Zimbabwe is one of the few countries in Africa that have included questions on household deaths in two successive censuses, those of 1992 and 2002. In both censuses, additional questions were asked to identify deaths of women of reproductive age that occurred while the woman was pregnant, in childbirth or in the postpartum period (that is, to identify pregnancy-related deaths; some (usually large) proportion of such pregnancy-related deaths are maternal deaths, that is, deaths that are the direct or indirect result of the pregnancy). Both censuses also collected information on the lifetime fertility and date of most recent live birth for women aged 12 to 49. This paper focuses on the evaluation and adjustment of these data to estimate pregnancy-related mortality for Zimbabwe. In addition, the paper reviews similar data collected by intercensal surveys in 1997 and 2007.

Standard demographic techniques are used to evaluate the completeness of reporting in the censuses of all female deaths and of births. The completeness of reporting adult female deaths is assessed using the General Growth Balance (GGB) and Synthetic Extinct Generations (SEG) methods; since the population of Zimbabwe was affected by migration between 1992 and 2002, the two methods were applied to data for the age range 30 and over. Birth data were assessed using the P/F Ratio method; since fertility has been declining in Zimbabwe over the last two decades, the P/F Ratio method used was for synthetic cohorts. The proportions of deaths that were pregnancy-related were evaluated in two ways: through a comparison of the proportions by age of deaths that were pregnancy-related with the age pattern of fertility, and by comparison with a model developed for the 2005 global estimates of maternal mortality (WHO etc. 2007).

The results from these evaluations were used to adjust the basic data. For 1992, an earlier analysis (Stanton et al. 2001) had indicated that both female deaths and births were completely reported, so no adjustment was required. Initial analysis of the mortality data from the 2002 census indicates very different estimates of completeness according to whether the GGB or the SEG methodology is used: such differences in the results of the two methods usually occur if census coverage changes between the two censuses or in the presence of migration. Further analysis of the data, including at the sub-national level, is required to establish which of these two explanations is correct. The GGB methodology, applied to information for women 30 and over only, indicates an under-reporting (relative to average census coverage) of about seven percent, whereas the SEG methodology indicates under-reporting of close to 40 percent. The P/F Ratio method for synthetic cohorts indicates a small under-reporting in 2002 of about five percent. As a result of these adjustments, the 2002 pregnancy-related mortality ratio was adjusted upwards from an observed value of 1,070 per 100,000 live births to 1,095, the upward adjustment of deaths slightly exceeding the upward adjustment of births. The 1992 pregnancy-related mortality ratio for Zimbabwe was estimated to be 395.

The huge apparent increase in the pregnancy-related mortality ratio from the 1992 census to the 2002 census requires further exploration. Overall female mortality rose sharply from 1992 to 2002 as the HIV epidemic became mature; the female probability of dying between the ages of 15 and 60 is estimated on the basis of the GB analysis to have increased to 0.507 by 2002. It is likely that the relationship between the maternal

mortality ratio and the pregnancy-related mortality ratio changed as the HIV epidemic increased the background mortality risk of women of reproductive age. It is also likely that the HIV epidemic increased the true maternal mortality ratio by reducing the healthiness of HIV-positive women in pregnancy and delivery. More work is required to attempt to quantify these effects.

Data from the 1997 and 2007 intercensal surveys provide additional information about changes in overall female mortality, but underline the fact that surveys in general have samples that are too small to provide stable estimates of the age distribution of deaths (needed for the GGB/SEG analysis) and that are much too small to provide stable estimates of proportions of deaths that are pregnancy-related.

This analysis points to the feasibility of censuses in producing useful information about pregnancy-related and in some settings maternal mortality. Among other merits, censuses are capable of producing estimates which can depict differentials by demographic socio-economic characteristics of respondents at both national and sub-national levels, as is illustrated in this paper. It is therefore imperative for the 2010 Round of Population and Housing Censuses to include the necessary questions in order to serve as important data source for maternal mortality estimates for developing countries. It is also essential that further analytical work be carried out on the performance of the GGB and SEG methodologies and on the relationship between maternal and pregnancy-related mortality ratios under a range of settings.