

28th February 2012

STATISTICS for CRITICAL CARE

Maximum 20 minutes for each talk including questions – your talk should be 15mins max!

1. Length of Stay Audit Data, 2003

Length of Stay (days) for 844 patients admitted to AICU in 2003					
Mean	Median	Mode	Standard Deviation	Interquartile Range	Minimum/Maximum
5.8	3	2.0	11.5	2 - 6	1 / 264

Analyse and comment on this data:

- What type of data is presented (be expansive in your explanation into examples of other sorts of data – nominal, ordinal, discrete and continuous)
- How is the presented data distributed (guesstimate)? So what?
- Of the numbers presented in the table which best/most appropriately describes the data?

2. Mortality 2003

Number of Admissions	Lived greater than 28days	Died by 28days	28 day Mortality Rate	SMR
844	639	205	24%	0.95

Analyse and comment on this data:

- What is SMR? How is it calculated?
- What scoring system is best for calculating the SMR denominator? What are common limitations in scoring systems?
- What are the uses and limitations of SMR?

3. Chi-square (χ^2) test for the Prowess data

	28 Day Mortality		
	Died	Lived	
aPC	a 210 (E = 236)	b 640 (E=614)	a+b 850
Placebo	c 259 (E = 233)	d 581 (E=607)	c+d 840
	a+c 469	b+d 1221	a+b+c+d 1690

Use this data to explain:

- a. Absolute risk reduction (ARR)
- b. Number needed to treat (NNT)
- c. Relative risk reduction (RRR)
- d. In the Prowess trial the '95% confidence interval for the ARR was given as 1.9 to 10.4%. What is meant by "95% confidence interval"? Explain the practical applications of confidence intervals and indicate why they might be preferred to p-values.

4. Procalcitonin as a Marker for Systemic Infection

		Disease: Systemic Infection		
		Present	Absent	Totals
Test: Procalcitonin level $\geq 0.5\text{ng/ml}$	Positive	24 a TP	1 b FP	25 a+b
	Negative	44 c FN	126 d TN	170 c+d
	Totals	68 a+c	127 b+d	195 a+b+c+d

Using the data above explain the following concepts:

- Sensitivity
- Specificity
- Positive Predictive Value
- Negative Predictive Value
- Prevalence (Pre-test Probability)
- What happens to the above (Sensitivity, Specificity, PPV & NPV) if prevalence is halved?
- Receiver Operating Characteristic (ROC) curves
- Post-test Odds = Pre-test Odds * Likelihood Ratio

- 5. Advanced Randomised Control Trial Statistical Thinking
(talk if time else handout)**
 - a. Null hypothesis, superiority and equivalence trials**
 - b. Fixed treatment protocols**
 - c. Learning during trials**

- 6. Outline the steps required to carry out a systematic review**