CHEERS sampling and visit planning

The CHEERS way module 1

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This CHEERS documentation guides research teams through defining the population frame, selecting nested samples and planning visits across time and space. It draws on the Nouna HDSS 2.0 experience and CHEERS workshop materials. Adapt the workflow with the local HDSS team and study statistician before field implementation.

The Nouna figures below describe a historical design example. They are not a sample-size recommendation, evidence of current recruitment or a requirement for another site. The study statistician and local HDSS team must agree the target population, design and analysis before selection.

The Nouna example

The 2024 Nouna HDSS 2.0 workshop materials describe approximately 15,000 households, a nested morbidity sample of about 1,500 households, 52 weekly allocations and 20 operational sub-zones. Each sub-zone was assigned to a field worker. A weekly allocation could contain geographically dispersed households. The materials describe about 289 surveillance households and 29 morbidity households per week, with a proposed four-week shift in visit timing for the next round. These rounded weekly counts should not be multiplied into a final sampling register without reconciling the annual totals.

Design terms to reconcile

The April 2022 sampling-principles note describes spatial clusters of adjacent villages or neighbourhoods with randomised weekly order. The 2024 operational review describes weekly sub-samples whose households need not be adjacent, with field work organised within operational sub-zones. The 2023 framework paper also uses the term cluster for weekly allocation. A new protocol must define its sampling units, allocation units and operational zones explicitly; these terms should not be treated as interchangeable.

Population frame and sample selection

1 Establish a dated population register

Start with the existing HDSS register. Record its date, geographic coverage, household definition and eligibility rules. Resolve duplicate households, inconsistent membership and duplicate or missing identifiers with the register team. Confirm whether apparently empty households are vacant, temporarily absent or outside the study definition. Preserve the original register and a log of corrections and exclusions. If the register is incomplete, document the gaps and agree an update or additional household listing with the HDSS team before selection. Reconcile new records and identifiers, define the population covered, and date the resulting frame. If gaps remain, record the excluded areas or groups and their implications with the statistician before proceeding.

Output A dated sampling frame, a correction and coverage log, and counts of eligible households and individuals. Record any remaining coverage gaps and agreed action.

2 Separate the study populations and components

Define the coverage of vital-event registration, the nested morbidity sample and each wearable or environmental sub-study. State the selection unit for each component. Do not assume that every household in a morbidity sample must receive a wearable or indoor sensor.

Output A component-specific eligibility and sample specification linked to the same population frame.

3 Specify the statistical design

Agree the sampling unit, any stratification or clustering, target sample size and allocation with the study statistician. Document the rationale and selection probabilities. Name the geographic strata, weekly allocation units and field-worker zones separately. Define how repeat observations and refreshment samples will be handled.

Output A written design specification and a reproducible selection procedure.

4 Select and preserve the sample

Run the agreed random-selection procedure against the frozen frame. Save the code, software version, seed if used, input version, selection date and selected identifiers in controlled storage. Check uniqueness, eligibility and counts. Keep personal identifiers and household locations outside public documentation.

Output A checked selection record with an audit trail and access controls.

Visit allocation and field review

5 Allocate visits across time and space

Prepare a calendar covering the intended seasons. Check coverage within each geographic stratum and workload for each operational team. Allocate integer household counts and reconcile them to the exact sample total. Specify whether weekly groups contain adjacent or dispersed households and how visit order is generated.

Output A checked visit calendar and counts by week, stratum and study component.

6 Define response and change rules before fieldwork

Record the agreed procedures for absence, refusal, migration, new households, repeat visits and interrupted field access. Distinguish a deferred visit from a replacement household. Keep nonresponse visible and preserve the reasons for changes. Approve any replacement or refreshment procedure within the sampling protocol.

Output A visit-outcome code list, revisit rules and an amendment record.

7 Check identifiers and event histories during collection

Verify that returning household members retain their identifiers and that household changes are recorded consistently. Check event dates and previous reports to reduce duplicate event records. Reconcile visit dates with the period each household contributes to follow-up. The workshop materials highlight identifier harmonisation and completeness of vital-event and morbidity reporting as practical field concerns.

Output Regular identifier, event-history and completeness checks with documented corrections.

8 Review realised coverage and analysis implications

Compare planned and completed observations by week, geography and study component. Review delays, missing groups and differential nonresponse. Provide the statistician with the sampling specification, selection probabilities and realised field outcomes. Agree any weighting or design-aware analysis from this record, rather than inferring weights from rounded targets.

Output A coverage report and a documented analysis handover.

Illustrative arithmetic only: if a study selects exactly 1,500 households for 52 weekly allocations, 44 weeks of 29 households and 8 weeks of 28 households total 1,500. This reconciles counts only. It does not specify the randomisation or ensure seasonal or geographic balance; those properties require a separately defined allocation procedure.

Sampling plan worksheet

Complete the fields for the proposed study. Keep participant-level registers and locations in the approved research environment. This worksheet records study decisions and links to those controlled files.

Decision to record	Local study specification
Study and setting	
Local lead and sampling reviewer	
Protocol and frame versions	
Eligible population and sampling unit	
Components and target sample sizes	
Strata and geographic allocation units	
Weekly allocation and observation period	
Selection method and reproducibility record	
Nonresponse revisit and change rules	
Coverage checks and analysis handover	
Review decision date and version	

Points for local review

Confirm the frame version, selection and weekly allocation units, seasonal coverage, change rules, selection probabilities and between-round visit intervals with the local HDSS team and sampling reviewer.

Sources

1. CHEERS and HDSS workshop materials. Review of the Nouna HDSS 2.0 manual, 2024. Slides 4 to 12 cover sampling and time-space allocation; slides 13 to 16 cover field-quality lessons. This planning guide is an adaptation for site-specific review.

2. Sampling principles for both HDSS 2.0 and nested morbidity/economy module. Planning note dated 13 April 2022. Used to identify the alternative spatial-cluster design; the note contains unresolved frame-reconciliation questions and is not treated as a final protocol.

3. Barteit S et al. Frontiers in Public Health. 2023;11:1153559. Section 2.4. https://doi.org/10.3389/fpubh.2023.1153559