# *Does Sampling at Service Sites (Markets) produce biased estimates of maternal mortality? Examining selection bias in a new approach to sampling using the sisterhood method*

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## Introduction:

Sampling at Service Sites (Markets), or SSS-M, is a new approach to sampling that has been used to estimate maternal mortality indicators in Burkina Faso. Because the sampling is opportunistic rather than probability-based the possibility that these estimates are derived from an unrepresentative sample, and therefore biased, must be considered. Another potential source of bias is that the estimates of maternal mortality are calculated from information reported by respondents on the deaths of their sisters (the sisterhood method), so the representativeness of this group will also be explored, and we will look at whether their mortality patterns are similar to those found in the respondents' households. The data also provide an opportunity to determine which respondent characteristics are most closely associated with maternal mortality (of sisters and in their own households), and are therefore most relevant in assessing how representative a sample is for estimating mortality indicators.

The objectives of this study are:
1. To assess how representative the respondents in SSS-M are of the adult female population living in the same area.
2. To compare socio-economic characteristics between sisters and respondents to assess how representative the sisters of the respondents are of the adult female population living in the respondents' area.
3. To explore whether maternal mortality in respondents' households is associated with maternal mortality of their sisters.
4. To compare maternal mortality estimates derived from sisters with those from respondents' households.
5. To compare which respondent household characteristics are most strongly associated with maternal deaths to household members and to sisters.

## Methods:

Secondary analyses of existing data sets from a household survey in Hounde, and a census and a market place survey both in Ouargaye.

1. A maternal mortality survey was conducted in Ouargaye district of Burkina Faso in summer 2006 using an opportunistic sample of women in market places (SSS-M). Data were collected from 16,606 women aged 15-49 years and the direct sisterhood method was used to estimate maternal mortality indicators. Demographic and socio-economic characteristics of the survey respondents (household assets, age, fertility and education) were compared with those recorded in the Ouargaye census, described below (3). Characteristics of women in the survey were compared with data from the census to assess how representative the sample was of the general population (Objective 1).

2. A household survey was conducted in the Hounde district of Burkina Faso in autumn 2004 to obtain baseline information on women's demographic and socio-economic characteristics. To assess the similarity of respondents and their sisters, one sister was chosen at random and

respondents were asked similar questions about her characteristics. Dual data were collected from 1072 respondents, out of a total of 1272 sampled. Characteristics were compared between the respondents and the selected sisters at an individual and a group level, using paired t-tests and chi-squared tests (Objective 2).

3. A census was conducted in Ouargaye district of Burkina Faso in summer 2006 to obtain a measurement of maternal mortality based on deaths in the household, along with demographic and socio-economic characteristics. For a sample of households maternal mortality was also measured using the direct sisterhood method. Our analysis looked at whether there was an association between household deaths and deaths reported to sisters at an individual level (Objective 3). The MMRs obtained from both sources were compared (Objective 4). We also examined which household characteristics were most strongly associated with the two categories of maternal death using cross-tabulation with Fisher's exact test (Objective 5).

**Findings:**
1. The demographic and socio-economic characteristics of the respondents were similar to those of the women of reproductive age recorded in the census.
2. Sisters tended to have more assets that are suggestive of wealth than respondents.
3. Data suggest an association for all-cause female mortality between household mortality and sister mortality. There is no evidence of such an association for maternal mortality.
4. The two estimates of MMR obtained were very similar.
5. Household maternal deaths and sisterhood maternal deaths were found to be associated with different sets of household characteristics. Ownership of certain types of animal and farming equipment were associated with household maternal death; poverty and household construction were associated with maternal death to a sister.

**Conclusion:**
SSS-M is likely to have only a low level of bias and MM findings valid, this confirms the usefulness of the new approach for resource poor countries, with limited information systems. ortality indicators.