

OHDSI Network Study Execution Framework v2.0: A Standardized Model for Reproducible Project Management of Network Studies for Successful Completion

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Background

Real-world evidence (RWE) generated across networks of real-world data repositories using the OMOP Common Data Model (CDM) can address clinically meaningful questions with enhanced external validity compared to randomized trials.^{1,2} The FDA has emphasized increased use of RWE,³ and OHDSI network studies are a leading strategy for answering this call.^{1,4,5} To enhance rigor and reproducibility, an OHDSI Network Study Execution Framework was previously introduced to outline the key stages of study design and execution.⁶ Building on that work, the framework has been iteratively refined through multistakeholder engagement with clinician-scientists, informaticists, and experienced network study leaders.

Objectives

This work presents an updated OHDSI Network Study Execution Framework that defines the key process stages common across network studies to improve repeatability, reproducibility, and shared expectations. Its central contribution is the formalization of an expanded Base Camp stage, encompassing team formation, project management strategy, role assignment, and ETL evaluation and enrichment, as the foundational preparation that enables rigorous execution of all subsequent stages.

Methods

An iterative multistakeholder refinement process was undertaken with individuals experienced in leading OHDSI network studies, informaticists, and clinician-scientists. Emphasis was placed on study feasibility assessment, phenotype development and evaluation, data fitness, and reproducible execution. This process surfaced the need to formalize the preparatory work preceding protocol development, leading to an expanded Base Camp stage decomposed into discrete operations, team formation, project management strategy, role assignment, and ETL evaluation and enrichment, derived from the recurring realities reported by experienced study teams.

Results

The updated framework identifies ten stages of network study execution, in order: Base Camp, protocol development, data diagnostics, phenotype development, phenotype evaluation, analysis specifications, network execution, study diagnostics, evidence synthesis, and results evaluation (Figure 1). The addition of Base Camp reflects the importance of multidisciplinary preparation, informatics expertise, feasibility assessment, and foundational planning prior to protocol

development. Although presented as successive stages, execution is inherently iterative and non-linear: as in a mountaineering expedition, investigators may advance, encounter limitations requiring reassessment, and return to prior stages before continuing the ascent. Phenotype evaluation may require revised computable phenotypes, data diagnostics may reveal feasibility constraints prompting protocol modification, and study diagnostics may prompt refinement of analytic specifications. The framework is therefore structured but adaptive.

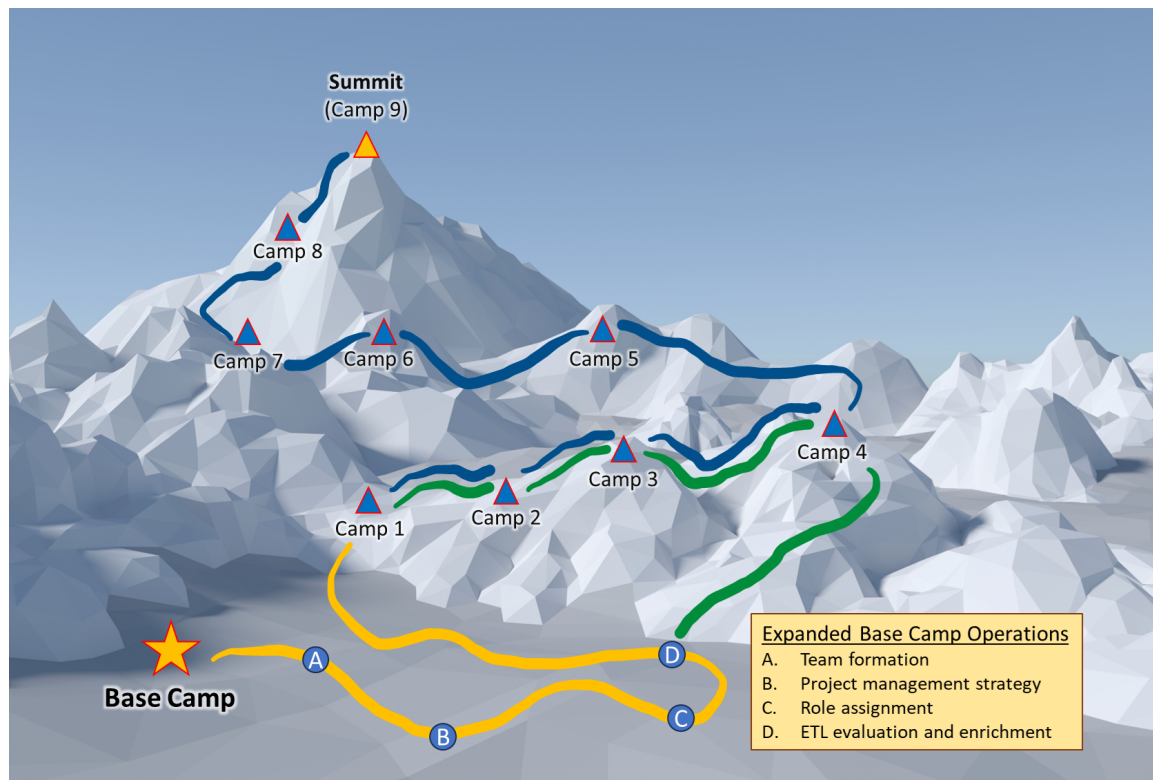


Figure 1. Ten Stages of an OHDSI Network Study Expedition, with Expanded Base Camp Operations (team formation, project management strategy, role assignment, and ETL evaluation and enrichment).

Expanded Base Camp Operations

The principal refinement in v2.0 is the formalization of Base Camp as the foundational stage of every expedition. Whereas the original framework began at protocol development, feedback consistently identified that a study's success is often determined beforehand, during the work of assembling the right people, establishing how they will collaborate, and confirming that the underlying data are fit for purpose. Base Camp makes this phase explicit and decomposes it into four interdependent operations (Figure 1):

Team formation (A) assembles the multidisciplinary party, clinical domain experts, informaticists, statisticians, and data partners, early enough that each shapes the study question rather than merely reacting to it, so feasibility, clinical relevance, and methodological rigor are considered jointly from the outset.

Project management strategy (B) defines how the team coordinates across the long, non-linear ascent, communication channels, version-controlled repositories, documentation conventions,

decision-making, and timelines, converting a loose collection of collaborators into a coordinated network that sustains momentum through iterative reassessment.

Role assignment (C) clarifies responsibility for each subsequent stage, designating the study lead, phenotype developers, analysts, data-partner liaisons, and manuscript leads. Explicit roles reduce duplicated effort, prevent critical tasks from being missed, and set clear expectations for contribution and authorship.

ETL evaluation and enrichment (D) assesses the readiness of each site's extract-transform-load pipeline and OMOP CDM instance, identifying gaps in vocabulary mapping, source coverage, and data quality and enriching the CDM before the study depends on it, protecting downstream phenotyping, analysis, and evidence generation from avoidable rework.

Together, these operations constitute the acclimatization required for a successful expedition. Investing in them before protocol development lowers the barrier to entry for novice study leaders and data partners, strengthens the rigor of every subsequent stage, and reflects the reality that the work done at Base Camp determines how far a network study can ultimately climb.

Following Base Camp, protocol development solidifies the research question, study lead, team, and data-partner recruitment; data diagnostics determine which databases can answer the question. Phenotype development creates concept sets defining cohorts, and phenotype evaluation assesses their validity. Analysis specifications determine the best methods, after which network coordination becomes the focus of network execution. Sharing results across sites marks the transition to study diagnostics, where statistical power, equipoise, covariate balance, generalizability, and systematic error are assessed. Evidence synthesis selects the most appropriate representations of results, and results evaluation interprets the clinical meaning communicated to the broader community.

Conclusion

OHDSI network studies share substantial methodological commonality and recurring scientific, operational, and coordination challenges. The updated framework provides a structured yet adaptive approach for organizing study progression while supporting the rigor and reproducibility required for real-world evidence generation. As in a mountaineering expedition, teams may progress, reassess, and return to earlier stages before continuing the ascent. The central advance of this version is the formalized Base Camp stage, which underscores that successful expeditions begin well before protocol development, through deliberate investment in team formation, project management strategy, role assignment, and ETL evaluation and enrichment. By making this preparatory work explicit and decomposing it into concrete operations, the framework lowers barriers to participation and strengthens the foundation on which every subsequent stage depends. Continued refinement and adoption by the OHDSI community will be essential to maximize its scientific and operational utility.

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