# SQUEAC and SLEAC Case Studies

The case studies presented in this section were written by experienced SQUEAC and SLEAC practitioners and were drawn from their experiences applying the SQUEAC and SLEAC methods and in training others to use the SQUEAC and SLEAC methods.

The first three case studies provide insight into defining priors for programs with varying levels of coverage. The opening case study describes how the prior of a very high (> 80%) coverage program was defined. This is followed by a case study of defining a prior for a program with a moderate (about 50%) coverage. The third case study is an example of a prior that was set unrealistically high and illustrates the need for realism when defining the prior.

The next five case studies describe various sampling strategies that have been applied in conducting SQUEAC likelihood surveys. Two of these case studies illustrate techniques to address issues frequently encountered when selecting villages in the first-stage sample of the likelihood survey. One case study shows what to do when there are no maps or lists of villages or when the available maps and lists of villages are not useful. The other case study illustrates the use of satellite imagery for selecting and mapping areas to survey. The next three case studies present the use (and misuse) of active and adaptive case-finding during the within-community sampling stage of the likelihood survey. The lessons of these case studies also apply to small studies and small-area surveys that use active and adaptive case-finding. The first of these three case studies describes how to conduct active and adaptive case-finding in a rural setting. This is followed by a case study of how active and adaptive case-finding was adapted for use in an internally displaced persons (IDP) camp setting. The third case study shows how the use of active and adaptive case-finding may fail in urban settings and suggests alternative sampling strategies.

The final two case studies are special cases. One case study describes an investigation of 'hidden defaulters' through triangulation of various information and data. The final case study presents the application of SLEAC to the assessment of the coverage of a national CMAM program.

## Case Study: Defining a Prior for Very High Coverage Programs

This case study describes a method that may be used to define a prior for a program in which coverage is believed to be very high (> 80%). It is taken from a SQUEAC assessment of the coverage of a program implementing community-based management of SAM, acute respiratory infection (ARI), and diarrhoea delivered by CHWs within a growth monitoring and promotion (GMP) program in Southern Bangladesh.

### *The Prior*

**Table 7** summarises the findings of the initial SQUEAC assessment of the program. Negative findings are highlighted in the table and are described in more detail in **Table 8**. The collected data indicated that coverage was likely to be very high.

The probable range of the impact on coverage associated with each negative finding was decided by presentation and consideration of the available data with program staff, including CHWs (see Table 8). The prior was defined by assuming that coverage could be 100% (no uncovered cases were found in small-area surveys of probable poor coverage areas) and that a reasonable prior could be defined by accounting for the probable range of impacts on coverage associated with the negative findings in the collected data.

**Table 7.** Summary of the findings of the initial SQUEAC assessment

| Method | Source | Topic | Summary findings* |
|---|---|---|---|
| Quantitative | Routine data | Admissions | Consistent with high coverage |
| | | Cure, default, etc. | Consistent with high coverage |
| | Patient records | Admission MUAC | Consistent with high coverage |
| | Small-area surveys | Coverage | No uncovered cases found |
| | GMP coverage data | Coverage | GMP coverage below 100% |
| Semi-structured interviews | Carers of active cases | CHW activities | Regular screening |
| | | | Watch-list system |
| | | | CHWs recruit carers |
| | | | Post-discharge screening |
| | | | CHWs well regarded |
| | | SAM - Aetiology | Infection |
| | | | Infection-nutrition cycle |
| | | | Early weaning |
| | | | Household economy |
| | | SAM - Awareness | Signs recognised |
| | | | Treatable |
| | | | Preventable |
| | | Pathways to care | CHW case-finding |
| | | | Self-referral welcomed by CHWs |
| | | | Community referrals welcomed by CHWs |
| | | | No referrals from hospital |
| | | | Referrals between CHWs |
| | | 'Coverage' | Migrating children not covered |
| | | | Islamist agitation against the program |
| | CHWs | Case-finding | Small catchment for each CHW |
| | | | ARI and diarrhoea cases screened |
| | | | Integrated with GMP and EPI |
| | | | Referrals from village doctors/pharmacists |
| | | | Self-referrals |
| | | | Referral by community leaders |
| | | | Routine screening |
| | | | Weekly screening of borderline cases |
| | | | No referrals from hospital |
| | | Logistics | No problems with RUTF and SAM drugs |
| | | | Problems with supply of ORS and ARI drugs |
| | | | RUTF well accepted |
| | | Awareness | MUAC had raised awareness of SAM |
| | | | Acceptance of program by 'grandmothers' |
| | | | Islamist agitation against the program |
| | Key informants | Several | Program accepted, well known, well regarded |
| | | | Informants recruited as case-finders |
| | Community leaders | Several | Program accepted, well known, well regarded |
| | | | Informants recruited as case-finders |
| | | | Regular contact with program staff |
| Informal group discussions | Male-only groups | Several | Limited awareness of the program |
| | Female-only groups | Several | Good awareness of SAM |
| | | | Good awareness of the program |
| | Mixed sex groups | Several | Limited awareness in males. |
| | 'Baday' nomads | Several | No awareness of the program |
| | | | No contact with the program |

* White cells indicate positive findings (boosters), shaded cells indicate negative findings (barriers).

**Table 8.** Summary of the assessed effects of the identified barriers

| Barrier | Probable impact (percentage points)* | | |
|---|---|---|---|
| | Maximum | Most Likely | Minimum |
| **GMP coverage below 100%**<br>Government and NGO sources estimated the coverage of GMP services to be about 95%. A few sub-villages without GMP coverage were found in some villages. Informal group discussions with female caregivers in these communities indicated that distance from GMP stations was an issue only in areas where women's movements were restricted to their immediate home neighbourhood. The program recruited cases by means other than screening at GMP sessions, but it was believed likely that some SAM cases may have remained undetected in areas where GMP coverage was poor. | 10% | 5% | 5% |
| **No referrals from hospital**<br>Program staff and CHWs were confident that SAM cases discharged from hospital would be identified and admitted shortly after their return home. This was confirmed by a small study. This problem had already been identified by program managers and staff appointed to review hospital discharges and create watch lists for CHWs. It was thought likely that cases may remain uncovered for a maximum of about 2 weeks. | 5% | 1% | 0% |
| **Migrating children not covered**<br>Program staff, CHWs, and community members were confident that SAM cases entering the area would be picked up by CHWs shortly after their arrival in the program area. | 5% | 1% | 0% |
| **Islamist agitation against the program**<br>A small study indicated that some agitation against the program had occurred at the start of the program but was **not** ongoing at the time of the SQUEAC assessment. | 2% | 1% | 0% |
| **Problems with supply of ORS and ARI drugs**<br>Further interviews with CHWs suggested that problems with the supply of ORS and ARI drugs may have had an effect on the timeliness of case-finding, because carers of children with diarrhoea or ARI tended to seek care from village doctors or pharmacists. CHWs reported that village doctors and pharmacists usually referred such cases to them for screening. This was confirmed by interviews with village doctors and pharmacists. | 5% | 2% | 0% |
| **Limited male awareness of SAM and the SAM program**<br>Care decisions in the program area were made by the mother and grandmother of the case. Very little impact expected. | 1% | 0% | 0% |
| **Exclusion of nomads**<br>A small survey that screened all children in the nomad troupes present in the program area at the time of the SQUEAC assessment found **no** SAM cases. There is only a small number of nomads in the program area at any one time. | 1% | 0% | 0% |
| **Sums of probable impacts** | 29% | 10% | 5% |

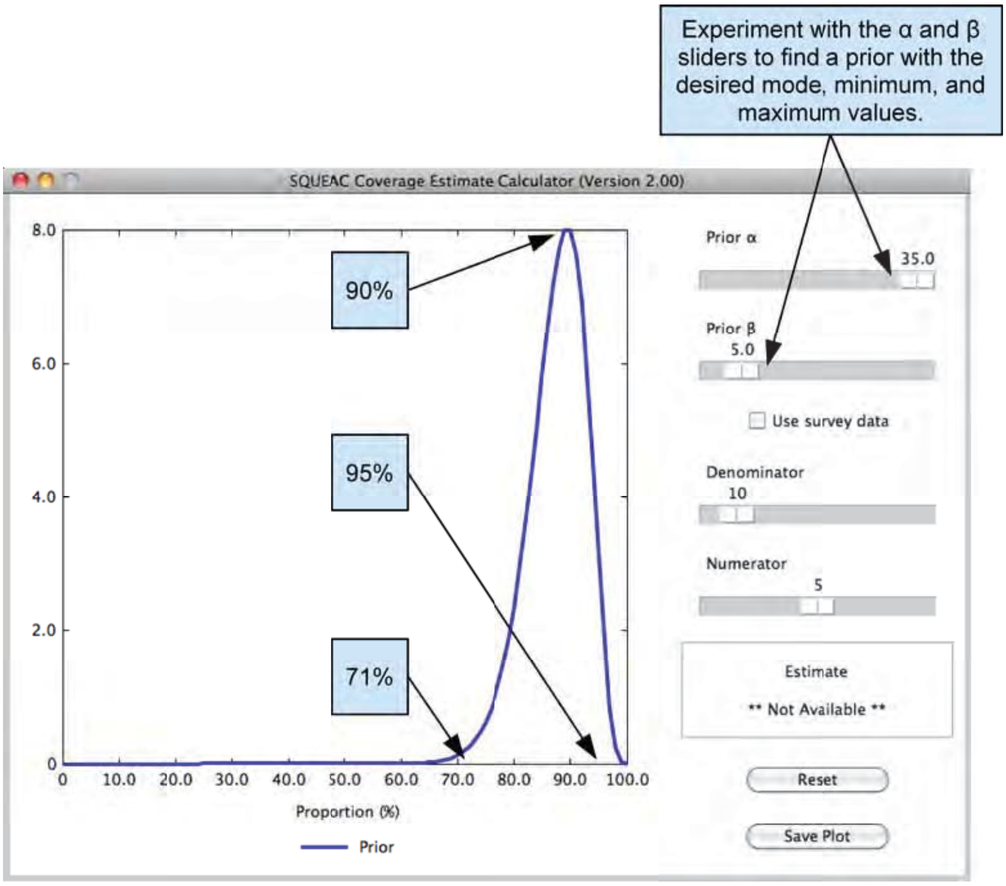
* Expected magnitude (in percentage points) of the drop in coverage associated with the listed barrier

The mode and range of the prior was decided using the probable impacts of the identified barriers:

| Prior parameter | Value |
|---|---|
| Mode | $100\,\% - 10\,\% = 90\,\%$ |
| Lower limit | $100\,\% - 29\,\% = 71\,\%$ |
| Upper limit | $100\,\% - 5\,\% = 95\,\%$ |

Suitable $\alpha_{Prior}$ and $\beta_{Prior}$ parameters for the prior were found by experimenting with the **BayesSQUEAC** calculator to find a combination of $\alpha_{Prior}$ and $\beta_{Prior}$ parameters that yielded a prior with the desired mode, minimum, and maximum values (**Figure 72**).

**Figure 72.** Finding suitable $\alpha_{Prior}$ and $\beta_{Prior}$ parameters for the prior using **BayesSQUEAC**

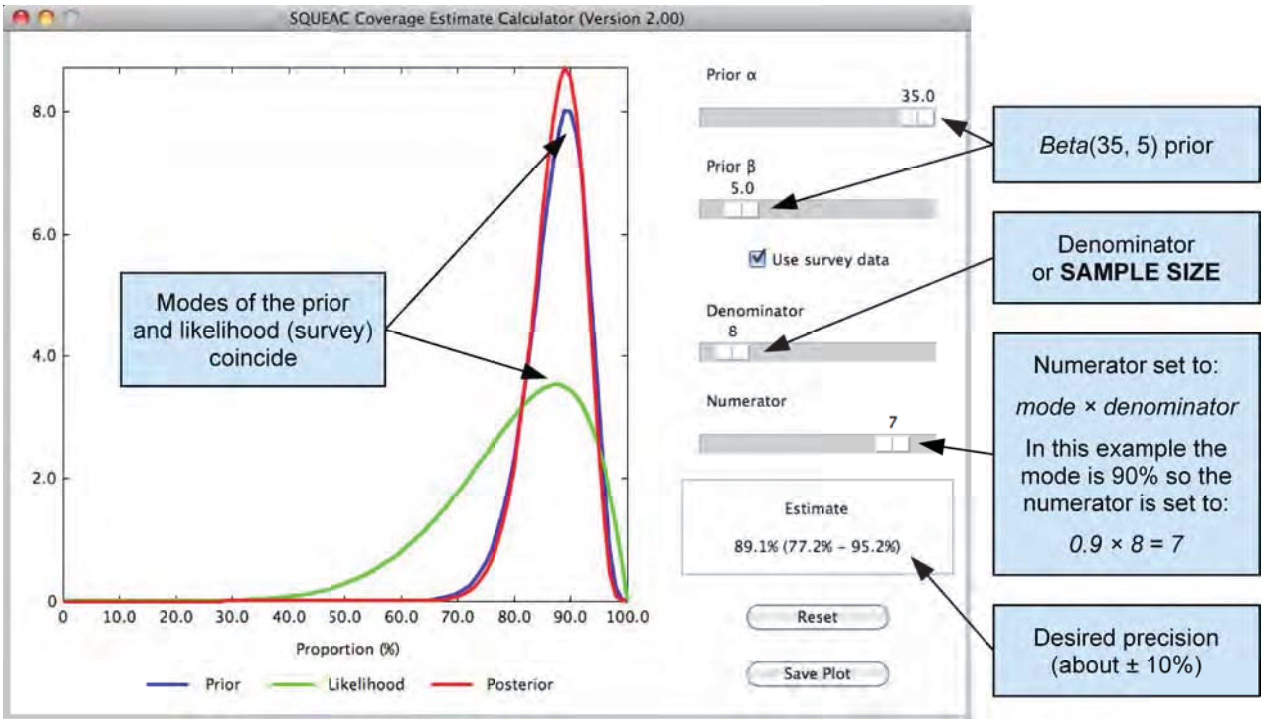



## *Sample Size and Sample Design for the Likelihood Survey*

The sample size for the *likelihood* survey was calculated, using the simulation approach with the **BayesSQUEAC** calculator (see **Figure 73**). The minimum sample size needed was found to be $n = 8$ current or recovering SAM cases. It was estimated, from program data and recent survey work that 13 GMP station catchment areas would need to be exhaustively sampled to find eight current or recovering SAM cases:

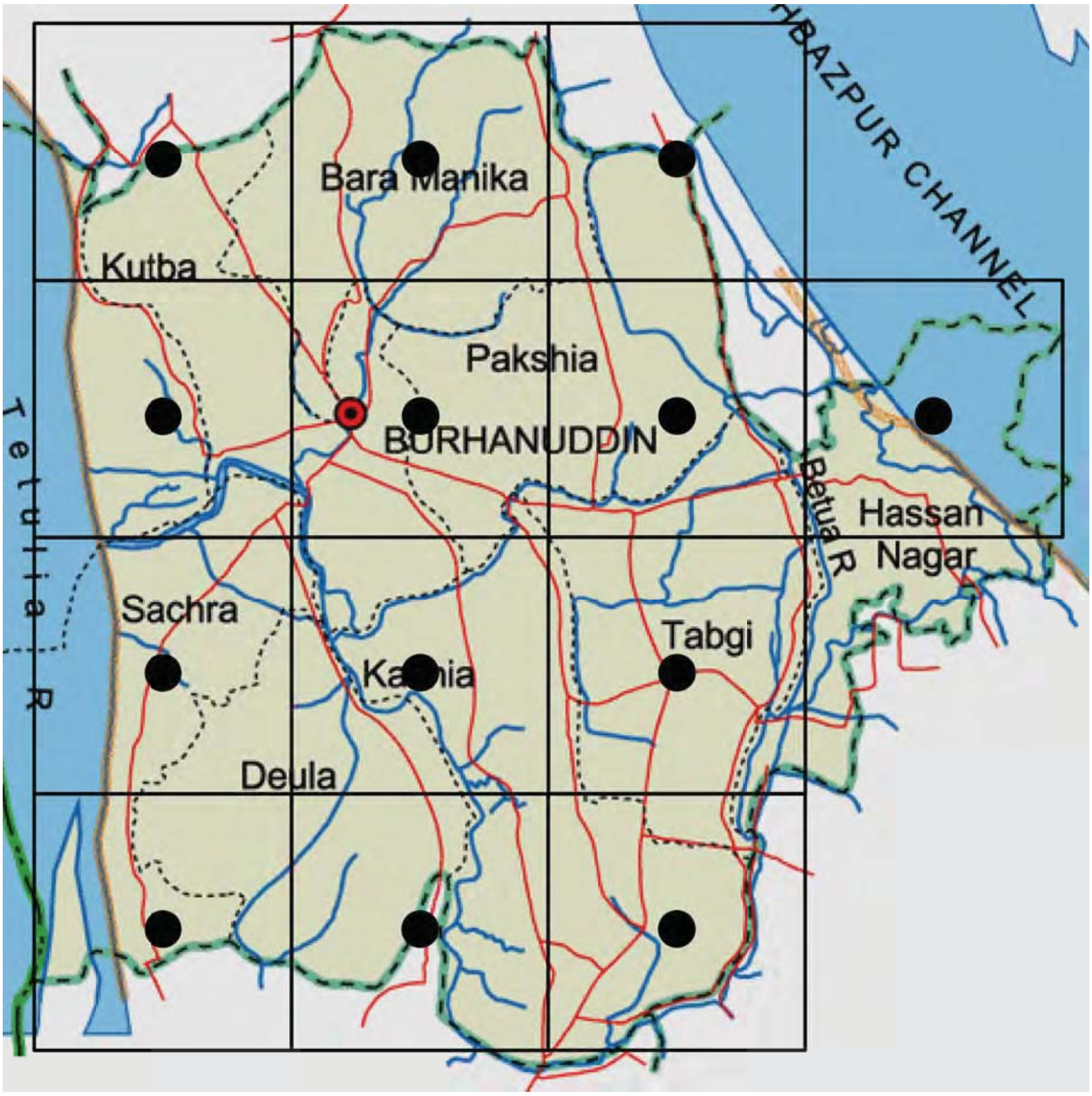
$$n_{GMP} = \left\lceil \frac{n_{cases}}{\text{average GMP catchment population} \times \frac{\text{SAM prevalence}}{100}} \right\rceil = \left\lceil \frac{8}{38.9 \times \frac{1.59}{100}} \right\rceil = \lceil 12.93 \rceil = 13$$

**Figure 73.** Finding the likelihood survey sample size by simulation using `BayesSQUEAC`




A grid (CSAS) sampling framework was used. Thirteen 3 km × 3 km quadrats were used to locate the primary sampling units (PSUs). PSUs were the catchment areas of the GMP station located closest to the centre of each quadrat (**Figure 74**). Active and adaptive case-finding was used to find SAM cases within the selected PSUs.

**Figure 74.** Grid (CSAS) sample used for the likelihood survey




The catchment areas of the GMP stations located closest to the centre or each quadrat (marked with a ●) were sampled using active and adaptive case-finding

## *Selecting the Appropriate Coverage Estimator*

The program admitted on MUAC < 110 mm or oedema. A tabulation of admission MUAC indicated case-finding, treatment seeking, and admission:

| | | Admission MUAC (mm) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Oedema | 108–109 | 106–107 | 104–105 | 102–103 | 100–101 | 98–99 | 96–97 | 94–95 | 92–93 | ≤ 90 |
| **Number of admissions** | 5 | 308 | 55 | 17 | 5 | 15 | 3 | 4 | 6 | 3 | 4 |
| **Proportion of admissions** | 1.2% | 72.5% | 12.9% | 4.0% | 1.2% | 3.5% | 0.7% | 0.9% | 1.4% | 0.7% | 0.9% |

The mean duration of treatment episode from admission to cure was 30.44 days. This is shorter than is seen in many CMAM programs and probably reflects timely case-finding, resulting in a patient cohort dominated by uncomplicated SAM cases.

Routine program monitoring statistics were:

| | | |
|---|---|---|
| **All exits** | 512 | |
| **Cured** | 478 | 93.4% |
| **Deaths** | 1 | 0.2% |
| **Non-response** | 1 | 0.2% |
| **Defaulters** | 32 | 6.2% |

Defaulting was highest in the first few months of program operation. CHWs reported that many defaulters had returned to the program as 'new admissions' and completed treatment. This was confirmed by a review of patient records.

The collected quantitative and qualitative data were consistent with a high coverage program with timely admissions and short length of stay, so the period coverage estimator:

$$\textit{Period coverage} = \frac{\text{Number of current and recovering cases attending the program}}{\left(\begin{array}{c}\text{Number of current and recovering cases attending the program} \\ + \text{ Number of current cases } \textbf{not} \text{ attending the program}\end{array}\right)}$$

was considered to be the most appropriate indicator of program coverage to use for this program.

The likelihood survey found:

| | |
|---|---|
| Number of current cases : | 1 |
| Number of current cases in the program : | 0 |
| Number of recovering cases in the program : | 6 |

The numerator for the period coverage estimator was:

$$\text{Number of current and recovering cases attending the program} = 6 + 0 = 6$$

The denominator for the period coverage estimator was:

$$\left(\begin{array}{c}\text{Number of current and recovering cases attending the program} \\ + \text{ Number of current cases } \textbf{not} \text{ attending the program}\end{array}\right) = 6 + 1 = 7$$

Data were analysed using the `BayesSQUEAC` calculator (see **Figure 75**). Coverage of the program was estimated to be 88.9% (95% CI = 76.8%–95.0%). The precision of the coverage estimate was slightly worse than expected from Figure 73 because the likelihood survey found fewer cases than expected.

**Figure 75.** Estimating *period coverage* using `BayesSQUEAC`