

Letter to the editor

Point estimates and confidence intervals and limits

Harrington *et al*'s¹ establishment of a rate of intravascular device-related bacteraemia (IVDRB) in an ICU [see 'Intravascular device-related primary bacteraemia rates in a general intensive care unit AIC 4(3):8-11] using recognised standardised definitions and methodology² is to be commended. The rate was established from a 6-month period of surveillance. When such a rate is estimated using a proportion of inpatients rather than all patients during an entire year, it is helpful to readers to present the probability of the accuracy of that rate. Harrington *et al*'s¹ rate is a **point estimate** and the measure of accuracy of this estimate is called the **confidence interval**. The most commonly used interval is the 95 per cent confidence interval, with the ends of this interval known as the **confidence limits**.

The 95 per cent confidence interval around an IVDRB rate would provide us with a measure of the uncertainty of the point estimate as a representation of the true IVDRB rate in the population from which the sample was taken. The narrower the 95 per cent confidence interval the closer the point estimate is to the true rate. The 95 per cent confidence limits of Harrington *et al*¹ are **2.3 per 1000** and **10.0 per 1000 line days**. On examination of the rate of 5.3 per 1000 line days, one would not suggest that it is "less than recently reported NNIS central device rates for a medical/surgical ICU (4.4/1000)." On examination of the limits, it is, however, comparable with that of NNIS. The rate of IVDRB identified by McLaws *et al*³, 6 per 1000 line days (95% CI 5.7-6.3), identified during a 3-month period, was not significantly different ($p = 0.94$) to that reported by Harrington *et al*¹. Some epidemiologists might suggest that the confidence interval contains more information than a significance test. However, providing the value of the significance level ($p = 0.94$) gives additional information to that of the 95 per cent confidence interval and it is recommended that when comparing rates authors present both⁴.

Another helpful addition is a description of the comparability of risk factors or other characteristics in the sample surveyed. This allows the reader to speculate about the possibility of a

systematic difference in these characteristics in the surveyed sample. Termed 'selection bias' or 'surveillance bias', it determines the degree to which authors' conclusions are generalisable either to other samples or the entire population⁵.

References

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2. National Nosocomial Infection Surveillance (NNIS) System Report: Data Summary from October 1986 – April 1998. Atlanta, Georgia: Hospital Infections Program, National Centers for Disease Control and Prevention, Public Health Services, US Department of Health and Human Services. Issued June 1998.
3. McLaws ML, Murphy C, Taylor P & Coroneos N. Measuring line related bacteraemia in intensive care patients. *Anaesth Intensive Care* 1998; 26:282-86.
4. Armitage P & Berry G. *Statistical Methods in Medical Research* (3rd ed). Oxford: Blackwell Science.
5. Gordis L. *Epidemiology*. Philadelphia: WB Saunders Company, 1996.

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I and my co-authors thank Dr McLaws for her comments and agree with her that the inclusion of confidence intervals would have been helpful to readers. However, we were not suggesting that the rate of 5.3 per 1000 line days was "less than recently reported NNIS central device rates for medical/ surgical ICU (4.4/1000)" and we refer Dr McLaws back to our article. To clarify, we stated "and comparable to or less than" (ie. our rate of 5.3 per 1000 line days was comparable to the NNIS reported rate of 4.4/1000 line days for medical surgical ICU and less than 12.8/1000 line days for burns ICU).

Once again, we thank Dr McLaws for her comments.

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