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Mortality, Violence and Lack of Access to Health-care in the Democratic Republic of Congo

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The people of the Democratic Republic of Congo for decades have been living in a situation of chronic crisis. Violence, population displacement and the destruction of infrastructure and health services have devastated the health of the population. In 2001, Médicins Sans Frontières conducted a survey in five areas of western and central DRC to assess mortality, access to health-care, vaccination coverage and exposure to violence. High mortality rates were found in front-line zones, mainly due to malnutrition and infectious diseases. In Basankusu approximately 10 per cent of the total population and 25 per cent of the under-five population had perished in the year before the survey. Humanitarian needs remain acute across the country, particularly near the front line. Infectious-disease control and treatment are a priority, as is increasing access to health-care. Humanitarian assistance must be increased considerably, especially in rural areas and zones that have been affected directly by conflict.

Keywords: Democratic Republic of Congo, chronic insecurity and crisis, lack of health-care.

Background

The people of the Democratic Republic of Congo (DRC) have for decades been living in a situation of chronic crisis. Thirty years of appalling mismanagement and corruption under the rule of President Mobutu had left public services in this country in disrepair, creating desperate poverty and chronic poor health. In 1996, Laurent Kabila launched a rebellion that succeeded in ousting Mobutu a year later. In August 1998, Kabila's government was attacked by a rebel movement supported by Rwanda and Uganda, thus marking the onset of the so-called 'second war'. These successive conflicts have further shredded the economic and social fabric of the country.

After the killing of Laurent Kabila in January 2001, the new regime led by his son Joseph Kabila expressed its intention to bring stability to the country. A peace agreement was signed in Lusaka, Zambia, in July 1999, but has been violated by all sides (UNOCHA, 2000). Many Congolese and foreign-armed groups are reluctant to give up control of this mineral-rich country and insecurity still reigns.

Violence, population displacement and the destruction of infrastructure and health services have devastated the health of the population of this country two-thirds

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the size of Western Europe. An estimated 2.7 million people have been displaced within Congo, many in insecure regions outside the reach of aid workers, while a further 331,200 have fled to DRC from neighbouring countries (UNOCHA, 2003).

There is a near-total collapse of the country's health-care system, which ranks 179 out of 191 countries surveyed by the World Health Organisation (WHO, 2000). Decades of under-investment by the Congolese authorities have resulted in unpaid salaries, dilapidation of health centres and hospitals and poor distribution of essential medicines and supplies. Development indexes place the DRC among the world's least-developed countries: the infant mortality rate is estimated at 128 per 1,000 live births (compared to seven in the US); under-five mortality rate is 207 per 1,000 live births (eight in the US); and 55 per cent of the population have no access to improved water services (UNDP, 2001). The withdrawal of multi- and bilateral aid initiatives since 1992 has left the health system in the sole hands of NGOs, churches and private assistance. Conservative estimates show that at least 37 per cent of the population (approximately 18.5 million people) have no access to any form of formal health-care; other figures suggest this figure is as high as 75 per cent (Oxfam, 2001; WHO, 2002).

A mortality survey by the International Refugee Committee (IRC) in 2001 estimated the death toll for the 'eastern Congo' since 1998 to exceed 2.5 million (IRC, 2001). While alarming in themselves, these figures represent only a fraction of the country (North and South Kivu, Maniema, Katanga and Orientale provinces). A lack of scientific data from western and central regions equally affected by conflict should not result in a disproportionate amount of funding and assistance to eastern regions.

MSF has been providing medical assistance in the DRC since 1981 and is currently working in both government- and rebel-held territory. Activities include supervising and training health staff, vaccinations, antenatal care, epidemiological surveillance and water and sanitation improvement. Between August and October 2001, MSF conducted a survey in each of five regions to determine mortality rates, access to care, vaccination coverage and exposure to violence in five health zones in provinces not covered by the IRC survey. This survey of five regions also aimed to complement existing mortality figures from the eastern regions, and thus to create a more balanced picture of mortality and its causes in the Congo crisis. The additional aims of this project were to assist with programme planning and to inform advocacy efforts.

The collection of quality epidemiological data amid the chaos of conflict is a difficult but necessary task: such surveys are invaluable for documenting the plight of forgotten populations; they assist aid agencies in programme planning; and they provide a platform for advocacy towards the international donors for a community in desperate need of greater humanitarian assistance (Legros and Brown, 2001).

Provinces surveyed

The survey covered areas differentially affected by the war, including ceasefire zones occupied by the military (Basankusu, Kilwa), troop withdrawal zones (Lisala, Kimpangu) and non-conflict zones (Inongo). The survey areas are found in four provinces (Equateur, Katanga, Bas-Congo and Bandundu) as described below (see Figure 1).

In Equateur Province (Basankusu and Lisala) fighting has divided the province in two — the north and east occupied by rebel forces, and the west and south controlled by the government — causing widespread population displacement. More

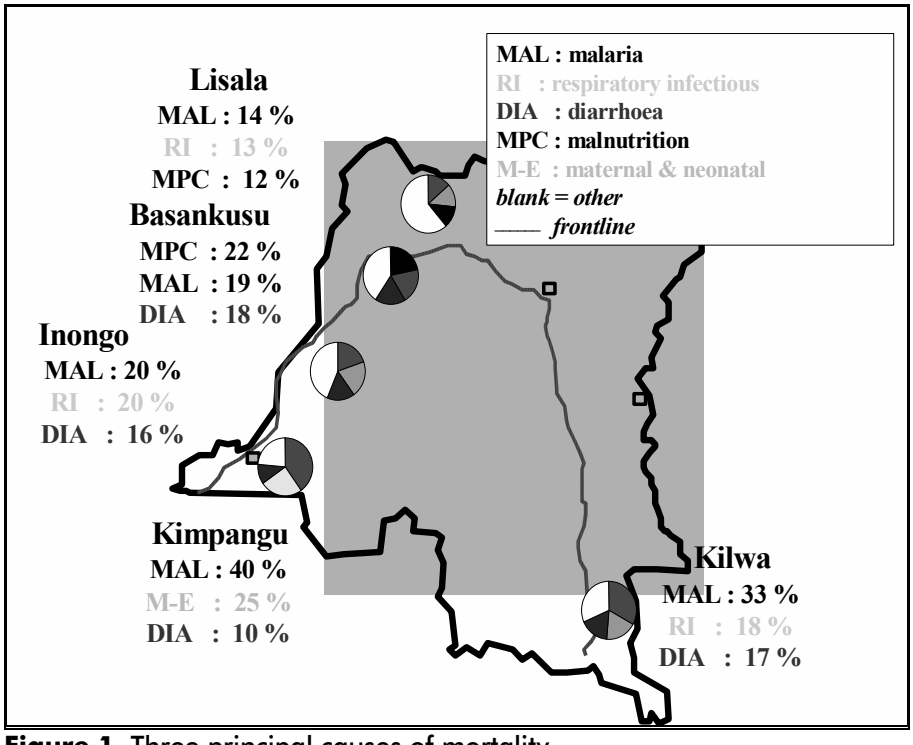

Figure 1 Three principal causes of mortality

than 100,000 people have fled to the Central African Republic, Congo-Brazzaville and south of Basankusu (UNHCR, 2001). Health structures in 28 of Equateur's health zones have experienced systematic looting (UNOCHA, 2001a). Basankusu and Lisala, the two health zones surveyed, lie on the north-eastern rebel side. Those who stayed found themselves isolated by the closing of the Congo River because of fighting, which compounded economic collapse and limited aid to the area. Poverty is extreme and many families in Basankusu lack basic materials and farming tools.

Katanga Province (Kilwa) is also divided by the front line: the north is controlled by rebels and the south is under government control. Only 14 of the province's 40 health zones are regularly supplied with essential medicines (UNOCHA, 2001a). Intensive military activity north of Katanga has resulted in population displacements, with people seeking refuge as far away as Zambia and Tanzania. The population of the surveyed zone, Kilwa, has been afflicted by serious disease outbreaks and chronic malnutrition.

Bas Congo Province (Kimpangu) was home to a large number of refugees fleeing the conflicts of neighbouring Angola and Congo-Brazzaville. The socio-economic infrastructure has been damaged by war, and civilians have suffered from extensive looting, destruction of health services and loss of life. In November 1999, the general reference hospital and central office of the surveyed health zone, Kimpangu, were comprehensively looted by Angolan rebel UNITA forces, with cold-chain material, surgical equipment and pharmaceutical stocks taken or destroyed. Between December 1999 and July 2000, MSF was forced to suspend activities in Kimpangu due to insecurity.

Bandundu Province (Inongo) has not been directly affected by the war, but contains over 26,000 refugees from Congo-Brazzaville (UNOCHA, 2001a) and suffers from the indirect consequences of country-wide economic crisis. Roads and bridges throughout the health zone surveyed (Inongo) have literally disappeared, making many areas practically inaccessible, as the health system continues to suffer a lack of medicines, material and money. The nearest reference hospital is 350km away in Equateur, and thus practically inaccessible. Only 17 of Bandundu's 38 health zones are regularly supplied with essential medicines.

Methods

A multi-stage sampling scheme was used to select households for survey. Provinces to be surveyed were selected based on accessibility and security. Specific health zones were then chosen on the basis of control (government or rebel), proximity to the front line and the presence or absence of humanitarian agencies. MSF is present in (or supports indirectly) three of the five zones surveyed: Basankusu, Lisala and Kilwa.

A two-stage cluster sampling was chosen, with a sample size of 30 clusters of 30 households in each zone (see below). Once specific sites were identified, health workers determined the centre of the village, hamlet or district, and chose a direction at random by spinning a pen. Households in that direction were numbered, and a number picked at random (spinning a pen on to a sheet marked with numbers 1–9) to define the household from which the survey would begin. The next household to be surveyed would be the one closest to the first, and so on. Following this methodology, a total of 4,527 households were surveyed in five zones between August and October 2001.

Calculation of sample size

Sample size was calculated over an expected mortality rate of 1.5/10,000/day. The precision or confidence interval (CI) was fixed at +/- 0.44/10,000/day; so the lower limit of the CI will not include the mortality emergency threshold of 1/10,000/day (CDC, 1992). This means that for a recall period of six months it is expected that 2.7 per cent +/- 0.8 per cent of the population will have died. As is usual for a 95 per cent CI, the standard-error parameter was fixed at 1.96 (corresponding to an error risk alpha of 5 per cent). A cluster effect of between three and four was chosen, based on operational experience that in a war zone violence is not homogeneous and can be expected to vary considerably from one place to another. With those hypotheses, a sample size of between 4,731 and 6,308 people was required.

Household was defined as a group of people who sleep and eat under the same roof at least three days per week. (The notion of family is complex, implying members not necessarily living under the same roof, and including additional wives, distant cousins adopted into the family, and so on.) Data were checked as soon as supervisors returned from the field and entered their EPI Info 6.04 (CDC, Atlanta). The average number of people per household was estimated at between five and seven, corresponding to a sample size of between 676 and 1,262 households. Therefore, a two-stage cluster sampling was chosen, with a sample size of 30 clusters of 30 households (giving a total of 900 households in each zone), using WHO/EPI methodology (Henderson and Sundaresan, 1982).

A sampling frame was constructed on the basis of population lists provided by local health authorities dating from a WHO polio-vaccination campaign in July and August 2001. The clusters were selected from these lists based on probability proportionate to size to ensure that smaller clusters were not over-represented in the sample.

Twelve teams of two Congolese each were selected based on their knowledge of the region, literacy (a university degree as a minimum requirement), and ability to speak the local languages. Teams were trained on methodology and procedures over two days and then tested. Their work was systematically reviewed every evening by at least two supervisors (MSF expatriate staff or Congolese epidemiologists from the national health system), headed by a coordinator.

Data on mortality rates and health-care access were gathered retrospectively over eight months (January 2001 to time of survey), while violence and vaccination coverage were surveyed over a longer period (August 1998 to time of survey). A questionnaire comprising 22 closed or semi-open questions was used, covering four issues: mortality, access to care, vaccination coverage and violence. These questions were directed either to the whole household (mortality and violence) via the household head, or a single sick person or child randomly chosen from each household (access to health-care and vaccination) as appropriate. Cause of death for each member of the family was determined by verbal autopsy (WHO, 1999), respondents choosing from the following four options: diarrhoea, respiratory infection/pneumonia, fever/malaria and others. Respondents in Lisala were not asked questions regarding their experience of violence for reasons of security.

Cooperation of the local authorities of each health zone was obtained. No material compensation was given to participants and care was taken in explaining the purpose of the survey to avoid raising expectations. Every effort was made to ensure confidentiality and to prevent any adverse effects on participants (Leaning, 2000).

Results

Mortality

Crude mortality was found to exceed the alarm threshold in Kilwa; in Basankusu it exceeded the emergency threshold (see Figure 2). The under-five mortality was more worrying, breaching alarm thresholds in Kimpangu (see Table 1). Malnutrition (24.2 per cent), diarrhoea (20.9 per cent) and suspected malaria (18.9 per cent) were reported as the leading causes of mortality in the Basankusu health zone. In Lisala, the two most common causes of death were respiratory infections (14.7 per cent) and suspected malaria (14.1 per cent). In Kimpangu, suspected malaria was the leading cause of mortality (40.3 per cent), followed by diarrhoea (11.1 per cent). In Kilwa, suspected malaria (32.7 per cent), diarrhoea (22.0 per cent) and respiratory infections (19.5 per cent) were the leading causes of death. In Inongo zone malaria (19.7 per cent) and respiratory infections (18.4 per cent) were the leading causes of death (see Figure 1).

Access to care

In all health zones more than eight in 10 households had one or more member fall ill in the six months prior to the survey. People with no access to care were defined as those

Table 1 Crude and under-five mortality rate

	Basankusu	*Lisala*	*Kimpangu*	*Kilwa*	*Inongo*
Population	198,438	204,544	93,975	234,630	24,240
Households visited	912	907	907	901	900
Sample population	11,532	8,331	4,491	5,077	6,172
No. children <5	2,783	1,955	914	1,178	1,463
CMR* 10,000 people/day (95% CI)	2.7 (2.3–3.1)	0.8 (0.6–1.0)	0.6 (0.4–0.7)	1.1 (0.8–1.3)	0.4 (0.3–0.5)
CMR <5** 10,000/day (95% CI)	6.6 (5.3–7.9)	1.8 (1.0–2.5)	2.0 (1.4–2.6)	3.1 (2.3–3.8)	1.0 (0.7–1.4)

*Crude mortality rate.
**Under-five mortality rate.

who did not seek a consultation when needed or obtained no or incomplete treatment following consultation. More than two-thirds of the people who fell ill in Basankusu (67.4 per cent, 59–75.9 CI) reported not seeking consultation outside the family; the figure was more than two-fifths for Lisala (41.2 per cent, 33.5–48.9 CI), Kilwa (44.3 per cent, 38.2–50.4 CI) and Inongo (42.1 per cent, 36.6–47.6 CI). In Kimpangu only 13.1 per cent (8.1–18.1 CI) reported no consultation outside the family (see Figure 2). The most frequent prohibitive factor to complete care was the cost of consultation and medicine. In general most consultations were received at public or religious-run health centres (Table 2).

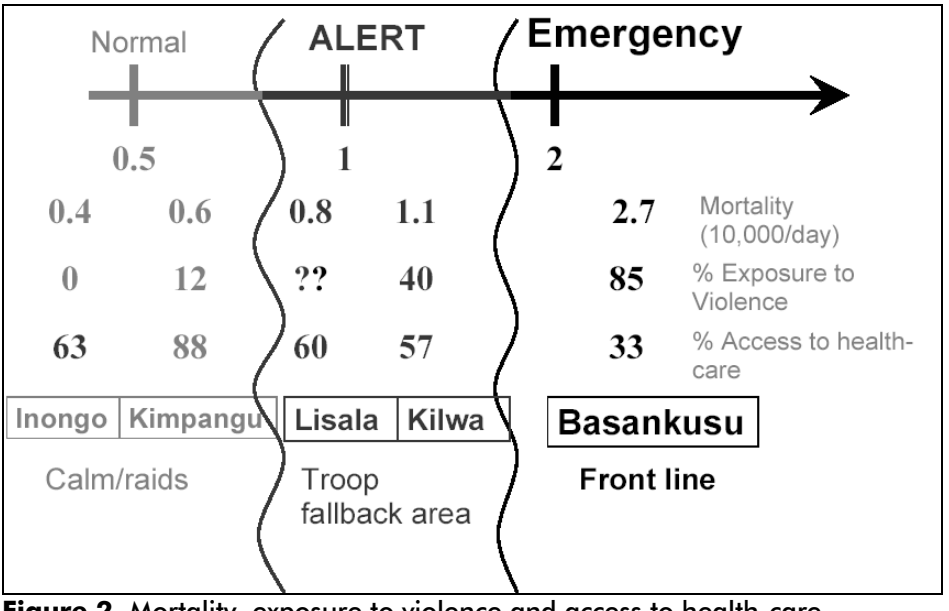

Figure 2 Mortality, exposure to violence and access to health-care

Table 2 Factors preventing complete access to health-care

	Basankusu (n=912)	*Lisala (n=907)*	*Kimpangu (n=907)*	*Kilwa (n=901)*	*Inongo (n=900)*
No. households with ≥ 1 person ill in past 6 months	884 (96.9%)	869 (95.8%)	793 (87.3%)	841 (93.3%)	891 (99%)
No. sick who did not seek consultation outside family	322 (36.4%)	207 (23.8%)	160 (20.2%)	237 (28.2%)	198 (22.2%)
*Reasons given**					
Inability to pay for consultation	255 (79.2%)	162 (78.3%)	83 (51.9%)	192 (81.0%)	160 (80.8%)
Inability to pay for medicines	252 (78.3%)	156 (75.4%)	54 (33.8%)	177 (74.7%)	151 (76.3%)
Lack of medicines	151 (46.9%)		2 (1.3%)	14 (5.9%)	23 (11.6%)
Transport/distance	138 (42.9%)	4 (1.9%	9 (5.6%)	38 (16.0%)	6 (3.0%)
Lack of health personnel	76 (23.6%)	1 (0.5%)		18 (7.6%)	9 (4.5%)
No confidence in health personnel	28 (8.7%)	1 (0.5%)	1 (0.6%)	2 (0.8%)	15 (7.6%)
Insecurity	20 (6.2%)	2 (1.0%)		2 (0.8%)	1 (0.5%)
Consultation not regarded as necessary	17 (5.3%)	18 (8.7%)	87 (54.4%)	23 (9.7%)	90 (45.5%)

* People often gave several reasons.

Vaccination coverage

Polio coverage for children aged 9–59 months was surveyed in all five health zones. Vaccination (Expanded Programme on Immunisation (EPI)) was assessed by evaluating BCG (tuberculosis) coverage (at birth) in Basankusu; while late vaccination (nine months to five years) for measles was evaluated in the four remaining health zones. Polio converage was near complete in all regions, with the percentage of those not vaccinated standing at 4.0 per cent in Basankusu (n=783, 2.1–5.8 CI); 1.2 per cent in Lisala (n=742, 0.4–2.1 CI); 0.9 per cent in Kimpangu (n=566, 0–1.9 CI); 3.4 per cent in Kilwa (n=613, 1.8–5.1 CI); and 0.7 per cent in Inongo (n=732, 0.1–1.2 CI). For other EPI vaccines, it was significantly lower. The percentage unvaccinated for TB in Basankusu was 45.3 per cent (33.2–57.5); 68.5 per cent were not vaccinated for measles in Lisala (56.1–78.8 CI), 29.5 per cent in Kimpangu (20.9–38.0 CI), 55 per cent in Kilwa (45.4–64.6 CI) and 76.8 per cent in Inongo (67.5–86.0 CI).

Exposure to violence

Exposure of violence was most acute at the front line (Basankusu and Kilwa), where looting and the destruction of property were rampant (see Table 3). In Basankusu 84.5 per cent of households contained at least one family member who stated that they had experienced violence during the second war; 88.6 per cent of households stated they had been obliged to flee or were displaced during that time. Looting and the destruction of property were the two most pervasive types of violence experienced. The levels of physical assaults, torture, imprisonment and sexual abuse were also high. In Kimpangu, 114 households (12.3 per cent) stated that at least one member had experienced violence during the second war; 25.5 per cent of households had to flee or were displaced during this time. Looting of houses and fields was significant, but other types of violence were minimal. In Kilwa 360 (40.0 per cent) stated that at least one member of the household experienced violence during the second war; 53.8 per cent of households had to flee or were displaced at that time. Looting was again the most significant type of violence (77 per cent prior to 2001, 17 per cent in 2001). Forced recruitment by soldiers was also significant in Kilwa (17 per cent), while other types of

Table 3 Exposure to violence

	Basankusu (n=912)		*Kimpangu (n=907)*		*Kilwa (n=901)*	
Exposure to violence	771 (84.5%)		112 (12.3%)		360 (40.0%)	
Type of violence	*1998-2000*	*2001*	*1998-2000*	*2001*	*1998-2000*	*2001*
Theft	596 (77.3%)	349 (45.3%)	38 (33.9%)	59 (52.7%)	278 (77.2%)	62 (17.2%)
Destruction of house/field	362 (47.0%)	236 (30.6%)	1 (0.9%)	0	49 (3.6%)	15 (4.2%)
Physical assault	160 (20.8%)	140 (18.2%)	5 (4.5%)	6 (5.4%)	21 (5.8%)	5 (1.4%)
Imprisonment	85 (11.0%)	59 (7.7%)	2 (1.8%)	0	5 (1.4%)	1 (0.3%)
Torture	118 (15.3%)	55 (7.1%)	2 (1.8%)	0	4 (1.1%)	1 (0.3%)
Sexual abuse	103 (13.4%)	82 (10.6%)	0	0	2 (0.6%)	1 (0.3%)
Mines	3 (0.4%)	2 (0.3%)	0	0	1 (0.3%)	0
Bullet wound	41 (5.3%)	34 (4.4%)	6 (5.4%)	0	3 (0.8%)	0
Knife/machete wounds	34 (4.4%)	13 (1.7%)	0	0	5 (1.4%)	1 (0.3%)
Forced recruitment	82 (10.6%)	54 (7.0%)	6 (5.4%)	1 (0.9%)	61 (16.9%)	3 (0.8%)

Note: It was possible to give several answers.
No exposure to violence was reported in Inongo.
Security conditions prohibited posing questions about exposure to violence in Lisala.

violence were minimal or non-existent. For security reasons, the survey team was not authorised to ask questions about violence in Lisala. However, of 907 households questioned, 88.6 per cent stated that they had been obliged to flee or were displaced during the second war. No households in Inongo reported any violence or displacement in connection with the second war.

Limitations

In Basankusu health zone, four health areas close to the front line were inaccessible for security reasons. More than 5 per cent of the population live these areas, so results can only be extrapolated to 94.8 per cent of Basankusu's total population. In Lisala, survey coverage was limited to 97.7 per cent of the population, after a bridge was destroyed in one health area. In rural parts of Inongo a large number of empty houses were observed, possibly because the survey was carried out in the dry season when many (adult) inhabitants leave their homes for camps in the bush and forest in order to fish.

Despite the best efforts, it was impossible to hire an equal distribution of men and women for the survey teams, and in the more distant zones it was difficult to find any qualified female personnel. There was only one female team member in Basankusu, Kimpangu and Kilwa; in Lisala and Inongo, two female team members were hired. Lack of women surveyors may have influenced answers to questions about sexual violence — a subject that remains relatively taboo in the DRC, especially when raised by men.

Depending on the region, culture and ethnic group, some communities are less inclined than others to speak to strangers about their health problems or their extreme poverty. Visibly ill people or households with obviously malnourished children stated that the family was in good health. This was particularly obvious in the Lisala and Kimpangu health zones, where consultation rates may be slightly underestimated.

Discussion

The Crude Mortality Rate (CMR) for a stable population in developing countries is estimated at 0.5/10,000/day (and 1/10,000/day for children under five); the alarm threshold is 1/10,000/day (2/10,000/day for children under five); an emergency is declared when the CMR exceeds 2/10,000/day (4/10,000/day for children under five) (CDC, 1992). The high crude and under-five mortality rates in the front-line zones of Kilwa and Basankusu is comparable to those noted in eastern DRC by the IRC in May 2001 and cause for great concern (see Figure 3). Extrapolated results for Basankusu show that approximately 10 per cent of the total population and 25 per cent of the under-five population died over the 12-month period prior to the survey. In Kilwa, the under-five mortality rate was 12 per cent over this period. In Inongo, an area unaffected by the conflict, mortality rates were near the stable benchmark.

The main causes of death in the surveyed zones are malnutrition, suspected malaria and infectious and diarrhoeal illnesses — a pattern typical in emergencies (Toole and Waldman, 1997). The low level of violent deaths in the front-line zones could indicate a relative respect for the ceasefire during this period. These results are considerably different from the east of the country where, despite the absence of a front

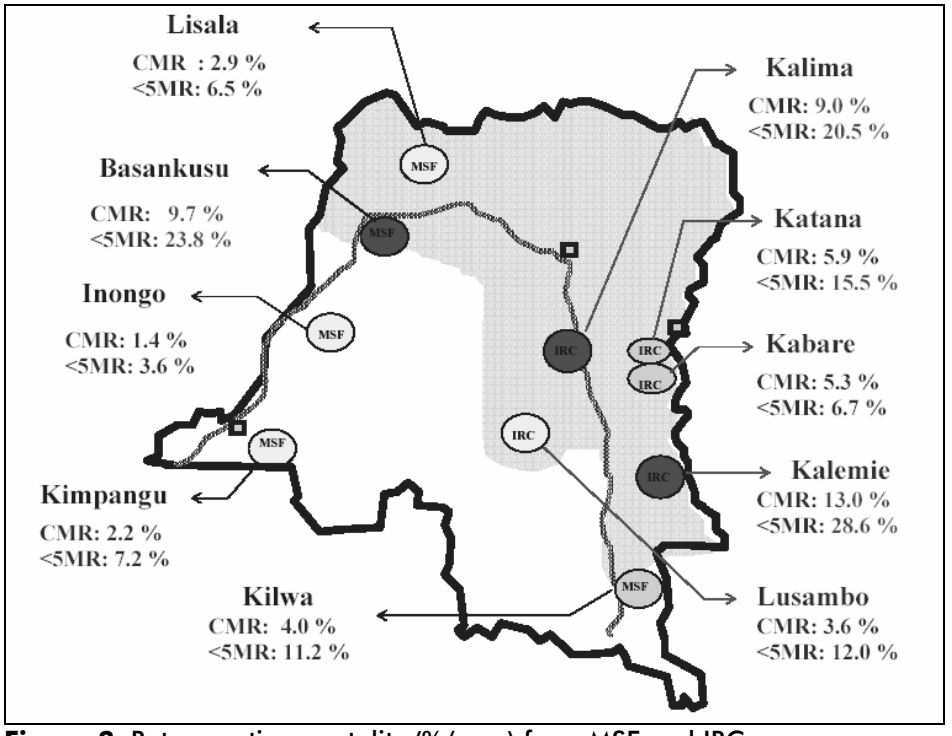

Figure 3 Retrospective mortality (%/year) from MSF and IRC surveys

line, physical violence remains a significant cause of mortality (as high as 23 per cent) (IRC, 2001).

Nearly four out of every 10 people in the two zones closest to the front line did not seek health-care when they fell ill, mostly because of cost. Up to half of those who received a consultation obtained no or incomplete medicinal treatment, again for financial reasons. Similar results were reported in the country's capital, Kinshasa, in June 2001 where two in 10 households had no access whatsoever to health-care, and three in 10 receive incomplete treatment because of lack of money (UNOCHA, 2001b). In Inongo, where primary health-care is not supported by external actors, access to care is comparable to the front-line zones. More than two in 10 sick people did not consult a medically trained person, while one in three households obtained no or incomplete treatment due to lack of money and medicines.

Although unable to calculate precise poverty rates, the survey teams observed a disconcerting level of poverty in Kilwa zone (tattered clothing, absence of food stocks and cooking utensils) and extreme poverty in Basankusu, where money has almost ceased to circulate in rural parts. Lack of money and food reserves is closely linked to the difficulty of producing and protecting harvests. Although physical violence has diminished since the ceasefire, troops have not completely withdrawn from all regions and continue to feed off the population. Many rural health structures remain isolated due to the destruction of infrastructure and the extortion of civilians by the military on the river and roads. Distances are measured in terms of days, not hours or kilometres. Theft of medicines by soldiers (and even by medical personnel) was also a frequent occurrence in rural parts.

As a result of the mass-vaccination campaign run by WHO, a large majority of children (96.0–99.3 per cent) had received all three polio shots according to their mothers. However, EPI coverage is very poor. The difference in effort expended by multilateral agencies when vaccinating against polio (CDC, 2000) as opposed to other diseases of significant mortality is the first explanation for this disparity (Roberts, 2001). Nevertheless, the inability to pay for vaccination cards, poor management of the zone's central office, the lack of an effective vaccination strategy from fixed bases, a shortfall in the vaccine supply and problems with the cold chain (distance to health centres, broken refrigerators) all contribute generally. Kimpangu zone is an exception where, owing to less serious socio-economic conditions and dynamic chief medical doctor, EPI coverage is encouraging (70.5 per cent vaccinated against measles).

Looting soared in the front-line zones of Basankusu and Kilwa (77 per cent of all households surveyed for each zone) and remained high in 2001 (45 per cent and 17 per cent, respectively). Basankusu has been a theatre for armed conflict between the rebel forces and the government army and was most affected by the destruction of houses and fields, physical assaults, arbitrary arrests and imprisonment, torture and sexual abuse. Kilwa zone has seen more withdrawals than conflict, with government soldiers and civilians fleeing the rebel advance in December 2000. The violence in Kimpangu was linked to two factors: the withdrawal of the rebels in August 1998 during their attempt to open a Western front, and frequent incursions by UNITA rebels from Angola.

Conclusions

Prior to this survey, MSF programmes had been concentrated in the national and provincial capitals. These survey findings, revealing high mortality rates in war-affected zones among a population exposed to the violence of war and with limited or no access to health-care, resulted in an increase in MSF operations in the countryside, particularly war-affected zones. The emphasis for MSF has shifted from support to health zones to direct support to the population. An operation was established in Basankusu in March 2002 with further operations predicted in Kilwa and seven other war-affected regions (Boende, Bomongo, Bolomba, Befale, Lokutu, Djolu and Pweto) in 2003. Other potential activities include: vaccination campaigns, needs assessments among people located in other war zones, particularly Ituri and Kivu; permanent response to epidemics and natural catastrophes (30 interventions per year on average); epidemic control (such as monkey pox and cholera); surgery and mental health.

Peace remains elusive in the DRC but this should not discourage humanitarian actors and donors from augmenting their efforts in the western and central provinces where conflict is less chronic but health-care is unavailable to many. The medical and humanitarian situation remains acute across the country, particularly near the front line where mortality far exceeds alarm thresholds. Inability to pay consultation fees and purchase treatment was the rule rather than the exception in all health zones surveyed.

Generalised instability clearly has deleterious effects on rural economies, which in turn creates obstacles to providing health-care for the sick. Where exposure to violence was highest, lack of medicines was a frequently cited factor for not seeking health-care outside the family. The impact of infectious diseases, which claimed most lives, was compounded by the weakening effects of malnutrition — itself responsible

for one-quarter of deaths in Basankusu. CMRs were higher closer to the front line, and lowest in Inongo probably owing to its isolation from the violence.

Infectious disease control and treatment are a priority; in particular, given the risk of epidemics, systematic vaccination against measles should be urgently undertaken. Because of difficulty in accessing health centres, medical staff should be encouraged to go to patients and become more visible in patient health-care, for example through mobile clinics.

The curtailing of commercial traffic on the Congo River and the destruction of roads and bridges have severely damaged rural economic activities and destroyed trade networks throughout the interior. The resumption of economic life is crucially dependent upon the restoration of this infrastructure and securing safe passage against extortion.

The population's survival depends on security. Physical violence was not a major cause of mortality in the zones surveyed during this post-ceasefire period, but material violence — looting, destruction of homes, fields, and reserves — remains a serious concern and is linked to the enduring presence of military of all sides. The UN troops, whose mandate is limited to protecting UN personnel, can offer no protection against this violence. The UN's ceasefire monitoring mission consists of only 442 military observers (*Economist*, 2002).

Western governments have mostly ignored the DRC's humanitarian crisis, considering it too tangled to resolve. The assistance provided by external humanitarian groups and NGOs is concentrated in the most accessible parts of the country — Kinshasa, Lubumbashi, Goma and Kisangani — with very little assistance to the rural interior of the country. A massive increase in assistance is needed country-wide, especially in rural areas. Funds allocated to humanitarian action in the DRC must be increased considerably, with specific support to conflict-affected zones.

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