Mortality patterns during a war in Guinea-Bissau 1998–99: changes in risk factors?

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Background
The crude mortality rate of the whole population and the mortality of children <5 years of age are the common indicators of the severity of a complex emergency situation. However, these indicators rarely take account of differences in socioeconomic conditions and vulnerability.

Methods
We followed a population in Guinea-Bissau, which fled when fighting took place in the capital during the war in 1998–99. The population stayed close to the area of conflict and returned as soon as a cease-fire was negotiated. A peace treaty was signed after half-a-year. The following 6 months was a period of returning and re-settlement, even though two outbreaks of fighting occurred.

Results
In the first half-year the mortality rate was 78% [mortality ratio (MR) = 1.78; 95% CI 1.61–1.97] increased and mortality for children <5 years of age doubled (MR = 2.07; 95% CI 1.79–2.38). In the last 6 months of the war, mortality was slightly increased for children and not at all for the total population. In the first half-year, households living in better houses and having members with schooling were less affected. In the ‘re-settlement’ period two inequalities emerged; the largest ethnic group, Pepel, continued to have high mortality when the mortality of other groups declined; likewise girls continued to have an elevated mortality whereas mortality of boys declined.

Conclusion
Whereas specific ‘free’ interventions reduced social inequalities for the groups affected, for the total population health-inequalities were slightly amplified during the war. Once the population returned to their urban homes, mortality fell to pre-war levels even though some fighting continued, limited humanitarian aid was available and the pre-war infra-structure had not been re-established.

Keywords

Introduction
During complex emergency situations (CESs), the vulnerability of the affected populations is increased and the populations are exposed to a higher risk of diseases and malnutrition. Most of the evidence about the impact of CESs has come from refugees or displaced persons in camps, which were distant from the centre of conflict. During the war in Guinea-Bissau 1998–99, we followed a population that was internally displaced during periods of fighting but returned to their urban residence shortly after the fighting had stopped. Hence, throughout the war they stayed close to the centre of fighting and conflict.

The crude mortality rate (CMR) and the CMR of children under five years of age (CMRU5) are key health indicators1,2 and increases in these mortality levels have been used to characterize CESs. In non-emergency Sub-Sahara countries, the CMR of a population is expected to be ~0.4 per 10 000 per day and CMRU5 to be ~1.0 per 10 000 per day.3 When mortality doubles the situation is normally classified as a CES 3–7 It has, however, been observed that children >5 years and adults may be disproportionately more affected during a CES than younger children.3

In a CES, a wide range of potentially vulnerable social groups is recognized including infants, children <5, pregnant and lactating women, and older people. Many agencies target their activities to such groups to maximize the impact of the humanitarian aid. Individuals may have different vulnerability during a CES.2,3,8–10
In peacetime, a population will have health inequalities related to cultural and socioeconomic conditions. During a CES, cultural and socioeconomic groups may be affected differently and the increased risk of death may not affect all age groups equally and inequalities may change during a CES. Health inequalities might be reduced if the CES creates equally bad conditions for everybody, for example, if all have to ‘run for their life’. Conversely, health inequalities might be further strengthened if the public health sector breaks down and access to other resources becomes even more important.

Humanitarian interventions might influence inequalities if they target specific groups; since interventions are free-of-charge they might be expected to diminish inequalities between groups. Little is known about how non-targeted groups are affected; the whole household might be expected to benefit from aid to children <5 years of age.

Inequality in infant and under five mortality in developing countries favours the better-off households and households with resources, like parental education. In a CES, schooling as well as presence of a male adult has been found to be favourable. Inequalities in child mortality associated with ethnic group, district, education of the mother, and economic status had been identified before the war in Guinea-Bissau. During the war in Guinea-Bissau 1998–99, we compared the key health indicators of CES (CMR and CMRU5) with the observed mortality rates during the war and we investigated the impact on cultural and socioeconomic health inequalities. The Bandim Health Project (BHP) maintains a longitudinal, demographic surveillance system in four districts of Bissau, the capital, CMR, CMRU5, and inequalities in mortality associated with cultural and socioeconomic differentials before the war were used to forecast expected mortality rates and inequalities in mortality during the war period, as they would have occurred had the war not occurred. Observed mortality rates and inequalities were compared with the expected inequalities and mortality levels during the war.

Materials and methods
Complex emergency situation
From June 1998 to May 1999, Guinea-Bissau experienced an armed conflict between a military Junta, backed by most of the army and the population, and the president, who was supported by troops from the two neighbouring countries: Senegal and Guinée. There were several periods of fighting: June 7 to July 26 and October 9 to December 1 in 1998, and January 30 to February 15 and May 6–7 in 1999. In November 1998, a peace agreement was signed in Abuja, Nigeria, including withdrawal of foreign troops and return to the barracks of soldiers, a deployment of peace-keeping troops and establishment of a government of national unity. The peace-keeping troops arrived late December 1998. From January 1999 the conflict changed character from an open-war to a peace-settling process. In May 1999, government troops surrendered to the Junta.

Fighting was most intense in the capital; the residential areas of Bissau were exposed to heavy shelling during periods of fighting. The majority of the population fled, many taking refuge on the peninsula just outside Bissau. By the end of 1999, 265 000 internally displaced persons (IDPs) had returned and out of 7100 refugees, who left the country, 5300 had returned. Camps never became a prominent feature of the war in Bissau; displaced people moved in with relatives, friends, or strangers in the rural areas. As soon as people believed the cease-fire would hold they started returning to the capital to defend their property and because living conditions were better than in the rural areas.

During the war, the public health systems did not function, but the central hospital supported by humanitarian aid continued to receive patients. Most other public services did not function. Less money was available as salaries were not paid and the market was limited making access to food difficult. Humanitarian aid provided a limited proportion of the missing food and, although there was no real hunger, the situation was difficult.

The Bandim Health Project and humanitarian assistance
The BHP maintains a longitudinal, demographic surveillance system in four districts of Bissau: Bandim I, Bandim II, Belem, and Mindara. The project covers 16% of the population in the capital, Bissau. The districts of the BHP have a higher proportion of the Pepel ethnic group and since this group has higher mortality, one could expect a higher mortality in the BHP population. On the other hand the health surveillance system in these districts has facilitated access to healthcare, e.g. the vaccination coverage is higher in the BHP areas. Hence, there is no difference in the hospital case fatality of BHP and non-BHP children hospitalized at the paediatric ward of the national hospital (unpublished data). As part of the routine demographic surveillance system, all houses are visited monthly to identify new pregnancies, births, and deaths. Reported deaths are subsequently confirmed in an interview and the perceived causes of deaths registered. Children <3 years of age are visited at home every 3 months to monitor nutritional status, breastfeeding, hospitalizations and immunizations. The older population was followed in connection with censuses every second or third year.

Owing to the 3 monthly visits, information on date of death or date of movement would be fairly accurate. However, some of the deaths or migrations registered through the censuses were not reported to the exact date but only up to month, season, or year; these deaths or movements have been registered at the middle of the reported period, implying excessive monthly mortality rates in February (dry season), August (rainy season), and June (year) for persons >3 years of age.

During the war, BHP took responsibility for humanitarian aid activities, organizing consultations, providing medical drugs, and distributing food to IDPs. When the population returned to Bissau, BHP followed and continued to organize consultations at the local health centres in the project area and organized food distribution, when stocks were available. From September 1998 supplementary feeding was established for malnourished children, from October 1998 the project organized vitamin A supplementation for children <5 years of age, and from January 1999 impregnated bednets were distributed to pregnant women and children <2 years of age. For humanitarian assistance, the routine home visits were extended to include children <3 years of age.
Study populations
We used data from all persons resident in the four districts Bandim I, Bandim II, Belem, and Mindara (study area) sometime from January 1, 1995 to May 31, 1999. The war period covered June 1998 to May 1999. In the war period, 49,731 persons were resident for some time in the study area; of these, 8933 were <5 years of age, at least part of the period. Deaths due to acts-of-war or accidents, as reported in a cause-of-death interview, were censored. In the war period 1051 died, 916 deaths were included in the analysis, and 135 deaths were censored: 439 children <5 years of age died during the war, of these 430 were included in the analysis and 9 were censored. We could not clearly distinguish abortions, stillborn, and children who died during the first day of life, therefore only children who survived the first day of life were included. Vaccination coverage was adequate in the study population.29

Study designs
Observed CMRs and CMRU5s during the war were compared with standard mortality rates and local expected mortality based on mortality from January 1995 to May 1998: accidents and deaths due to acts-of-war were censored. We expected an increased mortality throughout the whole war period; a doubled mortality was expected in the first 6 months of the war and an increased but abating mortality in the last part of the war, as the war changed to a peace-settling process. Further, CMRU5 was compared with crude mortality over five (CMRO5) to investigate an age differential in mortality.

Health inequalities may decline owing to free-of-charge interventions; on the other hand, existing inequalities might be exacerbated because those managing well before the war cope better with difficult living conditions. Hence, we initially expected the inequalities to be strengthened, but as interventions were implemented the inequalities might disappear. In the last part of the war, when people returned inequalities were expected to return to pre-war levels. We investigated changes in inequalities in CMRU5 during the war associated with differentials in socioeconomic status and household resources:

- Ethnicity: Pepel vs other ethnic groups; Pepel is the largest group (36%), indigenous to the study area, and normally has higher mortality than other ethnic groups.
- District: Bandim vs the more urban districts, Belem and Mindara; Bandim usually has higher mortality than Belem and Mindara.
- Economic status expressed by type of roof: straw vs solid roof.
- Mother’s education: 0–4 years of schooling vs >4 years of schooling.
- Highest education in the household: 0–4 years of schooling vs >4 years of schooling.
- Gender composition of household: only female adults vs mixed households.
- Gender: female vs male.

Inequality in mortality (CMRU5) associated with a differential factor was expressed as a rate ratio (RR) between the mortality rate of the disfavoured and the privileged groups; for example, inequality associated with maternal education for children <5 years of age: 

\[
RR_{\text{mother's education}} = \frac{CMRU5_{<4 \text{ years schooling}}}{CMRU5_{>4 \text{ years schooling}}}
\]

Inequalities (RR) associated with a differential were calculated for each month January 1995 to May 1999. Based on RRs from January 1995 to May 1998 we forecasted expected inequalities for the war period from June 1998 to May 1999.30 Changes in inequalities during wartime were estimated as the relative rate ratio (RRR) of the observed inequality relative to the expected inequality. RRR > 1 signifies a strengthening of the inequality and RRR < 1 a reduction in the inequality.

Expressing inequalities as monthly mortality RRs allows the inequality to be different over calendar time; in a ‘standard’ relative-risk analysis the inequality will be assumed to be constant over calendar time even though it is controlled for seasonal variations and trend. Mortality and inequalities were calculated on a monthly basis but are presented for 3 month intervals.

Statistical methods
Some of the deaths or migrations registered through the censuses (persons ≥3 years of age) were not reported to the exact date but only up to month, season, or year; these deaths or movements were registered at the middle of the reported period, implying excessive monthly mortality rates in February (dry season), August (rainy season), and June (year). To circumvent this, we used methods adjusting for interval censoring31 when estimating monthly mortality rates.

It had not been registered which deaths had been reported to the exact date and which had not, i.e. interval censored. Hence, we cannot know exactly the dates of death that were accurate and that were interval censored. Based on the fraction of excessive deaths in the months where interval censored death had been registered (February, June, and August) we simulated 100 assignments of interval censoring and used the average mean and variance of these32 as estimates.

Since monthly mortality rates for children <5 adjusted for interval censoring and without such adjustment showed no systematic difference, estimates of CMRU5 and the corresponding inequalities in mortality under-5 were not adjusted for interval censoring. However, CMR and CMRO5 were adjusted for interval censoring.

Expected monthly mortality rates during wartime were achieved by forecasting data from January 1995 to May 1998 controlling for trend and seasonal variation into the war period.30 Inequalities, expressed as mortality RRs, were forecasted in a log-transformed Gaussian regression with estimation error.

RRRs were estimated monthly as the ratio between the observed and the expected mortality ratios. The variance of log (R) was obtained as the sum of the variances of the two independent log (Robserved) and log (Rexpected).

Monthly RRRs were averaged, weighted by the inverse of the variance, to quarter and half year, adjusted to dry and rainy season, and for the whole period; test for homogeneity showed how appropriate the summarizations were.

Analyses were done in SAS Release 8.2 (SAS Institute, Cary, NC).

Results
Crude mortality of the study population during the war is shown in Figure 1 (left). The CMR was not constant through the
different months of the war ($P_{homogeneity} < 0.01$). An expected local time-constant mortality would have been 0.43 (95% CI 0.41–0.44), a little higher than the expected standard mortality in developing countries: 0.4 death per day per 10 000. Observed CMR was compared with the local expected mortality (Table 1; Figure 1, right). A crude mortality elevated with ~78% (MR = 1.78; 95% CI 1.61–1.97) was observed from June to November 1998. From December 1998 to May 1999 crude mortality was ‘normal’.

Mortality of children under-5 (CMRU5) during the war is shown in Figure 2 (left) and, as for CMR, it varied over time ($P_{homogeneity} < 0.01$). The expected mortality of children, under-5 (1.0 death per day per 10 000) fits well with a local time-constant expected mortality rate of 1.02 (95% CI 0.96–1.08). Mortality during the war was compared with the local expected mortality (Figure 2, right and Table 1). Mortality for children <5 was 2.07 (95% CI 1.79–2.38) times higher from June to November 1998 compared with the expected mortality. From December 1998 to February 1999 CMRU5 was significantly increased with an MR of 1.40 (MR = 1.40; 95% CI 1.10–1.77) and in the last 3 months mortality under-5 was slightly increased.

When comparing the expected CMRU5/CMRO5 ratio with the observed ratio during the war, there was no evidence of a disproportional effect between children <5 and, children >5 and adults (Figure 3).

The impact of cultural and socioeconomic differentials on mortality inequalities during the war is shown in Table 2. Though the Pepel ethnic group usually has higher mortality than other groups (RR = 1.14; 95% CI 1.07–1.21), this differential was further deepened (RRR = 1.60; 95% CI 1.14–2.25) in the last 6 months of the war. The pre-war increased mortality-level in Bandim compared with Belem and Mindara (RR = 1.43; 95% CI 1.32–1.55) remained unchanged throughout the war. In the pre-war years, living in houses with straw-roofs was associated with higher mortality (RR = 1.10; 95% CI 0.99–1.21); this inequality was significantly higher with a RRR of 1.81 (95% CI 1.18–2.77) in the first 3 months of the war and it was slightly increased in the second half-year of the war. Living in a house with straw roof was the only inequality that differed significantly for the whole war period.

The better childhood survival associated with 4 years of schooling of the mother (RR = 1.52; 95% CI 1.38–1.67) in the pre-war period was not affected during the war. However, having no one with >4 years of schooling in the household, which in the pre-war period was associated with a slight inequality in mortality (RR = 1.10; 95% CI 1.00–1.23), was associated to a significantly higher mortality from September to November 1998 (RR = 2.07; 95% CI 1.31–3.28); afterwards the inequality in mortality was as before the war (RR = 1.13; 95% CI 0.74–1.74). In the pre-war period, households with female adults only had
slightly increased mortality compared with mixed households (RR = 1.07; 95% CI 0.99–1.16); this did not change during the war.

Prior to the war, there was no difference in the female/male under 5 mortality ratio (RR = 1.01; 95% CI 0.91–1.13). During the first 6 months of the war, when mortality was increased, the sexes were equally affected (RRR = 0.99; 95% CI 0.76–1.29) (Table 3). In the last 6 months of the war, mortality for boys levelled to normal (RR = 0.98; 95% CI 0.75–1.27). Even though mortality for girls decreased in this period, it remained significantly elevated compared with normal (RR = 1.41; 95% CI 1.10–1.79). Hence, in the last 6 months of the war, girls had 47% (RRR = 1.47; 95% CI 1.03–2.09) higher mortality than boys.

Discussion

We followed the population in four districts of the capital through wartime, from June 1998 to May 1999. The population was followed both when present in Bissau and when they fled the capital, i.e. were IDPs. Most reports of mortality from war-emergencies have been from refugee camps or long-time displaced persons separated from where the underlying conflict is occurring. We followed a population that was displaced within a short distance while active fighting was going on, but returned a few months after fighting had stopped. Hence, the population stayed in the area of the conflict. Though deaths due to acts of-war and accidents were censored, mortality was increased in the first 6 months of the war, which was the period with the heaviest fighting and when people spent most time away from...
their normal residence. Crude mortality of the whole study population was 78% increased in the first half-year of the war and mortality during the whole year was 43% increased. Mortality of children <5 was doubled in the first half-year, i.e. a CES according to international definitions. The increased mortality was only found in the first part of the war, there being virtually no increase in the last 6 months of the war after a peace treaty had been signed and people returned.

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<tr>
<th>Ethnicity (Pepel)</th>
<th>Pre-war mortality ratio for social inequality indicators</th>
<th>Relative change in mortality ratio during the war</th>
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<td>January 1995–May 1998</td>
<td>Before signed peace treaty</td>
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<tr>
<td>Ethnicity (Pepel)</td>
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<td>1.14 (1.07–1.21)</td>
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| District (Bandim) |                                                      | 1.43 (1.32–1.55) | 0.96 (0.64–1.43) | 0.75 (0.50–1.12) | 1.30 (0.74–2.29) | 0.81 (0.45–1.45) |

| Economic status (Straw roof) |                                                      | 1.10 (0.99–1.21) | 1.81 (1.18–2.77) | 0.83 (0.47–1.48) | 1.58 (0.86–2.89) | 1.20 (0.61–2.38) |

| Education of mother (<4 years of schooling) |                                                      | 1.52 (1.38–1.67) | 0.74–(0.49–1.12) | 1.11 (0.69–1.79) | 0.90 (0.52–1.56) | 1.12 (0.57–2.19) |

| Education in household (<4 years of schooling) |                                                      | 1.10 (1.00–1.23) | 0.82 (0.52–1.31) | 2.07 (1.31–3.28) | 1.10 (0.63–1.92) | 1.18 (0.60–2.31) |

| Household composition (Only female adults) |                                                      | 1.07 (0.99–1.16) | 1.17 (0.78–1.76) | 1.16 (0.75–1.79) | 1.36 (0.82–2.26) | 0.87 (0.46–1.65) |

| Relative female mortality under five |                                                      | 1.03 (0.91–1.02) | 1.62 (1.24–2.11) | 1.72 (1.31–2.27) | 1.65 (1.20–2.28) | 1.14 (0.79–1.65) |

| Relative male mortality under five |                                                      | 1.01 (0.90–1.07) | 1.59 (1.22–2.08) | 1.78 (1.35–2.35) | 1.15 (0.82–1.63) | 0.79 (0.52–1.18) |

| Female male mortality ratio |                                                      | 1.01 (0.91–1.13) | 1.01 (0.70–1.46) | 0.97 (0.66–1.42) | 1.41 (0.88–2.24) | 1.56 (0.91–2.69) | 0.99 (0.76–1.29) | 1.47 (1.03–2.09) | 1.14 (0.92–1.41) |
Evidence of a disproportional impact on mortality for children <5 compared with persons >5 years, censoring for accidents and deaths due to war.

Mortality inequalities associated with cultural and socioeconomic differentials, including schooling in the household and type of roof, were affected in the first half-year of the war. If type of roof can be interpreted as economic status, then children in better-off households were less vulnerable in the first quarter of the war, but the advantage decreased possibly as resources were used; the disadvantage of people living in houses with straw roofs remained throughout the whole war period. The pre-war inequality in CMRU5 associated with schooling of the mother was unchanged during the war. However, schooling in the household had a beneficial effect on childhood mortality towards the end of first half-year of the war. It was unexpected that the inequality associated with mother’s schooling was unchanged, but education in the household reduced vulnerability. This might be because a child’s vulnerability is associated not merely with the mother’s resources but is linked to household resources and the ability to seek aid. Education in the household had the largest effect in the phase when humanitarian aid became available and the majority of people still were IDPs. In the second half-year of the war when most people had returned, the inequality related to schooling was as before the war.

The capital, Bissau, is located in the Pepel homeland of Guinea-Bissau and Pepeis constitute the largest group in the study area. It might have been easier for the Pepel households in the beginning of the war because their relatives and family-land were close by. However, in the second part of the war, mortality declined more slowly for the Pepel group than other ethnic groups. The reason for this is unknown, but the Pepel homeland, supporting the Pepeis returning to Bissau, may have been comparatively more exhausted because all IDPs initially fled to the Pepel area surrounding Bissau. Some from other ethnic groups continued to their ethnic homeland, but all had a stop-over in the Pepel homeland. Hence, the change in inequality that seems associated to ethnicity may actually have been associated with being co-resident with IDPs, which has been shown to have a deleterious impact on childhood mortality.

During the first 6 months of the war, when CMRU5 was elevated, the mortality for boys and girls were equally affected. In the last 6 months of the war, however, mortality for boys normalized, but mortality for girls levelled more slowly. There is no clear explanation for this occurrence. There is no indication of marked sex-differential treatment in this society and mortality levels were equal before the war. The pattern could have been due to a different return-pattern, for example, girls staying longer outside Bissau, while boys returned earlier. However, we found no difference in migrations pattern of boys and girls during the war (data not shown).

We have earlier shown an equalizing impact on health inequalities of humanitarian aid interventions during the war such as vitamin A supplementation and distribution of drugs free of charge at the paediatric ward. Hence, it might be surprising that most general inequalities maintained their pre-war level. However, these interventions were probably too limited to have an impact on the overall mortality levels.

The war in Guinea-Bissau was a CES even though its duration and mortality level may have been below what has been observed in other African CESs. However, even in short CESs the affected individuals suffer both in terms of health and material conditions as looting is common and resources are exhausted. In the Bissau war, mortality was increased during the first 6 months, when the fighting was most intense. Though mortality was increased, most inequalities in childhood mortality remained unaffected, except an advantage for those with better housing conditions and a short-term beneficial effect of schooling in the household, which might be associated with a better ability of attaining humanitarian aid.

Little is known about conditions for war-affected people who stay close to the area of fighting because they maintain the hope that fighting will soon stop and they may be able to return to better living conditions and to save whatever material conditions they had been able to accumulate. It is not surprising that mortality was increased in this period, but it was surprising that no stronger changes in inequalities in childhood mortality associated with cultural and socioeconomic differentials occurred during this period. We had expected that the miserable living conditions that most people had had as IDPs would have tended to reduce inequalities between different groups.

We analysed mortality associated with the poor living and health conditions for the civil population during the war. This, in Africa, mainly means increased risk of infectious diseases. We censored direct war-related deaths as these will have other risk factors and patterns. To our surprise, the number of war-related deaths among the civil population increased in the last 6 month period. This might be owing to most people remaining in the capital during the last outbreaks of fighting; many civilians sought safety in mission stations in the periphery of the fighting area. One of these stations was hit by bombs and 60–70 individuals were killed on the final day of the war.

The first 6 months of the war coincided with the rainy season whereas the last 6 months were the dry season. Hence, the marked differential effect during the first 6 months could be related to people being more susceptible to the impact of a CES in the rainy season with immune suppression and reduced hygienic levels. However, it is also noteworthy that mortality normalized already when a peace treaty had been signed and people started to return more permanently, and not when the total war-period was over. The reduced crowding and improved hygiene when people returned to their normal homes might have been very important for disease transmission and mortality patterns. During the war, the rebel radio consistently advised the population not to return to the capital owing to the risk of fighting and bombing. Even though the general population was in favour of the rebels, most people did return home feeling living conditions to be better and more secure in spite of the breakdown of public systems and risk of further fighting. Our analysis would suggest that they probably took the right decision even though bombing did kill some people during the final assault on Bissau in May 1999. Humanitarian aid programme may benefit from trying to re-settle IDPs as quickly as possible.

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data collection would have been impossible. Contributions: Peter Aaby was responsible for the humanitarian work of the Bandim Health Project during the war. Peter Aaby took part in planning the design of the study and the collection of data. Henrik Jensen and Per K. Andersen supervised statistical methods and analyses. Jens Nielsen designed the study, implemented data control, did all statistical analyses and wrote the first draft of the paper. All authors contributed to the final version. Sponsorship: The Danish Council for Development Research and ECHO, European Union, supported studies of the war.

Conflict of Interest
The authors have declared no conflicts of interest.

KEY MESSAGES
- Infectious disease mortality increased 2-fold during an armed conflict in Guinea-Bissau, when all inhabitants of the capital had to flee their home
- Peace settlement and returning home had an immediate beneficial impact on mortality levels
- Overall the war maintained or deepened social inequalities in mortality, even though specific humanitarian aid interventions reduced inequalities

References
Commentary: When should we monitor mortality in humanitarian crises?

Richard Garfield

This paper on mortality patterns in Guinea-Bissau contributes to the current extensive discussions on monitoring mortality rates during humanitarian crises. Mortality is the most sincere expression of vulnerability and, when well monitored, should direct efforts for relief, protection, and humanitarian intervention. Unfortunately, areas with humanitarian crises in the world today seldom enjoy an active case finding system like that set up by the authors prior to conflict in Guinea-Bissau. One lesson from this research is the importance of maintaining, and if possible enhancing, any such system in areas of crisis. Failing this, at best we get occasional special mortality studies that are easily biased by rapid population movements and difficult to interpret owing to their cross-sectional nature. This is just the situation in most of the major humanitarian crises in the last decade, including the Democratic Republic of Congo, Afghanistan, and Iraq. Without a system of on-going monitoring, even if special studies are accurate, the information is frequently not available to act on in a timely basis. In Guinea-Bissau, monitoring helped minimize all these problems.