Supplementary

Table S1 Quality assessment of included studies

Study	Selection				Comparability	Outcome/Exposure			Score
	1)	2)	3)	4)	1)	1)	2)	3)	
Battaglini 2023	✹	✹	✹	✹	✹	✹	✹	✹	9
Nisar 2023	✹	✹	✹	✹	✹	✹	✹	✹	9
Pawlik 2022	✹	✹	✹	✹	✹	✹	✹	✹	9
Teng 2022	✹	✹	✹	✹	✹	✹	✹	✹	9
Belay 2022	✹	✹	✹	✹	✹	✹	✹	✹	8
Kaur 2022	✹	✹	✹	✹	✹	✹	✹	✹	9
Watson 2022	✹	✹	✹	✹	✹	✹	✹	✹	9
Suljevic 2020	✹	✹	✹	✹	✹✹	✹	✹	✹	9
Robba 2020	✹	✹	✹	✹	✹	✹	✹	✹	9
Esnault 2017	✹	✹	✹	✹	✹	✹	✹	✹	8
Mathai 2015	✹	✹	✹	✹	✹✹	✹	✹	✹	9
Jovanovic 2015	✹	✹	✹	✹	✹✹	✹	✹	✹	9
Song 2014	✹	✹	✹	✹	✹	✹	✹	✹	8
Lepelletier 2010	✹	✹	✹	✹	✹✹	✹	✹	✹	9
Gacouin 2009	✹	✹	✹	✹	✹✹	✹	✹	✹	9
Hyllienmark 2007	✹	✹	✹	✹	✹✹	✹	✹	✹	9
Apostolopoulou 2003	✹	✹	✹	✹	✹✹	✹	✹	✹	9

Each ✹ represents a rating point for each item, ✹ represents 1 point, ✹✹ represent 2 points.

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Table S2 Intensive care unit (ICU) types and disease distribution of patients included in this meta-analysis

Author	Year	ICU type	Disease distribution
Battaglini	2023	Neuro ICU	Traumatic brain injury (TBI), subarachnoid aneurysmal hemorrhage (aSAH), intracranial hemorrhage (ICH), ischemic stroke (IS), and central nervous system (CNS), infection (brain abscess, empyema, meningitis, encephalitis), or brain tumor
Nisar	2023	General ICU	After surgery, sepsis, trauma, stroke, and metabolic disorders
Pawlik	2022	Anesthesiology and Intensive Therapy ICU	Neurosurgical, cardiovascular, general surgical, non-cardiac internal medicine
Teng	2022	Neurosurgical ICU	Subarachnoid hemorrhage, intracerebral hemorrhage, and massive cerebral infarction
Belay	2022	General ICU	Low Glasgow coma scale (GCS), acute respiratory distress syndrome (ARDS), neurosurgery, burn, cardiac diseases, diabetes mellitus, acquired immunodeficiency syndrome (AIDS), trauma, and sepsis
Kaur	2022	Trauma ICU	All the patients who were admitted in the Trauma ICU and mechanically ventilated for more than two days were recruited in the study
Watson	2022	Non-tertiary ICU	Cardiovascular, respiratory, neurological, gastrointestinal, trauma, metabolic, haematological, renal
Suljevic	2020	Anesthesia and resuscitation ICU	Patients using mechanical ventilation for more than 48 hours
Robba	2020	Trauma ICU	Patients with TBI undergoing mechanical ventilation
Esnault	2017	Trauma ICU	Severe TBI
Mathai	2015	Tertiary-level (mixed medical-surgical)	All adult patients intubated and mechanically ventilated for more than 48 hours
Jovanovic	2015	Multidisciplinary (medical, surgical, and trauma) ICU	Patients with traumatic brain injury receiving mechanical ventilation for more than 48 hours
Song	2014	Surgical and medical ICU	Patients using mechanical ventilation for more than 48 hours
Lepelletier	2010	Surgical ICU	Head-trauma patients
Gacouin	2009	Nontrauma ICU	Medical, emergency surgery, elective surgery, noninvasive ventilation (NIV) failure prior intubation, Aspiration before intubation
Hyllienmark	2007	General ICU	Trauma, surgery, medical
Apostolopoulou	2003	Multidisciplinary ICU	Multiple injury, head injury, respiratory failure, neurological disease, cardiovascular disease, intra-abdominal disease, poisoning, miscellaneous

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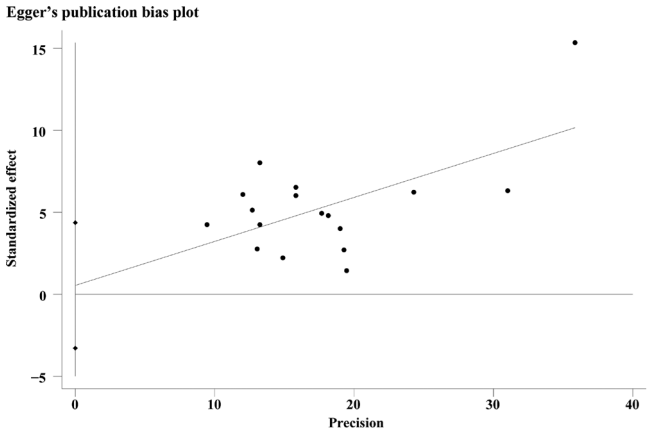

Egger's test

Standardized Effect	Coef	Standardized Effect	t	P	95% Confidence Interval	
slope	0.268345	0.093820	2.86	0.012	0.068371	0.468319
bias	0.540062	1.796121	0.30	0.768	-3.28828	4.368404

Figure S1 Egger test for VAP incidence. VAP, ventilator-associated pneumonia.

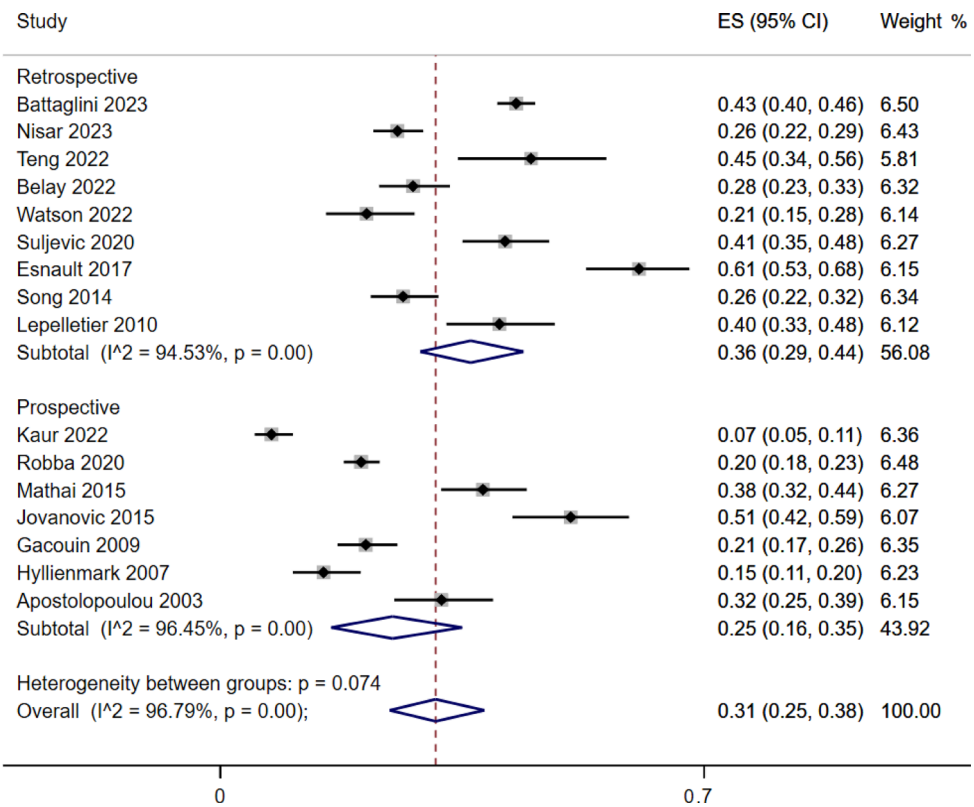

Figure S2 Incidence of VAP by study design. Risk factors of ventilator-associated pneumonia. VAP, ventilator-associated pneumonia; ES, effect size; CI, confidence interval.

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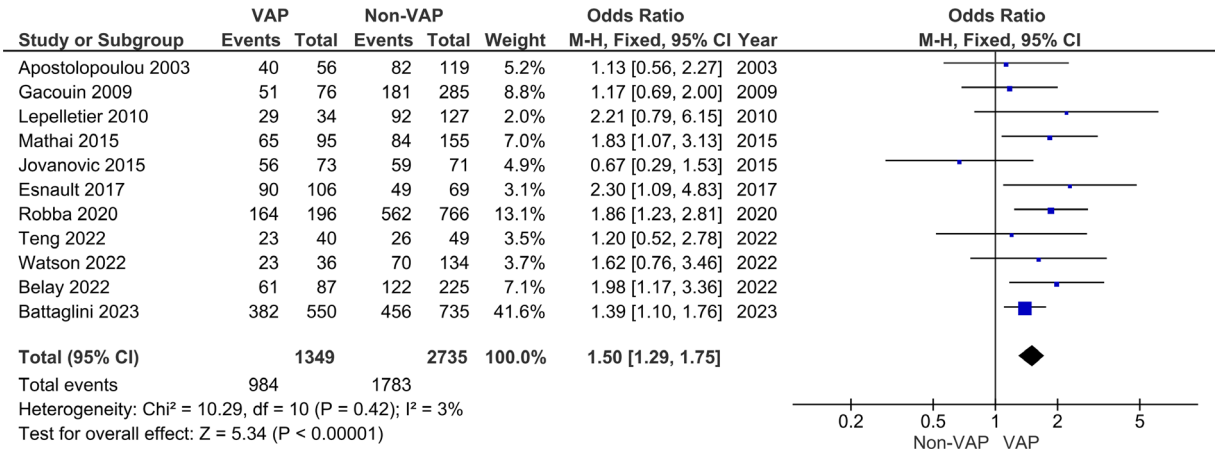

Figure S3 Male. VAP, ventilator-associated pneumonia; M-H, Mantel-Haenszel; CI, confidence interval.

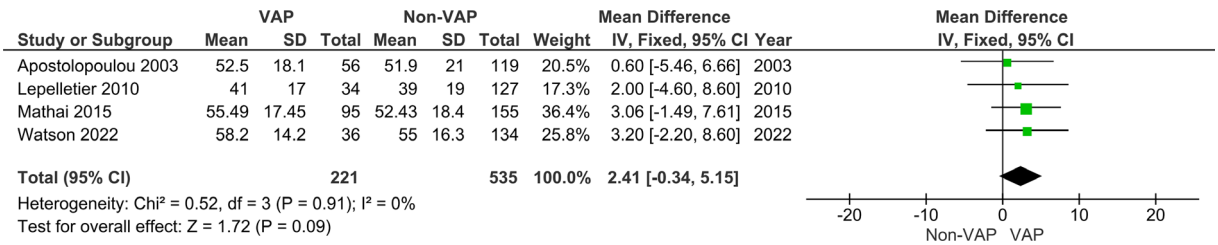

Figure S4 Age. VAP, ventilator-associated pneumonia; SD, standard deviation; IV, inverse variance; CI, confidence interval.

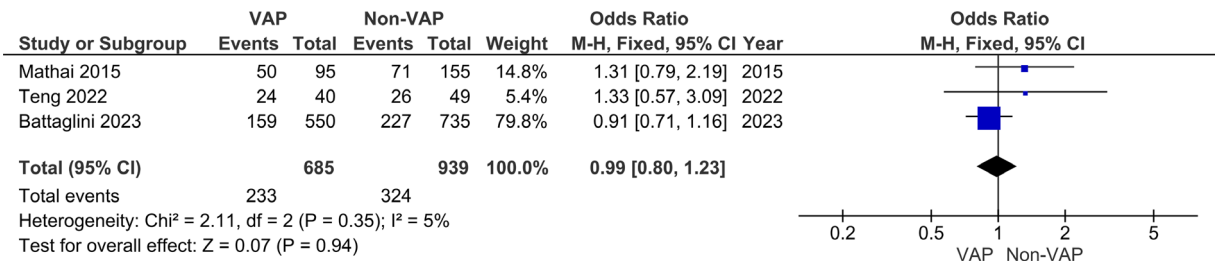

Figure S5 Hypertension. VAP, ventilator-associated pneumonia; M-H, Mantel-Haenszel; CI, confidence interval.

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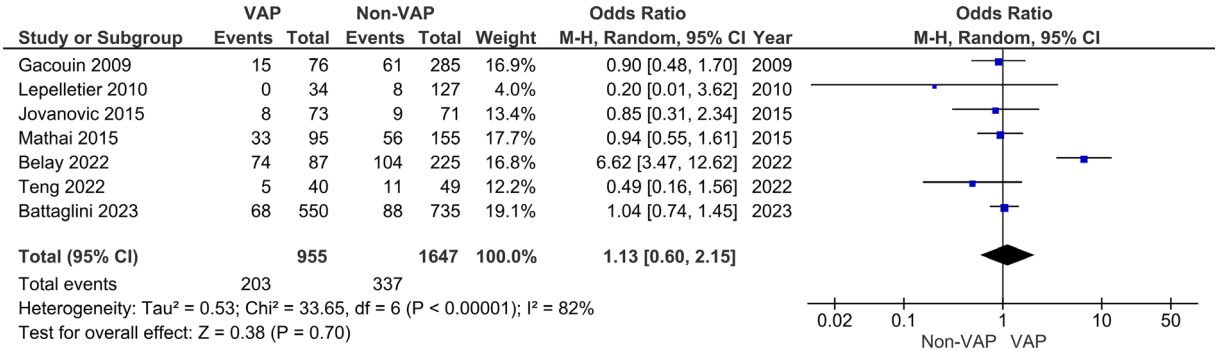

Figure S6 Diabetes VAP, ventilator-associated pneumonia; M-H, Mantel-Haenszel; CI, confidence interval.

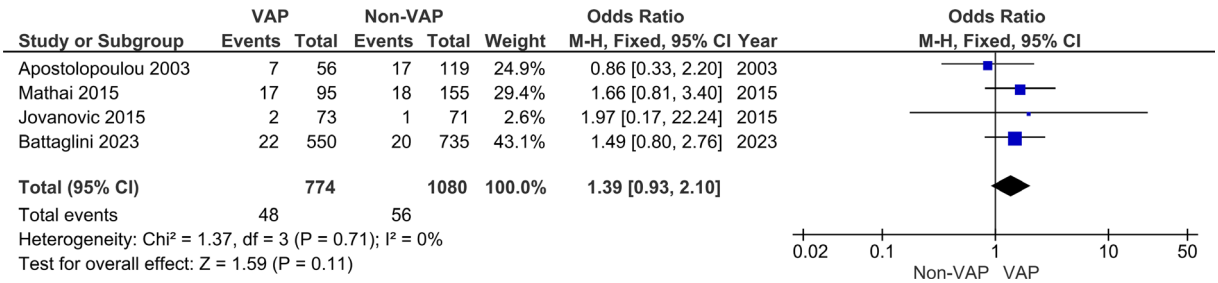

Figure S7 Chronic obstructive pulmonary disease. VAP, ventilator-associated pneumonia; M-H, Mantel-Haenszel; CI, confidence interval.

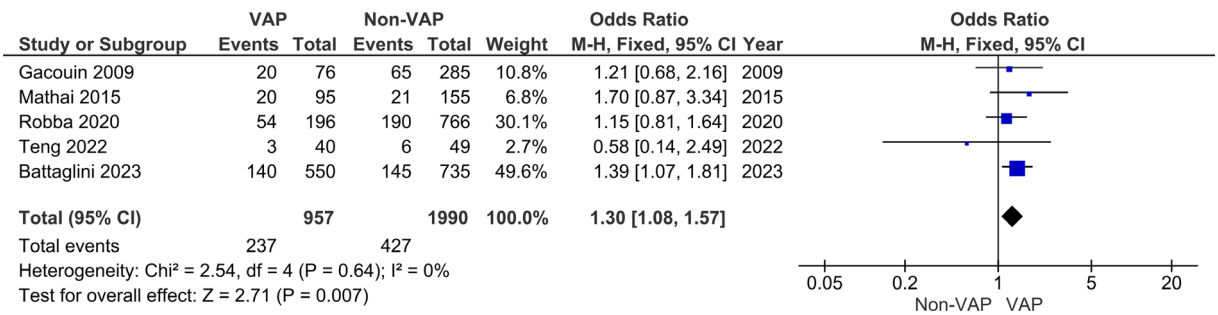

Figure S8 Smoking. VAP, ventilator-associated pneumonia; M-H, Mantel-Haenszel; CI, confidence interval.

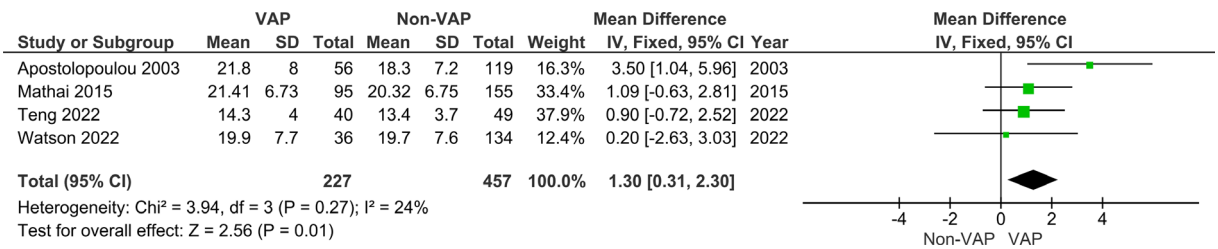

Figure S9 Acute Physiology and Chronic Health Evaluation II (APACHE II). VAP, ventilator-associated pneumonia; SD, standard deviation; IV, inverse variance; CI, confidence interval.

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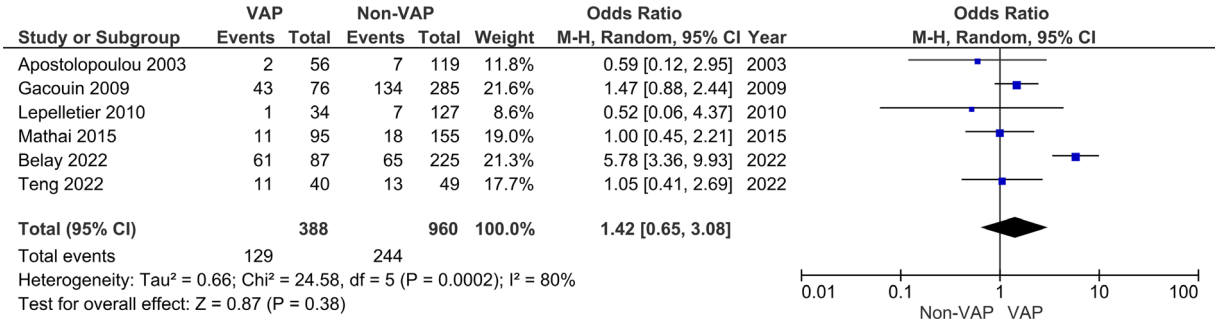

Figure S10 Steroid use. VAP, ventilator-associated pneumonia; M-H, Mantel-Haenszel; CI, confidence interval.

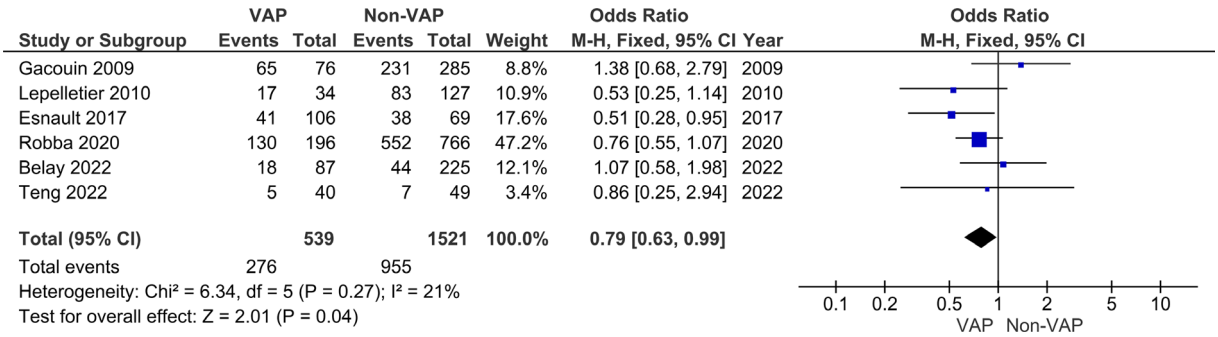

Figure S11 Antibiotic prophylaxis. VAP, ventilator-associated pneumonia; M-H, Mantel-Haenszel; CI, confidence interval.

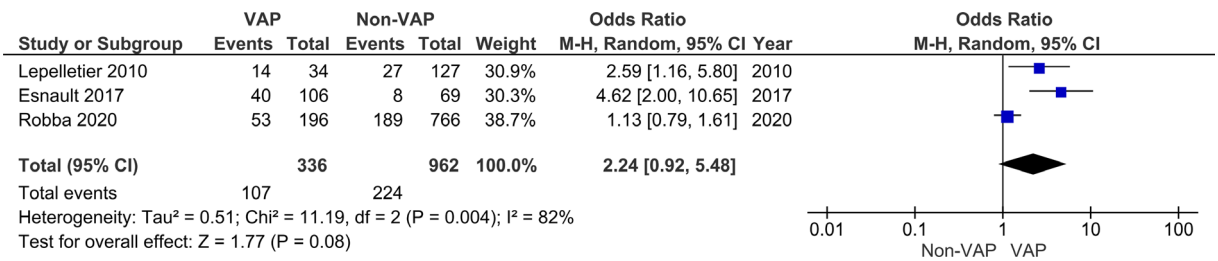

Figure S12 Barbiturates. VAP, ventilator-associated pneumonia; M-H, Mantel-Haenszel; CI, confidence interval.

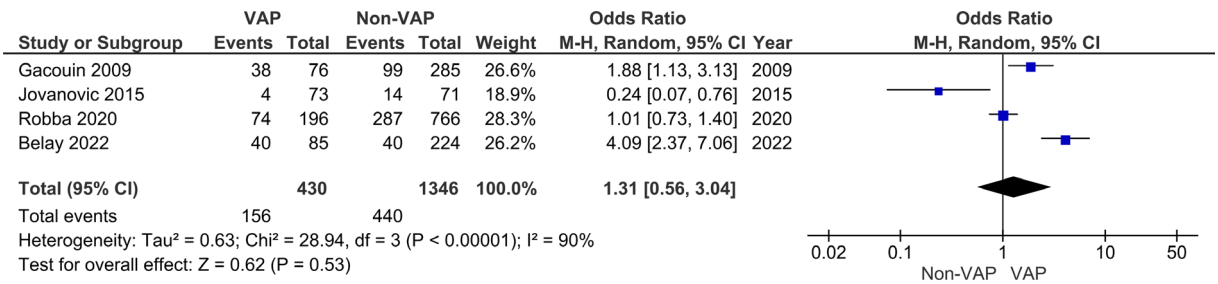

Figure S13 Transfusion. VAP, ventilator-associated pneumonia; M-H, Mantel-Haenszel; CI, confidence interval.

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