Table S1: CPT and ICD-9 Codes used to Generate Outcome Measure

Outcome	Procedure Name	Code Type	Code
Pneumonia	Pneumococcal pneumonia [Streptococcus pneumoniae pneumonia]	ICD9	481
	Pneumonia due to Klebsiella pneumoniae	ICD9	482.0
	Pneumonia due to Pseudomonas	ICD9	482.1
	Pneumonia due to Streptococcus, unspecified	ICD9	482.30
	Pneumonia due to Staphylococcus, unspecified	ICD9	482.40
	Pneumonia due to Staphylococcus aureus	ICD9	482.41
	Methicillin resistant pneumonia due to staphylococcus aureus	ICD9	482.42
	Pneumonia due to escherichia coli [E. coli]	ICD9	482.82
	Pneumonia due to other gram-negative bacteria	ICD9	482.83
	Pneumonia due to other specified bacteria	ICD9	482.89
	Bacterial pneumonia, unspecified	ICD9	482.9
	Pneumonia, organism unspecified	ICD9	486
	Pneumonia due to other specified organism	ICD9	483.8
	Pneumonia in aspergillosis	ICD9	484.6
	Bronchopneumonia, organism unspecified	ICD9	485
	Pneumonitis due to inhalation of food or vomitus	ICD9	507.0
Pulmonary edema	Pulmonary congestion and hypostasis	ICD9	514
	Acute edema of lung, unspecified	ICD9	518.4
	Congestive heart failure	ICD9	428.0
	Fluid overload	ICD9	276.6
	Other fluid overload	ICD9	276.69
Respiratory failure	Pulmonary insufficiency following trauma and surgery	ICD9	518.5
	Acute respiratory failure following trauma and surgery	ICD9	518.51
	Other pulmonary insufficiency, not elsewhere classified, following trauma and surgery	ICD9	518.52
	Respiratory failure	ICD-9	518.81
	Other pulmonary insufficiency, not elsewhere classified	ICD-9	518.82
	Acute and chronic respiratory failure	ICD-9	518.84
Reintubation	Intubation, endotracheal, emergency procedure	CPT	31500
	Ventilation assist and management, initiation of pressure or volume preset ventilators for assisted or controlled breathing; hospital inpatient/observation, initial day	CPT	94002

Table S2: Baseline Characteristics Missing and Complete Case Cohorts

	Complete Case (n= 69265)	Missing Data (n=16653)
Men	30823 (44.5)	8377 (50.4)
American Society of Anesthesiologists classification:		
1	6508 (9.4)	1859 (11.2)
2	42096 (60.8)	9471 (56.9)
3	19722 (28.5)	4939 (29.7)
4	939 (1.4)	384 (2.3)
Surgery type:		
Laparoscopic abdominal	12244 (17.7)	2327 (14.0)
Retroperitoneal	2429 (3.5)	294 (1.8)
Hernia repair or minor abdominal	2269 (3.3)	704 (4.2)
Major abdominal	6056 (8.7)	1016 (6.1)
Hip and knee arthroplasty	3463 (5.0)	403 (2.4)
Neurosurgery (non-spine)	5231 (7.6)	1426 (8.6)
Vascular	2875 (4.2)	825 (5.0)
Plastic	2704 (3.9)	913 (5.5)
Urologic (non-abdominal)	5435 (7.9)	1653 (9.9)
General (non-abdominal)	5828 (8.4)	2570 (15.4)
Orthopedic (non-spine)	11071 (16.0)	2892 (17.4)
Spine	3638 (5.3)	549 (3.3)
Breast	3781 (5.5)	780 (4.7)
Gynecologic	2241 (3.2)	301 (1.8)
Epidural	4854 (7.0)	899 (5.4)
Emergent/urgent	6852 (9.9)	2799 (16.8)
Ambulatory procedure	13013 (18.8)	2531 (15.2)
Existing chronic pulmonary disease	8466 (12.2)	1846 (11.1)
Mean (SD) units of packed cells transfused	0.09 (1.9)	.12 (3.0)
Mean (SD) duration of intraoperative ventilation (hours)	2.9 (2.5)	2.8 (2.5)
Mean (SD) body mass index	28.7 (7.1)	29.6 (8.5)
Mean (SD) score for prediction of postoperative respiratory complications	1.7 (2.2)	2.0 (2.3)
Mean (SD) age (years)	54.7 (16.4)	54.2 (17.3)
Mean (SD) Charlson comorbidity index	2.2 (2.9)	1.9 (2.7)
Mean (SD) relative value units	17.6 (11.2)	15.8 (11.2)
Mean (SD) total fluids administered (mL)	2446.9 (7963.1)	2302.5 (7792.3)
Mean (SD) estimated blood loss, (mL)	171.0 (355.1)	150.3 (366.5)
Mean (SD) units of platelets transfused	0.036 (0.63)	.040 (.65)
Mean (SD) units of fresh frozen plasma	0.023 (0.33)	.029 (.44)

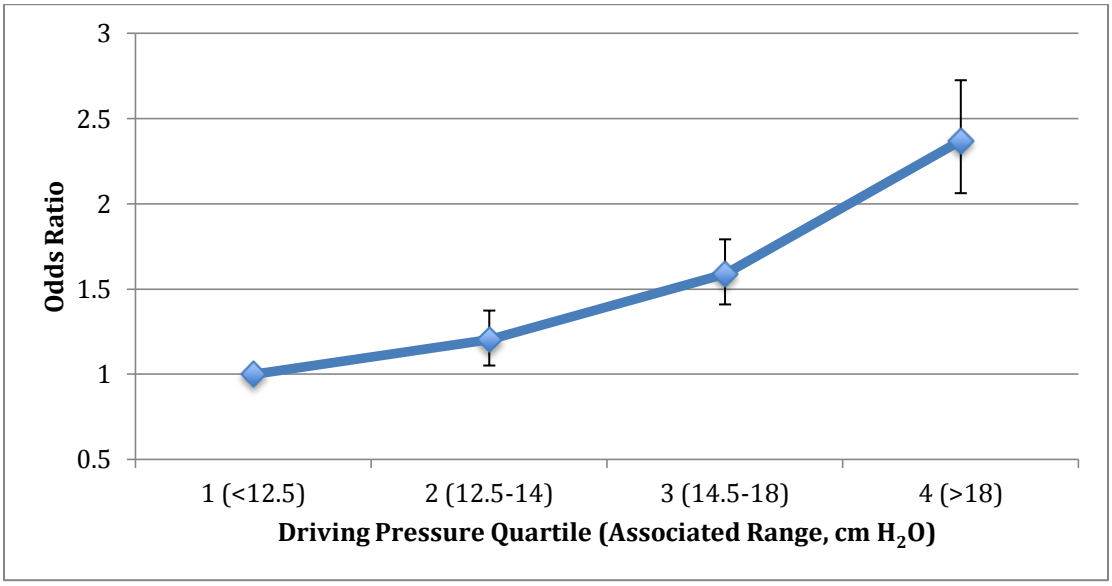
Table S3: Ventilation parameters in entire unmatched cohort

	Non-Protective (n= 34465) n (%)	Protective (n=34800) n (%)	Total (n=69265) n (%)
Plateau Pressure (cm H_2O)			
<20	20290 (58.87)	19213 (55.21)	39503 (57.03)
20-30	11480 (33.31)	15587 (44.79)	27067 (39.08)
>30	2695 (7.820)	0	2695 (3.891)
Tidal Volume (ml/kg Predicted Body Weight)			
<8	10224 (29.66)	16582 (47.65)	26806 (38.70)
8-10	12022 (34.88)	18218 (52.35)	30240 (43.66)
>10	12219 (35.45)	0	12219 (17.64)
PEEP (cm H_2O)			
<5	25703 (74.58)	0	25703 (37.11)
5	5925 (17.19)	27732 (79.69)	33657 (48.59)
>5	2837 (8.232)	7068 (20.31)	9905 (14.30)

Table S4: Unadjusted Outcomes in entire unmatched cohort

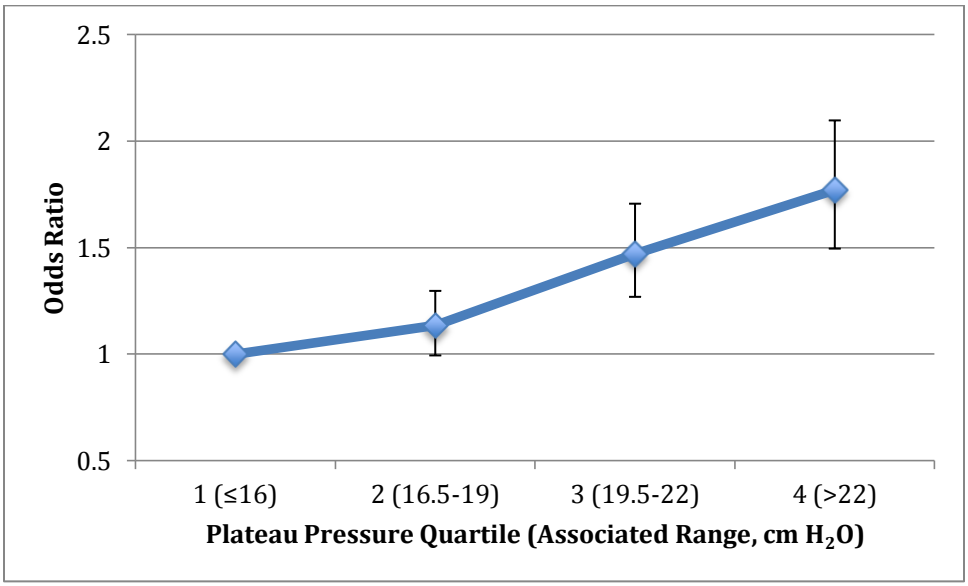
	Total (n=69,265) n (%)	Non-Protective Ventilation (n=34,465) n (%)	Protective Ventilation (n=34,800) n (%)	p-value
Composite Outcome	2705 (3.9)	1289 (3.7)	1416 (4.1)	0.025
Reintubation	143 (0.2)	62 (0.18)	81 (0.23)	0.13
Pulmonary Edema	1876 (2.7)	921 (2.7)	955 (2.7)	0.56
Respiratory Failure	815 (1.2)	370 (1.1)	445 (1.3)	0.012
Pneumonia	497 (0.72)	237 (0.69)	260 (0.747)	0.35

Figure S1: Multivariable Logistic Regression Analysis Examining the Impact of Driving Pressure on Postoperative Pulmonary Complications in Entire Unmatched Cohort*



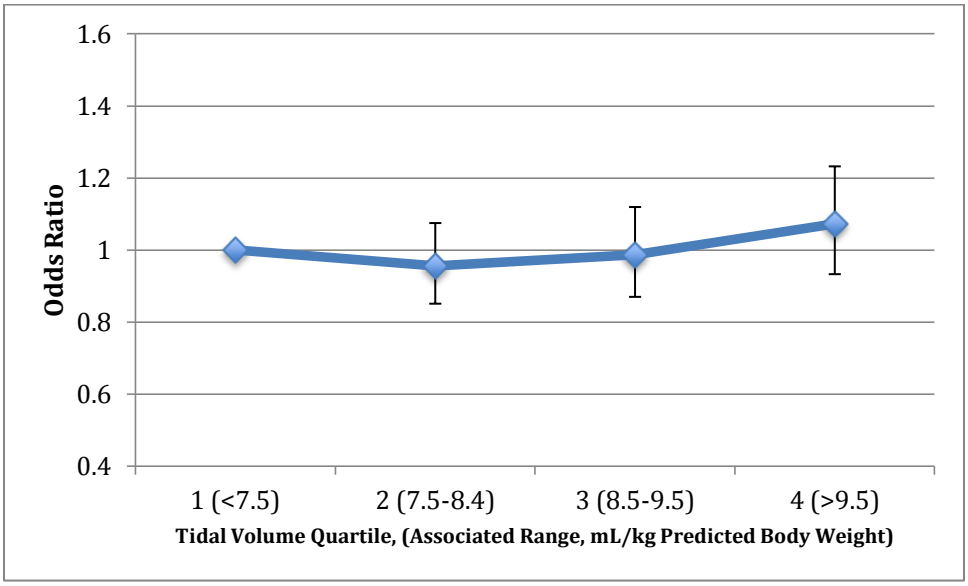
*Adjusting for patient body mass index, age, gender, American Society of Anesthesiologists classification, score for prediction of postoperative respiratory complications score, Charlson Co-Morbidity Index, work relative value units, pre-existing chronic pulmonary disease, surgery type, duration of ventilation, epidural placement, units of packed red blood cells, fresh frozen plasma and platelets transfused, ambulatory surgery, urgent/emergent surgery, estimated blood loss, total fluids administered

Figure S2: Multivariable Logistic Regression Analysis Examining the Impact of Plateau Pressure on Postoperative Pulmonary Complications While Adjusting for Compliance in Entire Unmatched Cohort*



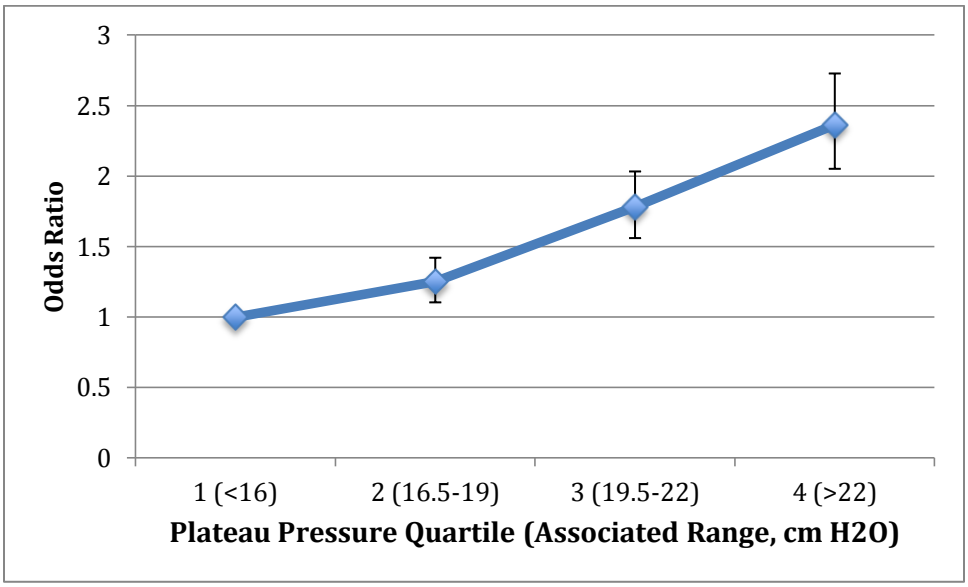
*Adjusting for compliance, patient body mass index, age, gender, American Society of Anesthesiologists classification, score for prediction of postoperative respiratory complications score, Charlson Co-Morbidity Index, work relative value units, pre-existing chronic pulmonary disease, surgery type, duration of ventilation, epidural placement, units of packed red blood cells, fresh frozen plasma and platelets transfused, ambulatory surgery, urgent/emergent surgery, estimated blood loss, total fluids administered

Figure S3: Multivariable Logistic Regression Analysis Examining the Impact of Tidal Volume on Postoperative Pulmonary Complications While Adjusting for Compliance in Entire Unmatched Cohort*



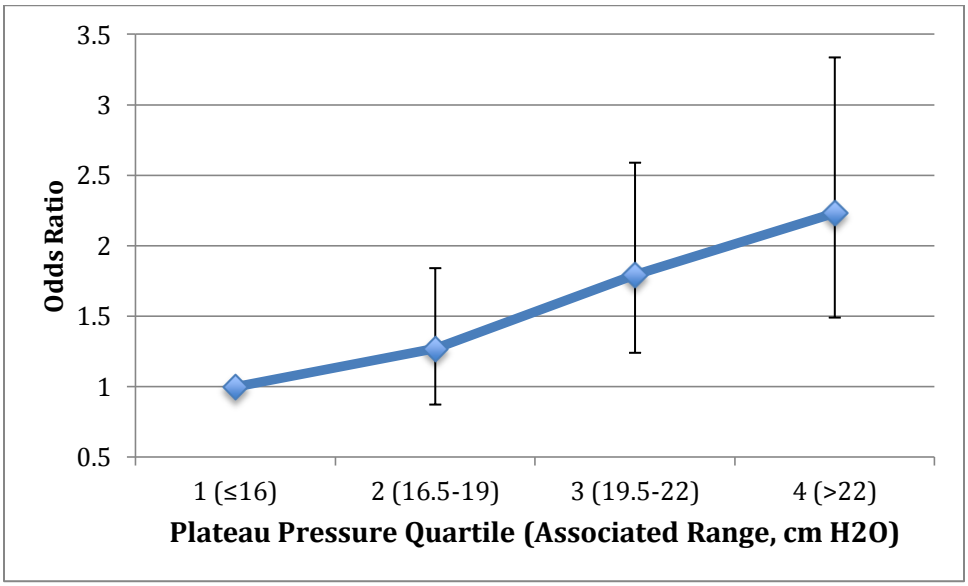
*Adjusting for compliance, patient body mass index, age, gender, American Society of Anesthesiologists classification, score for prediction of postoperative respiratory complications score, Charlson Co-Morbidity Index, work relative value units, pre-existing chronic pulmonary disease, surgery type, duration of ventilation, epidural placement, units of packed red blood cells, fresh frozen plasma and platelets transfused, ambulatory surgery, urgent/emergent surgery, estimated blood loss, total fluids administered

Figure S4: Multivariable Logistic Regression Analysis Examining the Impact of Plateau Pressure on Postoperative Pulmonary Complications While Adjusting for Tidal Volume in Entire Unmatched Cohort*



*Adjusting for tidal volume, patient body mass index, age, gender, American Society of Anesthesiologists classification, score for prediction of postoperative respiratory complications score, Charlson Co-Morbidity Index, work relative value units, pre-existing chronic pulmonary disease, surgery type, duration of ventilation, epidural placement, units of packed red blood cells, fresh frozen plasma and platelets transfused, ambulatory surgery, urgent/emergent surgery, estimated blood loss, total fluids administered

Figure S5: Multivariable Logistic Regression Analysis Examining the Impact of Plateau Pressure on Postoperative Pulmonary Complications in Subset of Patients Ventilated with Pressure Control Mode (n=9035)*



*Adjusting for patient body mass index, age, gender, American Society of Anesthesiologists classification, score for prediction of postoperative respiratory complications score, Charlson Co-Morbidity Index, work relative value units, pre-existing chronic pulmonary disease, surgery type, duration of ventilation, epidural placement, units of packed red blood cells, fresh frozen plasma and platelets transfused, ambulatory surgery, urgent/emergent surgery, estimated blood loss, total fluids administered