
Independent	726,360	0.8	Ref.	Ref.
Partially dependent	16,006	2.1	2.6 (2.4-3.0)	1.2 (1.1-1.4)
Totally dependent	3,184	2.3	2.9 (2.3-3.7)	1.1 (0.9-1.5)
ASA Class				

1-No Disturbance	69,685	0.2	Ref.	Ref.
2-Mild Disturbance	337,688	0.5	2.3 (1.9-2.7)	1.1 (0.9-1.3)
3-Severe Disturbance	296,037	1.2	5.3 (4.5-6.2)	1.3 (1.1-1.6)
4-Life Threatening	44,179	2.2	10.3 (8.7-12.2)	1.6 (1.3-1.9)
5-Moribund	1,343	4.4	20.9 (15.4-28.3)	1.7 (1.1-2.4)
Hospital Length of Stay				
0-1 day	372,952	0.2	Ref.	Ref.
≥2 days	377,369	1.5	7.8 (7.2-7.8)	4.0 (3.6-4.4)
Concurrence Sepsis				
No	737,630	0.8	Ref.	Ref.
Yes	13,307	4.6	6.1 (5.6-6.7)	3.1 (2.9-3.4)
Ventilator Dependence				
No	748,380	0.8	Ref.	Ref.
Yes	2,557	6.3	8.2 (7.0-9.6)	2.5 (2.0-3.0)
Disseminated Cancer				
No	733,087	0.8	Ref.	Ref.
Yes	17,850	3.3	4.4 (4.0-4.8)	2.1 (2.0-2.4)
Work Relative Value Units				
Quartile 1	188,666	0.3	Ref.	Ref.
Quartile 2	191,609	0.4	1.3 (1.2-1.4)	1.0 (0.9-1.1)
Quartile 3	185,945	1.0	3.1 (2.8-3.4)	1.4 (1.2-1.5)
Quartile 4	184,717	1.6	5.0 (4.6-5.4)	1.7 (1.5-1.9)

The multivariable model was limited to 642,946 patients (complete-cases) and was adjusted for age, sex, race, body mass index, functional health status prior to surgery, the American Society of Anesthesiology (ASA) severity class, hospital length of stay, occurrence of sepsis, mechanical ventilation dependence, disseminated cancer, and work-related relative value units (as a surrogate for complexity of surgery).

Abbreviations: OR, odds ratio, adjOR, adjusted odds ratio, CI, confidence interval

eTable 2. Sensitivity Analysis of the Association Between Perioperative Red Blood Cell Transfusion and the Development of Postoperative VTE Within 30 Days of a Surgical Procedure Using Multiple Imputation With Chained Equations

	Adjusted Odds Ratio (95% CI) of VTE
Perioperative RBC Transfusion	
No	1 [Reference]
Yes	2.1 (2.0-2.3)
Time of Perioperative Transfusion	
None	1 [Reference]
Pre-operative only	1.8 (1.5-2.2)
Intra/Postoperative only	2.1 (1.9-2.2)
Pre- and Intra/Postoperative	2.8 (2.4-3.3)

This was a sensitivity analysis using multiply imputed data and included all 750, 937 patients in the original sample. Separate multivariable models were used for each exposure-outcome relationship shown. Each multivariable model was adjusted for age, sex, race, body mass index, functional health status prior to surgery, the American Society of Anesthesiology (ASA) severity class, hospital length of stay, occurrence of sepsis, mechanical ventilation dependence, disseminated cancer, and work-related relative value units (as a surrogate for complexity of surgery). Data were derived from the American College of Surgeons' National Surgical Quality Improvement Database, 2014.

Abbreviations: VTE, venous thromboembolism

eTable 3. Characteristics of Participants in the Full Sample and the Propensity-Matched Subsample by Perioperative Red Blood Cell Transfusion Status

Clinical Parameters	Original Sample			Propensity-Matched Sample		
	Transfused (n=47 410)	Non-Transfused (n=703 527)	Standardized Difference (%)	Transfused (n=47 142)	Non-Transfused (n=47 142)	Standardized Difference (%)
Mean Age	65.9	55.6	64.1	65.8	66.0	-0.8
Male Sex [a]	43.5	43.2	0.7	43.5	43.4	0.1
Race						
White	71.8	73.6	-4.1	71.8	71.9	-0.2
Black or African American	13.1	9.9	10.1	13.1	13.0	0.4
Asian	3.1	2.8	2.0	3.1	3.1	0.1
Other	1.0	1.1	-1.7	0.1	0.1	0.7
Unknown	11.0	12.6	-4.8	11.0	11.1	-0.4
Body Mass Index						
Underweight	4.2	1.5	16.5	4.2	4.2	-0.2
Normal weight	31.0	23.4	17.2	31.0	31.3	-0.8
Overweight	28.8	30.8	-4.3	28.9	28.8	0.1
Class 1 Obesity	17.4	20.9	-8.9	17.4	17.3	0.3
Class 2 Obesity	8.3	11.1	-9.3	8.3	8.4	-0.0
Class 3 Obesity	7.0	10.4	-12.4	7.0	6.8	0.7
Unknown	3.3	1.9	8.6	3.2	3.2	0.3
Functional Health Status Prior to Surgery						
Independent	89.2	97.2	-32.4	89.3	89.3	0.1
Partially dependent	7.9	1.7	29.1	7.8	8.0	-0.7
Totally dependent	2.0	0.3	15.6	1.9	1.9	0.8
Unknown	0.9	0.7	2.4	0.1	0.1	0.6
ASA Class						
1-No Disturbance	1.1	9.8	-39.0	18.5	18.6	-0.1
2-Mild Disturbance	18.4	46.8	-63.4	54.1	54.3	-0.0
3-Severe Disturbance	53.8	38.5	31.1	24.8	24.9	-0.5
4-Life Threatening	24.8	4.6	59.5	1.3	0.1	-0.5
5-Moribund	1.7	0.1	17.4	0.2	0.0	4.4
Unknown	0.2	0.3	-2.4	0.2	0.1	0.8
Hospital Length of Stay						
0-1 day	2.8	52.8	-134.7	2.8	2.4	1.2

≥2 days	96.9	47.1	133.1	96.9	97.4	-1.5
Unknown	0.4	0.1	6.5	0.3	0.2	2.5
Other Medical Complications						
Concurrence Sepsis	6.1	1.5	24.3	6.0	5.8	1.0
Ventilator Dependence	2.9	0.2	22.5	2.5	1.8	5.9
Disseminated Cancer	7.8	2.0	27.0	7.8	8.0	-0.9
Work Relative Value Units						
Quartile 1	5.4	26.5	-60.0	5.5	5.4	0.2
Quartile 2	10.9	26.5	-40.7	11.0	10.9	0.3
Quartile 3	32.2	24.3	17.8	32.3	32.8	-1.0
Quartile 4	51.4	22.8	62.0	51.2	51.0	0.5

Data derived from American College of Surgeons' National Surgical Quality Improvement Database, 2014.

eTable 4. Association of Perioperative Red Blood Cell Transfusion and the Development of VTE Within 30 Days Postoperatively in Propensity-Matched Patient Groups Undergoing Surgical Procedures

	Matched Odds Ratio (95% Confidence Interval)
Perioperative RBC Transfusion	
No	1 [Reference]
Yes	1.9 (1.8-2.1)
Time of Perioperative Transfusion	
None	1 [Reference]
Pre-operative only	1.6 (1.2-2.2)
Intra/Postoperative only	1.9 (1.7-2.1)
Pre- and Intra/Postoperative	2.3 (1.8-3.0)

Include 47 142 propensity score-matched pairs.The matched odds ratio of developing postoperative VTE was estimated by a univariate conditional logistic regression model that included 47,142 propensity score-matched pairs. Estimation of the propensity score considered age, sex, race, body mass index, functional health status prior to surgery, the American Society of Anesthesiology (ASA) severity class, hospital length of stay, occurrence of sepsis, mechanical ventilation dependence, disseminated cancer, and work-related relative value units (as a surrogate for complexity of surgery) were included in the logistic regression model that estimated the propensity score.

e-Figure. Schema of Participants in the Original Sample and the Propensity-Matched Subsample