

ENVIRONMENTAL AND SOCIOECONOMIC RISK FACTORS OF CHILDHOOD MORTALITY IN RURAL WESTERN KENYA

Extended Abstract

Background. The Demographic Surveillance System Area (DSA) of the Kisumu Health and Demographic Surveillance Systems (KHDSS) is one of the areas with the worst child survival outcomes in Kenya – 241 deaths per 1,000 live births in 2003. Although ostensibly a homogeneous, rural area, there is significant geospatial variability within the area that could influence both morbidity and mortality. We explored the geospatial distribution of child mortality in the DSA.

Design: The Kisumu Health and Demographic Surveillance Systems (KHDSS) was launched in September 2001 by the US Centers for Disease Control and Prevention (CDC) in collaboration with the Kenya Medical Research Institute (KEMRI). The DSA is located in Bondo and Siaya districts, Nyanza Province, with a population of 135,000 people in 2006. The area is divided in two by a tarmac road to Bondo Town, with Asembo in the south bordering Lake Victoria and Gem in the north. Village reporters living in the villages report every birth and death, including those among neonates. Verification of DSS residence is made before entering the child into the DSS birth and death tables. Under-5 mortality rates (U5MR) were calculated using these tables from May 1, 2002 to December 31, 2005 using 1,000 child-years as the denominator, where a child's cumulative time as a DSS resident contributed to the denominator. GPS coordinates of residences at the time of death and distances to nearby locations were calculated using ArcView software. Multivariate poisson regression that used the generalized estimating equation to account for household clustering was used to evaluate the effect of distance to roads, health clinics and streams on mortality.

Results. Among 50,416 children, the U5MR was 59.9 per 1000 person-years (py) (95% CI= 58.2, 61.6). The U5MR varied by village from a low of 21 per 1000 py to a high of 165 per 1000 py. Of the 54 villages in the highest mortality quintile, 50 (93%) were in Gem. High mortality villages tended to occur in clusters. Many villages in the lowest mortality quintile were in south Asembo near the lake.

Multivariable analysis showed that the U5MR increased by 12% for each additional kilometer that a child lived from a road served by public transport (RR=1.12, 95% CI: 1.06, 1.18, $p<.0001$). Increased mortality was also observed in children living near streams. Each additional 100 meters a residence was located away from a stream reduced mortality by 6.5% (RR=0.93, 95% CI: 0.90, 0.97, $p=.0013$). Living close to a clinic was not protective in multivariable analysis.

Conclusions. There was clustering of **childhood mortality** in the DSS. Easier access to a major road reduced mortality and proximity to a stream increased mortality due to unknown factors. These results could be used as a first step in prioritizing areas for further study of causes of mortality and public health interventions.