MATH 341 HW 2

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Problem 4

Measuring effectiveness of a treatment. RR: Relative Risk ARR: Absolute Risk Reduction

a) $RR = P(B|T)/P(B|\overline{T})$
RR should be > 1 if the treatment increases chances of harm, and < 1 if it reduces the chances of harm. This equation makes sense, as the numerator will increase

b) $ARR = P(B|\overline{T}) - P(B|T)$
As the paper explains how $P(B|\overline{T})$

c) Is it possible to have a sutation where $RR \approx 0$, and$ARR \approx 0$?
Consider a "Rare disease", where

$$\begin{aligned} P(B|\overline{T}) &= 0.001 \\ P(B|T) &= \text{(smaller than above)} \\ ARR &= P(B|\overline{T}) - P(B|T) \end{aligned}$$

d) Show that $P(B|\overline{T}) = \frac{ARR}{1-RR}$

$$\begin{aligned} \frac{ARR}{1-RR} &= \frac{P(B|\overline{T}) - P(B|T)}{1 - [\frac{P(B|T)}{P(B|\overline{T})}]} \\ &= \frac{P(B|\overline{T})}{P(B|\overline{T})} \cdot \frac{P(B|\overline{T}) - P(B|\overline{T})}{1 - [\frac{P(B|T)}{P(B|\overline{T})}]} \end{aligned}$$