Modeling Phase III Microbicide Clinical Trial Costs

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Issues
Licensure trial sizes for Phase III microbicide studies have been estimated between 4,000 and 10,000 participants and are expected to take between 2-5 years to complete. Samples sizes are based on statistics for valid clinical study (p value, power), local incidence of HIV transmission and drop-out rates. Currently, six first generation microbicide studies are being conducted around the world. The sample size can vary widely based on these factors, making financial planning difficult.

Description
Given the complex nature of microbicide efficacy studies and the large financial commitment required to conduct these studies, a costing model was developed to identify major cost drivers and to project cost expenditures over time. Initially, a static model was developed that comprehensively estimated costs and timeline based on one sample size. A dynamic simulation model was then built that allows user input to vary by study size, statistical parameters, enrollment forecasts, number of sites, costs associated with salaries, laboratory procedures and facilities. The outputs are study size, overall study timeline, timeline of visits, and cash flow.

Objectives
- Create a comprehensive multi-site clinical trial forecasting tool
- Calculate trial size and associated costs based on a range of statistical and operational parameters
- Allow model operation by clinical and project management
- Permit instant, high level feedback to a wide range of variables
- Communicate ramifications of scenario assumptions to stakeholders

Lessons Learned
Static models are cumbersome modeling tools. Analyses of various scenarios from the dynamic model indicates that there is no one major variable that drives the cost of the microbicide study other than overall study size itself. Additionally, conducting licensure quality clinical research in developing countries is of the same financial magnitude as conducting clinical research in the developed world. Furthermore, the type of microbicide tested, i.e. second generation microbicides containing potent anti-retrovirals, do not add significant costs to Phase III studies.

Operational Parameters (Inputs) & Summary Results
Site staffing requirements and associated costs are calculated for two designated wage areas

Study Parameters (Inputs) & Summary Results
Up to 50 Sites may be selected with a range of enrolment terms & patterns

Known & estimated line-item costs may be input and effects shown

Study Parameters & Summary Results

Operational Parameters & Summary Results
Up to 50 Sites may be selected with a range of enrolment terms & patterns

Clinical & Lab procedures selected by visit type (partial list for illustration)

Graphic Display of Recruitment, Trial Progress and Associated Costs of Various Scenarios

Scenario 1 – 8 sites: 4 open in month one, 4 open in month 18. Same enrolment and completion rates. (see summary results above) Total cost $89.2 million.

Scenario 2 – same as Scenario 1 except incidence rate set to 4% instead of 2.5% (6,084 to be enrolled). Total cost $60.2 million.

Recommendation
Planning for large scale studies should involve constructing a model that permits easy sensitivity analysis. Such a tool would result in improved cost predictions and cash management. In addition, planning for the logistical realities of the various enrolment patterns will allow for efficient implementation of studies in that, for instance, staffing needs can adjust accordingly. Finally, the tool should accommodate actual data as it becomes available so that performance can be compared to goals and expectations. As with all modeling exercises, the tool will improve as real-life experience is gained.