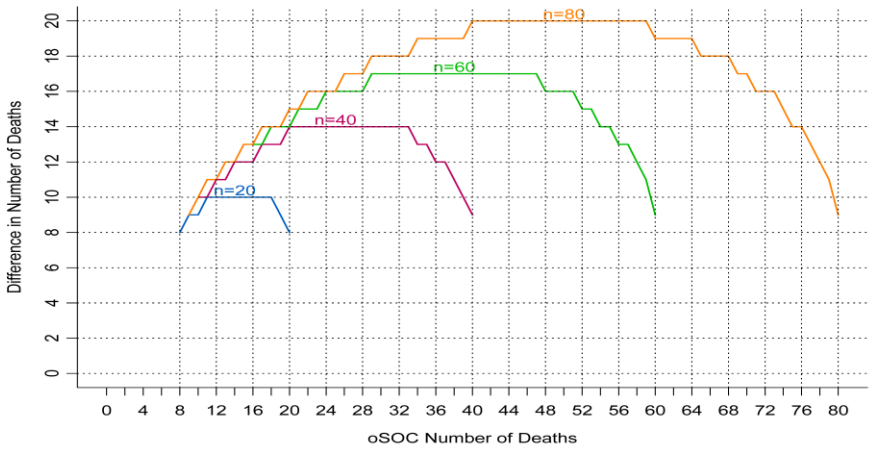
*Supplementary Text*

The following formula describes how to compute the posterior probability that arm A is superior to arm B given $x_A$ deaths in arm A and $X_B$ deaths in arm B, i.e., $P(p_A < p_B)$, where $p_A$ and $p_B$ are mortality probabilities in arms A and B, respectively.

$$P(p_A < p_B \ | x_A, x_B) = \int_0^1 G_A(p|x_A) g_B(p|x_B) dp = \sum_{k=x_{A+1}}^{n_A+1} \frac{\binom{n_A+1}{k}\binom{n_B+1}{x_B}(n_B - x_B + 1)}{\binom{n_A+n_B+2}{x_B+k}(n_A+n_B-x_B-k+2)}$$

where $G_A(p|x_A)$ denotes the beta cumulative distribution function for arm A given observed deaths $x_A$ and $g_B(p|x_B)$ denotes the beta density function given observed deaths $x_B$. The notation $\binom{n}{k}$ denotes the "n choose k" function. Having observed 10 subjects in each arm in total, and observing 2 deaths in arm A and 6 deaths in arm B gives a posterior probability (that arm A has a lower mortality rate than arm B) of 0.96.

Supplementary Figure 1. Differences in number of deaths required to cross boundary at different interim analyses



Supplementary Figure 2. Type I error rates for various sample sizes and various underlying mortality rates