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Sepsis incidence and mortality are underestimated in Australian intensive care unit administrative data

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Sepsis incidence and mortality are underestimated in Australian intensive care unit administrative data

TO THE EDITOR: We commend Heldens and colleagues¹ for publishing their data on the incidence and in-hospital mortality of sepsis and septic shock among patients admitted to Australian intensive care units (ICUs). The incidence of sepsis and septic shock in ICUs is estimated to be 101.8 and 19.3 per 100 000 patient-years, respectively, at an attributable cost of \$32 421.² We concur that sepsis cases captured using the Australian and New Zealand Intensive Care Society Centre for Outcome and Resource Evaluation database criteria, compared with prospective clinical diagnoses,³ has poor sensitivity for sepsis case ascertainment.

Notwithstanding, we propose that the application of a third surveillance metric using coded discharge data could be a viable alternative for sepsis case ascertainment and monitoring in ICUs. International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) diagnostic coding data are feasible to collect with a reduced risk of sampling bias and minimal loss to follow up.

Using tandem dataset comparison following the implementation of a hospital-wide sepsis pathway,⁴ we explored the utility of coding data for sepsis surveillance. We noted that 78% and 74% of ICU cases were designated an ICD-10-AM code denoting sepsis at admission and patient level, respectively (Box). Alarming, the concordance rate between coded administrative data and clinically verified sepsis diagnoses was even lower in non-ICU settings (Box). These data are in keeping with international reports.²

Robust and reproducible data are required to evaluate quality improvement regarding sepsis management. Given the poor sensitivity of research criteria and coding data, used in isolation for sepsis identification, a multifaceted approach is required. We hypothesise that the combination of administrative coding data and electronic medical record data, augmented with sepsis screening algorithms, may improve the sensitivity for sepsis case ascertainment in both cancer and non-cancer settings.⁵ We encourage Heldens and colleagues to consider these suggestions as an alternative reproducible method needed to elucidate the incidence of sepsis and septic shock in Australian ICUs.

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- 5 van Mourik MSM, Perencevich EN, Gastmeier P, Bonten MJM. Designing surveillance of healthcare-associated infections in the era of automation and reporting mandates. *Clin Infect Dis* 2018; 66: 970-976.
- 6 coded discharge data in both the intensive care unit and non-intensive care unit settings, 2012 - 2014
- 7 ^a Clinically-diagnosed sepsis cases according to consensus diagnostic criteria
- 8 Abbreviations: ICD-10-AM, International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modifications; SD, standard deviation

[Box]

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Relationship between sepsis cases satisfying clinical criteria and designated coded discharge data in intensive care unit (ICU) and non-ICU settings, 2012–2014

Year	Admission level					
	ICU			Non-ICU		
	All new admissions*	ICD-10-AM captured cases	Concordance	All new admissions*	ICD-10-AM captured cases	Concordance
2012	38	27	71%	70	62	89%
2013	39	34	87%	175	103	59%
2014	81	61	75%	331	149	45%
Mean (± SD)	–	–	78% (± 8.3%)	–	–	64% (± 22%)

Year	Patient level					
	ICU			Non-ICU		
	All new admissions*	ICD-10-AM captured cases	Concordance	All new admissions*	ICD-10-AM captured cases	Concordance
2012	37	26	70%	60	53	88%
2013	34	26	76%	153	53	35%
2014	68	52	76%	263	140	53%
Mean (± SD)	–	–	74% (± 3.5%)	–	–	59% (± 27%)

ICD-10-AM = International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification; SD = standard deviation. * Clinically diagnosed sepsis cases according to consensus diagnostic criteria.