INTERIM ANALYSIS FOR TRIALS DESIGNED USING THE EXPECTED VALUE OF INFORMATION

A.R. Willan[†1,2], M.E. Kowgier[1,2]

[1] *Sick Kids Research Institute, Toronto, Canada*
[2] *University of Toronto, Canada*

[†] E-mail: *andy@andywillan.com*

Traditional sample size calculations for randomized clinical trials depend on arbitrarily chosen factors, such as type I and II errors. Type I error, the probability of rejecting the null hypothesis of no difference when it is true, is most often set to 0.05, regardless of the cost of such an error. In addition, the traditional use of 0.2 for the type II error means that the money and effort spent on the trial will be wasted 20% of the time even when the true treatment difference is equal to the smallest clinically important one and, again, will not reflect the cost of making such an error. A pragmatic trial (otherwise know as an effectiveness trial or management trial) is essentially an effort to inform decision-making, *i.e.* should *Treatment* be adopted over *Standard*? As such, a decision theoretic approach will lead to a more optimal sample size determination. Using incremental net benefit and the theory of the expected value of information, and taking a societal perspective, Willan and Pinto (*Statistics in Medicine* 2005; **24**:1791-1806) have shown how to determine the sample size that maximizes the expected net gain (*i.e.* that maximizes the difference between the cost of doing the trial and the value of the information gained from the results). These methods are extended to examine the effect of doing interim analyses on the expected net gain, expected sample size and total cost. Examples will be given.