

The Volume-Outcome Relationship in Critical Care A Systematic Review and Meta-analysis

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e-Appendix 1. Search algorithm on Medline and EMBASE:

MEDLINE (PubMed)	
1. population	("intensive care units" [Mesh] OR "critical care" [MesH] OR "critical illness" [MesH] OR "intensive care"[tiab] OR "critically ill"[tiab] OR "critical care"[tiab] OR "ICU"[tiab] OR "critical illness"[tiab] OR "acute" [tiab])
2. outcome	("mortality"[MesH] OR outcome[tiab] OR mortality[tiab] OR survival[tiab] OR death[tiab])
3. volume	(volume[tiab] NOT tidal[tiab] NOT hemodialysis[tiab] NOT stroke[tiab] NOT lung[tiab] NOT pressure[tiab] NOT ventricule[tiab] NOT gastric[tiab] NOT platelet[tiab] NOT blood[tiab] NOT brain[tiab] NOT hematoma[tiab] NOT hemofiltration[tiab])
Search equation: 1 AND 2 AND 3	
EMBASE	
1. population	('intensive care'/exp OR 'intensive care':ti,ab OR 'critically ill'/exp OR 'critically ill':ti,ab OR 'critical care'/exp OR 'critical care':ti,ab OR 'critical illness'/exp OR 'critical illness':ti,ab OR 'acute':ti,ab)
2. volume	(Volume:ti,ab NOT tidal:ti,ab NOT (hemodialysis:ti,ab OR 'hemodialysis'/exp) NOT ('stroke':ti,ab OR 'stroke'/exp) NOT (lung:ti,ab OR 'lung'/exp) NOT (pressure:ti,ab OR 'pressure'/exp) NOT (ventricule:ti,ab OR 'ventricule'/exp) NOT (gastric:ti,ab OR 'gastric'/exp) NOT (platelet:ti,ab OR 'platelet'/exp) NOT (blood:ti,ab OR 'blood'/exp) NOT (brain:ti,ab OR 'brain'/exp) NOT (hematoma:ti,ab or 'hematoma'/exp) NOT (hemofiltration:ti,ab OR 'hemofiltration'/exp))
3. outcome	Outcome:ti,ab OR mortality:ti,ab OR 'mortality'/exp OR survival:ti,ab OR 'survival'/exp OR death:ti,ab
Search equation: 1 AND 2 AND 3	

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e-Table 1: Risk adjustments

Source	Positive ?	Adjusted for Hospital characteristics						Adjusted for ICU characteristics			
		Teaching status	Geographical position	Technology capacity	Trauma center designation	Size	Other	ICU type	High intensity model	Nurse-to-patient ratio	Other
Ananthakrishnan et. al., 2008	No	Yes	Yes	No	No	No	No	No	No	No	No
Callaway et. al., 2010	No	Yes	No	Yes	Yes	No	No	No	No	No	No
Carr et. al., 2009	Yes	No	No	No	No	No	No	No	No	No	No
Chen et. al., 2003	Yes	No	No	Yes	No	Yes	No	No	No	No	No
Chul Cha et al. 2012	Yes	No	Yes	No	No	No	No	No	No	No	No
Cooke et. al., 2012	No	Yes	Yes	No	No	Yes	Yes (ICU hospital level)	No	No	No	No
Cross et. al., 2003	Yes	No	No	No	No	No	No	No	No	No	No
Cudnick et al.; 2012	No	Yes	No	Yes	Yes	No	Yes (hospital volume)	No	No	No	No
Darmon et. al., 2011	Yes	No	No	No	No	No	No	No	No	No	No
Dimick et. al., 2002	No	No	No	No	No	No	No	No	Yes	No	No
Dimick et. al., 2003	Yes	No	No	No	No	No	No	No	No	No	No
Durairaj et. al., 2005	No	No	No	No	No	No	No	No	No	No	No
Durairaj et. al., 2005	No	No	No	No	No	No	No	No	No	No	No
Durairaj et. al., 2005	No	No	No	No	No	No	No	No	No	No	No
Giles et. al., 2009	Yes	No	No	No	No	No	No	No	No	No	No
Glance et. al., 2006	No	No	No	No	No	No	No	Yes	Yes	Yes	No
Gopal et. al., 2011	No	No	No	No	No	No	No	No	No	No	No
Joseph et. al., 2009	No	Yes	No	No	No	No	No	No	No	No	No
Kahn et. al.,	Yes	No	No	No	No	No	No	Yes	Yes	No	No

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2006												
Kahn et. al., 2009	Yes	No	No	Yes	No	No	No	No	No	No	No	No
Knipp et. al., 2007	Yes	Yes	No	No	No	No	No	No	No	No	No	No
Kuo et. al., 2001	Yes	No	No	No	No	No	No	No	No	No	No	No
Lecuyer et. al., 2008	Yes	No	No	No	No	No	No	No	No	No	No	No
Lin et. al., 2008	Yes	Yes	No	No	No	Yes	No	No	No	No	No	Yes (Intensivist characteristics)
Macomber et al.; 2012	Yes	No	No	No	No	No	No	No	No	No	No	No
Metnitz et. al., 2009	Yes	No	No	No	No	No	No	No	No	No	No	No
Moran et al., 2012	No	No	No	No	No	No	No	No	No	No	No	Yes (ICU level)
Needham et. al., 2006	No	No	Yes	No	No	No	No	No	No	No	No	No
Nguyen et. al., 2011	No	Yes	Yes	No	No	No	No	Yes	No	No	No	No
Nguyen et. al., 2011	No	Yes	Yes	No	No	No	No	Yes	No	No	No	No
Nuno et al.; 2012	Yes	No	No	No	No	No	No	No	No	No	No	No
Peelen et. al., 2007	Yes	Yes	No	No	No	Yes	Yes (presence of a step down unit)	No	No	Yes	Yes	Yes (ICU size, Intensivist per ICU bed)
Powell et. al., 2010	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No	No
Shahin et al. 2012	No	Yes	No	No	No	No	No	No	No	No	No	No
Shin et. al., 2011	Yes	No	No	No	No	No	Yes (ED level)	No	No	No	No	No
Stub et. al., 2011	No	No	No	Yes	No	No	Yes (admission hours)	No	No	No	No	No
Sun Ro Youg et al.; 2012	Yes	No	Yes	No	No	No	Yes (ED level)	No	No	No	No	No
Vaara et al.; 2012	Yes	No	No	No	No	No	No	No	No	No	No	No
Zuber et. al., 2012	Yes	No	No	No	No	No	No	No	No	No	No	No
Banta et al. 2012	Yes	Yes	Yes	No	No	Yes	Yes (ownership)	No	No	No	No	No

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Shen et al. 2012	Yes	No	Yes	No	No	Yes	p) Yes (ownershi	No	No	No	No
Dres et al. 2013	Yes	No	No	No	No	No	p) No	No	No	No	No
Fernandez et al. 2013	Yes	No	No	No	No	No	No	No	No	No	No
Shahin et al. 2014	Yes	Yes	No	No	No	No	No	No	No	No	No
Walkey et al. 2014	Yes	Yes	Yes	No	No	Yes	Yes (transfer)	No	Yes	No	No

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