Case Study: Defining a Prior for Moderate Coverage Programs

This case study describes how the prior for a program with coverage between the typically observed limits of about 20% and 80% can be defined. The case study is taken from a SQUEAC investigation of a program implementing CMAM in an east African country. The intervention was implemented through selected government primary healthcare centres and supported by an international NGO.

Figure 76 presents a simplified mind map of the SQUEAC investigation findings. **Table 9** summarises boosters and barriers to coverage found in the SQUEAC investigation and triangulated by source and method.

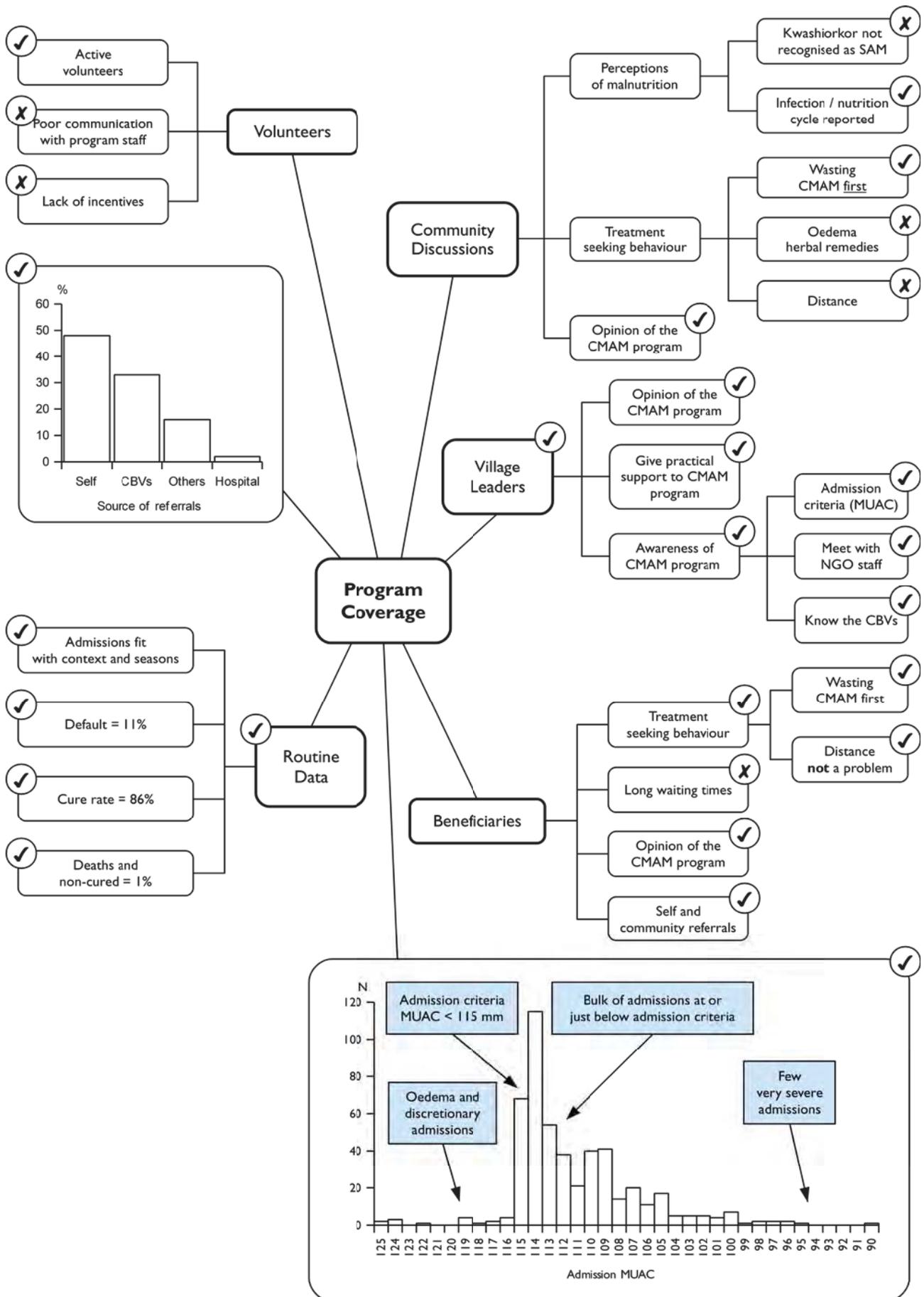**Figure 76.** Simplified mind-map for the SQUEAC investigation findings

Table 9. Boosters and barriers to coverage found in the SQUEAC investigation

Boosters	Findings
High numbers of self-referrals High numbers of peer-to-peer referrals Volunteer referrals respected	Data on referral source showing about 50% of admissions are self-referrals.
	Informal group discussions with program beneficiaries found that other mothers with children in the program were referring cases.
	Case histories of children currently in the program found that many came to the program after having been referred by volunteers.
Early treatment-seeking behaviour	Plots of MUAC on admission revealed that the majority of cases were admitted at or close to the programs admission criteria.
	Informal group discussion with program beneficiaries found that carers were seeking care at CMAM sites when they thought that their child was wasting or wasted.
	Informal group discussions with the community members found that they sought care at the CMAM clinic for wasting.
Community perception of wasting is consistent with program case definition	Community members, community-based volunteers, and program beneficiaries all identified and described wasting consistent with the program's case-definition of wasting.
General community understanding and acceptance of program admission criteria	Community members, community-based volunteers, and program beneficiaries all understood and accepted the program's admission criteria.
Discretionary admissions	Examination of plots of MUAC at admission revealed a number of admissions with MUAC above the program admission criteria but without oedema. Discussions with program staff revealed that these were discretionary admissions based on visible severe wasting or moderate wasting with infection. Staff reported that they felt that they should err on the side of sensitivity (or caution) rather than specificity.

Barriers	Findings
Movement of nomadic populations	Mapping of defaulters found high defaulting in nomadic populations.
	Case histories of recent defaulters revealed that movement as part of nomadic practices was an important reason for defaulting.
	Interviews with community leaders and NGO staff found that nomadic populations were most prone to defaulting.
Disconnect between volunteers and the program staff	Observations during CMAM sessions at clinics revealed that volunteers did not perform any specific function.
	Interviews with volunteers found that NGO staff did not routinely co-ordinate or communicate with volunteers.
	Interviews with NGO staff previously in charge of community mobilisation activities revealed that meetings with volunteers were not held regularly.
Lack of motivation for volunteers	Trend of admissions and defaulting revealed that program recruitment and retention was highest when volunteers were incentivised (e.g., by training sessions).
	Interviews with volunteers found that they felt unappreciated.
	Community leaders reported that volunteers needed more practical support from the program in order to perform their duties.
Kwashiorkor is not recognised by the community as treatable within the CMAM program	Community members, program beneficiaries, and community leaders all reported that *libai* and *lobute* (local terms for kwashiorkor) cannot be treated in the clinic.
Lack of communication between program staff and the community regarding CMAM schedule	Program beneficiaries, community-based volunteers, and NGO staff all reported a recent lack of co-ordination and communication between the program and the community regarding the schedule of clinic days.

The findings suggested a moderate level of coverage (about 50%), with boosters and barriers appearing to mitigate each other. The prior was determined by ranking and weighting the boosters and barriers according to their perceived relative contribution to overall coverage. The weights were then summed for the positive and negative factors. The sum of the weights of the boosters was added to 0%. The sum of the weights of the barriers was subtracted from 100%. The resulting figures were then averaged to come up with the mode of the prior. The mode of the prior was located at 50%. This process is summarised in **Table 10**.

Table 10. Ranking and weighting of boosters and barriers to find a credible prior mode

Rank	Boosters	Weight	Rank	Barriers	Weight
1	Self-referrals	+5%	1	Lack of communication between volunteers and program staff	-5%
2	Early treatment-seeking behaviour	+4%	2	Lack of information dissemination from program staff regarding OTP schedule	-3%
3	Perception of wasting consistent with program definition	+3%	3	Motivation of volunteers	-3%
4	Population understands and accepts criteria for admission	+1%	4	Kwashiorkor **not** seen as treatable	-2%
5	Discretionary admissions	+1%	5	Nomadic populations	-1%

Sum :	+14%
Lower value anchor :	0%
Total :	14%

Sum :	-14%
Upper value anchor :	100%
Total :	86%

$$Prior\ mode = \frac{14\% + 86\%}{2} = 50\%$$

The range of the prior was decided by drawing a histogram prior. This was done as a group exercise involving the SQUEAC investigation team. The histogram was drawn on flipchart paper:

1. The peak of the histogram was set at 50%, since this was the most credible value for coverage consistent with the available data.

2. Highly unlikely values were identified by starting at 0% and asking 'Do we believe coverage could be 0%?' and 'If not, then why not?'. This was repeated for 10%, 20%, 30%, etc., until a level of coverage that was not extremely unlikely was identified. At each step, the available data were reviewed and debated. It was agreed that coverage was unlikely to be below about 30%.

3. Step 2 was repeated starting at 100% and working down in 10% steps (i.e., 90%, 80%, 70%, etc.) until a level of coverage that was not extremely unlikely was identified. At each step, the available data were reviewed and debated. It was agreed that coverage was unlikely to be above about 70%.

4. The group was then asked to judge how likely coverage was to be 30%, 35%, 40%, 45%, 55%, 60%, 65%, and 70%. At each step, the available data were reviewed and debated.

This process is illustrated in **Figure 77**. Sufficient information to define the prior for this SQUEAC investigation was available after Step 3 of this process was completed. Step 4 is usually required when the prior mode is considerably above or below 50% and the histogram prior is not symmetrical about the mode, as in **Figure 78**.
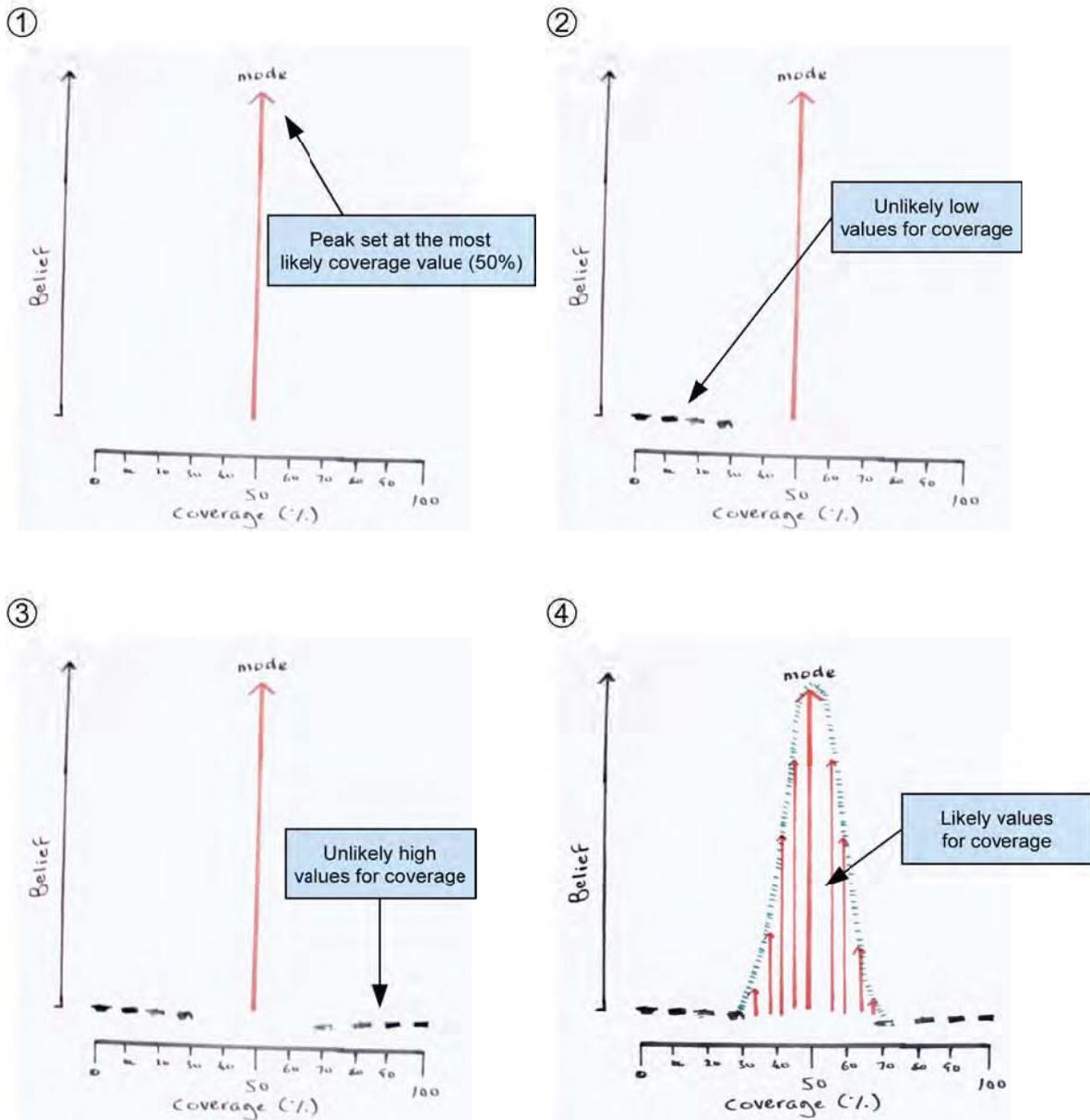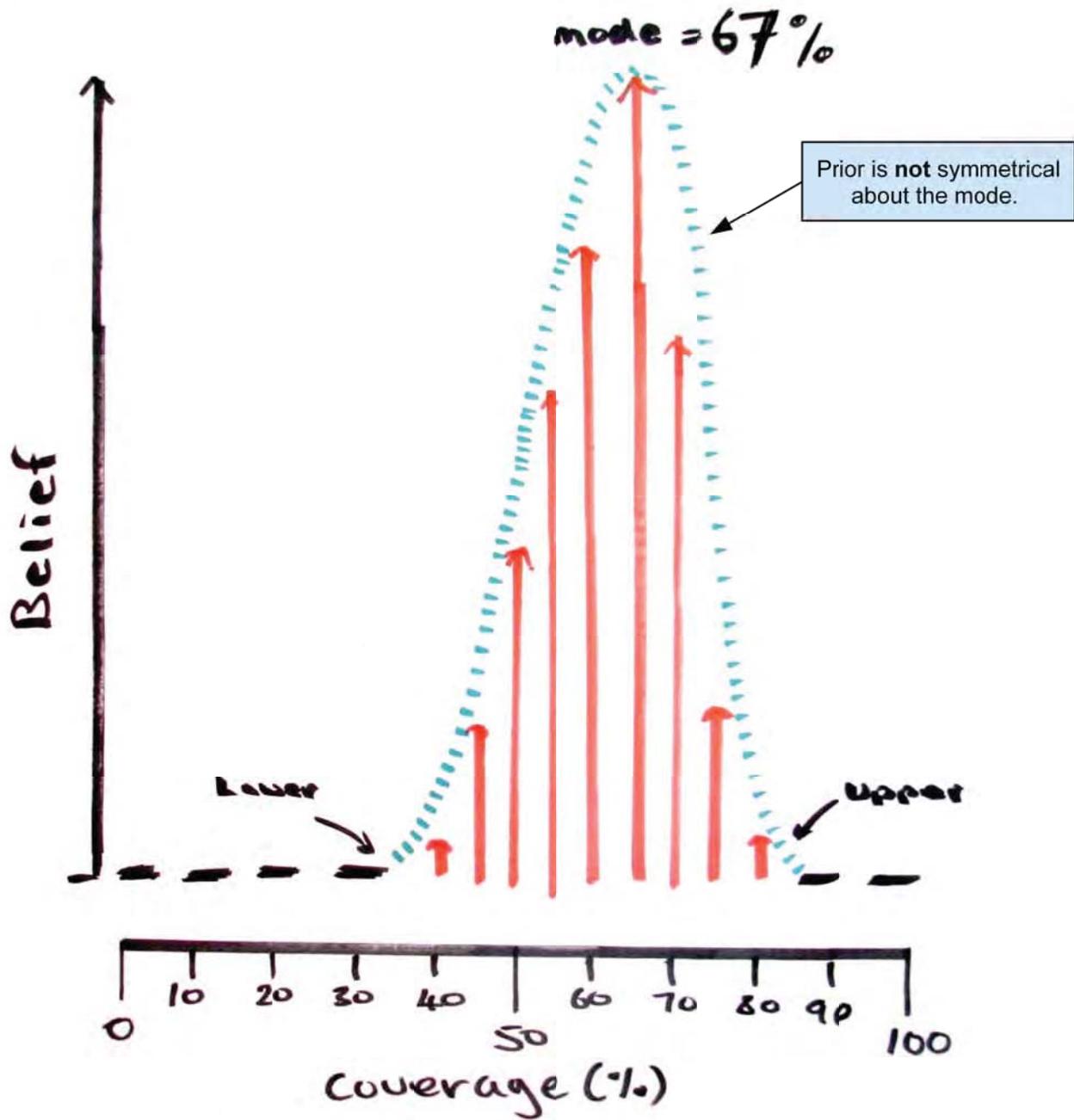
Figure 77. Building the histogram prior

Figure 78. A prior that is not symmetrical about the mode

This process generated a prior range of 30% to 70%. The α_{Prior} and β_{Prior} shape parameters for the prior were found by experimentation with the **BayesSQUEAC** calculator (see **Figure 79**). A *Beta*(15.4, 15.4) summarised prior belief as described by the histogram prior.

Subsequent data collection and analysis revealed that the selected prior was reasonable (i.e., the prior and likelihood did not conflict and coverage was estimated to be 58%).

Figure 79. *Beta*(15.4, 15.4) prior matching the histogram prior developed in Figure 78