STATISTICAL CHEAT SHEET

for my

Primary Care Clerkship Evidence-Based Medicine Small Groups
(INMD 7508, INMD 7509)

Students are expected to crunch a few numbers to include in their critically appraised topics (CATs). This sometimes causes a little anxiety, confusion and frustration—none of which, I should point out, are formal course objectives. The purpose of this document is to illustrate and explain some common metrics associated with *therapeutic* investigations, which is the general type of investigation that most students select for their CATs.

Example: Consider a completely hypothetical therapeutic investigation that examined the effect of caffeine on level of consciousness. Two hundred medical students were recruited and appropriately randomized to receive either decaffeinated (placebo group) or caffeinated (experimental group) coffee at the beginning of a particularly boring required lecture. The outcome was whether they were asleep at the end of the lecture. (Please assume that the study was perfectly executed: it was double-blinded, unblinding did not occur, no confounding co-interventions [e.g., eating chocolate] occurred, *et cetera.*)

Results: In the placebo group and experimental group, 68 and 59 subjects, respectively, were asleep at the end of the boring lecture.

Statistics: These data can be converted into a standard 2 x 2 table:

	Asleep (*y*)	Awake (*z*)
Caffeinated coffee (*w*)	59 (a)	41 (b)
Decaffeinated coffee (*x*)	68 (c)	32 (d)

where *w* = treatment group, *x* = comparison group (placebo or some other intervention), *y* = outcome present, and *z* = outcome absent.

From this table we can determine the controlled event rate (CER), experimental event rate (EER), relative risk reduction (RRR), absolute risk reduction (ARR) and number needed to treat (NNT):

CER = [c ÷ (c + d)] = [68 ÷ (68 + 32)] = 0.68

EER = [a ÷ (a + b)] = [59 ÷ (59 + 41)] = 0.59

RRR = [(CER − EER) ÷ CER] = 0.13

ARR = CER − EER = 0.09

NNT = 1 ÷ ARR = 11.1

Translation: Sixty-eight percent and 59% of subjects were asleep in the placebo and experimental groups, respectively, at the end of the boring lecture. Caffeine decreased the relative risk of sleeping by 13% compared to placebo (an absolute risk reduction of 9%). One would have to treat about 11 medical students with caffeine to prevent one student from falling asleep during a boring lecture.

Bonus calculations: One can also calculate confidence intervals for each of the metrics above. Although the necessary equations are relatively straightforward, they involve mathematical operations that most medical students last used in college calculus. The truly motivated can consult the following references:

Guyatt G, Rennie D [editors]. Users' guide to the medical literature: a manual for evidence-based medicine. Chicago: AMA Press, 2001, pages 659–664.

Sackett DL, et al. Evidence-based medicine: how to practice and teach EBM [2nd edition]. Edinburgh: Churchill Livingstone, 2000, pages 233–243.

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