Creation of a Consort Diagram to Visualize Participant Enrollment and Allocation at the Data and Safety Monitoring Committee (DSMC)

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Background

- The Data and Safety Monitoring Committee (DSMC) requires a database report and monitoring form with each submission.
- Both documents require the inclusion of enrollment and analysis information; however, the numbers generated from different data sources are often discordant for multiple reasons (Figures 1 and 2).

Figure 1:
Sample Database Report Breakdown

Target Accrual	15
#Enrolled	12
#Eligible	12
#Ineligible	0
#Evaluable	5
#Inevaluable	0
#Treated	2

Figure 2:
Sample Monitoring Form Breakdown

b. Participant Breakdown
1. **Screened for eligibility**: 14
2. **Enrolled (on each arm/phase/cohort)**:
   i. Phase I Cohort 1 Dose Level 1: 8 patients
   ii. Phase I Cohort 1 Dose Level 2: 6 patients
3. **Treated (on each arm/phase/cohort)**:
   i. Phase I Cohort 1 Dose Level 1: 7 patients
   ii. Phase I Cohort 1 Dose Level 2: 5 patients
4. **Active follow-up**: 8 (6 off treatment for survival, 2 on active treatment)
5. **Lost to follow-up**: 0
6. **Evaluable**: 10 (8 for protocol, 2 for toxicity only)
7. **Inevaluable**: 4
8. **Withdrawn**: 2 (after start of treatment)

Goals

Improve data reconciliation by creating a visualization tool that:
- Provides an accurate status regarding overall study flow, enrollment breakdowns, assignments to arms/cohorts, on-and-off study statuses, number evaluable for key endpoints, and interim analyses results.
- Allows for customized manual entry and an opportunity to clarify enrollment and analysis data.

Methods & Solutions

- In collaboration with Committee Leadership and the department of biostatistics, the administrative team created and piloted two consort diagram templates, one for phase studies (e.g., phase I, I/II, and II therapeutic protocols) and one for non-phase studies (e.g., psychosocial) studies (Figure 3).
- The pilot included protocols for which DSMC members and Protocol Review and Monitoring System (PRMS) committee members were Principal Investigators.
- Feedback regarding the functionality and clarity of the templates was provided by investigators, study staff, and DSMC reviewers.
- The pilot was deemed successful based on demonstrated feasibility, positive feedback, and improved submission quality.
- Feasibility was initially impacted by unclear instructions which resulted in creating a guidance document containing definitions for each diagram category (Figure 4) and hosting trainings.
- Following the pilot and updates to the templates based on feedback, consort diagrams became a submission requirement for studies opened to accrual in 2018 or later.

Example Completed Consort Diagram for a Phase Study

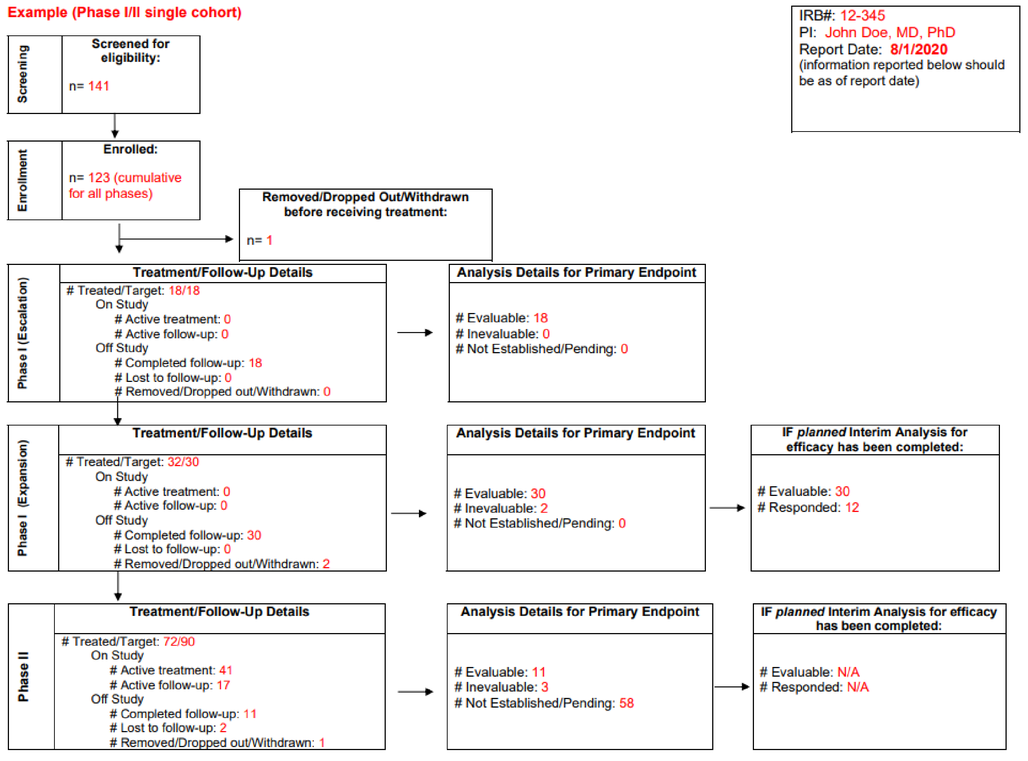
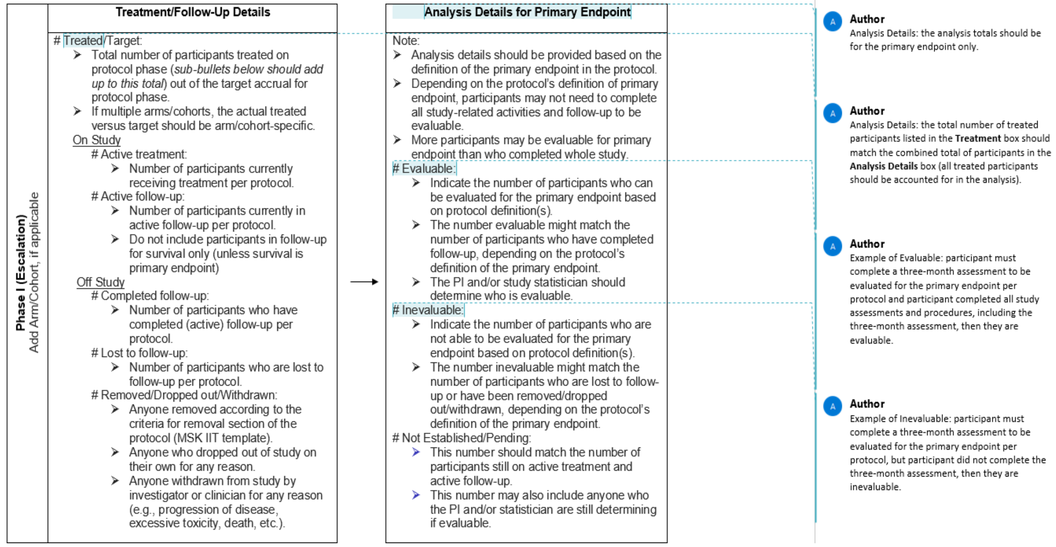


Figure 4: Excerpt of Consort Diagram Guidance Document for Phase Studies



Outcomes

- Implementing the consort diagram has had a positive impact on all stakeholders:

DSMC Administration:
Easily identifies protocols eligible to be removed from monitoring

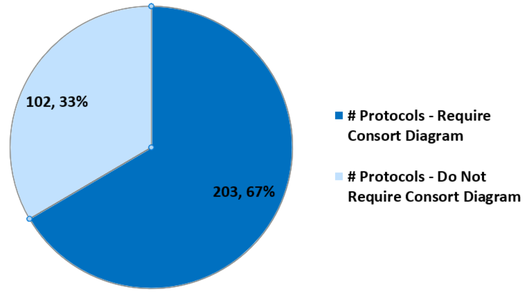
Principal Investigators, Study Staff & Statisticians:
Facilitates data analysis and publication by tracking participants and engaging biostatistical input throughout the lifecycle of the study

DSMC members:
Improves monitoring by highlighting withdrawal and inevaluable rates, data errors, and protocol non-compliance (i.e., following design/analysis plan)

All:
- Fosters data integrity by providing a platform that can be easily followed at each requisite timepoint of monitoring
- Improves understanding of participant flow within a trial, and overall study status
- Clarifies study analyses details (i.e., evaluable participants for a specific endpoint, interim analysis details)

- The requirement impacts 67% of the DSMC portfolio (Figure 5).
- 74% are therapeutic trials and 71% are phase trials.
- 60% are from the Department of Medicine.

Figure 5: Impact of Consort Diagram Requirement on DSMC Portfolio



Lessons Learned and Future Directions

- The consort diagram requires adaptation to fit varied and non-traditional study designs.
- Plan to transition to a 'smart' (electronic) form and potentially pool data from multiple data sources.
- Expand beyond DSMC to other key committees (e.g., IRB, INDC) and as a template for investigators (e.g., accrual monitoring, federal reporting, publication).