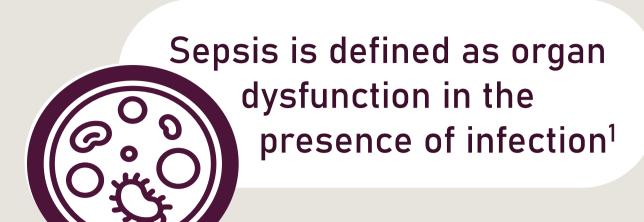
# Sepsis Survivors Readmitted with Sepsis or Pneumonia

Systematic Review and Meta-analysis

Khalia Ackermann<sup>1</sup>, Isabelle Lynch<sup>1</sup>, Nanda Aryal<sup>1</sup>, Johanna Westbrook<sup>1</sup>, and Ling Li<sup>1</sup>

<sup>1</sup>Centre for Health Systems and Safety Research, Australian Institute of Health Innovation, Macquarie University, Sydney AUS



Almost 50 million people have sepsis each year<sup>2</sup>

# BACKGROUND

21.4% of survivors return to hospital within 30-days<sup>3</sup>

Knowing why survivors readmit may help reduce readmissions

Do survivors readmit with infection?

This study aimed to review and summarise the available evidence for readmission with sepsis or pneumonia diagnoses following an initial sepsis admission.

Two reviewers did screening, data extraction, and quality assessment

studies in English investigating

in human sepsis survivors



Modified Newcastle Ottawa Scale & GRADE to assess study quality and confidence in results

Minimum of 3 studies reporting the same outcome and study population to be eligible for meta-analysis.

Meta-analysis were performed in R software<sup>4</sup> using Freeman-Tukey double arcsine transformations and random effect models. Prediction and confidence intervals were calculated

Figure 1 – PRISMA flowchart

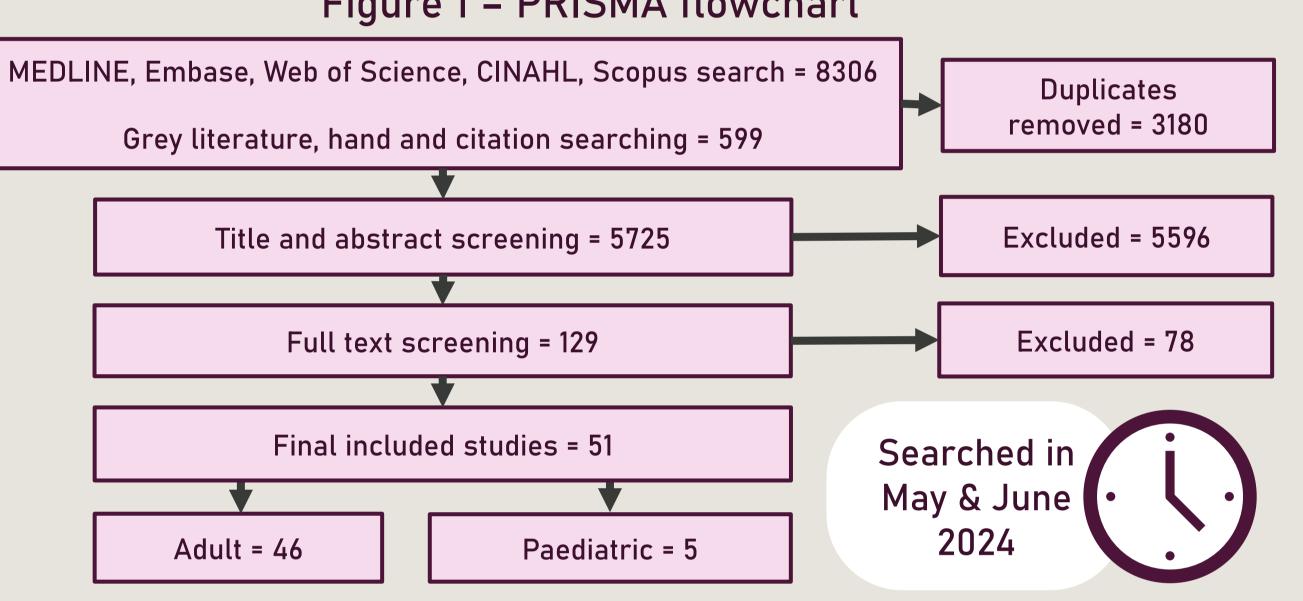
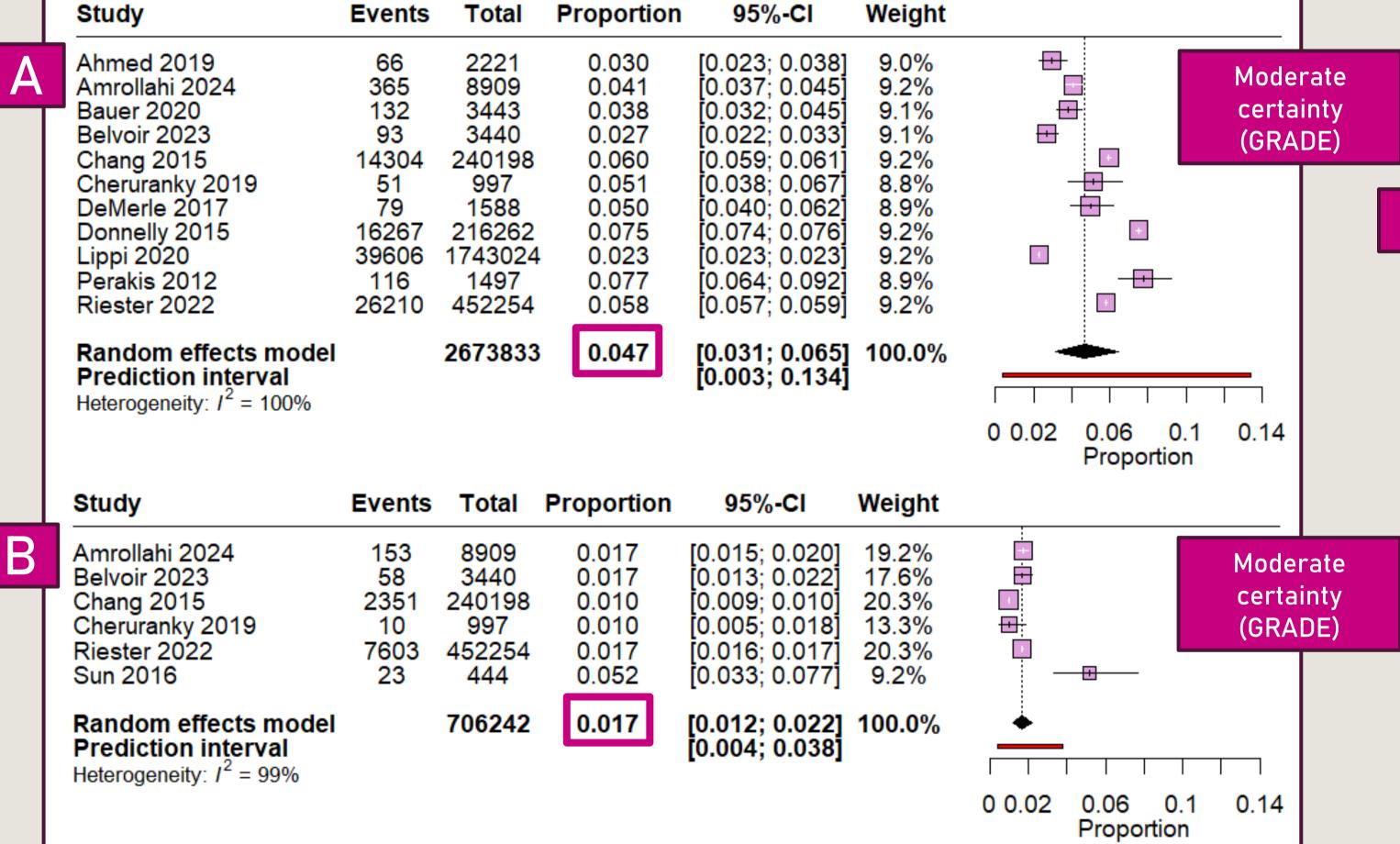


Figure 2 – Proportion of sepsis survivors readmitted within 30-days with a diagnosis of A) Sepsis, or B) Pneumonia



### RESULTS

**METHODS** 

Table 1 – Methods used to identify index admission and readmission diagnoses

	ICD-coding	Database querying	Chart review	Chart review & ICD-coding	Chart review & database querying
Index sepsis admissi (N = 42*)	on 30 (71.4%)	6 (14.3%)	2 (4.8%)	4 (9.5%)	0 (0%)
Readmission (N = 31	19 (61.3%)	3 (9.7%)	5 (16.1%)	3 (9.7%)	1 (3.2%)

\*9 studies did not report how the index sepsis admission diagnoses was identified ^20 studies did not report how the readmission diagnoses were identified

Figure 3 – Proportion of sepsis survivors readmitted within 90-days with a diagnosis of A) Sepsis or B) Pneumonia

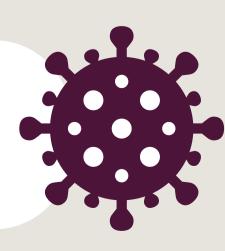
	Study	Events	Total	Proportion	95%-CI	Weight		
A	Belvoir 2023 Chang 2015 DeMerle 2017 Kim 2019	196 21174 137 274	3440 240198 1588 2062	0.086 0.133	[0.049; 0.065] [0.087; 0.089] [0.073; 0.101] [0.119; 0.148]	14.4% 14.2% 14.2%		Low certainty (GRADE)
	Prescott 2015 Prescott 2017 Thompson 2022	167 2254 1915	2617 95743 12553	0.064 0.024 0.153	[0.055; 0.074] [0.023; 0.025] [0.146; 0.159]	14.4%		
	Random effects model Prediction interval Heterogeneity: I <sup>2</sup> = 100%		358201	0.081	[0.045; 0.127] [0.000; 0.289]		0 0.05 0.1 0.15 0 Proportion	
	Study	Events	Total	Proportion	95%-CI	Weight		
В	Belvoir 2023 Chang 2015 Prescott 2015 Prescott 2017	114 3529 92 2442	3440 240198 2617 95743	0.033 0.015 0.035 0.026	[0.027; 0.040] [0.014; 0.015] [0.028; 0.043] [0.025; 0.027]	24.1% 26.2% 23.5% 26.2%		Moderate certainty (GRADE)
	Random effects model Prediction interval Heterogeneity: $I^2 = 99\%$		341998	0.026	[0.018; 0.036] [0.001; 0.088]	100.0%	<u></u>	
L							0 0.05 0.1 0.15 0. Proportion	

Figure 4 - Proportion of sepsis survivors readmitted within 1 year with a diagnosis of sepsis

Study	Events	Total	Proportion	95%-CI	Weight		
Devos 2018 Pandolfi 2022 Thompson 2022	485 23728 2420	3205 178017 11450	0.151 0.133 0.211	[0.139; 0.164] [0.132; 0.135] [0.204; 0.219]	33.6%		Low certainty (GRADE)
Random effects model Prediction interval Heterogeneity: I <sup>2</sup> = 100%		192672	0.164	[0.113; 0.222] [0.000; 0.963]		0 0.1 0.2 0.3 Proportion	

Readmission with an infectious diagnosis, particularly sepsis or pneumonia, is common in sepsis survivors with 1 in 6 readmitted with a second sepsis diagnosis within 1 year

Within 30-days, 1 in 21 and 1 in 59 survivors are readmitted for sepsis or pneumonia respectively



Identification of diagnoses is most often through ICD coding; this may underestimate true diagnoses rates

## CONCLUSIONS





Literature suggests only half are recurrent or relapsed infections<sup>7,8</sup>



6. Viechtbauer, W. (2010). Journal of Statistical Software. 36(3).

7. DeMerle, K. et al. (2017) Critical Care Medicine. 45(10):1702-8. 8. Arshad, A. et al. (2020) Critical Care Explorations. 2(2):e0080.





