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HIV Risk and Prevention in Emergency-affected Populations: A Review

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While basic guidelines on HIV prevention in emergencies have been available for several years, international agencies involved in the provision of health services have not placed sufficient priority on the prevention of the human immune deficiency virus (HIV) and other sexually transmitted infections (STIs) in complex emergencies. This paper reviews the factors that may increase the risk of HIV transmission in populations affected by complex emergencies and outlines recommendations for research and programmes. Research into the most appropriate methods of carrying out HIV surveillance and interventions in these settings is needed. In the post-emergency phase programmes need to be far more extensive than those offered under the Minimal Initial Services Package (MISP). While the potential for stigmatisation represents an important constraint, there is a need to prioritise HIV/STI interventions in order to prevent HIV transmission in emergency-affected populations themselves as well as to contribute to regional control of the epidemic.

Keywords: HIV and STIs in complex emergencies, HIV and refugees, risk and prevention strategies, southern and central Africa

The term ‘complex emergency’ is used to define a situation that affects large civilian populations and usually involves a combination of war or civil strife, food shortage and population displacement, all of which result in significant excess mortality (Toole, 1999, Burkle, 1999). These situations have become more common over the past two decades, particularly in Africa, and they may extend over many years. HIV prevalence rates are high in many of the countries affected. Recent examples of complex emergencies in Africa are those in Sierra Leone, southern Sudan, Rwanda, Somalia and Angola.

The main causes of death in the emergency phase are typically measles, diarrhoeal diseases, acute respiratory diseases and malaria. A high prevalence of protein energy malnutrition is also common and is another major cause of mortality.
The causes of death are similar for refugees, who, by definition, have crossed international borders, and for the internally displaced. The latter, however, do not benefit from the protection of an international agency with a clear mandate for the co-ordination of a humanitarian response.

Significant advances have been made in developing and improving technical standards in many important areas of public health in emergencies. Immunisation programmes (particularly against measles), adequate water and sanitation facilities and food of a quality and quantity that meets basic caloric and micronutrient requirements are now viewed as minimum standards in humanitarian interventions (IFRC, 1998). As yet, however, the prevention of HIV and sexually transmitted infections (STIs), which we argue are important, though less visible, causes of morbidity and mortality, have not received adequate attention in populations affected by emergencies. Efforts are needed to document the extent of this problem, implement prevention strategies that are of proven effectiveness, and develop innovative approaches suitable for these complex environments. The prevention of HIV infection in emergency settings has implications not only for the populations immediately affected by the crisis but also for the regional transmission and control of the HIV/AIDS epidemic in the long term. Based on a review of available literature, we summarise some of the potential risk factors for HIV in populations affected by emergencies, describe the prevention strategies appropriate for the setting, and recommend topics for research and action.

Factors associated with increased risk in emergencies

In terms of the factors associated with transmission, complex emergency settings may differ substantially from the more stable environments in which HIV research and prevention programmes have traditionally been implemented. These risk factors differ from context to context but may include massive population displacement, disruption of family and social structures and mores, disruption of sexual networks, sexual interaction of emergency-affected people with military or paramilitary personnel, the economic vulnerability of women and unaccompanied minors, the frequency of commercial sex work, the frequency of sexual violence and coercive sex, psychological trauma, the disruption of preventive and curative health services, unsafe blood transfusion practices at a time of increased blood transfusion requirements, the increased use of illicit drugs and the high prevalence of sexually transmitted infections (Santos-Ferreira et al., 1990, Salama et al., 1999, Burkle, 1999).

At a policy level, there are encouraging signs that HIV prevention in emergencies is gaining attention. The Joint United Nations Programme on HIV/AIDS (UNAIDS) has produced intervention guidelines on HIV in emergencies (UNAIDS, 1998). An international conference has been convened (UK AIDS Consortium, 1997), and a World Health Organization (WHO) research agenda for complex emergencies gives some priority to STI and HIV prevention (WHO Division of Emergency and Humanitarian Action, 1998). The revised edition of an interagency field manual on reproductive health, including a chapter on HIV and STI prevention, has recently been published (UNICR, 1999). Very few studies, however, have documented the magnitude of the HIV epidemic in complex emergencies.
epidemiological risk factors of importance in the specific context of these emergencies, or made recommendations about appropriate surveillance systems or prevention programmes based on sound, ethical scientific study.

**Sexual transmission**

**Rape**

Military and paramilitary personnel have frequently and systematically used rape to terrorise and drive a population from an area (Stegmayer, 1994, Crossette, 1998). At other times in unstable settings, men with weapons and power opportunistically exploit available women (McKinley, 1998). During Liberia's civil war, nearly half of civilian women and girls are estimated to have been physically or sexually abused in the first five years of fighting (Bauer, 1998). The United Nations High Commissioner for Refugees (UNHCR) reported that 39 per cent of Vietnamese 'boat women' were raped or abducted, primarily by pirates, while fleeing their home country by sea (Ashford and Hucl-Vaughn, 1997). Risk can continue in refugee camps: recounting a sadly frequent situation, a Liberian woman related how the women's shelters were set up on the fringe of the camp, which made the women more susceptible to sexual violence from military personnel, police and male refugees (Kinnah, 1997).

Women raped by military and paramilitary personnel are at increased risk of contracting HIV. Even in peace, the STI rate is two to five times higher for military personnel than for civilians (Kingham, 1996, Haour-Knipe et al., 1999). A small study in Angola showed HIV rates four to five times higher in members of the military than in comparable urban populations (Santos-Ferreira, 1990). The first documented statistical link between soldiers and the spread of AIDS was found in Uganda. In particular, the geographical pattern of AIDS was correlated with the placement of the Ugandan National Liberation Army for the first six years of the post-Amin civil war (Smallman-Raynor and Cliff, 1991).

HIV prevalence data are limited for male military and police personnel and for civilian women in the same region, but most often show higher rates in the men (see Table 1). The increased HIV prevalence for military and police personnel is attributed to their high-risk age group (25–44 years), multiple sex partners and high-risk behaviour during their long periods away from home and family (McCarthy et al., 1989). Women's risk of contracting HIV as a result of sexual violence increases when there are multiple perpetrators or when women are held by military personnel for prolonged periods for sexual purposes, as has been reported in recent emergency situations (Salama et al., 1999). Young women and girls may be at even higher risk because of their increased biological vulnerability (Vuylstke et al., 1996).

**Sex as a survival strategy**

The use of sex as a survival strategy with its attendant HIV risk is well recognised in economic or politically vulnerable communities, particularly in Africa (Vuylstke et al., 1996). In emergency situations, forced or at least coerced sexual relations may be relatively common. Typically, women and children make up approximately 80 per cent of the 40 to 50 million refugees and internally displaced persons worldwide.
Table 1 Comparison of HIV seroprevalence among male military and police and among pregnant women, by country, 1994–1999

<table>
<thead>
<tr>
<th>Country</th>
<th>Group</th>
<th>Men no of studies</th>
<th>Men median (range)%</th>
<th>Pregnant women no of studies</th>
<th>Pregnant women median (range)%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>Belarus</td>
<td>M 1</td>
<td>0.4 (n/a)</td>
<td>1</td>
<td>0.0 (n/a)</td>
</tr>
<tr>
<td></td>
<td>Cambodia</td>
<td>M &amp; P 66</td>
<td>6.2 (0.0–17.3)</td>
<td>49</td>
<td>2.3 (0.5–19.5)</td>
</tr>
<tr>
<td>Africa</td>
<td>Cameroun</td>
<td>M &amp; P 2</td>
<td>13.3 (12.0–14.7)</td>
<td>30</td>
<td>4.2 (1.9–14.6)</td>
</tr>
<tr>
<td></td>
<td>Central</td>
<td>M 3</td>
<td>14.5 (13.9–15.0)</td>
<td>39</td>
<td>12.8 (1.6–20.0)</td>
</tr>
<tr>
<td></td>
<td>African Rep</td>
<td>M &amp; P 4</td>
<td>13.3 (12.2–13.7)</td>
<td>35</td>
<td>12.2 (0.0–32.5)</td>
</tr>
<tr>
<td></td>
<td>Tanzania</td>
<td>M &amp; P 3</td>
<td>27.0 (26.5–28.1)</td>
<td>63</td>
<td>11.7 (1.3–26.4)</td>
</tr>
</tbody>
</table>

M=military, P=police
n a = not applicable

Source: Bureau of Census 1999

(UNHCR, 1992, UK AIDS Consortium, 1997) Men often abandon or are separated from their families for military reasons or in their search for employment in the cities (Mabe, and Mbayid, 1997), or they may be targeted by opposing forces and be killed or taken prisoner. The percentage of female-headed households therefore may be high and these households may have higher economic vulnerability (Shoham, 1996). Women and girls with limited education, low financial earning ability when far from their home area and without male wage earners or protectors in the household may be particularly vulnerable or have few realistic alternatives to trading sex for income or basic needs. Women may move to the city to earn money, by whatever means possible, to support their families living in the rural areas (Zwi and Cabral, 1991).

When families are separated by war and displacement, new social units are formed (McKinley, 1998). Unaccompanied minors, a particularly vulnerable group, increasingly encountered in large numbers in African emergencies, lack parental guidance and protection. Children may become sexually active at an earlier age (Obasa, 1998). Teenage pregnancies and illicit abortions are common in some emergency settings (UNHCR, 1992). The traumatic events and psychological sequelae experienced by many displaced people may precipitate an erosion of traditional values. These various factors in combination with the heightened economic vulnerability of women and children can disrupt sexual networks and lead to the formation of new networks with more unfavourable power differentials. In practice, this may mean in addition to additional sexual exposure, a decreased ability for women to demand their partners to use condoms and a higher risk for the sexual transmission of HIV.

Refugee women may engage in commercial sex (McKinley, 1998) or trade sex for basic commodities such as food, shelter material and other necessities. Throughout Africa, the prevalence rates of HIV and STIs are highly elevated among commercial sex workers (CSWs) (Bureau of the Census 1999). The risks from
unprotected vaginal intercourse with an HIV-positive male partner are clearly high. The probability of male-to-female HIV transmission ranges from 0.1 per cent to as high as 5.6 per cent per sex act (Mastro and de Vincenzi, 1996). The risk of female-to-male transmission can also be high (Satten et al., 1994), especially if a CSW or other female partner is co-infected with a STI; and an HIV transmission rate as high as 13 per cent has been reported for men who simultaneously acquired a symptomatic STI (Mastro and de Vincenzi, 1996).

High-risk groups for HIV infection also include young refugee men who travel to nearby cities to find labour and may spend time in taverns and hostels (Haour-Knipe et al., 1999). They typically must leave their families behind and often look for companionship with CSWs inside or outside refugee camps (Zwi and Cabral, 1991). In non-emergency settings, migrant workers are well recognized to be at considerably increased risk of STIs and HIV (Prison et al., 1993, Mabey and Mayaud, 1997), and many of these workers’ risks would be similar to those of refugee men seeking work far from families.

**Host-refugee interaction**

Higher risk of HIV infection for migrants may be particularly important for those from rural areas, where HIV prevalence and knowledge of HIV are typically low, who migrate to urban centres. Risk may similarly be increased for refugees from rural areas who settle near cities or large villages. In these situations, widespread sexual mixing may be common (Salama, no date). Rural Sudanese refugees in Uganda have demonstrated a marked lack of awareness about HIV (Jurugo, 1996). In Rwanda, HIV prevalence increased dramatically among rural women after the civil war (Letoy et al., 1995).

In general, the risk of HIV transmission in host-refugee sexual interactions depends on the relative HIV prevalence for the two populations and the extent and pattern of host-refugee interaction, as suggested by a study of Mozambican refugees in Swaziland (Van Rensburg et al., 1995). As well as factors such as the prevalence of STIs and the maturity of the HIV epidemic in the vicinity, HIV risk may depend in part on whether displaced populations are housed in closed or open camps or are integrated into the community.

**STIs as a cofactor in transmission**

STIs are an important cofactor in the sexual transmission of HIV. The association is strongest for ulcerative disease (Plourde et al., 1994), but is also present for nonulcerating infections such as gonorrhoea and chlamydia (Laga et al., 1993). STIs increase the shedding of HIV in the genital tracts of infected men (Fleming and Wasserheit, 1999) and women (Ghys et al., 1997). Some information suggests that rates of STIs are high in refugee situations (Mabey and Mayaud, 1997). CDC unpublished data, 1992 STD/HIV Control and Prevention Project, Bench Zone, Region 8 Ethiopia) and are consistently under-reported, in some areas, as many as half of sufferers seek care from traditional healers (Mayaud et al., 1997). Successful
STI treatment reduces HIV spreading (Ghys et al., 1997) In a trial in Mwanza, Tanzania, STI treatment services were integrated into the primary health-care system and made available to people with few resources. Within two years, the incidence of HIV infection decreased 40 per cent in the study villages compared to the rates in surrounding communities (Grosskurth et al., 1995) The apparently contrary findings of the Rakai study (Wawer et al., 1999) — that mass STI treatment had no significant effect on HIV incidence — may merely reflect a different set of circumstances: a mature HIV epidemic with high baseline HIV seroprevalence and a relatively high prevalence of genital herpes simplex infection, which is not curable by treatment. Overall, STI treatment remains a key strategy in HIV prevention (Wasserheit, 1992, Fleming and Wasserheit, 1999, Hitchcock and Fransen, 1999)

Best-practice guidelines for STI diagnosis and treatment in resource-poor settings advocate syndromic diagnosis (i.e., based on signs and symptoms, without the requirement of laboratory capability) and treatment (WHO/GPA 1994, WHO/UNAIDS 1997, Dallabetta et al., 1997) These guidelines, however, are not implemented consistently in emergency situations. The reasons for inconsistent implementation are similar to those that have hindered other responses to HIV: lack of resources, lack of high-quality data showing the magnitude of the problem, and lack of accepted methods of rapid assessment.

Inconsistent implementation may also be related to health-care providers’ lack of confidence in the syndrome approach, which may correlate poorly with lab diagnosis and may be less specific for the nonulcerative STIs (Paxton et al., 1998). According to one study, the correlation between the symptoms and signs and the etiologic diagnosis may be poor in the refugee setting (Mayaud et al., 1997). For these reasons the potential value of mass STI treatment needs to be evaluated further, particularly in situations in which there is little sexual interaction with members of the surrounding community (Wilkinson et al., 1999)

Risk of mother-to-child HIV transmission

During the acute stage of an emergency, fertility rates may be reduced; however, as stability returns and the general health and nutritional levels improve, sexual activity increases and fertility rates may rise to pre-disaster levels (Holck and Cates, 1980). As part of a socio-cultural impetus to repopulate after a civil conflict, adults may refrain from using condoms (Obaso, 1998). On a population basis, the risk of mother-to-child transmission depends upon the HIV seroprevalence among pregnant women, which is high in some populations affected by refugee emergencies.

Table 2 summarises the seroprevalence in antenatal women in countries that have been affected by emergencies or that have received refugees from such countries. In the absence of antiretroviral prophylaxis, the risk of transmission from an HIV-1-infected mother to her infant ranges from 15 to 45 per cent, the rates being higher in sub-Saharan Africa (Working Group on Mother-to-Child Transmission of HIV 1995). The risk of HIV transmission through breastfeeding ranges from 7 to 14 per cent (Dunn et al., 1992, Ekpin et al., 1997). Newly acquired HIV infections in the mother may be associated with a higher risk of transmission associated with breastfeeding (Dunn et al., 1992). Therefore, if newly acquired infections are common...
### Table 2: HIV seroprevalence among pregnant women by country 1996–1999

<table>
<thead>
<tr>
<th>Country</th>
<th>No of studies</th>
<th>Median (range)%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Europe</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belarus</td>
<td>1</td>
<td>0.0 (n/a)</td>
</tr>
<tr>
<td>Russia</td>
<td>3</td>
<td>0.0 (0.0–0.0)</td>
</tr>
<tr>
<td><strong>Asia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burma</td>
<td>53</td>
<td>1.0 (0.0–8.5)</td>
</tr>
<tr>
<td>Cambodia</td>
<td>43</td>
<td>2.3 (0.3–19.5)</td>
</tr>
<tr>
<td>India</td>
<td>11</td>
<td>0.8 (0.0–3.4)</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>7</td>
<td>0.0 (0.0–0.0)</td>
</tr>
<tr>
<td>Thailand</td>
<td>168</td>
<td>1.8 (0.0–7.9)</td>
</tr>
<tr>
<td>Vietnam</td>
<td>63</td>
<td>0.0 (0.0–1.2)</td>
</tr>
<tr>
<td><strong>Africa</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Botswana</td>
<td>14</td>
<td>13.9 (21.8–43.8)</td>
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<tr>
<td>Burkina Faso</td>
<td>4</td>
<td>9.6 (5.9–10.0)</td>
</tr>
<tr>
<td>Burundi</td>
<td>3</td>
<td>17.0 (3.4–20.6)</td>
</tr>
<tr>
<td>Cameroon</td>
<td>6</td>
<td>5.6 (1.9–11.2)</td>
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<td>Central African Republic</td>
<td>14</td>
<td>13.6 (1.6–20.0)</td>
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<td>Congo</td>
<td>4</td>
<td>5.4 (1.6–5.8)</td>
</tr>
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<td>Côte d’Ivoire</td>
<td>20</td>
<td>9.3 (0.4–16.7)</td>
</tr>
<tr>
<td>Democratic Rep Of Congo</td>
<td>3</td>
<td>3.1 (1.5–6.3)</td>
</tr>
<tr>
<td>Eritrea</td>
<td>10</td>
<td>17.1 (9.0–26.0)</td>
</tr>
<tr>
<td>Gabon</td>
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<td>4.7 (n/a)</td>
</tr>
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<td>Ghana</td>
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<td>1.4 (0.0–12.8)</td>
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<tr>
<td>Guinea</td>
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<td>1.4 (1.3–1.8)</td>
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<td>Guinea-Bissau</td>
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<td>2.0 (0.5–4.6)</td>
</tr>
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<td>Kenya</td>
<td>29</td>
<td>14.4 (4.1–34.9)</td>
</tr>
<tr>
<td>Liberia</td>
<td>4</td>
<td>0.0 (0.0–0.0)</td>
</tr>
<tr>
<td>Malawi</td>
<td>42</td>
<td>16.9 (2.3–34.0)</td>
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<tr>
<td>Mali</td>
<td>3</td>
<td>2.3 (0.2–2.7)</td>
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<td>Mozambique</td>
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<td>18.2 (n/a)</td>
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<tr>
<td>Namibia</td>
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<td>16.7 (3.7–25.7)</td>
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<td>Nigeria</td>
<td>3</td>
<td>2.7 (0.8–6.7)</td>
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<td>Rwanda</td>
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<td>18.3 (4.0–34.4)</td>
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<td>Sudan</td>
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<td>4.5 (n/a)</td>
</tr>
<tr>
<td>Swaziland</td>
<td>5</td>
<td>26.3 (23.9–27.7)</td>
</tr>
<tr>
<td>Tanzania</td>
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<td>13.7 (n/a)</td>
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<tr>
<td>Togo</td>
<td>10</td>
<td>4.6 (3.0–8.2)</td>
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<tr>
<td>Uganda</td>
<td>27</td>
<td>10.3 (1.6–15.4)</td>
</tr>
<tr>
<td>Zambia</td>
<td>1</td>
<td>27.0 (n/a)</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>25</td>
<td>31.4 (7.0–50.8)</td>
</tr>
</tbody>
</table>

n/a = not applicable

Source: Bureau of Census, 1999
because of the increased sexual risks already described, the risk of mother-to-child transmission is likely to be heightened in emergency settings.

The effectiveness of antenatal short-course oral zidovudine in the absence of breastfeeding has been as high as 50 per cent for preventing mother-to-child infection (Shaffer et al., 1999, Wiktor et al., 1999, Dabis et al., 1999). In another recent study, a different drug, nevirapine, given once to the mother during labour and once to the newborn has also decreased HIV transmission by nearly 50 per cent (Guay et al., 1999). This drug regimen is inexpensive as well as easy to administer (Marseille et al., 1999). Both drug-based preventive approaches are currently used in various settings in developing countries. Selection of the preferred regimen will depend on further experience with their use under field conditions.

**Risks related to health-care**

It is difficult to quantify HIV transmission from inadequately sterilised equipment because such cases tend to occur in locations where diagnostic and surveillance systems are poor (MAP Network, 1998). If organisations providing health-care are not well prepared, there is, however, a potentially increased risk for the transmission of HIV and other blood-borne infections accidentally resulting from clinical practice or from transmission between patients and or health-care workers. These risks include mass immunisation campaigns, overuse of intramuscular injections and intravenous infusions, and infusion procedures when supplies are inadequate, unsafe sterilisation practices, and poorly trained and supervised staff. Health-care workers may themselves be at increased risk of contracting HIV through needlestick injury or exposure of open cuts and mucous membranes to the blood and body fluids of an infected patient, especially under chaotic emergency conditions.

Although screening has reduced the risk through transfusion in most parts of the world, HIV is still transmitted through transfusions, even under stable conditions. In a study in Kenya, the risk of HIV infection from a blood transfusion was estimated at one in 50 (Lackritz, 1998), a statistic 10,000 times higher than figures in industrialised countries such as the US or France. Contributing factors included poor record-keeping, breaks in the cold chain while transporting test kits, collection of blood from family members when rapid tests are not available, and the assumption that a mother and her child have the same HIV infection status (Lackritz, 1998).

The transfusion-associated HIV risk may be even greater in complex emergencies if a large number of war-related injuries require transfusion. This is particularly true if there has been a breakdown of the health infrastructure in war-affected areas and a subsequent failure to screen blood transfusions or ensure the supply of clean needles and syringes and sterile surgical equipment. The use of paid donors and the failure to screen out high-risk donors also increases the risk (Chattopadhyay et al., 1991, Mundie et al., 1995), and both are likely to be more common when services are under pressure in conflict situations.

There are two other routes of transmission which are potentially important in emergency settings, although little is known about their frequency. The first route is the injection of illicit drugs, because drug users would rarely have access to clean needles or sterilisation equipment in complex emergencies. The other route is sexual contact between men, particularly anal intercourse, whether consensual or coerced.
Minimal Initial Services Packages

A Minimal Initial Services Package (MISP), which represents the basic programmatic requirements for HIV prevention in the emergency phase of disaster relief, includes safe blood transfusions, access to condoms, availability of materials for universal precautions and the availability of basic HIV/AIDS information (UNAIDS/WHO/UNHCR, 1996). The recently updated New Emergency Health Kit (‘NEHK ‘98’) (UNFPA, 1998) lists materials required for assuring the MISP and complementary reproductive health services Supplies for the NEHK are packaged in quantities adequate for 10,000 people for three months Currently, however, HIV test kits for screening blood for transfusion or assessing HIV status are not included among these supplies.

Barriers to HIV prevention

HIV prevention in complex emergencies has not yet been adequately addressed for several reasons One, which is common to all HIV programmes, relates to the silent nature of the epidemic and the stigma attached to the diagnosis Methods of assessing HIV prevalence and risk in emergency settings have not yet been developed While governments and international assistance organisations often characterise HIV as a development issue, little consideration has been given to HIV as a priority health issue during emergencies, as this review has discussed In emergency settings, the focus of donors and implementing partners has traditionally been on basic needs food, water, shelter and health services (Mabey and Mayaud, 1997). This focus may be more relevant during natural disasters, which are generally of short duration with the infrastructure rebuilt relatively quickly afterwards In complex political emergencies, however, such as those in Sierra Leone, Burundi, southern Sudan or Angola the physical and social infrastructure may remain devastated for many years

Additionally, because the limitation of human rights (such as the right to seek and enjoy asylum or the right to freedom of movement) has been an integral part of the history of HIV, organisations such as UNHCR, whose mandate is to protect refugees, have been reluctant to support HIV testing. One concern is that the governments providing asylum could use individual HIV status or high prevalence rates in a given refugee population as an exclusion criterion for refugees trying to cross their borders (Annas, 1993). Furthermore, individual testing requires the availability of counselling and should be linked to care for those who test HIV-positive Counselling and care are rarely available in the refugee environment, and it is difficult to ensure confidentiality in confined camps.

Another frequent barrier to HIV prevention in emergency situations is the lack of any functioning health system. In complex emergencies, a ministry of health may not actually exist because of the breakdown of civil institutions as a result of war (for example, Somalia) or territorial control by a rebel group (for example, southern Sudan), it may be antagonistic to one ethnic minority and therefore reluctant to provide services to that group, it may have no coherent HIV policy, or it may be constrained by a lack of resources (for example, Sierra Leone) It is in these situations that HIV/AIDS transmission may accelerate most dramatically
The final barrier to HIV prevention is the critical lack of high-quality data on the prevalence of STI or HIV in countries affected by conflict. HIV is under-recognised in populations affected by emergencies. In refugee camps, sentinel surveillance systems are rare. The data derived from blood bank HIV screening in host country hospitals or from diagnostic tests ordered by health-care workers are usually not disaggregated by refugee or indigenous status and are rarely systematically gathered and analysed. Moreover, in emergency relief settings, morbidity and mortality due to chronic diarrhoeal illness, fever of unknown origin, recurrent pneumonia, wasting syndromes, meningitis and tuberculosis (all frequently consequences of AIDS-related immunosuppression) are rarely attributed to HIV in reporting systems. Similarly, in children, failure to thrive, cachexia, developmental retardation and recurring bacterial infections, which may be symptoms of AIDS rather than a result of the health and nutritional conditions in a refugee camp, are rarely designated as HIV related.

This lack of recognition is due partly to the difficulties in diagnosing HIV/AIDS in the absence of testing facilities and the unfamiliarity of clinicians, particularly those from developed countries, with the manifestations of the disease in developing countries, and the reluctance of those who do recognise the disease to risk stigmatising their patients by reporting it.

In fact, HIV epidemiological information is usually not current or sufficient for many of the countries affected by emergencies or host to refugees. For example, in the UNAIDS profiles (which use data collated by the US Bureau of Census (Bureau of the Census, 1999)) for two countries with complex emergencies, Sierra Leone and Sudan, reliable antenatal HIV seroprevalence data have not been reported since 1992 and 1996, respectively (UNAIDS/WHO, 1998a; UNAIDS/WHO, 1998b). Without data to quantify the extent of the problem and provide a baseline against which to evaluate programmes, the NGOs that provide the bulk of health services to emergency-affected populations situations may assign HIV low priority.

**Discussion**

**Prevention strategies**

The MISP should be made available in the acute phase of emergencies as the major HIV-prevention strategy, including transfusion blood safety and prevention of other health-care-related transmission, during the time when mortality is more than one per 10,000 per day. The procedural details of mobilising and implementing the MISP in camp settings have been published (UNAIDS/WHO/UNHCR, 1996, UNHCR, 1999). Note, however, that 60 to 75 per cent of Africa’s refugees have never lived in camps (Harrell-Bond, 1994). In recent emergencies, a large proportion of refugees have sought assistance and shelter directly from host populations (USAID, 1999). Until now, however, most of the HIV-prevention activities that have been attempted have been directed to camp populations. Innovative strategies are needed to give internally displaced persons and refugees outside camps access to the services outlined in the MISP. Normally, UNHCR or the designated agency for reproductive health coordination takes the lead in co-ordinating the MISP, however, when UNHCR is not present (for example, with internally displaced people), another agency such as UNICEF could play the co-ordination role.
In the post-emergency phase, the prevention of HIV should be integrated into the prevention and treatment of STIs and, in more stable situations, into comprehensive reproductive health services. The latter, in addition to providing HIV education and condom promotion, should, when feasible, include voluntary testing and counselling services as well as comprehensive care for people with HIV/AIDS. Increasingly, interventions to prevent mother-to-infant transmission are being implemented in developing countries and may become important in some emergency-affected populations. In countries where the ministry of health or health authorities are functioning, HIV policies for emergency-affected people should be consistent with national policies, and in countries where there are refugees, host populations should benefit from similar services.

The prevention of sexual violence and coerced sex is also important during all phases of an emergency. Women are at risk of sexual violence during civil conflicts and also during flight to another region or country. For those who have reached camps, the risk can be minimised by placing latrines and facilities in accessible, well-lit areas, making special arrangements for unaccompanied minors, and avoiding the sharing of living space by unrelated families (UNHCR, 1999). One practitioner has suggested inspecting potential camp design from the perspective of a potential rapist (Newberry, personal communication). Comprehensive guidelines have been developed for many aspects of the prevention and management of sexual violence in refugee camps (UNHCR, 1995). Internally displaced women, however, may not benefit from the protection provided for refugees by the UNHCR and other international agencies.

There is as yet no proven HIV prophylaxis for women who have been raped. In some countries, including South Africa, antiretroviral drugs are used presumptively as post-exposure prophylaxis (Caerens, 1999), because such an approach is effective after needlestick injury (Cardo et al., 1997) and after the birth of a baby to an infected mother (Wade et al., 1998). The post-exposure use of antiretroviral drugs is probably not feasible in refugee camps at this time.

Until a more comprehensive assessment is possible, a basic assessment of HIV and STIs by the reproductive health co-ordinator should be mandatory. It should be carried out at an early stage in an emergency as the MISP is being implemented. Secondary sources may be used, if available, such as data from the ministries of health of the country of origin and the host country, blood-bank data on HIV and syphilis prevalence in donors, and proxy indicators such as new cases of tuberculosis and STIs from health service providers. Other indicators, such as the number of reported cases of sexual violence, the number of unaccompanied minors, the presence of injection drug users, and the baseline level of HIV knowledge and condom use, may also be important.

The treatment of STIs remains one of the few proven means for preventing HIV that has been applied in emergency situations. Community health workers can be trained in syndromic diagnosis and treatment, which is simple and relatively sensitive, particularly for genital ulcer disease and urethral discharge (Mayaud et al., 1997). Outreach programmes should facilitate the promotion and provision of condoms, partner notification and referral, and group-based education and counselling (UNAIDS, 1996). Clearly, STI management and prevention may be more efficient in a confined refugee camp rather than when refugees are more integrated into host populations.
Research needs

There are several priority areas for research. One area relates to the development of rapid and workable assessment methods for the post-acute phase STI and HIV prevalence and risk assessment may be carried out using methods such as cluster-sampling techniques, which are used in measuring malnutrition prevalence or vaccination coverage in emergency settings. An assessment of STI HIV prevalence and risk should include qualitative and quantitative components.

Qualitative methods such as focus groups, food economy analyses, and sexual networking studies can provide better understanding of the specific determinants of vulnerability and the groups that need intervention. Qualitative analysis may lead to a conclusion that would not have been reached by using other methods. For example, it may suggest that generating or supplementing income may reduce vulnerability to HIV. In Uganda, for example, Sudanese refugee women were provided alternative employment so that they would not need to resort to selling sexual services (Akawir et al., 1998).

Quantitative studies should include not only the gathering of baseline data, but when feasible and appropriate anonymous unlinked cross-sectional studies (Schwartlander et al., 1994). Blood drawn during antenatal screening for syphilis serology can be used for this purpose. In the future, techniques such as the detuned assay (Janssen et al., 1998) may be useful in obtaining critical age-specific incidence (as well as prevalence), measures that give current information on the HIV epidemic. Incidence measures would be particularly useful immediately after a prolonged emergency or war during which seroprevalence data may not have been collected for several years and the current epidemic trends are thus unclear. There is an urgent need to validate under field conditions, the detuned assay for the HIV subtypes commonly found in Africa.

Interventions

Interventional studies are another priority. For effective intervention trials, however, the first priority is descriptive epidemiological research so that investigators understand the distribution and determinants of STI and HIV risk under complex emergency conditions. Although the Rakai (Uganda) HIV prevention study — a trial of mass STI treatment — did not show a significant decrease in HIV incidence in the intervention group (Wawer et al., 1999), the study may have less than important implications for refugees or displaced persons in camps. In that study, in a community-based design, participants were evaluated in a fairly non-invasive manner in their homes for STIs and HIV. The relative efficacy in the prevention of HIV by mass STI treatment compared with syndromic STI management should be investigated in a refugee camp or a camp for displaced persons in an area where STI prevalence rates are high and HIV prevalence rates are low.

As zidovudine and the newer drug, nevirapine, become more commonly used to prevent mother-to-child transmission in countries that host large numbers of refugees, it is important that intervention programmes do not exclude populations affected by emergencies. A mother-to-child prevention programme has three principal components: HIV testing with counselling, antenatal and/or peripartum
administration of anti-retroviral drugs, and (potentially) provision of substitutes for breastfeeding. Each component is complicated logistically, has attendant costs, and requires confidentiality and cultural acceptability. The risk for HIV transmission through breastfeeding must be balanced carefully against the risks of bottle feeding or early weaning in emergency settings, where access to safe water may be limited, sanitation may be poor, and diarrhoeal disease a major cause of mortality in children under the age of five.

Ethical and political considerations should not be minimised. Information regarding HIV status may be misused against individuals and against groups. We believe, however, that if the principles of informed consent and confidentiality are respected in the conduct of intervention and research, the outcome will be increased access to measures that will allow refugees and displaced persons to protect themselves from STIs and HIV. A key aspect will be the participation by local health authorities, community representatives, and HIV-infected refugees or displaced persons in the design of interventions and research.

**Conclusion**

Refugees and internally displaced persons are clearly at risk of contracting HIV infection. This risk differs according to many factors:

- the maturity of the HIV epidemic,
- the relative prevalence of HIV in the host and refugee population,
- the prevalence of other STIs that may facilitate transmission,
- the level of sexual interaction between the two communities,
- the presence of context-specific risk factors such as systematic rape by military or paramilitary groups and commercial sex; and
- the level and quality of HIV-prevention services.

HIV prevention is important not only for the affected communities but also for stemming the regional spread of HIV. Means of decreasing HIV transmission (for example, condoms, safe transfusion practices, universal precautions in health-care, the treatment of STIs and the prevention of mother-to-child transmission) are becoming more affordable for developing countries. The international community has an obligation to assist host governments in ensuring that these services are also made available for refugees. A coherent prevention strategy will require better baseline information, better surveillance and more access to testing and counselling than currently exist in emergency settings. Undoubtedly the ethical concerns regarding confidentiality, stigmatisation and the potential for the misuse of information must be dealt with sensitively and in partnership with the communities at risk. Continuing to miss opportunities for the prevention of HIV/AIDS in emergencies, however, represents a far graver ethical concern.
HIV Risk and Prevention in Emergency-affected Populations

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Conflict-induced Displacement and Involuntary Resettlement in Colombia: Putting Cernea’s IRLR Model to the Test

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This paper tests Cernea’s (1997) impoverishment risks and livelihood reconstruction (IRLR) model in cases of conflict induced displacement (CID). In applying the model to a situation involving internal conflict, the article illustrates the particular problems encountered by internally displaced people (IDPs) and policymakers charged to respond to them. The article searches for local interpretations of CID and resettlement through a comparative profile of two IDP settlements in Colombia—one in the rural area. It concludes that the IRLR model when contextualised provides a useful tool to identify and categorise risks of impoverishment and resettlement priorities. At the same time this article demonstrates that the model insufficiently captures the root causes of causalities of CID.

Keywords: internally displaced people; resettlement; impoverishment risks and livelihood reconstruction; Colombia

Introduction

Forced internal displacement, whether a result of development or conflict, is one of the great scourges of the contemporary era—tearing apart regions, communities and households. Although the article focuses on conflict-induced displacement (CID) and involuntary resettlement, the push factors determining people’s choice to leave in development and conflict are often quite similar—a combination of violated human rights and the anticipation of ‘human security’ in other regions. Cernea’s (1997) impoverishment risk and livelihood reconstruction (IRLR) model is introduced as a means of systematically identifying the impoverishment risks associated with CID and the involuntary resettlement of internally displaced people (IDPs). The model was initially devised to assess and plan for resettlement in the context of development-induced displacement (DID) but has been recently tested in the context of refugee settlements (Cernea and McDowell, 2000). One of the central advantages of the model is that it moves beyond a narrowly determined linear perspective toward a more synchronic and non-geographically bound approach. For these and other reasons, it provides an extremely useful starting-point from which to explore CID and resettlement in Colombia. Nevertheless, as this article explains, the introduction of the IRLR model to cases of CID must be approached with a certain measure of caution.
This article begins with a brief synopsis of the IRLR framework and reviews the adaptations included to the model to account for CID. It subsequently compares and contrasts involuntary resettlement resulting from CID with resettlement occurring as a consequence of DID. In order to illuminate the perilous consequences of CID, the article provides a review of the displacement crisis and the range of factors contributing to the forced displacement of IDPs in Colombia. As a means of testing the model and to provide further local contextualisation of the impoverishment risks facing conflict-induced displaced people, the experience of two resettled communities— one urban, the other rural— are explored. The paper concludes by raising some provisional observations about the utility of the IRLR model in assessing and planning for resettlement as a result of CID.

**Reviewing the impoverishment risk and livelihood reconstruction (IRLR)**

The article appraises the value of the IRLR model as a conceptual framework for macro-policy and planning and seeks to test its applicability in contexts of CID. Originally designed for the analysis of DID and involuntary resettlement, Cernea (1997, 1571) believes that ‘it is possible to extend this model to the analysis of other displaced populations such as refugees deprived of their habitat and assets not by development, but by civil war, ethnic persecution or natural disasters.’ This article explores the strengths and weaknesses of Cernea’s model in relation to past approaches, with a specific focus on the implications of conflict to the analysis.

In the past, resettlement activities have been viewed through a neo-classical lens, with traumatic social costs treated as the unavoidable price of economic development. The resulting impoverishment of resettlees catalysed a general re-think of traditional approaches. With the relative decline of narrowly conceived cost-benefit appraisals (CBAs), resettlement was subsequently conceived as a sequential, if dynamic, process involving planned phases (for example, see Colson, 1971, Scudder and Colson, 1985). Traditionally, conceptual approaches to the analysis of resettlement started from the post-displacement planning stage, anticipating a smooth continuum from displacement to resettlement and social rehabilitation. Originally designed to capture processes for ‘voluntary resettlement’, these conceptual models were later extended to the analysis of ‘involuntary resettlement’— in spite of the substantial distinguishing characteristics between the two processes. Indeed, mounting evidence suggests that, even in cases involving DID, ‘not all projects pass through all stages a steady movement (through the four stages) is the exception rather than the rule’ (Cernea, 1997). Voluntary settlements, for example, rarely produce the ‘transitional resettlement colonies’ (Partridge, 1989) that are regarded as unavoidable in many projects dealing with the involuntarily displaced. Scudder and Colson’s (1985) approach, while formative, is of particularly limited value in the Colombian context— where continued violence frequently acts as a major obstacle to the equitable resettlement of displaced populations.

Cernea’s model is premised on eight basic variables common to resettlement: landlessness, joblessness, homelessness, economic marginalisation; increased morbidity; food insecurity; loss of access to common property; and social disintegration, which, when combined, lead to rapid impoverishment. As the model
was not originally designed to capture the impoverishment risks of CID, a series of supplementary variables drawn from empirical research have been added. These include limited access to education, declines in political participation, and the increased risk of political and criminal violence. The importance of these latter variables was illustrated in the frequency by which they were prioritised by public and NGO actors addressing resettlement in Colombia. The 11 components of the reconstruction process (land-based re-establishment, re-employment housing reconstruction, social integration, improved health-care, adequate nutrition, restoration of community assets, community reconstruction access to educational opportunities, reformation of political activity and protection (for example, physical and legal)) are designed to reverse these 11 impoverishment risks.

Cernea's IRLR model, as distinct from the theoretical contributions of earlier scholars, is not aligned to a rigid time frame or staged sequences. Neither is it spatially bound – it is open to planning and implementation in both urban and rural contexts. Importantly, the model is synchonic – it captures processes that are simultaneously occurring and also reflects movement in time from displacement (e.g., destitution) to resettlement (e.g., reconstruction). The IRLR model reveals to policymakers ongoing risks and possible outcomes of displacement, providing a rigorous and flexible framework for assessing the socio-economic consequences of large-scale population movements. In seeking to ensure that IDPs, at a minimum, resume their previous standard of living, the model argues for a 'new economics for resettlement', one that extends beyond CBA and strictly compensatory measures to an 'economics of recovery' (Cernea and McDowell 2000). Importantly, however, the model can be contested on the grounds that it suffers from an over-emphasis on economics at the expense of rights.

Certainly, key weaknesses with the applicability of the model in Colombia lie in its failure to illuminate the chain of activities leading to CID and involuntary resettlement (which certainly constitute a violation of human rights), its exclusive focus on risk avoidance and its generalised framework. A crucial failure of the IRLR is its failure adequately to highlight the impetus of displacement and the particular role (and positive gains) of those actors precipitating displacement to begin with. While it was originally designed for state-planners as a 'preventive' tool against further impoverishment (Cernea and McDowell, 2000), it systematically avoids the real or potential role of the state in CID. Rather, the model provides support for the establishment of an 'equity compass' to minimise DID and distribute gains fairly (and adequately compensate losers) in the process. In this sense, perhaps the most severe criticism of the model is that it is largely 'effects-based' instead of focusing on the consequences of forced displacement (of IDPs) rather than the cause. Put another way, their socio-economic entitlements of individuals are privileged (post facto) over the fundamental human rights.

In addition, the model inadequately identifies either the capabilities or specific vulnerabilities of displaced, concentrating instead on their risks of impoverishment. There is ample evidence suggesting that forcibly displaced people, as a consequence of either CID or DID, are not static victims in the face of adversity (Muggah, 2000; Partridge 1996). Rather, IDPs are frequently active subjects that make significant contributions to the reconstruction of livelihoods and communities, building on existing experience and networks...experimenting with new ways and means' (Sorensen, 1998: 76, see also Lautze and Hammock, 1996). The model begins a blank slate, envisioning IDPs as passive victims rather than individuals facing acute...
vulnerabilities (in addition to risks) and a range of potential coping strategies. It should be noted, however, that insight into coping strategies and vulnerabilities, while not a deliberate function of the model, may emerge indirectly from ‘testing’ the model in practice.

Other critics also argue that Cernea’s model is overly general, thus inflexible to the complex realities of IDPs (Horgan, 1999). Indeed, that it focuses on the ‘impoverishment risks’ of IDPs without identifying their potential and existing capacities for poverty avoidance is a significant omission. But these criticisms are largely superficial since Cernea (1997) acknowledges that the model must be contextualised for local realities and that new variables may be required for particular situations. Indeed, its ‘open-endedness’ could also potentially be seen as a positive aspect of the model, it is malleable to the local conditions and realities and not confined to a set pattern or sequence of activities as pre-determined by earlier scholars.

**Contrasting involuntary resettlement as a result of development and conflict**

National and international concerns with involuntary resettlement have broadened in the 1980s and 90s by the growing political resistance emerging from key actors of this process—the populations of the forcibly displaced. In addition, the proliferation and intensification of ethnic cleansing, violent complex emergencies and the convergence between humanitarian and developmental spheres of influence has focused the global lens on the plight, and the need for resettlement, of IDPs (Klugman, 1999, Holtzman, 1999). There have been a spate of recent attempts, beginning at Oxford in 1996, to build a ‘peace bridge’ between actors exploring resettlement in the context of refugees and IDID (Harrell-Bond, 1996). Their efforts have indirectly yielded a number of strong parallels between DID and CID. Both processes can represent a deliberate exercise in land redistribution and the direct violation of fundamental human rights. Similarly, each can lead to impoverishment if equitable resettlement programmes are not effectively prepared and implemented.

But while scholars agree that both ‘oustees’ and refugees are entitled to international protection, conflict-induced IDPs are frequently left out of the equation. In spite of the recently elaborated Guiding Principles on Internal Displacement that have been culled from existing international humanitarian law (IHL), IDPs are not entitled to special rights guaranteeing their security (UN, 1998). The reasoning behind their limited ‘protection’ has arguably more to do with state concerns over the preservation of sovereignty than with international legality or negligence. As IDPs fall within the legal and physical frontiers of their respective countries, they are frequently inaccessible to outside assistance. This is because agencies and foreign governments are unable and unwilling to readily violate the sovereign jurisdictions of the state in question. Even the ‘natural lead agency’, the United Nations High Commission for Refugees (UNHCR), remains unwilling to accept responsibility. UNHCR’s reluctance can be attributed to a combination of concerns related to ‘watering down of their refugee mandate’ and financial constraints. The International Committee of the Red Cross (ICRC), with its principal mandate for IHL, does arguably have more of a statutory basis to intervene than the UNHCR (Lavoyer, 1995, 1999). Suffice to say.

Problems in this conceptual confusion are further exacerbated by the distinction between voluntary and involuntary displacement and resettlement. As a starting-point, it is useful to note that almost all migratory movements involve an element of choice, even if people frequently have the option to choose where to go and, indeed, whether to flee at all (UNHCR 1997 35). Forced displacement, however, must be distinguished from voluntary movements. Voluntary or economic migration, including rural to urban (and intra-urban) movements, is more a reflection of people’s deliberate pursuit of new opportunities. Displacement and resettlement become involuntary when the choice to remain is not provided, in this situation, in both rural and urban contexts the forcibly displaced are facing more risks than opportunities. Conceptually, these two processes (forced displacement and involuntary resettlement) can be envisioned as separate processes, although in practice, the first does not always bring about the second. Specifically, involuntary resettlement attributed to DID differs in important ways from involuntary resettlement resulting from CID. Involuntary resettlement attributed to DID, for example, can be prepared (e.g. via assessments, planning and contingency plans) well in advance. Multilateral institutions such as the World Bank have even evolved principles and plans of action to ensure, at the very minimum, the return of the displaced to their previous standard of living (1999). But resettlement planners, particularly in a conflict or post-conflict situation, can rarely anticipate, adequately plan or generate sufficient political will to respond to CID, much less ensure the displaced population’s return to their previous patterns of livelihood.

If projects that precipitate DID can be viewed as fulfilling lofty nationalistic goals and profits of that objective used toward realizing a more equitable resettlement project, the same cannot always be said of CID. This is partly due to the fact that stakeholders and beneficiaries of resettlement attributed to DID are more explicitly aligned with the resettlement planner’s ‘equity compass’. In this sense, the burden of repayment and redistribution (‘winner-pays principle’) at least in theory, is relatively clear. With regards to CID, obvious questions of de facto responsibility and financing are not so readily apparent. While populations may be victimized by CID on nationalistic grounds (former-Yugoslavia, Georgia, East Timor, etc.) political will for sustainable resettlement is often negligible, given the macro-economic instability resulting from conflict and the interests of the state and non-state actors in precipitating DID to begin with. As a result, most IDPs who resettle in either urban or rural zones following conflict do so in the absence of significant assistance from humanitarian, non-governmental, or state entities.

Given the rapid rates of urbanization evidenced throughout Latin America (exceeding 70 per cent in Colombia) and the significant rural-to-urban movements of IDPs, it is useful to draw some distinctions between urban and rural involuntary resettlement. In the context of DID, urban resettlement generally refers to the forcible relocation of households as a result of urban renewal or modernization projects. Rural IDP and involuntary resettlement is often conceived as a product of large-scale infrastructural programmes such as hydro-electric dams and agro-industrial programmes. In the case of CID, urban and rural resettlement intersect with vast movements of people from their rural communities to cities and shanty towns.
Moreover, in the case of CID, the return and resettlement objectives of municipal authorities in the urban context are generally predicated on immediate relocation to rural zones — areas often experiencing high levels of conflict. Such resettlement programmes are hampered by their limited access to accurate socio-economic statistics on affected populations, the settlement of people based on land availability (e.g., rather than, for example, terrain quality, economic viability or physical security) and the limited consultation of IDPs in programme design. Additional challenges at the implementation stage include flawed national settlement and housing policies, uncoordinated and protracted decision-making, loss of continuity following political transformations, inadequate human resource support, weak management capacity among municipal administrators and invasions by opportunistic squatters (Muggah, 2000, Mejia, 1999).

Cernea (1997, 1999) argues that socially responsible resettlement is economically justified because the costs of poorly managed relocation extend well beyond the immediately affected population, to the sub-regional economy and the host population in relocated areas. In those cases involving DID, poorly planned and implemented resettlement often induces local resistance, increases political antagonisms, entails extensive project delays and postpones project benefits for all concerned. The benefits lost because of such avoidable project delays sometimes far exceed the marginal cost of a good resettlement package. In situations of CID, while these effects are certainly magnified, their interrelationships are arguably more complex. Not only are the regions of return and relocation likely to be areas of marked inequality, but issues of secure land availability (of adequate quality and security) and, as mentioned above, government financing are less certain. Informal and formal data collection and land-registration systems are also often deliberately targeted by armed actors. Personnel charged with coordinating or facilitating the resettlement effort are rarely provided with sufficient physical protection (UNHCR, 1999). Of particular concern, humanitarian assistance is rarely sustained throughout the entire resettlement process — a factor often sidelined in the design of relocation programmes.

**Conflict-induced displacement in Colombia**

Despite over 50 years of conflict, conventional interpretations and operational responses to population displacement in Colombia have focused on the role and importance of economic incentives. The motives for migration have traditionally been uncritically accepted as ‘the result of purposeful behaviour — as people migrate because they have reason to believe that, by migrating, they can improve their condition and that of their family’ (Shultz, 1969). Such an interpretation largely glosses over the politics of exclusion and a history of state repression that has encouraged forced migration since the middle of the nineteenth century. The clashes between the Liberal and Conservative parties in the 1940s (La Violencia) resulted in internal conflict of unparalleled proportions in Colombia’s history (Pearce, 1990). In spite of the high levels of political violence throughout the country, inter-regional variations in the levels of violent conflict are rarely mentioned as factors during population movements (Uverra, 1999). Instead, in spite of progressive normative
responses to the question of return and resettlement (CONPES 3057, 1999), the
Colombian government (GoC) continues to construct displacement in economic
terms rather than exploring the implications of their own military policies.

It is now generally accepted by most NGOs and enlightened bureaucrats
working with IDPs in Colombia that the enforced displacement of the civilian
population is a deliberate strategy of war employed by the Colombian armed forces,
guerrillas and self-defence (e.g., paramilitary) groups. The suggestion is that
productive and politically active community members are targeted by all sides of the
conflict with the objective of eliminating potential threats and dismantling production
systems. In the case of the Colombian state its public objective is to replace coca
production with sustainable alternatives, while simultaneously striking at the interests
that promote production and distribution. In seeking to contain the 50-year insurgency
(as well as the ‘interests promoting production and distribution’), the Colombian
military continues to raze entire communities and villages to the ground with tacit
support from commercial interest groups. The left-wing guerrilla movements (FARC,
ELN and FPL) and the far-right paramilitary groups (AUC) also use terror as a
weapon. This serves the dual purpose of undermining the capacity of the state to
govern and maximising their own rent-seeking opportunities in the form of extortion,
‘taxes’ for the protection of coca production, retail of narcotics and other forms of
wealth accumulation. Needless to say, the explicit targeting and displacement of
civilians by all armed actors is in direct violation of IHL.

Upon forcible eviction or CID, land assets of strategic economic or military
value are repopulated with supporters of either the guerrilla or paramilitary forces
thus creating individuated security zones. Each group also provokes CID among
perceived hostile sectors and/or those who have infringed the rules of conduct
imposed in the areas under their control. While their ‘stated’ objectives are
fundamentally political, the deliberate violence or conflict-induced displacement of
civilians does not simply reflect political or military objectives. The political
ecoconomy of the conflict suggests that control over coca and land, and the profits
they generate, are a particularly lucrative prize. A clear convergence may exist between
the strategy of the insurgents and the interests of certain economic sectors (both legal and
illegal) that support paramilitary groups with an aim of increasing their stranglehold
over natural endowments and productive land (Pearce, 1999).

Colombia’s conflict, then, is a manifestation of a number of overlapping
characteristics. On the one hand, there are the complex tensions and battles between
armed groups. On the other, there are the divisive conflicts generated by the legacy of
social exclusion among and between regions, the conflicts waged by political factions
over municipal control, and finally the community conflicts between peasants, land-
owners and agro-industrial interests within the state itself. It can be said with some
measure of certainty that innocent civilians are the principal victims of violence
committed by the various protagonists.

The complexity of internal displacement attributed to conflict is tremendous.
The route from CID to resettlement can be interpreted as occurring in various,
though not necessarily sequential phases: rural to rural, rural to semi-urban (in urban), urban
to urban, and urban/rural to return/resettlement. Rural rural flight is typically the first
form of CID in Colombia. A function of declining options for personal security or a
result of the violation of human rights, individuals, households and communities seek
emergency refuge in neighbouring communities in an effort to remain close to their
abandoned homes and possessions. The movement from rural to semi-urban
settlements is either forced, or often determined by kinship ties or family members’ efforts to seek alternative income-earning possibilities. It is at this stage that families are particularly traumatized and their vulnerability to impoverishment is high. Both rural–rural and rural to semi-urban CID can occur repetitively and interchangeably, depending on the severity of the conflict. Indeed, according to CODHLS (1999b), more than 80 per cent of IDPs relocate to urban regions and only 9 per cent remain in rural zones. Urban to urban movements, even as a secondary consequence of CID, are frequently economically motivated. IDPs migrate in order to, inter alia, obtain public benefits to which they are entitled by law, re-integrate into urban settings in an effort to conceal their identities or obtain alternative services that were shattered in their original communities. It is important to note that once IDPs flee to an urban centre, displacement frequently acquires a permanent character. The creation of generations of children with few links with land and agriculture is virtually inevitable. The final stage, referred to here as urban/rural to return/resettlement, occurs only rarely. Where it does take place, it is largely determined by voluntary relocation or public and NGO support of either return or resettlement. It is often precipitated by active protest on the part of IDPs, or direct solicitation and applied pressure from NGO or municipal authorities (Muggah, 2000)

Internally displaced people and vulnerable groups in Colombia

Using legislation, the GoC began constructing a normative response to CID in the late-1990s. According to the GoC, there have been approximately 400,000 civilians, or 80,000 individuals per year, internally displaced since 1995 (CONPES 3057, 1999). At the other end of the spectrum, the Consultancy for Displacement and Human Rights (CODHES, 1999a) estimates that approximately 1.5 million Colombians have been displaced since 1996 — with projections of massive increases between 1999 and 2001. The discrepancy between the two figures is in the order of three to one. Available data also suggest that the geographical scope of the conflict is expanding, so increasing the rate of displacement.

There are three central obstacles to determining or collectively agreeing on an accurate number of IDPs in Colombia. First, there are no universally credible statistics due to tensions concerning quantification methodology and the perceived legitimacy of either public or NGO actors documenting causes and consequences of CID. Second, confusion reigns over the appropriate starting date from which to ascribe a national displacement figure. It is widely believed that the GoC has fixed an arbitrary one. Finally, the trends for CID are dynamic rather than static, and existing registration systems rarely have the capacity to account for IDP activity following their original registration. Nevertheless, to put the current IDP crisis in perspective, the country is believed to have between 2 and 5 per cent of the estimated global total of IDPs, ranking third in absolute terms behind Afghanistan and the Sudan. It is in this context, then, that Colombia’s recently opened UNHCR office has as its exclusive mandate, attention, and ‘protection’ of IDPs and refugees.

As is the case of most societies affected by CID, a significant number of the victims are to be found among the poorest socio-economic sub-regions and households. Approximately 80 to 90 per cent of those IDPs now living in urban or
peri-urban settlements are campesinos or rural small-holders from states (Departamentos, hereafter) with the lowest per-capita income indicators. Unsurprisingly, the impoverishment risks for these vulnerable communities are particularly acute. Ethnic minorities (Afro-Colombian and indigenous) living in the south, north and north-western regions of the country are also targeted in spite of the growth of 'peace communities' that promote active neutrality and 'disengagement' from the conflict. Recent assessments of the displacement crisis by Los Andes University (1999) also illustrate the increasing rates of CID from wealthy ranching and mining regions, a result of the spreading conflict. Perhaps even more disconcerting, surveys conducted by the Displacement Support Group (GAD) and CODHLS suggest that less than an estimated 35 per cent of IDPs receive humanitarian or rehabilitative assistance from either the state or NGOs following their displacement. Vulnerable groups, then, are particularly susceptible to the consequences of CID.

More than 58 per cent of the displaced are female, the majority of whom (77 per cent) are heads of households. Seventy per cent of the displaced are under 19. DIAL (1999) estimates that more than 540,000 children have been displaced since 1995. The situation of forcibly displaced urban youth, particularly in the peri-urban barrios (neighbourhoods) of Bogota (Soacha and Ciudad de Bolivar), Cali (Aguia Blanca), Monteria (Cantaclaro), and as will be shown in the case study, Cartagena (Nelson Mandela) is perilous. Their inability to secure adequate employment or enrol in schools contributes to a vicious cycle of marginalisation and stigmatisation. Indeed, the impact of CID on access to educational and health services is dramatic. As the case studies show, continuing and vocational educational opportunities are simply not available to IDPs and the probability of 'de-skilling' looms large.

Another particularly vulnerable group consists of Colombia's several dozen indigenous communities. Numbering approximately 720,000 thousand in 536 reserves (GoC 1999), CID puts their very cultural and social existence in jeopardy. There is currently a limited appreciation of the particular dynamics that put them at risk. Even prior to CID, the rural and frequently isolated location of indigenous reserves has contributed to the incidence of low health indicators and higher-than-average levels of malnutrition. Social conditions are further aggravated by their already limited access to hospital and clinical services, communications equipment and transport facilities. That many of the reserves are known to straddle profitable mineral deposits and valuable ecological zones has exacerbated their plight, as political and armed actors with vested commercial interests seek to appropriate what is constitutionally indigenous land.

Conflict-induced displacement: a view from rural and urban areas

This section assesses IDP responses to the varied challenges of CID in Colombia through a comparative review of involuntary resettlement programmes in the Departamentos of Bolivar (Nelson Mandela) and Cordoba (Las Dudas). The methodology involved a combination of social mapping (e.g., Venn diagrams) participatory exercises (e.g., group ranking) and key informant interviews. The case studies focus on the variegated costs and compensatory mechanisms following from
CID The rank ordering of community and individual perceptions of key impoverishment risks (via the IRLR model) along gender and demographic lines, illustrate the severe and varied consequences of CID.

The point of employing the IRLR model in the Colombian context was to demonstrate empirically that the 11 features claimed by the adapted model were present in the region and to equip better policy formulation to mitigate the risks. The results emerging from the case studies are particularly compelling to the extent that they reveal the similarities in the resettlement processes occurring as a result of either CID and DID. Indeed, if de-facto relocation is to be understood as a state-driven planning process to address the requirements of IDPs, the IRLR model is a useful instrument to gauge the particular risks facing conflict-induced displaced people. Nevertheless, as the case studies show, where the state is an active participant in the displacement event and reluctant to respond in a suitable or sufficient fashion, the utility of the model diminishes. In this latter scenario, the model alone neither prevents additional CID and ‘impoverishment’, nor contributes to equitable ‘reconstruction’.

Conflict-induced displacement and involuntary resettlement in Las Dudas

The capital of the Departamento of Córdoba (Montería) is an epicentre for IDPs and home to Cantáclaro, Latin America’s largest constellation of involuntarily resettled IDPs. The city’s socio-economic indicators are among the lowest in Colombia (DNP, 1998). Approximately 150 km from Montería, the residents of Las Dudas (Spanish for ‘hardship’) were residents of four Departamentos before being forcibly displaced by armed actors from all sides of the conflict. For between two and four years following CID, households waited for the GOC’s Agrarian Reform Agency (INCORA) to secure suitable land for collective resettlement. As negotiations stalled, IDP households accumulated debts in the department capital. Approximately 125 families secured an arrangement for collective resettlement on a 200-acre plot (finca, hereafter) in early 1998. First arriving to the site that April, they were granted basic provisional assistance from the erstwhile Presidential Council for Displacement (pre-RSS; the Colombian Red Cross (RC) and the Executive’s Social Welfare Network (RSS). With household members varying from between five and 12 (given as ’M’ in Table 1), the majority of families settled in the north (Upper Duda) and 13 female-headed households opted for the south (EL Tomate).

With literally nothing prepared in advance, memories are of hunger, emotional turmoil and deprivation. In spite of obstacles, several relatively well-organised associations emerged from among the IDPs themselves. Resettlement proposals were prepared by organisations with the support of NGOs based in Montería and Bogotá, although at the time of writing, none of these had received a tangible response. In the first year of their resettlement, wet weather severely limited their harvests. Productive projects introduced by the RSS did not adequately measure the humidity of the soils and maize crops failed. NGOs have provided few tangible benefits to the community due to lack of representation and an ad hoc, incoherent, approach to assistance. In spite of repeated promises of support from the public
<table>
<thead>
<tr>
<th>Table 1 Costs of displacement and resettlement: Las Dudas</th>
<th>Familia 1 (7 members)</th>
<th>Familia 2 (6 members)</th>
<th>Familia 3 (8 members)</th>
<th>Familia 4 (7 members)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Losses from displacement (1996)</strong></td>
<td>Food production 1.9m</td>
<td>Food production 7.5m</td>
<td>Food production 2.5m</td>
<td>Food production 2m</td>
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<td></td>
<td>Livestock 4.8m</td>
<td>Livestock 900,000</td>
<td>Livestock 1m</td>
<td>Livestock 4m</td>
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<td></td>
<td>Land 6m</td>
<td>Land 21m</td>
<td>Land 2.5m</td>
<td>Land 20m</td>
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<td></td>
<td>Housing 2m</td>
<td>Housing 1m</td>
<td>Housing 4m</td>
<td>Housing 1m</td>
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<td></td>
<td>Possessions 1m</td>
<td>Possessions 1m</td>
<td>Horse stalls 4m</td>
<td>Horse stalls 3m</td>
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<tr>
<td></td>
<td>Savings none</td>
<td>Savings none</td>
<td>Savings 6m</td>
<td>Savings none</td>
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<tr>
<td><strong>Debts from displacement</strong></td>
<td>Transport 145,000</td>
<td>Transport 200,000</td>
<td>Transport 300,000</td>
<td>Transport 150,000</td>
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<td></td>
<td>Rent food 3.5m</td>
<td>Debts 1.5m</td>
<td>Debts 7m</td>
<td>Debts none</td>
</tr>
<tr>
<td></td>
<td>Income 3.6m</td>
<td>Rent/food 1.2m (family)</td>
<td>Rent/food 1.8m (family)</td>
<td>Rent/food 5.7m</td>
</tr>
<tr>
<td></td>
<td>Debts none</td>
<td>Education 400,000</td>
<td>Education 800,000</td>
<td>Education 1m</td>
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<td></td>
<td></td>
<td>Health 1m</td>
<td>Health 2m</td>
<td>Health 500,000</td>
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<td></td>
<td></td>
<td>Income 3.6m</td>
<td>Income 2.6m</td>
<td>Income 12m</td>
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<tr>
<td><strong>State support for displacement/resettlement</strong></td>
<td>RSS food assistance (x2)</td>
<td>Pre-RSS temp housing</td>
<td>RSS food assistance (x2)</td>
<td>Pre-RSS temp housing</td>
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<td>ICBF 1 visit pre-RSS temp housing</td>
<td></td>
<td>ICBF 1 visit pre-RSS temp housing</td>
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<tr>
<td><strong>Non-state support for displacement/resettlement</strong></td>
<td>RC food assistance (x2)</td>
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<td>RC food assistance (x2)</td>
<td>RC food assistance (x2)</td>
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<td>ICR food assistance (1)</td>
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<td>ICR food assistance (1)</td>
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<td></td>
<td>MSF medical (x2)</td>
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<td>MSF medical (x2)</td>
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<td>ACH survey (1)</td>
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<td>Marie de Cano capacity building</td>
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<td>Promusil capacity building</td>
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<td>Promusil capacity building</td>
<td>Promusil capacity building</td>
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<tr>
<td><strong>Income (1999)</strong></td>
<td>Food production subs</td>
<td>Food production subs</td>
<td>Food production subs</td>
<td>Food production subs</td>
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<tr>
<td></td>
<td>Collective 360,000</td>
<td>Collective 360,000</td>
<td>Collective 360,000</td>
<td>Collective 360,000</td>
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<tr>
<td><strong>Expenditure (1999)</strong></td>
<td>Food consumption 1.2m</td>
<td>Food consumption 1.8m</td>
<td>Food consumption 1.3m</td>
<td>Food consumption 1.3m</td>
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<td></td>
<td>Schooling/ Health can’t afford</td>
<td>Schooling 15,000 Health can’t afford</td>
<td>Schooling 15,000 Health can’t afford</td>
<td>Schooling 10,000 Health can’t afford</td>
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</tr>
<tr>
<td>Debts to state</td>
<td>7.1m (interest at 40% over 20 years) and 400,000 (interest on productive project at 36%)</td>
<td>7.1m (interest at 40% over 20 yrs) and 400,000 (interest on productive project at 36%)</td>
<td>7.1m (interest at 40% over 20 yrs) and 400,000 (interest on productive project at 36%)</td>
<td>7.1m (interest at 40% over 20 yrs) and 400,000 (interest on productive project at 36%)</td>
</tr>
<tr>
<td>Total accumulated losses/debts</td>
<td>23.4m</td>
<td>20.7m</td>
<td>48.7m</td>
<td>48.6m</td>
</tr>
<tr>
<td>Total earnings (as of 1999)</td>
<td>-840,000</td>
<td>-455,000</td>
<td>-15m</td>
<td>-951,000</td>
</tr>
<tr>
<td>Total deficit (as of 1999)</td>
<td>24,286m</td>
<td>21,2m</td>
<td>50,2m</td>
<td>49,6m</td>
</tr>
</tbody>
</table>

Source: Interviews in Las Dudas, 17-20 August 1999

 Authorities, there is no access to electricity, functioning latrines, potable water, health services, formal educational opportunities or communications infrastructure.

Table 1 is a snapshot of the aggregate costs and losses attributed to CID and involuntary resettlement drawn from a sample of households. It provides a preliminary indication of some of the key impoverishment risks and ‘vulnerabilities’ facing households in Las Dudas.

From the IRLR exercise, political, criminal and domestic violence was ranked as the lowest relative risk among all groups — men, women and adolescents alike. Though visibly scarred by violence in the past, community representatives felt no small measure of security to resettle away from the conflict. Though unexpected, the low incidence of violence in the community could be attributed to their relatively recent arrival, prior arrangements established between the government and elites in the area and their isolation from urban crime.

Nevertheless, as the two settlements in Las Dudas demonstrate differing levels of political organisation, two different profiles evolved from surveys. From among the adult male inhabitants in Upper Duda, lack of education, food insecurity, and threats to home and employment presented the most severe impoverishment risks. Women, on the other hand, perceived losses in common property and declining community services, as well as threats to their homes and educational opportunities as main priorities. Adolescents envisioned losses to common property and community services, limited access to education and declines in health as the highest risk factors.

Among the adult male respondents in FI Tomate, declines in health, problems associated with housing and the absence of political participation were
ranked as the highest empowerment risks. The women representatives responded in a similar fashion, envisioning declines in health, losses in educational opportunities, inadequacy of housing and losses to common property and community services as their key concerns. Finally, adolescents were most concerned with losses in common property, losses in educational access and problems associated with housing.

Conflict-induced displacement and involuntary resettlement in Nelson Mandela

The semi-urban barrios of Nelson Mandela, lining the edge of the heavy industrial zones of Cartagena, are located some 30 minutes from the heart of the city. The initial settlement was formed as a result of rapid illegal squatting of zoned housing plots allocated by the city mayor’s office in 1993. CID from Sur de Bolivar and the Departamentos of Choco, Antioquia, Norte de Santander and Sucre resulted in a massive IDP flows into Nelson Mandela from 1996 onwards. Approximately 15,000 to 18,000 conflict-induced IDPs currently live among an additional 4,000 low-income households (20,000 residents) in the 23 barrios that constitute the settlement. The high level of cultural heterogeneity is characteristic of peri-urban IDP settlements throughout Colombia. Results from participatory mapping exercises with a clustered samples of residents suggest that the inhabitants have widely diverging requirements and that rural relocation would not be applicable for all of them. As illustrated in Table 2, a significant proportion of respondents sought income through part-time salaried work in the city’s thriving informal sector. Where possible, most residents also sought supplementary resources and income from extended kinship networks.

As a result of a (non-official) policy of negligence, and the fact that the public authorities are not legally compelled to provide public services (e.g. health or education) to households lacking land title (titulacion), the conditions of the barrios are dire. For example, most homes consist of plastic sheeting, rubber tires and a few sheets of plywood or tin roofing. Electric lead lines are either poorly wired or pirated and frequently electric the tin roofs of individual shelters. Health and sanitation services, with the exception of those provided by a scattering of church organisations, NGOs and bilaterals, is limited or of extremely poor quality. The health and well-being of the settlement is aggravated by water-borne effluent from the city’s landfill and the industrialised zone, located only a short-distance from several barrios. Children from Nelson Mandela have been frequently registered by NGOs as victims of related illnesses and rashes.

The range and diversity of experiences among IDPs in Nelson Mandela provides a strong contrast to the collective experience of IDPs in Las Dudas. Given the varied arrival times, expulsion and migratory patterns of IDPs and the range of agencies and NGOs involved in Nelson Mandela, it was very difficult to draw a collective picture of their resettlement experience. In spite of high levels of public and NGO activity in Cartagena, few IDPs spoke of their direct positive impact. Although a number of credible public and NGO activities have responded to the crisis, it would appear that they are largely overwhelmed by the enormity of the challenges facing the community (Muggah, 2000).
Table 2 represents direct fiscal costs of displacement and resettlement among four randomly selected households in Nelson Mandela. The possibilities for livelihood diversification and income supplementation are arguably much greater in Nelson Mandela than in rural settlements such as Las Dudas. Even so, as the IRLR surveys revealed, the impoverishment risks tend to be comparably high.

From the IRLR profiling, violence was ranked as particularly serious risk by all groups in Nelson Mandela, particularly adolescents. The risk of real and perceived violence manifested itself in political, criminal and domestic forms, as new IDPs were believed to bring elements of the conflict into the community. While the state was not viewed as a principal agent of CID — its inability to respond effectively to impoverishment risks was forcing many households into alternative forms of economic migration.

The adult male respondents of Nelson Mandela were overwhelmingly concerned with the scarcity of the labour opportunities in the city, followed by their limited control over land and homes. There were fears that the state might reappropriate land, even if IDPs were equipped with títulaciones. In the surveys, men also expressed concern with their social and economic marginalisation and political disarticulation from Cartagena. From key informant interviews, adult male respondents noted the prevalence of violence and marginalisation among youth.

While expressing a more varied response, women expressed a clear concern about the extreme lack of access to children’s education (and corollary mechanisms to free-up their own time). Women also voiced concern about the limited work opportunities available to their household members and the social marginalisation experienced by their families in and outside of Nelson Mandela. Each respondent observed the high incidence of political and criminal violence within particular barrios. Adolescent respondents registered concerns with the long-term guarantees of títulación, educational opportunities, the limited prospects for work in the city and the extremely high presence of violence in the community. Similarly, they feared for further social disarticulation and declines in community services.

<table>
<thead>
<tr>
<th>Table 2 Costs of displacement and resettlement: Nelson Mandela</th>
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<tbody>
<tr>
<td><strong>Family 1 (9 members)</strong></td>
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<tr>
<td><strong>Losses from displacement (1996)</strong></td>
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<tr>
<td><strong>Debts from displacement</strong></td>
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<tr>
<td><strong>State support for displacement</strong></td>
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<tr>
<td>Resettlement/</td>
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<tr>
<td>Non-state support for displacement/resettlement</td>
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<tr>
<td>Income (1999)</td>
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<tr>
<td>Expenditure (1999)</td>
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<td>Debts to state</td>
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<tr>
<td>Total accumulated losses/debts in 1996 dollars</td>
</tr>
<tr>
<td>Total earnings (as of 1999)</td>
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<td>Total deficit (as of 1999)</td>
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</table>

Source: Interviews in Cartagena 15-20 August 1999
Conclusions

As suggested in the introduction, there are strong similarities between DID and CID both are deliberate and can represent explicit violations of human rights. Both can occur in rural and urban situations. Similarly, each can generate severe impoverishment if equitable and carefully planned resettlement programmes are not considered. What is more, the political economy of development and war suggests that both DID and CID can represent systematic objectives of states and vested interests—a problem that inevitably affects planning and implementation of resettlement.

A central distinction between the two forms of displacement, however, is predictability. CID tends to occur immediately (though also potentially a reflection of a long-term process of declining security), while DID generally takes on a more protracted form. What is more, involuntary resettlement during conflict tends to be, by its very nature, transitory, while DID more permanent. This is not to suggest that individual violence-induced IDPs are only displaced over a short period of time. Rather, that they are rarely safely resettled following their initial period of displacement. The fact that victims of CID are frequently explicitly targeted, as opposed to being designated arbitrarily, also represents an important difference. Relatedly, due to the shifting nature (and, by definition, illegality) of conflict, definition and ‘official’ assignment of responsibilities for the beneficiaries and stakeholders of CID and resettlement are not always clear. The need for ‘protection’ of conflict-induced IDPs before and during the entire resettlement process is therefore of critical importance.

As demonstrated in the cases of Las Dudas and Nelson Mandela, the IRLR model usefully captures impoverishment risks of conflict-induced IDPs, providing an interactive and flexible tool for policymakers and implementators alike. From the interviews and case studies, it is clear that virtually all of the risk variables in the IRLR model feature prominently in CID and involuntary resettlement. This suggests at a preliminary level, that the model is sufficiently flexible for application to the planning for either DID or CID. At the same time, the IRLR model provides a useful framework for organizing both capacities of social actors as well as categorizing risk of impoverishment among ‘beneficiaries’ (case study IRLR surveys). Perhaps another strength of the model relates to the way in which it raises more fundamental questions concerning coordination, gaps in capacities and the role of political will in responding to CID and involuntary resettlement.

That the IRLR model is ‘state-centric’ is very much central to the exercise, in that it was designed with the implicit recognition that states have a constitutional and international obligation to preserve and maintain the basic rights of its civilian population. But states are not monolithic entities. Even in states with constitutional obligations to displaced civilians (such as Colombia), there is rarely a consensus on how this should be achieved. In the case of belligerent states, or those civil regimes with inadequate control over their militaries, the model’s failings are immediately obvious. The fact that the Colombian armed forces are directly contributing to and sustaining CID has a clearly detrimental impact on resettlement efforts. That the state does not garner or demonstrate sufficient political will to respond to the crisis also limits the possibilities of sustainable resettlement. The state’s further inability to prevent CID from occurring throughout the country, as a result of limited service
provision near-absent political and physical protection, financing difficulties, corruption and widespread managerial incompetence, have further coloured non-state and IDP perceptions of the government’s commitment.

For these reasons, the reconstruction imperative of the IRLR model (namely, the 11 ‘reconstruction’ subcategories) can only tentatively be considered in the case of CID. According to Cernea, the model can be ‘turned on its head’ from risk identification to reconstruction through ‘risk reversal’. But this is premised on effective and participatory planning, the assignation (and acceptance) of responsibility for responding to IDPs and adequate preparation well in advance of CID. Naturally, due to the criticisms of the state (described earlier) and the unpredictability of CID itself, genuinely inclusive planning is unlikely to occur between planners and conflict-induced IDPs.

Nevertheless, the IRLR model supports field evidence from Colombia that demonstrates the disconnection between procedure and practice. While the GoC’s (new) normative framework represents a progressive departure from its past approach, the reality in the field suggests it is not doing nearly enough to prevent and respond to CID or relocation. The impoverishment risks of IDPs in both Las Dudas and Nelson Mandela demonstrate the clear gaps that exist in terms of both governmental and non-governmental response. Ultimately, in addition to addressing seriously the root causes of CID (e.g., the violation of human rights) and securing the political will to respond more effectively where it occurs, the state must apply greater attention to conceiving of resettlement as a long-term ‘opportunity for development’. Similarly, the focus of resettlement activities should not be restricted solely to mitigating or minimizing IDP ‘risks’ but also on supporting their productive processes and coping strategies.

Note

1. The following article is an abbreviated version of a larger comparative institutional diagnostic of state and NGO capacities elaborated with the government of Colombia’s Departamento Nacional de Planeación (DNP). The author acknowledges that displacement is largely a product of violence and that prevention ‘protection’, and the political resolution of conflict would constitute the most effective measure toward resolving the country’s long-term development requirements. In the meantime, the author envisages ‘resettlement’ as a short-term instrument to facilitate protection of IDPs and a viable long-term tool for development.

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The Use of Cluster Sampling to Determine Aid Needs in Grozny, Chechnya in 1995

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War broke out in Chechnya in November 1994 following a three-year economic blockade. It caused widespread destruction in the capital Grozny. In April 1995 Medical Relief International (MIRI) began a programme to provide medical supplies, support health centres, control communicable disease, and promote preventive health-care in Grozny. In July 1995 the agency undertook a city-wide needs assessment using a modification of the cluster sampling technique developed by the Expanded Programme on Immunization. This showed that most people had enough drinking-water, food and fuel but that provision of medical care was inadequate. The survey allowed MIRI to redirect resources earmarked for a clean water programme towards health education and improving primary health-care services. It also showed that rapid assessment by a statistically satisfactory method is both possible and useful in such a situation.

Keywords  Chechnya, Grozny, war, MIRI, NGO, medical aid, cluster sampling

Background

Chechnya, which lies to the north of Georgia and west of Daghestan and the Caspian Sea was the first of the small north Caucasian republics to declare independence from the Russian federation (in November 1991). Until that time it had been linked with Ingushetia and in 1989 the combined republic had 1.3 million inhabitants, 55 per cent of whom were Chechen, 22 per cent Russian and 12 per cent Ingush. After the Chechen declaration of independence, the Ingush formed their own autonomous republic, Ingushetia.

The Chechen declaration of independence was followed by the imposition of an economic blockade by Russia that caused a serious deterioration in public services including health-care services. Worsening relations led to the launching of air attacks by the
Russians on Grozny in November 1994, followed almost immediately by an assault by the Russian army. The war continued for months with Chechen fighters being pushed into the mountainous regions in the south. There was extensive loss of life, tens of thousands fled their homes and Grozny was badly damaged, although the degree of damage varied, while parts of the city were relatively unscathed, the centre was in ruins. Most of the pre-war population of Grozny (c. 450,000) fled, leaving about 60,000 who were mostly ethnic Russians. The winter was exceptionally harsh and those remaining spent months living in cellars without access to basic services. Institutions such as old people's homes and psychiatric hospitals were particularly badly affected.

By February 1995 only rudimentary public services were functioning, most public utilities were damaged and many were destroyed. The health-care infrastructure had been ruined. Hospitals, clinics and other buildings had been severely damaged or destroyed. Provision of new buildings or repair of old ones had low priority in the assignment of scarce financial resources. There was no transport for patients other than intermittent and unreliable buses or private cars. Drugs and other necessities were in short supply. There were grave concerns about potentially serious outbreaks of communicable diseases. Damage to the water and sewage systems meant that there was a severe risk of diarrhoeal illness including cholera.
addition, there was at that time a massive diphtheria epidemic in the former Soviet
Union and conditions in Grozny (notably the breakdown of vaccination programmes,
and a lack of primary care) were conducive to the spread of such a disease.

Communications were limited: the telephone system was not functioning,
newspapers were being produced; but access to TV and radio was restricted by lack of
electricity. Some transport was available although the roads were damaged. There
were no rail or air links — with the nearest airport at Vladikavkas in the neighbouring
republic of Ossetia two to three hours away by road.

The Merlin programme

In April 1995 the British NGO Merlin set up an aid programme in Grozny based on
two rapid and basic needs assessments undertaken by a doctor and a logistician in
February–April 1995 — a time when the security situation was very bad. It was clear
from both surveys that the population had been severely affected by the fighting.
None of those questioned had access to clean water every day. Many collected water
from flooded basements and the current daily water supply was about one litre per
person. Little food was available and there were only communal wood or kerosene
stoves. Many children were not (or only partially) immunised. On the basis of these
assessments, Merlin set up a programme in April 1995 that was designed to reduce
morbidity and mortality by addressing several areas of need. It included:

- Supply of medicines and other essentials to 20 health facilities
- Repair of damaged health facilities.
- Disease surveillance
- Rehabilitation of and supply of drugs to the infectious disease hospital.
- Rebuilding a limited cold-chain facility to support mass vaccination
  campaigns against diphtheria and polio
- Health education
- Repair of pumping stations, provision of potable water to health facilities
  and emergency distribution of clean water to the general population

By July 1995 the situation with regard to health-care provision and water and
food supply was known to have changed and a new and structured survey was needed
to determine the changes and provide a quantitative assessment of need. The security
situation had improved and, while still not wholly safe, it was felt that a city-wide
survey was feasible and this duly took place over a two-week period in July.

The new survey was designed to re-examine the findings of the initial
assessments and also to determine the need for a city-wide programme for the
provision of clean water in view of the fact that all of the city’s pumping stations had
been destroyed. In addition it was hoped that the survey would provide a baseline
from which progress could be measured, indicate areas for future work or further
investigation and test the value and feasibility of this type of survey in a post-conflict
setting. The survey is the subject of this paper.
Methods

The method used for the survey was a modification of the cluster-sampling technique originally developed by the Expanded Programme on Immunisation (EPI) of the World Health Organisation (WHO) to assess vaccination coverage during the smallpox eradication campaign (Bennett et al., 1991). The modification was that used by Hlady et al. (1994) to perform rapid needs assessment in southern Florida after Hurricane Andrew in 1992. In the original EPI method, clusters (or squares) are selected with a probability proportional to the size of the population, a method that gives a self-weighted sample and facilitates data analysis. Hlady and colleagues divided the affected area of Florida into quarter-mile grid squares and assumed that there were an equal number of households in each square, defining a household as 'a group of persons sharing meals and a residence'.

In the Grozny survey, having decided that the estimate for each variable should fall within ±10 per cent of its true value (see below), we performed a series of calculations to determine how many clusters were required. Between 45 and 60 clusters would have given us the required precision for the city as a whole (see Table 1), however because it was intended that sub-areas of the city would be examined independently a larger number of clusters was chosen to make this possible. Arbitrarily it was decided to cover 120 clusters.

To select the clusters, the city was divided into a grid of 240 squares (each square being a cluster). The starting-point on the grid was identified by the spin of a coin and every other square was then selected giving a total of 120 squares. Within each square, seven households were selected. The first household in each cluster was selected by proceeding from the centre of the cluster to the nearest household, in a direction indicated by the top of the image on a spun coin, and then moving to the next household until seven interviews had been completed (Hlady et al., 1994).

The survey was undertaken during July and managed by two Merlin expatriate staff, a nurse (VP) and a doctor. The survey questionnaire was designed to cover the areas in which Merlin was active (water, sanitation, access to health-care, food availability, public service coverage) and a small pilot study was conducted in the immediate area of the Merlin residence. The final questionnaire was administered to each selected household by locally recruited personnel (mostly young Chechen women). On most days four teams of two were active and all the households were visited in the morning. The MOH was informed about the survey and the local personnel were provided with Merlin identification cards. The survey was not published before it was undertaken.

Before the survey, the local staff received brief training covering the aims and methods of the survey and the procedures to be followed. They also received detailed security information. The interviewers were instructed to ask local inhabitants about which buildings were occupied and to look for regular movements into and out of buildings. Apparently deserted buildings were to be avoided (because of the risk from mines, booby traps and unexploded ordnance) together with dangerously damaged buildings, even if the protocol indicated that they should have been chosen. Under those circumstances the staff were instructed to proceed to the next house known to be occupied. The survey was entirely conducted in the morning (when people and markets were active), and the teams instructed to return by early afternoon, since movement in the city in the late afternoon and at night could be unsafe.
In the end, because of lack of staff and resources, no attempt was made to test the results from different sub-areas of the city. The data from all 120 clusters were used to calculate one proportion and related confidence interval for each variable by use of the simplified formula given by Bennett et al. (1991)

\[ s = [p (1 - p) D/n] \]

where

\[ D = \text{design effect and } n = \text{total number of responses}. \]

Data were entered into EPI-Info software and proportions calculated. The confidence intervals were calculated using an Excel spreadsheet.

**Results**

The main findings of the survey are presented in Table 1. The sex ratio in the households visited was 1:1 and the mean household size was five. There were three main conclusions: most people in the city lived in family groups, there were unlikely to be many large groups of people living together (for example, displaced people) who might be at special risk, and diseases associated with overcrowding were unlikely to present a major problem.

Most people in Grozny (>85 per cent) were found to have ‘sufficient’ water for drinking and cooking (a subjective assessment based on normal essential daily consumption needs), although a smaller proportion (about 40 per cent) said that they also had enough water for personal hygiene and laundry needs. Many of those questioned, while indicating that they had enough water, nevertheless had some difficulty in getting hold of it. About half obtained their water from domestic taps, stand-pipes or tankers. The remainder (51 per cent) obtained supplies from ‘other sources’ (such as private wells, wells in industrial premises), but there was some evidence that the alternative sources were used mainly for personal hygiene and laundry. Few houses had working toilets, so most people used latrines.

Food supply was not a major issue. 88 per cent of those questioned had some or enough food in the house, and 95 per cent reported they could get food from the market. These results suggested that food was available and that people had the means to buy it.

Most households had a supply of fuel for heating and cooking, and the finding that 92 per cent of respondents cooked with gas was both confirmation of the restoration of the gas supply and consistent with anecdotal reports about pre-war practices. Fourteen per cent of respondents had a functioning electricity supply in their homes although none claimed to use this for cooking.

In the month before the survey 25 per cent of households had a member who, it was considered (subjectively, either by the individuals themselves or by a family member) needed medical care. Only 48 per cent of these received this care.
Table 1 Results of the cluster analysis

<table>
<thead>
<tr>
<th>Question</th>
<th>Proportion</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main water source</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tap in house</td>
<td>0.21</td>
<td>0.15 0.27</td>
</tr>
<tr>
<td>Tanker</td>
<td>0.27</td>
<td>0.21 0.33</td>
</tr>
<tr>
<td>Stand-pipe</td>
<td>0.11</td>
<td>0.07 0.15</td>
</tr>
<tr>
<td>Other</td>
<td>0.51</td>
<td>0.45 0.57</td>
</tr>
<tr>
<td>Water sufficient for</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drinking</td>
<td>0.93</td>
<td>0.89 0.97</td>
</tr>
<tr>
<td>Cooking</td>
<td>0.86</td>
<td>0.82 0.90</td>
</tr>
<tr>
<td>Personal hygiene</td>
<td>0.42</td>
<td>0.36 0.48</td>
</tr>
<tr>
<td>Laundry</td>
<td>0.38</td>
<td>0.32 0.44</td>
</tr>
<tr>
<td>Household food stores</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>0.11</td>
<td>0.07 0.15</td>
</tr>
<tr>
<td>Little</td>
<td>0.55</td>
<td>0.49 0.61</td>
</tr>
<tr>
<td>Enough</td>
<td>0.33</td>
<td>0.27 0.39</td>
</tr>
<tr>
<td>A lot</td>
<td>&lt;0.01</td>
<td>—</td>
</tr>
<tr>
<td>Food source</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market</td>
<td>0.95</td>
<td>0.93 0.97</td>
</tr>
<tr>
<td>EMERCOM*</td>
<td>0.02</td>
<td>0.00 0.04</td>
</tr>
<tr>
<td>Red X†</td>
<td>0.05</td>
<td>0.03 0.07</td>
</tr>
<tr>
<td>Relatives</td>
<td>0.03</td>
<td>0.01 0.05</td>
</tr>
<tr>
<td>Neighbours</td>
<td>0.03</td>
<td>0.01 0.05</td>
</tr>
<tr>
<td>Own reserves</td>
<td>0.08</td>
<td>0.04 0.12</td>
</tr>
<tr>
<td>Houses with</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity supply</td>
<td>0.14</td>
<td>0.10 0.18</td>
</tr>
<tr>
<td>Gas supply</td>
<td>0.89</td>
<td>0.85 0.93</td>
</tr>
<tr>
<td>Functioning toilet</td>
<td>0.28</td>
<td>0.22 0.34</td>
</tr>
<tr>
<td>Latrine</td>
<td>0.62</td>
<td>0.56 0.68</td>
</tr>
<tr>
<td>Cooking fuel used</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas</td>
<td>0.92</td>
<td>0.88 0.96</td>
</tr>
<tr>
<td>Electricity</td>
<td>0.00</td>
<td>—</td>
</tr>
<tr>
<td>Wood</td>
<td>0.09</td>
<td>0.05 0.13</td>
</tr>
<tr>
<td>Illness in last month</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Of above, seen at</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polyclinic</td>
<td>0.20</td>
<td>0.14 0.26</td>
</tr>
<tr>
<td>Hospital</td>
<td>0.28</td>
<td>0.22 0.34</td>
</tr>
</tbody>
</table>

*EMERCOM is a local food aid agency
†Red X is a food aid NGO

Discussion

The priority of any aid agency when entering a disaster area for the first time is to undertake a needs assessment so as to ensure the effective use of limited resources. While a rapid survey based on qualitative or rapid-appraisal techniques is frequently sufficient (and often all that is initially possible, as was the case when Merlin first arrived in Grozny), such assessments are often inadequate or incomplete. This may be for perfectly valid reasons (such as conflict, lack of time or resources), but may be due to failure to use the right methods. As a result, the response by the agency may be inappropriate, waste scarce resources and needlessly endanger personnel. Rapid assessment of need by use of a statistically satisfactory survey method makes it
possible to avoid these pitfalls. Even if it is not possible to undertake a structured survey initially, agencies should consider doing so once the situation permits. It is equally important to undertake repeat surveys at intervals, using the same methods, to keep abreast of a changing situation and monitor the effectiveness of the agency’s response. This forms an important part of ongoing surveillance.

Merlin’s original programme, which began in April 1995, was based on two assessments that were limited by the security situation and the available time. By July 1995 the situation had begun to improve. Information gathered by Merlin staff (their observations, discussions with local health and civil services and with other aid agencies) indicated that while many homes were damaged, most were habitable and there was no evidence of widespread homelessness. Although some families were still living in squalid conditions in cellars and destroyed buildings, few flats had a functioning toilet.

Food for the population was apparently plentiful. The markets were stocked and there was no evidence of widespread or serious malnutrition. Access to potable water appeared to be restricted. Some people were seen collecting water from streams and puddles, but there were numerous water-distribution points around the city. It had been feared that personal hygiene would suffer due to the restricted supply of water but most people appeared well groomed.

The situation with respect to communicable disease was also less severe than had been feared. Early concerns about an outbreak of cholera had proven to be unfounded and while there had been six cases of diphtheria that year, this was fewer than expected. Of greater concern was the emergence of polio (120 cases were recorded during the summer and early autumn). Although the disease surveillance system was not functioning well, on the basis of anecdotal evidence local medical workers were not concerned about any other infectious diseases.

The changed situation called for a reassessment by Merlin to ensure that its programme remained appropriate. The security situation had improved and while not wholly safe, it was felt that a city-wide survey was feasible and should be done using an appropriate statistically valid method. The method selected was a cluster-sampling method originally designed to allow those undertaking immunisation programmes to obtain a statistically precise population-based estimate of vaccination coverage in situations where random sampling of the population was impossible. The original EPI method required that clusters or communities be systematically selected, from a random start, with a probability proportional to size (PPS). The number of subjects was then selected at random from each cluster. Selection of communities by PPS requires that detailed demographic information is available which was not the case in Grozny. The modified version of the EPI method used in this survey was developed by a number of different research groups who also investigated its statistical power (Henderson and Sundaresen, 1982; Lemeshow and Robinson, 1985; Bennett et al., 1991). In using this methodology some previous workers have uncritically adopted the EPI design of 30 clusters of seven and a design effect (see below) of two. However, this can lead to over-estimation of the precision obtained.

In deciding sample size, important factors to consider are the precision required and the distribution, in the population, of the variable under consideration. In simple random surveys, this is relatively straightforward. However, in a cluster survey, the effect of the clustering must be taken into account. This is done by introducing a concept that takes account of the variability between clusters as compared to the variability within a cluster. It is known as the rate of homogeneity ($\rho$) and the greater
the variability between clusters, the greater the value of \( p \). This value of \( p \), which is assumed to lie between 0.0 and 1.0 and which varies from variable to variable, survey to survey and country to country, is then used to calculate another factor, known as the design effect \( (D) \) where \( D = 1.0 + (\text{cluster size} - 1) \times p \) which is in turn used in calculations to estimate standard errors and consequently sample sizes.

A major difficulty is that \( p \) must be estimated to begin with. In many cases this is facilitated by experience with similar previous surveys, but in our case no similar surveys existed. However, a value of \( p \) greater than 0.4 is uncommon (Bennett et al., 1991), so this value was chosen. Wide variations in the value of variables throughout the city were expected and this further influenced the choice of a larger, rather than a smaller value. The value chosen gave a design effect, \( D \), of 3.4 with a cluster size of 7.0.

The distribution in the population of the variable under consideration is the other major factor in deciding sample size. Most studies are concerned with only one or two variables and have previous experience or studies to guide them. In our programme several variables were being considered with no previous studies to provide guidance. It was therefore decided that the proportion of each variable would be estimated as 0.5 for all sample size calculations. This would maximise the sample size and thus err on the side of caution.

Having decided on an estimated value of \( p \), an appropriate \( p \) and the consequent value of \( D \), a series of calculations was done for different sample sizes (see Table 2). This was also done for different values of \( p \) and \( D \) for comparison. Table 2 indicated a requirement for between 45 and 60 clusters to give the required precision. Had the city been uniformly affected by the war, one city-wide estimate for each variable would have been sufficient, and 60 clusters could have been a reasonable limit. The city was not uniformly affected, however, and it was decided to sub-divide it somehow. It would still be necessary to have a sufficient number of clusters to give the required precision. It was decided to select 120 clusters.

It is important to note that once a sample size has been calculated it is not acceptable to select a sub-sample and assume the same precision. If, for example, a national survey is planned and results are required on a regional basis, sample size calculations must be done regionally to give the required precision. The regional data can then be combined to give a national result. The confidence interval for the national estimate must be calculated on the basis of the total number of clusters and account must be taken of the sampling technique used.

In Grozny, it was assumed that each community or square was about the same size with about the same number of households. This facilitated household selection and allowed us to overcome the requirement to select them using the probability proportional to size methodology required by EPI. Even so, a more statistically rigorous approach to some aspects of the sampling could have been used (for example random selection of the households in each cluster) but this would have taken longer.

The survey was also inevitably affected by the security situation, the safety of the staff being of paramount importance. Potentially unsafe buildings were avoided and the survey was conducted entirely in the morning (both for security reasons and because temperatures often exceeded 30°C and provision of food and water for the teams could be difficult). A balance had to be struck between obtaining as much
Table 2 Calculations of standard error(s) for \( \rho = 0.5 \) (where \( \rho \) = rate of homogeneity, \( D \) = design effect, \( c \) = number of clusters)

<table>
<thead>
<tr>
<th>( \rho )</th>
<th>( D )</th>
<th>( c=120 )</th>
<th>( c=90 )</th>
<th>( c=60 )</th>
<th>( c=45 )</th>
<th>( c=30 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>1.0</td>
<td>0.019</td>
<td>0.020</td>
<td>0.024</td>
<td>0.028</td>
<td>0.035</td>
</tr>
<tr>
<td>0.1</td>
<td>1.6</td>
<td>0.022</td>
<td>0.025</td>
<td>0.031</td>
<td>0.036</td>
<td>0.044</td>
</tr>
<tr>
<td>0.2</td>
<td>2.2</td>
<td>0.026</td>
<td>0.030</td>
<td>0.036</td>
<td>0.042</td>
<td>0.051</td>
</tr>
<tr>
<td>0.3</td>
<td>2.8</td>
<td>0.029</td>
<td>0.033</td>
<td>0.041</td>
<td>0.047</td>
<td>0.058</td>
</tr>
<tr>
<td>0.4</td>
<td>3.4</td>
<td>0.032</td>
<td>0.037</td>
<td>0.045</td>
<td>0.052</td>
<td>0.064</td>
</tr>
<tr>
<td>0.5</td>
<td>4.0</td>
<td>0.035</td>
<td>0.040</td>
<td>0.049</td>
<td>0.056</td>
<td>0.069</td>
</tr>
<tr>
<td>0.6</td>
<td>4.6</td>
<td>0.037</td>
<td>0.043</td>
<td>0.052</td>
<td>0.060</td>
<td>0.074</td>
</tr>
<tr>
<td>0.7</td>
<td>5.2</td>
<td>0.039</td>
<td>0.045</td>
<td>0.056</td>
<td>0.064</td>
<td>0.079</td>
</tr>
<tr>
<td>0.8</td>
<td>5.8</td>
<td>0.042</td>
<td>0.048</td>
<td>0.059</td>
<td>0.068</td>
<td>0.083</td>
</tr>
<tr>
<td>0.9</td>
<td>6.4</td>
<td>0.044</td>
<td>0.050</td>
<td>0.062</td>
<td>0.071</td>
<td>0.087</td>
</tr>
<tr>
<td>1.0</td>
<td>7.0</td>
<td>0.046</td>
<td>0.053</td>
<td>0.065</td>
<td>0.075</td>
<td>0.091</td>
</tr>
</tbody>
</table>

Information as possible during a relatively quiet period and keeping risk to the staff to a minimum.

A number of biases probably occurred during the survey although it was impossible to quantify these. Doing the survey only in the mornings meant some houses might have been empty if their occupants went to the market. When a house or flat was empty, interviewers were instructed to go to the next occupied dwelling. Furthermore, this may have led to houses with older people being over-sampled since many old people had shopping done by neighbours. It was not possible to repeat visits to unoccupied houses. The issue of multiple dwellings (flats) was discussed before the survey, but it was not possible to obtain a consensus from external advisers on how to deal with this. This was an important problem because so many of the dwellings in Grozny were of this type. The options were:

- Take only the first occupied flat biased towards lower level flats which may have had a better water supply if pressure was low and which may have been less damaged by bombing and shelling.
- Take all the occupied flats in a building over-samples flat dwellers and also clusters the people interviewed within the cluster.
- Leave them out altogether under-samples flat dwellers and misses their perhaps particular problems.

In the event, the first option was used.

When calculating confidence intervals, we opted for a precision of ±10 per cent. Whether such a degree of precision is adequate or necessary can only be decided in each setting. A higher degree will be more important in situations where resources are scarce and decisions must be made as to whether or not to address a problem, or when making choices between recipients of aid. Time and resource constraints will also affect the degree of precision attainable. Table 2 shows the effect of reducing the number of clusters in any given situation.
The formula used to calculate confidence limits was simplified while it is better than taking no account of the design effect. It is still likely to underestimate the true spread. However, the fact that a relatively high estimated value for $\rho$, and hence $D$, was used for all variables would offset this effect. All calculations around confidence limits begin with an estimate of $\rho$. In this situation an arbitrary figure was selected to maximise sample size and err on the side of caution. It is possible to calculate the true value for each variable and, even if not possible during the programme, it should be done to inform the design of future studies.

Poorly trained interviewers can result in a marked increase in $\rho$, which will increase the standard error of an estimate (see Table 2). Before the survey, the locally recruited interviewers received some training covering the procedures to be followed. Although almost all were university undergraduates, it would be wrong to regard them as comprehensively trained. Here and in similar settings, this situation is likely to be common.

Redirecting Merlin’s activities

Overall the results of the survey suggested that Merlin’s activities to date had been appropriate, and that concentrating initially on water supply and the provision of medicines had been the correct approach. Initial preparation for an outbreak of waterborne disease had also been a valid precaution in view of the diverse and potentially heavily contaminated sources of water that the inhabitants of Grozny had to use in the months immediately after the fighting. It took some time to arrange an emergency water-trucking scheme. Also there had been large-scale population movements and experience in other disasters suggested that this posed a risk of increased diarrhoeal disease.

The results led Merlin to redirect some of its efforts. The finding that a large proportion of the inhabitants of the city had access to a functioning gas supply led to a channelling of activities towards health education (especially the need to boil water) and away from repairs to the water infrastructure that were increasingly being frustrated by poor co-operation from the local water authorities. Health-care facilities were under considerable pressure, not least because of large numbers of chronically ill patients. While most facilities had adequate staff, the main factors limiting the provision of adequate health-care were a shortage of drugs and the poor structural state of many of the buildings. Merlin was able to address some of these needs. After the survey, efforts to collaborate with and train local medical authorities and staff were strengthened, helping to ensure the sustainability of programmes. Should Merlin expatriate staff have to leave the city (as occurred later that year due to a flare up in hostilities), public health activities are difficult during a war, but often possible in areas where there is no active fighting or confrontation (Armenian, 1986; Toole et al., 1993; Healing et al., 1996). The survey reported here showed that a technique which had proved itself in the aftermath of a natural disaster (Hlady et al., 1994) was also useful in a war zone although further work is necessary to make it more user friendly.
Acknowledgements

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Internal Displacement in Burma

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The internal displacement of populations in Burma is not a new phenomenon. Displacement is caused by numerous factors: not all of it is due to outright violence, but much is a consequence of misguided social and economic development initiatives. Efforts to consolidate the state by assimilating populations in government-controlled areas by military authorities on the one hand, while brokering cease-frees with non-state actors on the other, has uprooted civilian populations throughout the country. Very few areas in which internally displaced persons (IDPs) are found are not facing social turmoil within a climate of impunity.

Humanitarian access to IDP populations remains extremely problematic. While relatively little information has been collected, assistance has been focused on targeting accessible groups. International concern within Burma has focused on the problems of displacement within general development modalities, while international attention along its borders has sought to contain displacement. With the exception of several recent initiatives, few approaches have gone beyond assistance and engaged in the prevention or protection of the displaced.

Keywords: Burma, internally displaced populations, assessment, forced labour, parallel economy

Introduction

Internal displacement, as defined in the Guiding Principles on Internal Displacement, is certainly not a new phenomenon in Burma, nor indeed in the South-east Asian region as a whole. Cambodia, Indonesia and the Philippines are all grappling with the problem (see Global IDP Survey, 1998). The scale of such displacement in Burma, however, overshadows that occurring elsewhere in the region, excepting Laos and Vietnam (UNDP, 1997; Jamieson et al., 1998).

As was recently pointed out by Francis M. Deng, representing the UN Secretary-General on IDPs at a regional conference on the subject, internal displacement is associated with conflict, human rights violations, authoritarian
governments and failed economic policies. A number of these conditions exist in present-day Burma, triggering large-scale population displacement.

The internal conditions of conflict, coercion and failed economic policies within Burma are long standing — in many areas dating back to the 1950s. Such massive displacement of people, however, is only now being reported — or even acknowledged — though accurate numbers are difficult to assess.

In recent years, displacement of population has been most visible, and hence most documented, in urban areas such as Rangoon, Mandalay and Bago. However, in rural remote areas, away from independent scrutiny, the forcible displacement of population — particularly ethnic minorities — continues. Most notably affected have been the Muslim Rohingyas of Arakan State, the Karen, the Shan, the Karenni, the
Kachin, the Mon and the Chin, each within their own state, as well as smaller ethnic populations that also live in the same areas (see map).

From a humanitarian perspective, there is great concern for victims of displacement, especially in the border states of countries where members of ethnic minorities live. Many such displacements are the result of systematic patterns of human rights abuses by warring parties. Unable or unwilling to cross international borders and hence be recognised, at least in international law, as de-facto refugees, these forcibly displaced people have become IDPs.

While the needs are manifold and the total affected population is large, spread over much of the country, the problems of assistance, protection, return or resettlement and reintegration in such a complex environment should not be underestimated. While the state persists in its tactics of war and development and refuses to grant access to the displaced by international agencies, the delivery of assistance to the affected displaced population or work towards guaranteeing their rights, remains very limited.

Despite some important gains, such as the granting of access to several of the border states by the International Committee for the Red Cross (ICRC), there remain significant gaps in knowledge regarding the needs of the internally displaced and the scope for international intervention to support them.

This paper seeks to fill at least part of this gap. It provides a descriptive analysis of the problems of displacement in Burma and then outlines a number of options that might facilitate analysis of displacement to inform more constructive responses.

Urban displacement in Burma

According to a 1994 report of the US State Department, an estimated half a million residents in Rangoon have been forcibly relocated from the city centre to new satellite settlements on the outskirts of the city between 1988 to 1994. Prior to this, a 1990 UNCHS/Habitat report indicated that between 1989 and 1990 some 15 million people throughout the country (4 per cent of Burma’s entire population) had been relocated or resettled. Given the nation’s small urban population, this represents some 16 per cent of the urban population. More than half of this massive social engineering exercise took place in only four cities: Rangoon, Mandalay, Bago and Taunggyi (BFRG, 1998). In secondary towns, the population relocated accounted for 22 per cent of the total town population, in other words 120,000 out of 754,520 people.

Considered by UNCHS/Habitat in their 1990 report as unprecedented internationally, both for the scale and the time period involved, these urban relocations or resettlements were undertaken by the government for purposes of land development, planning and other urban works. Provision was included for housing for civil servants, road, rail and pedestrian passageways, parks and gardens, commercial and residential amenities, clean-up and beautification, and drainage systems and water management. An additional cause for much concern was the accelerated forced relocation of poor communities to new, unprepared relocation sites, which was combined with notable heavy-handedness on the part of the military government to impose law and order in newly resettled areas.
Urban displaced people, particularly those in the poorest households, have frequently been described in government documents as squatters, although some of them had previously been paying tenants or owners of permanent houses. They were often evicted at their own expense to new resettlement sites where conditions were difficult and where social services were lacking or scarce. Some squatter clearance projects in Mandalay and Rangoon appear to have taken place as reprisals following the political upheavals of 1988, which saw the failure of the democratic movement. Fire has been used as another way to clear squatters, as old plots are rarely returned to fire victims.

The most controversial of these urban displacements have been those to relocate urban communities to rural areas. Throughout the early 1990s, the government moved squatter communities and other urban populations from urban to border areas to inhabit low-population-density areas thereby providing labour for development activities. Examples of this tactic have been reported in the Kabaw valley of Sagang Division and in the Dimosoe area of Karen State.

Rural displacement in Burma

Rural populations have also been forcibly displaced by a combination of violence, natural disasters, economic development projects and the extensive use of forced labour. Of these, displacement due to conflict between the military and various ethnic armies has been particularly harsh and historically resulted in the movement of refugees to neighbouring countries, especially Thailand and China.

Burma’s rural population has remained around 75 per cent of the total since the 1970s. The majority of the non-ethnic Burmans live in the seven border states (Kachin, Shan, Chin, Karen, Mon and Arakan) which are predominately rural, sparsely populated and marginalised in highland areas. These populations, which include many ethnic sub-groups within each state, have been particularly hard hit by displacement. Not only are populations economically and politically repressed, but also some cases of displacement appear to have been ethnically motivated.

Karen State and Tenasserim Division

At war since 1949, the Karen have been much divided by warfare and forcible relocation. This situation was particularly pronounced in the Irrawaddy delta region throughout the 1960s and 1970s, warfare and civilian displacement in the 1980s and 1990s shifted to the Karen National Union’s (KNU) self-proclaimed Karen Free State (Kawthoolei) on Burma’s eastern border. While accurate figures of displacements in rural areas are hard to obtain, estimates made in 1998 of the IDPs in Karen State and Tenasserim Division found between 100,000 and 200,000 Karen were internally displaced. The government has been cited as the responsible party for the forced relocation of small villages to larger villages or to relocation sites in order to control of areas where there is conflict. When combined with the number of people who were then in refugee camps in Thailand, it was estimated that approximately 30 per cent (or 480,000) of the rural Karen population of south-eastern Burma was currently displaced (BERG, 1998: 34).
The reality of generalized violence against Karen civilians by the Burmese army has caused large-scale displacement. This has been manifested by a complex pattern of forced relocation, harassment and persecution, impoverishment by labour demands and looting as much as by armed conflict associated with fighting between the Burmese army and the KNU army. More recently, displacements of civilians have also been perpetrated by various breakaway Karen factions or militias which have been operating in the increasingly fragmented environment. These factions or militias have brought the level of violence and displacement much closer to the villages and individual civilians.

Karenni State

Situated to the north of Karen State and with a population of 207,357 in 1998, in Karenni State there are currently three main forms of displacement: conflict-induced, development-induced, and displacement arising as a result of resource scarcity.

In Karenni State, the Karenni and particularly the Karenni National Progressive Party (KNPP) seek an independent state — a claim fiercely resisted by successive military governments. Perpetrated by the Burmese army since the 1960s to secure decisive military solutions, displacement has led to the expropriation of land and natural resources, shattering the resource base of many local communities.

The protracted conflict has not only led to displacement, but has also increased the rivalry between a myriad of armed groups vying for control of resources, populations and a stake in the balance of power in Karenni State. As armed Karenni groups rely on local levies or militia that can be called on to fight when needed, the war has been brought directly to the villages where Burmese Army retaliatory campaigns, including relocation, have aimed at separating communities from insurgent armed groups (BFRG, 2000).

Recent data indicate that while villagers have been displaced by fighting, it is also government-initiated development schemes, aimed at separating people from non-state groups by forcing them into relocation sites, that has resulted in most displacements since 1960s. These schemes were responsible for the wide-scale displacement of about 25,206 people in 1996 alone. Of these, 11,669 are known to have moved to relocation sites; 4,400 were registered in refugee camps, and a further 9,137 unaccounted for. Since 1998, many IDPs have moved out of relocation sites back to their villages (some voluntarily, while others have been ordered back) or to refugee camps in Thailand.

Land ownership is extremely fragmented and a significant proportion of the population is landless in Karenni State. There are large numbers of displaced connected to economic interests in the area. With an economy based on access to tea resources — and of equal importance, hydro-electric power and mining concessions — the government has in some cases taken steps to pacify areas, quelling so-called ‘insurgency’ problems before undertaking investment in the areas. Much of this displacement is carried out in military style outside any civil or legal framework. Moreover, the deterioration of the formal economy has fostered the growth of an extra-legal state economy, focused on the extraction of natural resources that all groups, including the state, rely on.

In the absence of lasting and substantive peace, the displacement of civilians is likely to continue. The current cease-fire agreements in the state appear to be ad hoc.
economic deals rather than a process aimed at political resolution and peaceful reintegration. The cease-fires in fact have allowed armed groups to legitimise their role in the extra-legal state economy and added to further factionalism in the competition for increasingly scarce resources.

**Mon State**

In Mon State, the ethnic Mon have suffered serious displacement after nationalists, under the New Mon State Party (NMSP), took up arms against the military government after the 1962 military coup. Reported to be more urbanised than either Karen or Karenni State to the north, where inhabitants are mainly rural dwellers, forcible or compulsory displacement has occurred largely in urban areas, such as in or around Moulmein city. While displacement in rural areas has taken place, its incidence has decreased since the cease-fire between the government and NMSP in mid-1995 — which has held generally with the exception of areas overlapping with Karen-insurgent-held areas.

Regarding urban displacement between 1995–6, the government announced its plan to construct a new road for Moulmein, starting from Nyaungbinzvek village and connecting to Mupon ward. Hundreds of households were evicted from their homes to make room for this planned road without being given any compensation or housing assistance. The road construction has yet to be completed.

Similarly, in 1990 the military government evicted some 3,000 families living in Kyettan, Mandalay and Mlaunghyn ward of Moulmein for construction of unspecified ‘modern buildings’. Approximately 18,000 people were ordered to move to new relocation sites without compensation — the new sites had no water or electricity supply. Inexplicably, the land vacated has, to date, only been used to build one hotel, and the rest of it is reportedly standing vacant (Anonymous, 1998).

**Shan State**

Massive internal displacement has occurred in Shan State since the 1950s. Multiple insurrections have resulted in continuous fighting between a variety of armed ethnic groups and the central government into the 1990s. Conflict and displacement has been compounded by the entry of two other armed parties in Shan State, the Kuomintang remnants from China in the 1950s, and the Chinese-backed Communist Party of Burma (CPB) between 1968 and 1989. In addition to the Shan majority, other ethnic groups in Shan State have been affected, including the PaO, Palaung, Wa, Lahu, Kachin, Akha and Kokang.

After March 1996 internal displacement again accelerated, despite cease-fires between the government and minority forces in a number of regional areas. Fourteen hundred villages spread over an area of 7,000 square miles in central Shan State, with an estimated population of 300,000, are reported to have been evicted from their homes and made to move to strategic relocation sites. During 1997 and 1998 it was said that some of the resettled people were then relocated a second time to yet another site. At no time was any compensation given for loss of property or agricultural livelihood (Shan Human Rights Foundation, 1996/8).
Arakan State

The situation of the Rohingya, Muslim inhabitants of this Arakan State, has been particularly grim. From December 1991 to March 1992, some 250,000 people left and fled to Bangladesh. The refugees reported that they have been forced to leave their homes because of killings, rapes, forced labour, forced porter ing and religious persecution by members of the Burmese army.

Human Rights Watch Asia reported that Muslims were being forcibly moved into two townships of the state (Maungdaw and Buthidaung), and that Burman and Arakanese ethnic families (the latter are the majority population in the state) were simultaneously being moved into 'model villages' in the wealthier parts of these same two townships. Many new families moving into the area are reported to be military families and their relations. This process of moving in a new population from outside the area and the confiscation of Muslim-owned land is, along with a prevailing background of human rights abuses, a prime factor for Rohingya fleeing to Bangladesh (Human Rights Watch Asia, 1997).

The Rohingyas face another hurdle in that they are not considered citizens of the country. They have no identification cards and have to seek permission even to travel outside their own village. Thus, having had their land or property confiscated, they are not free to travel and settle elsewhere.

Kachin State

While the situation of internal displacement is not reported and hence the scale of the problem not well known in Kachin state, 30 years of internal conflict between the various Kachin independence movements and the Burmese army has resulted in large-scale displacement of the Kachin population. Figures from Kachin State suggest that perhaps 100,000 were forcibly relocated from their homes by counter-insurgency operations between the 1960s and 1990s, while other estimates suggest that in 1994 — prior to the signing of a cease-fire — there were around 67,000 internally displaced. More recent estimates suggest that although conflict-related displacement has decreased, the impoverishment of many rural dwellers following three decades of strife have led to significant rural displacement. As no peace dividend followed the cease-fire agreements, leaving the issue of resetting previously displaced groups obscure, many rural populations in Kachin State have become landless and forced to seek a livelihood in the extractive natural resources (mining) sectors or in the service sector in urban areas.

Indeed despite the negotiated cease-fire arrangements between the central government and the Kachin Independence Organisation (KIO) and the Kachin Democratic Army (KDA) there continue to be problems of displacement and land confiscation. As has been remarked by numerous civilians in Kachin State, cease-fires have allowed the different armies to retain their arms and territory, controlling and taxing the populace, while basically prioritising business for themselves through the extraction of natural resources. These complaints are not solely levied at the rebel groups, but more importantly at government, as the army has claimed much farmland, principally to grow food. Recently the government put up 27,000 acres of fallow land for paddy production and has opened a land-title registration office in Myitkyina to facilitate the transfer of such land to new owners.
Other states and divisions of Burma

The situation in Chin State has also not been well reported, hence the scale of the problem is not generally known. However, estimates by Chin people themselves reflect large-scale displacement of population. The Chin National Front (CNF), a pan-Chin nationalist movement, reports displacement taking place. Members also estimate that there are 40-50,000 persons displaced from their homes, many of whom have fled to Mizoram State in north-east India.

In addition to conflict-induced displacement, many states have introduced border-area ‘development’ programmes, entailing resettlement of populations and carried out under the auspices of the Ministry for the Development of Border Areas and National Races, set up in May 1989. Initiated in border states where successive central governments have been involved in long-standing conflicts with ethnic insurgent armies, its objectives among others, are to carry out ‘all round development’, promote national unity and stamp out poppy cultivation. This programme was to extend to 19 distinct border zones with an estimated population of four million (MPBANRDA, 1994). In these zones, two groups were eligible for resettlement: former insurgents who laid down their arms in so-called ‘welcome’ sites and populations displaced by military action between the army and insurgents.

In the seven largely Burman-inhabited divisions, with the exception of Tenasserim Division, the displacement situation is little better despite the absence of any insurgent activity there. Evictions for reasons of city beautification, urban development and infrastructure construction (particularly roads, railways and dams) are likely to be the same as in the seven ethnic-majority states. The construction of the Kalay–Gangaw railway line in Sagaing Division illustrates clearly that the problems of forced displacement are not only confined to the war-affected zones. The line crosses mostly flat farmland and paddy fields, these were destroyed without any compensation being paid by the national government (Images Asia/KHRG/Open Society Institute, 1998).

Moreover, as is the case in Sagaing Division, the designated administrative boundaries of the division conceal the ethnic diversity within its borders and internal displacement which has occurred. Many Naga people, estimated to be around 100,000 strong in total, populate the four northern townships of the division, near the town of Khantzi and the Patkai mountain range (Smith, 1994: 53). Fighting for an independent Nagaland in both India and Burma, and facing increased internal divisions, the Naga have suffered significant conflict-related displacement. In the last six years particularly along the Khantzi–Tekai road, numerous Naga villages have been displaced after fighting between SPDC and Naga insurgent forces. It is estimated that up to 1,300 villagers have been displaced and fighting seems presently to have increased.

The war economy

A preoccupation with the insurgency problem by military governments in the capital has allowed security issues to come to dominate all aspects of government policymaking. In these areas efforts have been aimed at resettling former insurgent groups in ‘welcome sites’ as well as populations displaced by military action between
the army and non-state actors, usually through the auspices of Ministry for Progress of Border Areas and Development of National Races (MPBANRD\, 1994).

With state coffers empty, and an increasingly large army to feed and accommodate, the ongoing civil strife must be funded by economic activities. The exportation of primary products, such as timber, mining and illicit drugs, generates quick cash and are principally located in the border areas. In 1989, the government earned an estimated US$200 million alone from concessions with Thai companies to log in border areas where the Burmese military had not yet gained access. This deal provided much-needed foreign exchange, but also resulted in the clearing of thickly-forested land, thus enabling the military to extend the war into areas right up to the Thai border. During the period 1989–94 there was a significant increase in the number of people internally displaced by fighting as well as the number of refugees arriving in Thailand.

On the side of the insurgents too, cash is required to continue with their campaigns, which in some cases are half a century old. Hence, winning the war becomes equated, for all sides in the conflict, with gaining control over strategic resources. Providing rebel groups with access to resources, including logging and mining concessions or control of trade gates, has been a feature of many cease-fire agreements. In both cease-fire areas and those where conflict continues, an extra-legal economy has swiftly developed, in which all sides participate and benefit from. This extra-legal economy — which includes unregistered cross-border trade, resource extraction, an expanding black market and illegal taxation — has been accompanied by a long-running contraction in the state’s ability to provide services.

A further concern about the link between strategic resources and warfare which has had a crucial impact on many groups displaced in border states, is that counter-insurgency campaigns and continued turmoil have led to the confiscation of traditional and ancestral lands from many members of ethnic minorities. The Special Rapporteur’s 1998 report on Burma commented

very few legal titles to land exist. This permits the military to confiscate the land that had traditionally belonged to peasants and farmers living in Karen, Karen and Shan States and to redistribute it to military officials and soldiers.

While the extent of these confiscations remains undocumented, in one township in Karen State it was estimated that at least 2,400 acres of farmland had been confiscated in 1993 alone. In some cases families whose traditional lands had been confiscated were compelled to work as unpaid labourers on that same land. This then contributed to further displacement, as in such circumstances it is very difficult for families to earn even a subsistence wage.

The arbitrariness of the confiscation of farmland without compensation of any kind has been also been described by the Mon Information Service

confiscation of land of either agricultural land or ‘real estate’ has become common and widespread. There are no instances of the authorities’ provision of compensation for any confiscation of farmland or real estate according to the 1954 Agricultural Land Nationalization Act. all cultivated lands of the country are owned by the State, and can be repossessed by the State (1998).
Table 1 Compilation of recently reported figures for population displacement in Burma

<table>
<thead>
<tr>
<th>State and divisions</th>
<th>No of villages</th>
<th>No of households</th>
<th>No of people affected</th>
<th>Date of data</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karen State</td>
<td>423</td>
<td>21,039</td>
<td>108,280</td>
<td>Dec 1997</td>
<td>1</td>
</tr>
<tr>
<td>Shan State</td>
<td>1,478</td>
<td>55,957</td>
<td>&gt;300,000</td>
<td>April 1998</td>
<td>3</td>
</tr>
<tr>
<td>Mon State</td>
<td>?</td>
<td>?</td>
<td>&gt;20,000</td>
<td>Sept 1998</td>
<td>4</td>
</tr>
<tr>
<td>Chin State</td>
<td>?</td>
<td>?</td>
<td>40 50,000</td>
<td>~</td>
<td>6</td>
</tr>
<tr>
<td>Kachin State</td>
<td>?</td>
<td>?</td>
<td>67,000</td>
<td>Jan 1994</td>
<td>7</td>
</tr>
<tr>
<td>Arakan State</td>
<td>?</td>
<td>?</td>
<td>&gt;250,000</td>
<td>Aug 1997</td>
<td>12</td>
</tr>
<tr>
<td>Yangon</td>
<td>?</td>
<td>84,017</td>
<td>504,000</td>
<td>Oct 1994</td>
<td>20</td>
</tr>
<tr>
<td>Mandalay</td>
<td>?</td>
<td>25,000</td>
<td>150,000</td>
<td>May 1990</td>
<td>21</td>
</tr>
<tr>
<td>Bago</td>
<td>?</td>
<td>6,000</td>
<td>36,000</td>
<td>May 1990</td>
<td>21</td>
</tr>
<tr>
<td>Sagaing</td>
<td>10</td>
<td>210</td>
<td>1,260</td>
<td>Dec 1999</td>
<td>24</td>
</tr>
<tr>
<td>Ayeckarwaddy</td>
<td>?</td>
<td>?</td>
<td>18,000</td>
<td>May 1990</td>
<td>21</td>
</tr>
<tr>
<td>Tanintharyi</td>
<td>?</td>
<td>?</td>
<td>37,000</td>
<td>May 1990</td>
<td>21</td>
</tr>
</tbody>
</table>

The lack of any rule of law or independent judiciary offers opportunities — in logging, mining, fishing, road building, construction or the beautification of tourist sites — to make money for anyone involved. The land laws offer little protection to the rural farmer who in any case often fears taking any action against the military in case of reprisals.

Without the rule of law, or an independent judiciary free from interference by political or military personnel, displacement of this type is likely to continue both in rural and urban areas.

International response

On the whole international response to the issues of displacement in Burma has remained limited and has not influenced the government either to recognise or address the problems of displacement. Within the country, international agencies — such as UNDP, UNICEF, FAO, WHO or UNDCP — have not confronted the government over rights of access and NGOs have not gained unimpeded access to the displaced in contested areas in some cases intergovernmental agencies have inadvertently supported the relocation of populations and in particular ethnic-minority ones.

The government’s Urban and Border Area Development Programmes, which began in 1989, attempted to relocate populations within the country. This was to some degree supported by UN agencies. UNHCR was involved in projects for urban areas while UNDP undertook projects in the Wa and Kokang areas, and UNDCP (UN Drugs Control Programme) had projects in the Wa and eastern Shan State areas. Although these projects officially ended in 1992, UNDCP continues to support projects in eastern Shan State which have relocation and resettlement components. The populations targeted for relocation by these programmes are often ethnic-minority groups.
Cross-border initiatives to reach internally displaced people from neighbouring countries have succeeded in gaining access to many internally displaced populations. Although these initiatives remain modest and are provided through discrete channels along the various borders, they have been effective and significant in terms of relief assistance.

There is however an urgent need for a more thorough examination of the implications of displacement and conflict on the civilian population in many of the areas affected by displacement. As the implications of displacement have moved beyond the political and human rights arenas and seriously threaten rural development opportunities and cross-border relations, it is imperative that better and more data be collected, shared, analysed and acted upon.

So far most humanitarian interventions both from within the country and from outside have focused on relief strategies and short-term physical inputs. While indispensable and significant, this assistance does little to protect the rights of the internally displaced. In the present context, where the conflict is both protracted and complex, much more needs to be done. In addition to provision of humanitarian assistance, more needs to be done to develop effective strategies for protection, resettlement and reintegration rather than the present response, which aims at containment.

The present environment in which the cease-fire agreements between the state and various non-state actors have been signed are not binding agreements. They offer no recourse to the civil legal system or any other form of non-partisan arbitration. International agencies concerned with the protection of the internally displaced need to offer their services to all parties. In doing so, organisations and other appropriate actors should respect relevant international law, standards and codes of conduct.

Several options which should be implemented immediately include advocating for transparent humanitarian assessment missions and protection assessment missions which integrate the immediate concerns of populations with protection issues. While the recent access of ICRC facilitates this process, it is important that these concerns move beyond the mandate of the ICRC. More resources and money need to be set aside or allocated to address the needs of the internally displaced populations. Thus far only very limited funding is provided for internal displacement and much of this is for relief goods and services. There should also be a clearly defined lead agency, at present there is no inter-governmental agency or other international agency taking the lead in regard to IDPs. UNHCR has taken on numerous responsibilities in this area but is not mandated to take the lead. It is also significant that there is presently no common authoritative policy regarding the problems of IDPs in Burma. Action by various agencies are not clearly defined and this has serious repercussions not only on the implementation of activities but also on the use of international links and how international laws, conventions and standards are adhered to.

Note

1. *Guiding Principles on Internal Displacement* (1998) define IDPs as ‘Persons or groups of persons who have been forced or obliged to flee or to leave their homes or places of habitual residence, in particular as a result of or in order to avoid the effects of armed conflict, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized State border.’
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The Urban Poor in Dhaka City: Their Struggles and Coping Strategies during the Floods of 1998

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BRAC

Bangladesh experienced one of the worst floods in recorded history in 1998. This paper focuses on the needs and coping strategies of the urban poor in Dhaka City, which had been very badly affected. The city's roads were completely under water and most areas were water-logged with drainage and sewage systems blocked. Rising water levels compelled many slum dwellers to move to temporary shelters and relief camps. Women and children were the worst affected. The lack of sanitation facilities and privacy forced women and children to defecate in their own homes. There was an acute scarcity of safe drinking-water and food prices rose dramatically. Diarrhoea, fever, and colds were the most common illnesses affecting the poor. The floods left many of them unemployed and in some families, the result was increased tension and incidents of domestic violence. In some areas, members felt pressured to repay micro-credit loans. Most NGOs, however, suspended loan repayments during this period. A committee was set up to coordinate and work towards addressing some of the main post-flood problems.

Keywords: Bangladesh, Dhaka, floods, vulnerabilities, mitigation

Background

The 1998 floods have been described as one of Bangladesh's worst floods this century. Almost two-thirds of the country was submerged under water, and millions were affected (Ahmed, I., 1999). A total of 33 million people were marooned, of whom 18 million needed emergency food and health services. The floods continued for more than 65 days (from mid-July 1998 until September 1998). They affected 100,000 square kilometres in total, destroying basic infrastructure like roads and bridges, as well as houses, crops, animals and cattle (see Table 1). The most damaging aspect of the flood was the destruction of people's means of livelihood (Abed, 1999, Ahmed, SM et al., 1999). Bangladesh suffered severe flooding in 1954, 1974, 1987 and 1988 when one-fourth to one-half of the country went under water causing immense damage to life and property. The flood in 1988 was a catastrophe in which 52 per cent of the country's land was inundated. In that flood, 52 districts and 30 million people were affected, unfortunately, the scale of the 1998 event surpassed all past flood experiences.

Non-governmental organisations (NGOs), civic groups, volunteer bodies, development agencies, students, housewives, sports personalities, artists, journalists,
Table 1 Total damages incurred in the 1998 floods

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area affected</td>
<td>100,000km²</td>
</tr>
<tr>
<td>Number of districts</td>
<td>52</td>
</tr>
<tr>
<td>Number of police stations</td>
<td>366</td>
</tr>
<tr>
<td>Number of union parishads affected</td>
<td>3,323</td>
</tr>
<tr>
<td>Number of affected people</td>
<td>30,916,351</td>
</tr>
<tr>
<td>Affected standing crops (acres)</td>
<td>1,423,320</td>
</tr>
<tr>
<td>Number of affected homesteads</td>
<td>980,571</td>
</tr>
<tr>
<td>Number of deaths</td>
<td>918</td>
</tr>
<tr>
<td>Head of cattle killed</td>
<td>26,564</td>
</tr>
<tr>
<td>Roads damaged</td>
<td>15,927km</td>
</tr>
<tr>
<td>Embankments damaged</td>
<td>4,528km</td>
</tr>
<tr>
<td>Number of damaged bridges/curvets</td>
<td>6,890</td>
</tr>
<tr>
<td>Number of educational institutions</td>
<td>1,718</td>
</tr>
<tr>
<td>Number of flood shelters</td>
<td>2,716</td>
</tr>
<tr>
<td>Number of people taking refuge</td>
<td>1,049,525</td>
</tr>
</tbody>
</table>


business people and the government were all involved in mobilising resources for intervention measures in the flood-hit areas (Ahmed, I., 1999). This included distribution of food, medicine and clothing for the poor. Relief operations during the early period, however, lacked planning and co-ordination. The different agencies failed to share relevant information, which resulted in insufficient data on the numbers affected, extent of the damage and the needs of the affected population.

It was during this period that BRAC (Bangladesh Rural Advancement Committee, a large and local NGO) began massive relief operations and its research and evaluation division undertook a number of rapid needs assessment studies, in both rural and urban areas, to gauge the overall situation of the country. The objective was to identify the actual needs of the poor and plan a comprehensive needs-based rehabilitation programme (Ahmed, S.M. et al., 1999). This paper is one of many spawned from that initiative, and was carried out in the capital city, Dhaka. It focuses on the experiences of poor men and women living in the affected slum areas and attempts to provide an insight into their struggles and coping strategies. As floods are a recurring event in Bangladesh, a better understanding of their experiences and needs is crucial for effective relief strategies in the future.

Methods

A qualitative study was carried out in five slum areas of Dhaka city. Altogether 32 men and women (20 women and 12 men), some of whom were BRAC members, were randomly selected and interviewed. Since most of the places were affected by floodwaters, men and women were interviewed whenever possible from the Shahidertek and Baitola slums in the Mohammadpur area, and the Katashurben, Shibir Masjid and Mothertek slums in the Shobujbagh area. These slums were selected as they ranged from moderately to severely affected. The research findings
were urgently required, therefore the time given was quite short — approximately one
week to investigate the situation of the flood-affected urban poor

Interviews were taken by the principal investigator from various sites, from
sitting in boats to perching on chaits (roof's) of houses and squatting on roadsides
(where they were not completely submerged by floodwaters). In two of the slums, we
managed to have some privacy with a few poor women to discuss some of the more
sensitive issues: privacy, domestic violence, harassment and other concerns. Lack of
space and privacy, time constraints and prevailing conditions, however, limited the
extent to which one could investigate such sensitive issues. All of the interviews were
informal. Information collected was cross-checked through further discussions with
others living in the area and NGO workers involved in relief activities. One principal
researcher led all of the informal discussions. The research was accompanied by a
relief worker only in some of the most severely affected areas, as these places were
only accessible by boat.

It can be argued that the general problems that the paper illustrates are
common among the urban poor, who are extremely vulnerable during disasters. A
limitation is that it was a short exploratory study initially to assess the needs and
perceptions of the urban poor during the floods, and thus it was not possible to
explore any of the issues in greater depth.

Who are the urban poor?

In Dhaka, the urban poor are those residents who are mainly rural migrants living in
the slum and squatter settlements. It has been estimated that nearly 50 per cent of the
city's poor population live in slum and squatter areas (Hussain, cited in Islam, 1996).

Slums are high-density areas (over 300 people per acre), characterised by over-
crowding (three or more adults per room), and poor-quality housing such as kutchas
(mud homes), semi-pucca (semi-concrete) or other dilapidated buildings, either rented
or owner-occupied. The slum areas have inadequate water supplies, poor sewerage
and drainage facilities, and hardly any paved streets or lanes. The squatter settlement
areas are where the urban poor have illegally occupied land belonging to government
or non-governmental organisations by constructing makeshift structures with various
materials (jute sacks, newspapers, polythene) for sleeping. The poor and very poor
people who live here are mostly engaged in various informal sector jobs (Hussain,
cited in Islam, 1996). Hussain found that the organisation of poor urban areas
is comprised of little communities of migrants from similar places with common links to
a region, village, caste or kin. This structure enables a majority of the rural migrants
coming in from village communities to adjust easily and become accustomed to the
complex and fast-paced life in the city.

Wood (1998) argues that urban households — particularly the poorest — are
most vulnerable to events outside their control. Female-headed households are
especially vulnerable. Most of these households are financially insecure, with an
uncertain hold on what they have accumulated, and little prospect of improving their
economic circumstances. They live with the constant fear that their residential rights
or place of shelter may suddenly be taken away by the authorities or private landlords.

Changing international market forces may relocate employment industries (for
example, the garment industry). Increasing migration from rural to urban areas places
pressure on already scarce resources (water, land, fuel) and services (electricity, sanitation, health-care). Limited employment opportunities result in greater competition for jobs and lower wages. Further, compared to their rural counterparts, who have better safety nets of more relations to fall back on, the urban poor are far more dependent on access to jobs. They have fewer shared assets that can help during crisis situations such as in cases of illness, sudden unemployment or during a disaster. For poorer families, particularly in the urban areas, the loss of one set of resources seriously affects them, sending them into a downward spiral (Wood, 1998).

During the floods, the entire infrastructure of Dhaka came under severe pressure. Roads were covered with water, embankments threatened to crack, continuous rain and blocked drainage and sewage systems created a health and environmental nightmare (Ahmed, S.M et al., 1999). People from all levels of society, from slum dwellers to the country’s elite, were affected by the huge surge of waters. Basic services, marketplaces, transport were all disrupted, but life did not stop and many people, particularly the poor, devised ingenious methods to cope with the terrible conditions (Ahmed, I., 1999).

The section below illustrates the sufferings and coping strategies of the urban poor during this period.

**Homelessness: increased vulnerability of the poor**

In the severely affected areas, boats became the principal means of communication and many slum dwellers coped by living in shelters and relief camps while others made arrangements in their own homes to deal with the rising floodwaters (Ahmed, I., 1999). Continuous rain and blocked drains meant the level of the floodwaters had risen to about four feet in depth in some of the slums. Some of the women shared their fear and concern about the rising levels of water, 'the water rose and I was with my two children, so I went and stayed at the medical college. My house is submerged. What can I do if there is nowhere else for us to go?' Another woman exclaimed 'there are faeces floating around inside our homes. What will we do? We have to move!'

Many families were reluctant to move from their homes, but felt compelled to because of the stench of stagnating dirty water and the nuisance of mosquitoes. The dirty water created a perfect breeding ground for mosquitoes, and people saw snakes, leeches and rats floating in it. Several flood reports found that families moved because they feared being bitten by snakes or rats; and many were scared that their babies could fall and drown in the water, or someone might be electrocuted because of the loose electrical lines littering the area (Ahmed, S.M et al., 1999, Ahmed, I., 1999; Rashid and Halder, 1998) (see Table 2).

The majority of families were unable to remain on the chals (roofs) of their homes, and moved with their basic belongings of utensils and bedding into the nearby shelters and relief camps. A number of institutions provided temporary shelters for poor families and a number of women named schools, hospitals and empty construction sites which had been converted into relief camps. One woman mentioned a place that was primarily a hospital for the elderly as a place of shelter for her family for the past few weeks. They had previously stayed at the nearby Islamic Foundation building and in an empty construction site. When visiting a few of the relief centres, it
Table 2  Flood-related deaths (until 4 October 1998)

<table>
<thead>
<tr>
<th>Cause</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhoea</td>
<td>540</td>
</tr>
<tr>
<td>Drowning</td>
<td>24 (incl 22 children)</td>
</tr>
<tr>
<td>Snake-bite</td>
<td>5</td>
</tr>
<tr>
<td>Electrocution</td>
<td>21</td>
</tr>
<tr>
<td>Other causes not specified</td>
<td>610</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,200</strong></td>
</tr>
</tbody>
</table>

Source: Ahmed, I., 1999

was found that a number of those who had moved into the relief camps were from the same neighbourhood. This was a deliberate strategy taken by some to ensure that the families could rely on each other for security and support in the unfamiliar shelters.

Despite the appalling conditions in the slums, there were some families who preferred to remain in their homes. They refused to move, as they did not want to leave their household belongings behind. Instead they coped by raising the level of their chowki (beds) and stoves with bricks and bamboo in an attempt to remain. Most of them were frantic to keep their belongings from sinking, and used bricks, sandbags and makeshift wooden platforms. A man explained, ‘We went and got bricks from the roadside and put them under our beds to remain afloat’. Some of them spoke of sleeping on makeshift platforms on the main road (close to their homes) when they had run out of alternatives. Some of the families had left their cattle and goats in nearby empty buildings and construction sites. Similar findings in a report on the flood situation in Dhaka, indicated that many of the families managed by using sandbags and bricks to prevent water from flooding their homes, while some individuals set up wooden pillars and temporary platforms to live on, and a few even made makeshift arrangements to live in trees (Ahmed, I., 1999).

A common concern shared by the families living in relief camps and for those who had remained in the slums was the fear of losing valuable possessions. A woman who had chosen to stay behind in the slums, explained her predicament, ‘I stay awake all night to guard our household things now that our house is under water, and the children sleep next to me’. Families who had left their belongings behind and sought temporary shelter elsewhere, were concerned about valuable items such as fans or pieces of tin roof material stolen as these items were too difficult to take to a shelter. A man shared the loss of all his valuable household items. ‘When we went for shelter, our fans and other items such as clothing and utensils were all stolen. Pieces of our tin roof were taken’.

The most devastating loss for some of the families was the irreparable damage to their houses. They were distressed at having their bamboo walls, tin and other house materials destroyed. A few cried out:

We have lost everything, without our homes we have nothing and now our houses are gone, broken and destroyed. A woman exclaimed ‘Apa, what are we going to do? Do we sort out our utensils and belongings or buy food? All we have is our home and now we have nothing. No tin, no home, everything is flooded’. When I was there I remember seeing looks of despair on countless faces — one woman just sat there looking dazed and did not speak to anyone at all.
A major worry was not having a roof over their heads and remaining homeless. The narratives clearly illustrate their despair and utter helplessness over their present situation — with no home to return to, their cooking utensils destroyed and no money to buy food, their lives were completely crushed by the onslaught of the floods. In comparison, the flood-affected poor who lived in rented homes were less concerned about house repairs, as this was considered to be the responsibility of the local landlords.

Hygiene, shame and the ‘public’ gaze

Women and children are the most vulnerable during a disaster (Anam, 1999). The women shared stories about the difficulties they faced in gaining access to basic sanitation as most of the latrines were submerged by the floodwaters. They resorted to a number of desperate measures to cope with this predicament. Some of the women admitted walking long distances with female relatives, or planned trips together by boat to other less flood-affected areas to use the latrines. Some of them stated that they often spent hours controlling the urge to go to the toilet, and finally when this was no longer tolerable, urinated or defecated inside their own homes. They spoke of using newspapers and polythene packets for themselves and their children, which they then threw into the water after use. A few shared their feelings of dismay about their situation: ‘Apa, what to do now we put our faeces in polythene packets or newspapers and throw it into the water and we have to do the same thing with our children’s faeces.’

A number of the women expressed feelings of shame about ‘using the few remaining latrines in the presence of “unfamiliar” men who often loitered nearby’. They declared that before the floods they could approach any of the latrines easily and with more privacy. The floods, however, had left many men unemployed and they sat around idly; this made the women feel vulnerable and exposed to the ‘eyes’ of numerous male strangers. A few women spoke of the indignity of having to take baths on the roadside in full public view. ‘All of us take baths together, we take turns taking a bath on the roadside. They (men) see us but what else can we do?’

The difficulties faced by women during floods has also been reported in a number of studies, which found that women and young adolescents girls were unable to use a latrine until very late at night; while others out of desperation used their immediate surroundings as a toilet, and some stood in the floodwaters to urinate or defecate. Some of the adolescent girls threw their used menstrual cloths into the dirty floodwaters or in some cases, re-used menstrual cloths washed in dirty water (Anam, 1999, Rashid and Michaud, 1998, Rashid and Halder, 1998).

During the floods, many poor women were drenched in the continuous rain, particularly when they walked or swam in the floodwaters to get relief items. The wet saris clung to their bodies making a number of women feel uncomfortable about being ‘inappropriately’ covered while out in public. This is because gender-specific ideologies in Bangladesh dictate that women should have their bodies covered modestly when seen in ‘public’ spaces, they should not laugh or talk with men, or walk in a particular manner and other similar restrictions. Otherwise women can be subject to harassment, and even their families can face dishonour (Rashid and Michaud, 1998). Moreover, many poor women were compelled to leave their homes.
in search of flood and safe drinking-water in torn or worn-out saris, which made their husbands uncomfortable. A few of the men spoke with resignation of their own inadequacies — of not being able to provide sufficient clothing for their wives. They felt that their spouses were ‘indecently’ exposed to the gaze of strangers.

At least we as men can manage somehow, but what about the mother of our children? Now with the floods we cannot even clothe them properly, and they have to go out into the open in their torn saris! What will people say?

The narrative above suggests that many of the men and women did not want to be perceived as breaking cultural norms. Some authors have argued that such norms are flexible depending on the circumstances (Abdullah and Zerenstein, 1982). A recent study, however, explored female adolescents’ experiences during the floods and found that many of the young girls were subjected to offensive comments when walking in the floodwaters, despite their circumstances (Rashid and Michaud, 1998).

**No safe drinking-water**

‘Traditional’ chores for women, such as cooking and fetching water become very difficult tasks during a flood situation. During these particular floods, almost all of the tube wells were covered by the floodwaters, and reserve tanks and a number of the tube wells were contaminated as well. A number of women living in the flood-affected Kata Shurba slums managed to cope with the lack of water by purchasing water from individuals who owned deep tube wells. ‘We also buy water from the owner of the deep tube well — sometimes depending on the person it costs us 20 taka, 10 taka or 40 taka.’ Depending on their situation, many of the women stood in line for hours on end to gain access to free water. In many cases, women filled up large pitchers and carefully rationed their use of water over the next days. Not everyone, however, could afford to buy water or otherwise obtain safe water easily and some resorted to drinking the dirty floodwaters. The common declaration was, ‘What to do, juga?’ Kitchen utensils and clothes were usually washed in the floodwaters. The situation was such that very few had any choice, and the burden of collecting safe drinking-water for the rest of the household, for cooking and washing of clothes and so on, fell on the women.

Several flood reports found that in many places of the city, poor women helped each other to obtain water by using special techniques — by putting their *kolhus* (pitchers) under the flattened nozzles of tube wells and then pumping for water (Ahmed, I., 1999). Others got water from schools, mosques or other sources where water was still available (Ahmed, S. M. et al., 1999). In a few of the privately owned slum areas, tenants convinced their landlord to open the *teep kol* (main tap) — usually under lock and key — for their daily needs (Rashid and Halder, 1998). BRAC, the government, and other relief agencies distributed alum and water-purification tablets to clean the water in many of the affected areas. Some families, however, did not use these as they were not always available and many did not like the taste of treated water (Ahmed, S. M. et al., 1999, Shahaduzzaman, 1999).

Many of the poor women and men in the interviews complained of family members suffering from high temperatures and diarrheal illnesses. Children were
mainly affected with diarrhoea as many of them swam in the dirty flood waters to fetch relief items, and some of the young children played in the dirty water out of boredom, even drinking and bathing in it. Others complained that they had eaten stale relief food (bread, lentils and rice) given by NGOs, relief agencies and the government which caused their diarrhoea. A concern expressed by some of the women was that because of the scarcity of safe drinking-water, their children were unable to swallow tablets given by medical officers or doctors for fever, coughs and colds.

"A woman explained"

"My son is very sick, for the last few days he has had dysentery and is very sick. The NGO doctor gave us some tablets, but how can a child eat tablets? We need syrup. They sell syrup in the market. Why do they give us tablets? Our children will not be able to swallow these big tablets?" My husband is also very sick, he has loose motions and has been in bed for some days.

In all of the slums visited, the men and women repeatedly stated ‘give us medicine’; ‘my son is sick’; ‘my husband has had diarrhoea for two days’. In the areas visited by boat, many of the people desperately asked for oral rehydration solution. A few asked ‘Apa, do you have medicines?’ Due to the floods, individuals and families living in slums and shelters were increasingly isolated from getting access to adequate medical care and medicine.

An extensive flood study carried out by BRAC’s research team found that because of the dirty flood waters people in all areas complained of skin and fungal infection on their legs and feet (Ahmed, S.M. et al., 1999). Even individuals involved in relief work in the flood-affected areas complained of boils and fungal infections on their feet and legs. Further, widespread incidences of diarrhoea, fever, coughs, colds, other skin infections and even cases of jaundice were reported (Ahmed, S.M. et al., 1999, Shahaduzzaman, 1999). Some NGOs, including BRAC, sent their mobile medical teams to the affected areas, but these were not regular services and medicines were not always readily available for families. Shahaduzzaman (1999) in his flood report suggests that despite the lack of regular medical care and medicines, incidences of diarrhoea disease and deaths caused by diarrhoea were not as high as one would expect given the extent of the floods. This is because the message of clean water has been widely disseminated over the years by the government and NGO workers, and also, overall ORS (saline) was distributed efficiently throughout the country.

**No work: how can we repay our loans?**

During any disaster situation, work and wages become scarce for the poor. Most of the urban poor are unskilled and involved in the informal sector. A majority tend to work casually as wage or daily labourers. During this disaster, numerous flood reports noted that almost all of the poor became unemployed for months on end (Ahmed, I., 1999, Ahmed, S.M. et al., 1999; Rashid and Halder, 1998). When interviewed, all of the women and men complained about the lack of work available. "My husband cannot ride a rickshaw, it costs 30 taka daily to rent but where will he go with it? there is flood, and there is no income." Another woman said, "my husband has been
sleeping for two days, he has no work because he now only makes 20 taka a day riding a baby taxi,’ A havir man commented, ‘well my earth cutting is completely finished — there is no work for me anymore.’ Another man said, ‘I used to drive the truck from here to collect sand and bricks and take it to Gulshan and Baridhara. I earned 150 to 200 taka a day, now I have no job and am unemployed.’

A woman and her mother, who both break bricks for a living, were unable to do any work. The woman said, ‘we usually go and work in Sobhanbagh but now it is all flooded and we cannot earn any money.’ Another woman, who was still able to break bricks (although her place was slowly getting flooded), said that she was relying on the three takas she made per tokri (basket) to survive. Another man said, ‘we are slightly worse off now but before the floods we were not much better off either.’ A few women claimed that since then houses were completely submerged by the floodwaters, the rent in the nearby slums had risen, ‘Apu, what will we do, do we pay rent of taka 900 or try and eat food to live?’ (These slums were comparatively less flooded — and because of the demand and the circumstances — prices had risen.) Others stated, ‘we cannot pay 200 taka rent and also eat and with no income — what are we going to do?’

Some women complained that they were unable to pursue their income-earning activities such as selling vegetables, sugar-cane or selling clothes because prices had risen. ‘Apu, now a pumpkin costs 12 taka or more. 20 taka in some places, before we could buy pumpkin for four or five taka. Now how can we buy and how can we sell?’ Another woman trying to repaying an NGO loan stated, ‘we cannot even sell sari anymore, where is the money?’ Most of the other women complained that they were having difficulties repaying loans and had resorted to borrowing from different people (loan sharks and relatives) to repay these loans. Most of the main NGOs, however, suspended repayment of micro-credit loans, but the women worried in any case about their ability to repay the loans in the future, particularly since they were unemployed and had lost so much.

Previous flood studies indicate that the prices of basic food items generally multiply, with severe stress imposed on the poor who are not only unemployed but suffer from severe financial constraints. Therefore, to save on costs, most family members reduced their food intake. Similarly, in these floods, many of the women admitted cutting back from eating rice twice a day or once a day to every couple of days or even less. Most relied upon the roti (flat bread) distributed by the relief agencies to fill their stomachs. A woman said, ‘I keep the relief roti of eight chapatis (flat bread) and eat two every day for four days.’ Women used kerosene instead of gas for cooking. Prices had shot up for most cooking items, and kerosene which had previously cost 15 taka was now available for 20 to 25 taka in most of the shops. Prices for food items such as bitter gourd had risen from 12 taka to 25 taka, and potatoes, which had cost five taka, had risen to 17 taka. Lentils (the staple food for most Bangladeshis) had risen from five to 40 taka. Other studies found that even middle-income families cut back on their food spending. Instead of eating meals three times a day, they ate rice twice a day. Many poorer families relied on dry foods such as muri (puffed rice), molasses and others ate rice with dry chilies or salt. Numerous families in the urban areas suffered greatly because unlike their rural counterparts, they didn’t have any food stocked up but were used to buying food on a daily basis (Ahmed, S M et al., 1999).
Domestic violence: 'I can't ask him for money — he will beat me!'  

Owing to taboos and shame associated with domestic violence in Bangladesh, women were reluctant to speak about this subject. During some of the interviews, however, the women gradually told of some of these violent incidents. A number of women brought in a young girl (no more than 16 years old) and exclaimed, 'Look at her. Look at her arm, Apa, it is broken.' There was a large bruise on her arm and her face was considerably swollen. The young girl reported, 'He beat me because I asked him for bazaar money. He hasn't bought anything for the last two days so I asked him for money to buy food and he beat me.' The women explained that the financial hardship brought by the floods, there was greater pressure on their husbands to provide for their families 'Apa, due to the frustration of being unemployed they beat us!'  

Both men and women maintained that the lack of work and the increasing uncertainties brought by the floods had led to tension among family members, resulting in verbal and physical fights between husbands and wives. A few of the women admitted to feelings of anger and helplessness over their situation but were resigned to the fact that they were unable to do much. One woman said, 'I cannot ask him for anything at all, and if I do, he beats me.'  

A number of reasons can be attributed to their overall hesitation in discussing incidents of domestic abuse. The women may have been unwilling to talk because they viewed it as a reflection on themselves — there is a cultural belief that women 'deserve' to be beaten if they 'misbehave', thereby placing the blame on the victim. For most, their initial reaction was to deny emphatically any knowledge of violence in their slums, almost as if admitting it would undermine their own and their community's reputation: 'Not in our slum, we don't have problems like that. All our men are good ... in the other slums these things [violence] probably happen.'  

Further, some of the women viewed it as a 'private' family matter, or a husband-and-wife matter, and therefore it was difficult even to estimate the number of incidents of domestic violence occurring as a result of the floods. Two research reports conducted in Dhaka, managed to uncover a few incidents of domestic violence, with the floods blamed as the primary cause (Ahmed, S M et al., 1999; Rashid and Halder, 1998). Several studies exploring gender dynamics between poor women and men living in urban slums, found that domestic abuse in marriage is tolerated and quite a common occurrence (Salway et al., 1998). Nevertheless, it is important to point out that the women and their families were already distressed and anxious about their circumstances due to the floods, and domestic violence added more pressure and tension for the women.  

Community mobilisation and relief assistance  

In urban slums there tends to be an extensive network throughout each area. Most households within the neighbourhood are generally linked through genuine or fictive kinship ties, members tend to rely on each other for social support (Islam, 1996; Nutt, 1986). In a crisis situation, such as during floods, people tend to become displaced and disperse to different places. Thus, there is a break in the old network of bonds, as many families temporarily relocate to shelters, abandon their homes, and move
elsewhere. In slums like Shaheedertek or Baritola the community did not appear to have mobilised any large groups together to cope with the floods. Haque argues that the burden of losing resources, poverty constraints and added uncertainties, result in individuals becoming very self-absorbed in their own and their family’s survival (1997). It is quite feasible that at an invisible level, the women and men were able to provide each other with comfort and relief emotionally, if not material assistance. There were, however, some cases of united action taken by individuals. A few people appeared to have taken on the role of informing their community members about the distribution of relief items. In another case, two families bought a boat together, which they then rented out to the community for use. The issue in which the community mobilised was regarding the daily feeding of the Maulana (a religious teacher) at the basti Masjid. As one man explained:

_Apa, we are taking turns feeding him, after all he is teaching our children prayers and the Koran Nural Amin [a local leader] has drawn up a list of the people who will feed the Maulana, so we all know who is feeding him on which particular day._

In the Shobuj Bagh area of Shibir Masjid and Motherick, there appeared to be greater unity. This could be because a large number of families were all living together in the cramped surroundings of temporary shelters. For instance, several hundred people were living in some of the empty construction sites in Motherick. In the shelters, there appeared to be an organising committee who had a list of all of the families living there. The food items were passed on to members of the organising committee, who were in charge of distributing the food and relief items to all the families residing in the shelter. Even in the slums of Shibir Masjid, families volunteered information on other members in the neighbourhood so that no one missed out on flood relief goods. Some families even volunteered to keep relief goods on behalf of families who were unavailable during the distribution of relief items. According to NGO staff, follow up visits revealed that all of the families no matter how desperate or poor, had always passed on the food items to the concerned family members, rather than keeping the food for themselves.

If the poor manage to survive from one of the worst floods in recorded history, it is fundamentally due to their resilience, their tenacity in the face of all odds and their ability to co-operate wherever possible, rather than sit back and wait for assistance (Hashemi and Ahmed, 1999). However, many of the slum dwellers acknowledged assistance received from government, NGOs, and charity organisations, but some were angry and held the view that they had received insufficient assistance from NGOs and the government. A few men and women mentioned that relief operations were much better during the 1988 floods. It can be argued here that the magnitude of the floods of 1998 was far greater, and it cannot be expected that the government and NGOs can mitigate all the sufferings of the poor. A few of the urban poor, however, were less critical of the role of the government and NGOs and commented that since the basti populations had increased considerably in the last 10 years, it was impossible for the NGOs and the government to feed everyone. Although, a number of the urban poor did complain that the present relief distribution by the government in their slums had been misappropriated, extensive reports on relief activities during the floods found that there was less deterioration of the law and order situation in 80 per cent of the villages (see Table 3) and overall.
there was less corruption and irregularities in food and relief distribution, except for
some random incidents of local government elite distributing food items to their
favoured party members (Ahmed, I., 1999).

A review of the numerous flood reports, meetings and activities during this
period, indicate that people from all walks of life spontaneously and readily came
forward to assist in flood relief activities. The civic response was not confined
nationally and donations poured in from Bangladesh from all over the world. (Imtiaz
Ahmed (1999), however, suggests that we need to institutionalise the civic response,
particularly in disaster management, then the next floods can be tackled more
efficiently and effectively. The first tentative step in that direction was taken when a
group of concerned citizens set up the Citizen’s Initiative for Confronting the
Disaster4 to address the post-flood problems of relief, employment generation and
rehabilitation (Hasbani, 1999).

Conclusion

The study highlights some of the perceptions, needs and vulnerabilities of the urban
poor. It reveals the complete devastation in their lives cause by the floods and
illustrates their struggles and coping strategies. Many families were compelled to
move because of the various fears caused by the rising levels of water, the stench of
stagnating water, the menace of mosquitoes, rats and snakes and the negative
surrounding environment. Those who chose to remain in the slums guarded their
personal possessions closely while some of the families living in shelters had most of
their belongings looted from their houses in the slums. The urban poor who owned
their own homes were completely shattered at the destruction of their houses, and
despair over the high costs of building materials. In comparison, the urban poor
who rented or did not live in any permanent site were more concerned about getting
hold of food.

As stated before, women and children were the most vulnerable groups during the
floods. Many of the women were forced to manage in extremely difficult
conditions, such as several of the women admitting to urinating and defecating inside
their homes or directly into the floodwaters, due to the lack of latrines available.
There was a scarcity of safe drinking-water with most of the poor paying for water
from different sources, while others stood in queues for hours on end waiting to
receive safe water; and most of the families rationing their water use. Food prices had
risen considerably, so numerous families responded by cutting back on their food
intake. Several women and men complained of incidence of diarrhoea, fever, cough
and other illnesses, but were isolated from gaining access to care from medical
facilities. Relief bodies, including BRAC, provided mobile medical services, but it
was not enough to cope with the growing outbreak of illnesses.

Most of the urban poor were left unemployed, with no job prospects for at least
two to three months – from breaking bricks, driving trucks, selling vegetables and so
on – both women and men’s livelihoods were affected. Moreover, the added burden
of food and water costs, house repair costs for some, health problems and general
uncertainty about their lives added to their despair and misery. The anxiety and
tension resulted in incidents of domestic violence, with the men directing their anger
and frustration at their wives. The poor who belonged to different NGO micro-credit
Table 3  Law and order situation (field survey of 15,467 villages)

<table>
<thead>
<tr>
<th>Whether deteriorated</th>
<th>Whether deteriorated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Severe</td>
<td>13.5</td>
</tr>
<tr>
<td>Moderate</td>
<td>17.9</td>
</tr>
<tr>
<td>Normal/not affected</td>
<td>17.5</td>
</tr>
</tbody>
</table>

Source: Sen et al. (1999)

groups were worried about their ability to repay their loans in the future, as most of them had lost all of their resources and had no safety net to fall back on. There were incidents of individuals in the community and at shelters assisting one another with accessing relief items, and providing each other with social support. Finally, the setting up of a flood committee will assist in the present rehabilitation efforts for the poor, and may eventually lead to a more institutionalized civic response — especially in the event of another flood.

Notes

1 Bangladesh is a predominantly Muslim country, with a population of 120 million people. It is divided into 64 districts, 464 thanas, 4,451 unions and 86,000 villages with Dhaka as the capital city, having a population of 8 million.

2 F H Abed is the founder of BRAC (Bangladesh Rural Advancement Committee) — the largest indigenous NGO in the world. BRAC was set up in 1972 to assist and rehabilitate the poor after the liberation war of Bangladesh. Over the years BRAC has evolved into a large and multifaceted development organization with its objectives of ‘Alleviation of Poverty and Empowerment of the Poor.’ BRAC works in all 64 districts, covering 400 out of 464 thanas (lowest administrative units) covering over 50,000 out of 66,000 villages in Bangladesh. It works in the areas of rural development, urban development, health and population and education.

3 Over the last three decades Bangladesh has had one of the highest rates of growth of urban population, at over 6 per cent yearly compared to the national population growth rate of about 2.5 per cent annually. With this rapid urbanisation, the number of the urban poor has increased to approximately 11.5 million (Islam, 1996; Wood, 1998).

4 Aro is a courteous way of referring to other women (older or younger) in order to create a relationship of a ‘sister.’ Males are referred to as khan.

5 When discussing the issue of ‘covering one’s body,’ does not refer to the veil but to the appropriate covering of one’s arms, hands, legs, chest and so on.

6 Taka is the local currency of Bangladesh. One US dollar is equivalent to almost 50 taka, and one pound is equivalent to 80 taka.

7 Although the floods have been blamed for exacerbating the domestic situation and creating violence, some extensive studies done in urban areas by Proshika’s (local NGO) research team, found that married women have frequently to tolerate domestic violence, with male perpetration continuing to be sanctioned (Salway et al., 1998).

8 The group consists of people who belonged to NGOs, government organisations, engineers, journalists, university teachers, students, former ministers, researchers, businessmen, activists and so on.
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Field Reports

Let Them Eat Risk? Wealth, Rights and Disaster Vulnerability

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Disaster-vulnerability reduction is an imputed public good when provided to one it is provided to others but not equally provided to all. This means that in addition to the question of how much disaster-vulnerability reduction to provide, policymakers face the question of to whom it should be provided. This essay distinguishes between two broad classes of approaches to the latter question, one based on wealth, the other on rights.

Keywords: natural disasters, technological disasters, risk allocation, disaster vulnerability, rights.

We hold these truths to be self-evident, that all men are created equal that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness

(United States Declaration of Independence, 4 July 1776)

Every person shall have the right to an environment which is not detrimental to his or her health or well-being

(Constitution of the Republic of South Africa, 27 April 1984)

Introduction

Two centuries of history separate the United States Declaration of Independence from the post-apartheid Constitution of the Republic of South Africa, but both documents share the fundamental principle that each person has an equal right to life. This remains a revolutionary idea even today, as we enter the 21st century.

Bold words do not translate instantly into facts on the ground. More than eight decades elapsed after the Declaration of Independence before the abolition of slavery in the US. But declarations of principle can define a society’s goals, setting a standard by which to judge their subsequent accomplishments.
Examples of constitutional rights to the environment

All residents enjoy the right to a healthy, balanced environment  
(Argentina Constitution, art. 41)

Every person shall have the right to a wholesome environment  
(Belarus Constitution, art. 46)

Every person has the right to a healthy, satisfying and lasting environment  
(Benin Constitution, art. 27)

Citizens have the right to a healthy and favourable environment  
(Bulgaria Constitution, art. 55)

The right to a healthy environment shall be recognised  
(Burkina Faso Constitution, art. 31)

The Constitution guarantees to all persons... The right to live in an environment free from contamination  
(Chile Constitution, ch. III, art. 19(8))

Every individual has the right to enjoy a healthy environment  
(Colombia Constitution, art. 79)

All persons have the right to a clean and healthy environment  
(Ethiopia Constitution, art. 44(1))

All citizens shall have the right to a healthy and pleasant environment  
(Korea Constitution, ch. II, art. 35)

Citizens of the Kyrgyz Republic shall have the right to a healthy safe environment  
(Kyrgyz Republic Constitution, art. 35)

Every human being has the right to live an environment that is ecologically safe for life and health  
(Moldova Constitution, art. 37)

Everyone shall have the right to a healthy and ecologically balanced human environment and the duty to defend it  
(Portugal Constitution, pt. I, l III, ch. II, art. 66(1))

Everyone has the right to live in a healthy, balanced environment  
(Turkey Constitution, ch. VIII(A), art. 56)

Source: Popovic, 1996

The idea that every person is endowed with equal rights to life, liberty, the pursuit of happiness and to a safe and healthy environment is a universal ethical precept. To be sure, it is not universally accepted, let alone honoured. But this
principle has won increasingly widespread acceptance throughout the world and is today formally incorporated in the constitutions of governments which span the globe (for examples, see box).

We find a similar trend towards the assertion of an egalitarian right to a safe environment in judicial interpretations of constitutional guarantees. The Supreme Court of India declared in 1991, for example, that the ‘right to life’ guaranteed in the Indian Constitution ‘includes the right to enjoyment of pollution-free water and air for full enjoyment of life’.

Similarly, the Supreme Court of Pakistan has ruled that that country’s constitutional right to life includes the right to a clean environment, applying this principle, the Pakistani high court ruled that the dumping of nuclear waste in coastal areas of Pakistan would violate the right to life (Popovic, 1996, notes 116 and 117).

Public goods and services

Vulnerability to natural and technological disasters is to a large extent a public good. Such disasters typically strike communities, not isolated individuals. By the same token, measures to reduce vulnerability are to a large extent public goods.

Disaster-vulnerability reduction is seldom a pure public good, however, in the strict sense of a good which when provided to one is provided to all (non-excludability), and whose consumption by one does not diminish its availability to others (non-rivalness). The 20th-century textbook case of a pure public good was national defence, the 21st-century textbook case may be policies to combat global warming.

Many measures to reduce disaster vulnerability are impure public goods, which when provided to one are provided to others, but not equally provided to all. For example, flood-control projects provide location-specific benefits, restricted to that subset of the population who live or own assets in the protected area. Similarly, the reinforcement of public infrastructure against earthquakes primarily benefits its users. Safety measures to prevent or contain the effects of industrial accidents primarily benefit those who live and work nearby. By virtue of where they live, work or own property, some members of society are excluded from the benefits of these investments.

Although disaster-vulnerability reduction is not a pure public good, neither is it a pure private good. ‘To say a thing is not located at the South Pole,’ Paul Samuelson once remarked, ‘does not logically place it at the North Pole.’ (1955, 356). Measures to reduce disaster vulnerability often lie in intermediate terrain between the two. Some measures, such as cyclone early-warning systems, are near the public end of the spectrum (although some — those with radios, for example — are better able to obtain this information than others). Others, such as the retrofitting of individual homes in seismic zones, are near the private end of the spectrum. Many are somewhere in between.

This means that in addition to the public policy question of how much disaster-vulnerability reduction to provide, we must face the question of to whom it should be provided. We face not only the classic economic problem of the allocation of scarce resources among competing ends, but also the classic political-economy problem of the allocation of scarce resources among competing individuals, groups and classes.
Here the focus is on the latter issue. The ‘to whom’ question is relevant to two key arenas of public policies for risk reduction: first, the allocation of public-sector investment, and second, the creation of an appropriate incentive structure for private-sector investment. In formulating policies in both arenas, two broad classes of approaches to the inter-personal allocation question can be distinguished. For shorthand, they can be termed the wealth-based approach and the rights-based approach.

**The wealth-based approach**

The wealth-based approach is so widespread among economists that it is tempting to call it ‘the economic approach’, but for the fact that there are some economists, myself included, who are not enamoured of it. This approach is founded on willingness to pay, which is conditioned, as always, by ability to pay.

In brief, the wealth-based approach holds that the inter-personal allocation of disaster-vulnerability reduction should be guided by willingness to pay for those reductions: those individuals who are willing (and, perforce, able) to pay more, deserve to get more. Putting aside inter-personal differences in preferences, including differences in risk aversion, this willingness-to-pay criterion is strongly correlated with wealth. Richer individuals, groups and classes will get more of the impure public good of disaster-vulnerability reduction than their poorer counterparts.

Whatever its prescriptive appeal, this principle serves rather well as a first approximation of what often happens in practice; it has considerable descriptive relevance. For example, the casualties from the 1976 earthquake in Guatemala were so unevenly distributed across the population — with most of the 22,000 deaths among the poor — that the disaster was dubbed a ‘clasquake’ (Blankie et al., 1994, 170–71). The earthquake’s disproportionate impact on the poor was both because their homes were located in landslide-susceptible ravines and gorges, and because they were unable to afford earthquake-resistant construction.

Similarly, the International Federation of the Red Cross secretary-general, Didier Cherpitel, reminds us that malaria today kills more than one million people every year — the equivalent of a Guatemalan earthquake every eight days — most of them in sub-Saharan Africa. The medical capability to avert many, if not all, of these deaths exists, but it is not being used because ‘there is no market in malaria and little buying power in Africa’ (Cherpitel, 2000).

The wealth-based approach is not confined to the realm of ‘what is’. It also exerts a powerful influence, implicitly or explicitly, on many policymakers’ notions of ‘what ought to be’. One famous (or infamous) example is the memorandum written by then World Bank chief economist Lawrence Summers in 1992, in which he posed the question ‘Just between you and me, shouldn’t the World Bank be encouraging more migration of the dirty industries to the less developed countries?’ One reason for such a policy, Summers wrote, was that

The measurement of the costs of health-impairing pollution depends on the forgone earnings from increased morbidity and mortality. From this point of view a given amount of health-impairing pollution should be done in the country with the lowest cost, which will be the country with the lowest wages.
I think the economic logic of dumping a load of toxic waste in the lowest-wage country is impeccable and we should face up to that (Economist, 1992 8)

Summers’ memorandum was noteworthy not so much for the view expressed, but for the fact that it was expressed overtly. One virtue of tactlessness is that it spotlights matters which polite society prefers to leave unmentioned.

Inter-personal weights in the measurement of social welfare

Let us code the ‘economic’ terrain to this particular view, we should recall that other economists have advanced alternative notions of social welfare — and hence of development and efficiency — including several economists who, like Summers, have held prominent positions at the World Bank. A quarter century ago, for example, in the landmark volume Redistribution with Growth, Monica Aihhwala and Hollis Chenery defined the growth of social welfare as a weighted sum of the change in welfare of different subsets of the population

\[ G = w_1 g_1 + w_2 g_2 + \ldots + w_n g_n \]

where \( G \) = index of growth of total social welfare,
\( g_i \) = income growth rate of the \( i \)th group (e.g., quintiles ranked from poorest to richest),
and \( w_i \) = welfare weight assigned to the \( i \)th group (\( \sum w_i = 1 \))

The authors then distinguished three alternative measures. The first equates the weights, \( w_i \), to each group’s share in national income. In a ‘typical’ developing country, for example, Aihuwa and Chenery noted that the weight of the poorest quintile would be 0.05, while that of the richest quintile would be 0.53. In other words, the change in welfare of the richest quintile ‘counts’ more than 10 times more than that of the poorest, reflecting their respective income shares. The resulting index of social welfare is, of course, GNP growth, the conventional measure of economic performance.

Aihuwa and Chenery’s second measure, based on ‘equal weights’ counts a 1 per cent gain in income the same whether it is experienced by the poor or the rich. That is, instead of treating each dollar equally, as in the GNP weights scheme, the equal weights scheme treats each person (or income class) equally \( w_1 = w_2 = \ldots = w_n \) for all \( i \) groups.

The third measure is based on ‘poverty weights’. These are the opposite of the GNP weighting scheme, in that they put greater weight on gains to the poor than on gains to the rich \( w_1 < w_2 \leq \ldots \leq w_n \). To illustrate, Aihuwa and Chenery (1974 51) suggest poverty weights of 0.6 on the income change of the poorest 40 per cent of the population and 0.1 on that of the richest 20 per cent.

Applying these alternative social welfare measures to disaster-risk mitigation (instead of to income), equal weight could be put on risk reductions to all individuals regardless of their income or wealth. Or greater weight could be put on risk
reductions for the poorest strata of the population — those who are currently at greatest risk.

**The rights-based approach**

This leads back to the rights-based approach. This approach is founded not on the egalitarian distribution of wealth within and among countries (translated, via real-world markets or the shadow markets of benefit-cost analysis, into willingness to pay), but rather on the egalitarian distribution of the right to a clean and safe environment.

In the allocation of public-sector investments for disaster-risk mitigation, a rights-based approach would assign equal weight to mortality and morbidity impacts across the population, regardless of an individual’s wealth or social status. Extending this approach to inter-generational allocation would imply that future lives and health should not be discounted, but rather valued equally to present lives and health.

In shaping private-sector incentives via the legal and regulatory structure, a rights-based approach would define liability on the same basis, with the right to a safe environment held equally by all. Infringements of this right would constitute legal grounds for claims for restitution. Private firms would seek to insulate against such claims, opening an avenue for the insurance sector to play a role in the enforcement of safety standards. The more unsafe the facility, the higher the price of insurance. In the case of industrial disasters, at least, this would allow the insurance sector to play a constructive role even when the individuals whose safety is at risk are too poor to buy insurance, for it would be the responsibility of those whose actions jeopardise their safety to insure against any risks to lives and health.

Those of us who sympathise with the rights-based approach are encouraged by signs of its growing embrace by peoples and governments around the world. But I want to conclude by noting three tensions which efforts to apply this approach must confront.

First is the problem posed by non-uniform spatial distribution of human populations. There is a difference between saying that each individual has an equal right to risk mitigation and saying that the weight on each individual’s risk should be equal. In the latter case, risks in more densely populated areas carry greater weight than the same risks in less densely populated areas, simply because there are more people to add up. Even the most ardent proponents of the former principle — which aims for equality of risk regardless of where people happen to live — probably would not advocate putting a high-level nuclear waste-storage facility in New York City, even if Manhattan island had the same geological properties as Nevada’s Yucca mountain. But the ethical argument that people should not suffer greater disaster risk simply by virtue of living outside large population centres cannot be dismissed lightly.

Second is the problem posed by private risk mitigation. As an impure public good, disaster-risk mitigation has some components which can be privately purchased, the distribution of which is founded on ability and willingness to pay — for example, living in more earthquake-resistant homes. This fact provides compelling grounds for public policies which put priority on risk mitigation for those who are less
able to obtain it privately — a disaster-vulnerability application of Ahlulwalia and Chenery's poverty weights.

Finally, we must face the tensions between an egalitarian allocation of the right to life (and hence to disaster-vulnerability reduction) and the inequitarian allocation of economic wealth and political power. Lawrence Summers alluded to this problem in his memorandum.

The problem with the arguments against all of these proposals for more pollution in LDCs (intrinsic rights to certain goods, moral reasons, social concerns, lack of adequate markets, etc.) could be turned around and used more or less effectively against every Bank proposal for liberalization.

This is, perhaps, an exaggeration. Wealth-based and rights-based approaches to interpersonal allocations have long co-existed, and tensions between them will remain a feature of modern societies for the foreseeable future. Nevertheless, the sphere of the rights-based approach has gradually widened over time. The abolition of slavery is one example, the extension of the right to vote to all adult citizens, instead of its restriction on the basis of property ownership, race or gender, is another, the advent and spread of free public education is a third. The rights-based approach to disaster vulnerability represents a further step along this road.

The radically egalitarian principles proclaimed in the US Declaration of Independence and the South African constitution were, and remain today, actively contested. Yet these principles are on the ascendency worldwide. As my late countryman, Martin Luther King once remarked, 'The moral arc of history is long, but it bends toward justice.'

There is no magic recipe for pursuing a rights-based approach to disaster-vulnerability reduction in the face of the predictable opposition from vested interests who favour a wealth-based approach. But those who accept the challenges of moving in this direction can take heart from the belief that history is on their side.

Acknowledgement

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Notes


2 For discussion, see also Lau (1996)

3 Benefit-cost analysis similarly can incorporate distributional weights which value dollars differently depending on to whom they accrue. For discussions, see Lilett and Morlees (1974 234–42) and Ray (1984 22-31)
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An Earthquake Disaster in Turkey: An Overview of the Experience of the Israeli Defence Forces Field Hospital in Adapazari

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On 17 August 1999 at 3.04 a.m., an earthquake of 7.4 magnitude (Richter scale) struck the Marmara region in Turkey. The city of Adapazari suffered 2,680 fatalities with approximately 5,300 injured.

The Israeli Defence Forces (IDF) field hospital arrived at Adapazari on day four after the quake. The team consisted of 102 personnel. The field hospital acted as a secondary referral centre. A total of 1,205 patients were treated in the field hospital between day four and day 14 of the earthquake. The frequency distribution of the medical problems seen in the field hospital was 32 per cent internal medicine, 13 per cent general surgery, 21 per cent orthopaedic surgery, 23 per cent paediatric disease, 10 per cent obstetrics and gynaecology and 1 per cent major psychiatric disorders. A mean number of 35 patients per day were hospitalised in the field hospital for between 24 hours to one week.
The rapid establishment of the field hospital enabled the local medical facilities to 'buy time' in order to organise and restore surgical and hospitalisation abilities in this disastrous situation.

Keywords: Turkey, earthquake, field hospital, mass casualties, military assets, disaster management.

Introduction

In the context of earthquakes, experience has shown that rapid deployment of specialised logistical and medical support can save lives. Unfortunately, considerable time is typically needed for organisation of rescue systems (Heyman et al., 1998). Deployment of external improvised, pre-planned, volunteer-based medical aid or military field hospitals is feasible within 24 hours after the decision is made (ibid.). A multi-disciplinary, logistically independent structure can enable an effective mode of operation and reduces the dependency on time-consuming assessment of requirements prior to deployment. Such field hospitals may be formed in order to provide backup for the existing primary and secondary medical care systems in disaster-prone areas (Heyman, 1998; Henderson, 1994; Alson, 1993; Hauber, 1981; Kurillo, 1995; Kunn, 1996).

With the guidance of previous experience, an IDF military field hospital was located in Adapazari, Turkey, where an earthquake disaster took place. The aim of this article is to present an overview of the experience of the IDF field hospital in Adapazari and to describe the structure, management and performance of this hospital.

Description of the disaster

On 17 August 1999 at 3.04 a.m., an earthquake of 7.4 magnitude (Richter scale), with duration of 45 seconds, struck the Marmara region, one of the most populated areas in Turkey (Berger, 1999). The centre of impact was about 150km south-east of Istanbul. The result was the destruction of the cities Gölçuk, İzmit, Adapazari and Yalova. Many casualties were also reported in the cities Istanbul, Bolu, Eskişehir and Bursa. Two weeks after the disaster the number of casualties was estimated to be 50,000, with 17,000 fatalities. The earthquake significantly damaged the infrastructure of the cities including that of the health system. Many local medical personnel were either injured, dead or busy trying to rescue their own families. Most medical facilities were destroyed or badly damaged, severely compromising the remaining medical response. Countries all over the world offered and sent aid, which included professional search-and-rescue teams, medical staff and equipment, and vast amounts of supplies. Individuals and teams of volunteers from Turkey and abroad joined either their country delegations or local medical facilities.

Adapazari, the major city of the Sakarya, located in the Anatolian part of the Marmara region, has a population of approximately 400,000 citizens. The city was established in 1943, after a major earthquake destroyed the previous city on that site. In 1948 and 1967 other earthquakes struck the city but the casualties were relatively
The city is located in one of the major industrial centres in Turkey hosting many large factories and their employees.

The fact that the disaster hit the city at 3:04 when the inhabitants were sleeping contributed to the high number of casualties. There were 2,680 fatalities and approximately 5,300 injured in the city of Adapazari. According to local authorities around 70 per cent of the buildings of the city were either totally destroyed or damaged beyond repair during the quake. The extent of the damage was such that the government is considering rebuilding the city 15km from the current site. The electricity, running water and communication systems were damaged, leaving the city's services severely compromised. The main highway was closed due to cross-over cracks and the collapse of a bridge. Roads within the city were also blocked because of collapsed buildings. Following the preliminary rescue efforts, the inhabitants began to leave the city increasing the population to an estimated 40,000 people—about 10 per cent of its original population. Most of the remaining inhabitants moved to tents provided by non-governmental organisations, including Kızılay, the Turkish Red Cross. Tent cities were scattered all over the city, and after a few days the NGOs also provided necessities, such as latrines, clothing and hot meals.

The medical facilities and transport in Adapazari

The pre-disaster medical service in Adapazari consisted of two fully equipped general hospitals, the Social Security hospital SSK of 350 beds and the state hospital of 400 beds. A trauma centre, the Toyota-SA of 50 beds and one maternity and paediatric hospital of 150 beds also served the city. Small district health institutes provided primary outpatient-care services.

In the first days after the earthquake, the medical services of Adapazari were only partially functioning. Many medical personnel were buried under the rubble, trying to rescue relations, burying their dead or simply unavailable. The continuing aftershocks and the fear of further collapse prevented any in-patient medical services, even in buildings only slightly damaged and authorized for use by the city engineer. All existing treatment was therefore provided outside. Collapse of the electricity and telephone networks caused difficulties in collaboration between the existing medical facilities themselves. Lack of piped water and working sewage system complicated the function of the existing facilities creating a risk of an outbreak of epidemic diseases such as cholera and other gastro-intestinal infections. External help, which started arriving after the second day, also needed time to be set up.

The local health services regained their capabilities only gradually. The trauma centre, started functioning on day five after the disaster. Teams of qualified personnel from the medical faculties and state hospitals were sent from Istanbul and Ankara and joined the local teams. “Tent polyclinics” offered primary and secondary care.

Around 60 ambulances, most of them equipped with two-way radio, circled the city evacuating casualties to the temporary medical centres created in the city. The ambulances were effectively controlled by the ‘crisis centre’ established in the governor’s building. On day two, airborne evacuations started up to relieve the field hospitals. The heliport was situated in the city’s sport stadium. Quick medical air transfers were crucial to critically ill patients as well as to the health centres coping with new incoming patients. The destinations for the airborne and ambulance
evacuations were Ankara and Istanbul where large numbers of beds were available for surgical patients as well as those critically ill.

Medical teams and rescue services from numerous countries were posted in Adapazarı and provided medical aid. These came from Canada, Japan, Egypt, Algeria, the US, Greece and many other countries.

**Setting up the field hospital**

The Israeli aid consisted of two teams. There was a rescue team based in Gölçük, involved in search and recovery of survivors at the disaster sites as well as retrieval of the dead from the ruins. A military field hospital was set up in Adapazarı according to the request of the Turkish authorities who indicated that this city needed such a field hospital offering primary and secondary medical care with intensive care and surgical facilities.

The IDF Field Hospital is a uniformed hospital, based on active service military medical specialists and physicians from different Israeli hospitals serving in the medical corps reserves. This is an *ad hoc* mission-oriented field hospital. Its structure and personnel are tailored according to the pre-assessed needs in the disaster area. In this particular case, a pilot delegation — including the IDF surgeon-general and chief of logistics — was sent to Istanbul on day two after the earthquake to make needed contacts with the local authorities, and decide where to locate the hospital. The hospital arrived at Istanbul, on day three. The team consisted of 102 medical personnel: 23 doctors, 13 nurses, nine paramedics, 13 medics, support personnel, technicians, logistics and communication. Six other aeroplanes loaded with medical supplies and equipment also arrived at the airport in the next few hours. The convoy left on its 200km journey around midnight and arrived at Adapazarı by 4:30 Friday morning, day four. Normally the journey should have taken two hours, but progress was slow owing to earthquake destruction.

The field hospital was set up on the premises of the Turkish Ministry of Forestry. That building was declared ‘safe’ by the city engineers, and meant that tents would not be needed. Six hours after arrival, the hospital was up and running. As soon as the team settled into the building, it became clear that there was a risk of collapse due to constant aftershocks — some of these scored quite high on the Richter scale. Some patients were reluctant to enter the building and crew members were also hesitant. It was decided to relocate the hospital in the garden within the ministry’s premises in tents with only the operating theatre inside the building.

The structure of the field hospital included two main divisions: medical and logistics. The medical division comprised seven clinical sections: emergency room and triage, internal medicine, intensive-care unit, surgery, orthopaedics, paediatrics and obstetrics and gynaecology. The medical support departments were: radiology unit, operating room, pharmacy and laboratory. Medical teams were constructed in each specialty and included specialist physicians, surgeons, registered nurses, paramedics and medics.

The logistical support team of the hospital had 44 members. Service departments for energy, food, communication, transport and other necessities were set up by qualified technicians. The communication crew consisted of a spokesman, a deputy who handled the numerous media teams reporting from the hospital and a
Turkish volunteer who provided internet and e-mail services. Satellite telephones, cellular phones, fax and radio services provided easy access to headquarters. This enabled rapid transmission of needs for extra supplies and other necessities as well as access to the local authorities and other medical facilities.

Turkish volunteers arrived to the hospital from the first day of operation. They were willing to contribute in any useful way. According to their abilities, they were assigned to teams and the others were allocated as co-ordinators, translators and helped out in all medical and logistical activities. The total number of the Turkish volunteers was an average of 10 a day, adding up to 50 people in total.

The delegation commander was a colonel and ENT surgeon. The hospital was managed by an intensive-care specialist, and all operating-theatre activity was co-ordinated by a general and trauma surgeon. The heads of each department were all heads of departments or senior physicians in tertiary civilian hospitals throughout Israel. Regular staff meetings of the medical and logistical teams took place every day. Information about the logistics and the medical function of the hospital was presented to the department heads and to the logistics officers. Parameds personnel transferred between departments were scheduled according to the changing situations of the departments in these staff meetings.

The deputy of the delegation, a colonel (neurologist), together with a general surgeon and a paediatrician co-ordinated between the field hospital and the different medical facilities in the city. Meetings with the existing medical team managers and the governor of Adapazarı were regularly held in the ID field hospital. Collaboration between the different medical facilities in the city was assisted by a Turkish parliament member.

**The IDF field hospital in operation**

During the first 48 hours, the medical crew concurrently treated emergency medical situations while the logistics crew constructed the field hospital and organised the basic needs of the crew. On the third day, a work routine was established to relieve excess stress among the staff.

The field hospital acted as a secondary referral centre to the primary-care clinics in Adapazarı, to several worldwide volunteering medical teams and to the town’s reorganising four hospitals.

A total of 1,205 patients were treated in the field hospital within 10 days between day four and day 14 of the earthquake. The distribution of cases according to their medical problems is detailed in Table 1. A mean number of 35 patients per day were hospitalised for a period ranging between 24 hours and one week. The distribution of the patients according to medical problems is detailed in Table 2.

**The first three days**

As the hospital settled down, different types of patients began to arrive, of whom trauma, internal medicine and paediatric patients were the main groups. Although a
Table 1  Frequency distribution of patients treated in the IDF field hospital according to medical specialties

<table>
<thead>
<tr>
<th>Medical problems of the patients</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal medicine</td>
<td>32</td>
</tr>
<tr>
<td>General surgery, including plastic surgery</td>
<td>13</td>
</tr>
<tr>
<td>Orthopaedic surgery</td>
<td>21</td>
</tr>
<tr>
<td>Paediatric diseases</td>
<td>23</td>
</tr>
<tr>
<td>Obstetrics and gynaecology</td>
<td>10</td>
</tr>
<tr>
<td>Major psychiatric disorders (especially suicide attempts)</td>
<td>1</td>
</tr>
</tbody>
</table>

A high number of patients with internal complaints was not expected in these circumstances, the intense heat, excessive stress and physical activity triggered the development of food-borne infectious diseases, dehydration and various skin disorders. Trauma patients arrived who had not been treated in the first three days following the earthquake — especially orthopaedic and plastic-surgery patients with limb fractures and minor infected soft-tissue injuries. By now the more severe earthquake casualties had either died or had been transferred to Istanbul by the local authorities before the arrival of the field hospital. The fact that the city had lost all surgical capabilities meant that the operating room of the field hospital was fully occupied, especially by caesarean sections, obstetrical cases, and plastic- and general-surgery cases. In 10 days a total of 40 major operations and many other minor surgical interventions were performed.

The sixth through eighth days

By this time the natural recovery of the earthquake trauma casualties and meteorological changes has changed the patient mix. Very heavy rains and cold temperatures were affecting the people living in tents. Most patients had diseases associated with cold weather and stress such as asthma, pneumonia and pulmonary oedema. Patients who suffered from chronic diseases lost their regular medications or forgot to use them because of the stressful experience. They then needed to be admitted due to exacerbation of their chronic illnesses. These illnesses included myocardial infarction, diabetes, ketoacidosis, hypertension and asthma. The extreme stress of the population sometimes resulted in fights and even shootings, resulting in abdominal injuries, hemothorax, liver lacerations and bowel perforations treated in the operating room.

The ninth and tenth days

By the middle of the second week after the earthquake, the area’s own medical facilities had regained adequate capability, either in tents or buildings. There were a few operating rooms, and obstetrics units and in-patient services began to function. The local medical units at this point started to be self-sufficient and the contribution of the IDF hospital became less critical. At this stage, foreign ministry officials then decided that the IDF field hospital had completed its mission.
Table 2 Frequency distribution of patients hospitalised in the IDF field hospital according to main medical problems

<table>
<thead>
<tr>
<th>Medical problems of hospitalised patients</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal medicine (infectious diseases, exacerbation of chronic diseases, inaccessible chronic medications etc.)</td>
<td>41</td>
</tr>
<tr>
<td>Intensive care (acute coronary syndromes, pulmonary oedema, malignant arrhythmia, asthma, pre- and post-operative patients etc.)</td>
<td>18</td>
</tr>
<tr>
<td>Paediatric diseases (infectious diseases, neonatal care etc.)</td>
<td>21</td>
</tr>
<tr>
<td>Gynaecological and obstetrics (caesarean sections, labours, D&amp;C etc.)</td>
<td>11</td>
</tr>
<tr>
<td>Orthopaedic disorders (limb fractures, infected soft-tissue injuries etc.)</td>
<td>9</td>
</tr>
</tbody>
</table>

Discussion

The fact that the earthquake zone covered such a large area created initial difficulty in assessing the required numbers of aid teams, the transport of rescue teams with heavy machinery for evacuating casualties and also in providing basic needs for the survivors (Mahlay, 1996).

The time needed to restore functioning medical facilities is an important factor that determines the success of the medical effort. Decision-making in the context of an earthquake disaster must be very rapid. The high ratio of fatalities caused by the earthquake and the large number of casualties emphasises the necessity for rapid establishment of alternative medical facilities as a temporary replacement for the compromised local medical facilities until rehabilitation of these medical facilities can take place (Kunit et al., 1996).

Similar to the constantly changing medical necessities in a war zone, medical necessities in an earthquake zone are dynamic and change rapidly. Field hospitals must be prepared for requested changes to their mode of activity and ready for extreme conditions. In the first few days, the medical teams concentrated on treating injuries caused directly by the earthquake. Personnel from the surgical and orthopaedic fields as well as obstetrics and gynaecology are the main medical disciplines needed at this stage. In the later stages (approximately one week after the earthquake) a normal distribution of disease is encountered and the mixture of medical specialties must provide a substitution for the regular medical needs of the people living in the earthquake zone. Infectious diseases such as gastro-intestinal and respiratory infections should be anticipated as well as exacerbation of chronic illness because of the lack of appropriate medical supplies. A surgical capacity in the field hospital is crucial especially in cases where local surgical facilities have been wiped out as occurred in the Adapazarı earthquake (Lechat, 1976, Sharp, 1994, Angus, 1997).
Co-ordination between foreign field hospitals and the local and national authorities is the key to medical success. No hospital can function without proper communication between medical personnel and patients. Therefore, integration between the foreign crew and local translators, preferably with medical backgrounds, is necessary. In the IDF field hospital, the collaboration between the local translators and the hospital crew created exceptionally harmonious teamwork. The incorporation of Turkish doctors as an integral part of the medical staff was an important factor in the success of the IDF field hospital. Familiarity with standards of care throughout the local health system meant that the Turkish physicians could suggest long-term therapy and follow-up programmes for the patients. The involvement of local personnel in the crew also had an important role in co-ordination between the field hospital and other medical resources for various reasons, for example, transferring patients to the correct facility or arranging the most appropriate transport.

The mix of medical personnel in the IDF field hospital in the first two weeks enabled it to get organised in a most effective manner. The IDF field hospital completed its mission once local medical facilities regained responsibility and took over adequate medical care to the patients who were previously treated by the field hospital.

In conclusion, the capacity to construct a flexibly managed field hospital quickly, is necessary to provide the needed medical backup in an earthquake disaster.

Acknowledgement

This article is dedicated to the long-lasting friendship between the Turkish and the Israeli peoples. We also wish to express our condolences to the Turks who experienced this devastating event. We would also like to send our appreciation to the nurses, paramedics, medics, translators and logistical personnel, as well as to our friends—the Turkish physicians—for their great contribution. We are also grateful to the Turkish parliament member, Saray Gomel, who inspired the teamwork between the Israeli and the Turkish members of the field hospital.

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Casualty Treatment after Earthquake Disasters: Development of a Regional Simulation Model

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This paper presents a new approach to the casualty treatment problem following a large-scale disaster, based on a mathematical model of how a regional health-care system responds to an earthquake event. The numbers and locations of casualties rescued alive, the scale of pre-hospital care, the post-earthquake hospital capacity, and the transport system are inputs to the model. The model simulates the movement of casualties from the stricken areas to hospitals. It predicts the number of casualties that die as well as other statistics about the health-care system response, such as waiting time before treatment. The model can be run with varying input assumptions to simulate alternative disaster response strategies. Preliminary runs demonstrate the potential of the model as a tool for planning and training.

Keywords: earthquakes, large-scale disaster, mathematical modelling of post-earthquake event

Introduction

This paper puts forward a method for assessing how a regional health-care system responds to an earthquake event. Using a mathematical model, the performance of the health-care system can be compared under different scenarios and assumptions, making it possible to evaluate alternative development strategies for the mitigation of seismic impact. The first version of this model was developed in the context of the EC-funded HOPE Project (Fawcett et al., 1996).

This work builds on existing approaches to earthquake disaster modelling which have progressively extended the scope of analysis to include estimates of building damage and casualty numbers (Coburn and Spence, 1992), this paper adds the consideration of casualty treatment. In the immediate post-earthquake period the health-care system is subject to exceptional demands. The model has been developed to simulate the immediate post-earthquake period, which is usually taken to be of about four days duration (de Bruycker et al., 1985, Tanaka et al., 1998). It relies heavily on data from the medical literature about casualties from earthquakes and other disasters, but this is a developing area of research about which there is still considerable uncertainty (Noji, 1997), this paper relies on published sources where

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Figure 1 Diagram showing how the model divides the immediate post-earthquake period into the discrete time intervals.
individual hospital (for example, Nati and Monti, 1994). However, a significant earthquake has an impact at the regional scale, and all the hospitals in and around the location of the event will become involved in responding to the surge in demand for treatment. Therefore, co-ordination of efforts among different hospitals becomes an issue of primary importance. This regional dimension is considered in the current model.

The regional post-disaster casualty treatment problem requires consideration of a number of factors:

- casualties number and location,
- health-care system: capability and location, and
- accessibility/transport systems

The innovation of the work reported here is a comprehensive method of modelling the interaction between these factors in the critical hours after the earthquake event, in order to simulate the system behaviour.

The model operates at a simplified, strategic level and is intended to help policymakers evaluate rapidly many alternative regional plans under a variety of disaster scenarios. Another important use of the model would be in preparedness training and, in a future development, in real-time management.

**Health-care issues in earthquake disasters**

The most critical outcome of earthquake disaster is the number of deaths and injuries. Casualties can be classified in the following way (de Boer et al., 1989):

- dead and dead-on-arrival at hospital,
- life-threatening cases demanding immediate attention,
- non-life-threatening cases requiring hospital treatment, and
- casualties not necessarily requiring hospitalisation.

The emergency response system cannot provide assistance for those who suffer instantaneous death due to crushing or haemorrhage, but its role is critical in reducing the number of deaths which can occur in two ways (Nogi, 1997). The first is rapid death within minutes or hours (due to asphyxia, hypovolaemia, exposure); about 20–25 per cent of rapid deaths can be saved by on-site, pre-hospital immediate care, but hospitals cannot make a significant contribution. The second is delayed death within days (due to dehydration, hypo- or hyperthermia, crush syndrome, infection, sepsis), delayed deaths are usually preventable by a combination of on-site and hospital-based medical care.

Experience of earthquakes suggests that most deaths are immediate or rapid, and relatively few are delayed (Sapr, 1993). Therefore the crucial component of the health-care system for reducing deaths is immediate pre-hospital care for casualties with life-threatening injuries. This type of care must be provided within the first six hours or so after the event.

A further role of the health-care system is to alleviate the amount of suffering experienced by the much larger number of casualties whose injuries are not life-
threatening. In recent Californian earthquakes it is estimated that only 10 per cent of injuries needed medical care whereas most injuries were extremely minor (cuts, bruises and sprains (Shoaf et al., 1998)). In a review of recent earthquakes in other regions the proportion of injuries classified as 'slight' typically fell in the range 70–90 per cent (Alexander, 1996). The model described in this paper deals with casualties requiring medical treatment, not those with minor injuries.

Other studies have attempted to relate health-care system resources to the demands created by disasters. For example, the concept of a medical severity index (MSI) was described by de Boer et al. (1989), depending on the number and severity of casualties and three factors describing the health-care system, 'medical rescue capacity', 'medical transport capacity', and 'hospital treatment capacity'. The outcome is an MSI index number indicating the response required by the health-care system. Another index has also been proposed by de Boer (1997) called the 'Disaster Severity Scale' (DSS) which measures the scale of a disaster, not the health-care system response. The DSS index is based on a points system using seven variables and gives index values in a range of one to 13. The model proposed in the present paper relies on descriptive data which would enable both these indexes to be calculated.

The simulation model

Earthquake scenarios

Each model run is based on a single earthquake scenario with associated isoseismsals of intensity. To study the seismic risk facing a region, many earthquake scenarios could be generated and used for multiple model runs.

Zonation of study region

The study region covers the area affected by the earthquake and also the locations of the health-care resources which would be involved for treating earthquake casualties, so it is larger than the area directly affected by the event.

The chosen study area is divided into zones, usually relying on administrative areas (or aggregations of administrative areas) for which statistical data are available. A database is assembled with the following data for each zone: population, buildings, pre-hospital emergency care resources; hospitals, and transport systems.

Casualty estimation

Statistics about casualty numbers from past earthquakes are patchy and unreliable, not least because there is no standard threshold at which victims may be classified as 'injured' (Alexander, 1996). The types and numbers of casualties also vary with the characteristics of the earthquake and the building stock in the stricken area.

In its present form the model uses an approach to casualty estimation for a given earthquake scenario in which the extent of building damage in each zone is first estimated by applying appropriate vulnerability functions to the building stock, and
then an estimate of the number of casualties is derived from building damage by applying injury ratios to the occupants of the damaged buildings (Coburn and Spence, 1992). The number of casualties is dependent on the time of day when the earthquake occurs because of population movements between the various parts of the stricken region.

For moderate earthquakes it is assumed that casualties requiring hospital treatment occur in buildings damaged to grade D3, ‘heavy damage’. (Some additional casualties would occur in buildings damaged to grade D4, ‘partial destruction’, and grade D5, ‘collapse’. but the number of D4 and D5 buildings, and therefore the number of casualties, is relatively small compared to D3.) To estimate the number of casualties that would be injured and require hospital treatment, the casualty ratio is currently set at 15 per cent of the occupants in D3 damaged buildings. The vulnerability functions and casualty ratios are constantly being improved with new empirical data from earthquake events.

Other methods of estimating casualties could be used if it was thought that greater accuracy could be achieved, or if there was inadequate data about building stock and vulnerability to use the method outlined above. The other components of the regional casualty treatment model would be compatible with alternative ways of estimating casualty numbers.

Note that the model only considers casualties requiring hospital treatment. Less severely injured people not requiring hospitalisation are not counted.

In its present form the model does not distinguish different types of casualty. This simplifies the model, but would be unsatisfactory if different types of casualty had significantly different characteristics, for example, in respect of mortality rates or priority between hospitals for treatment. The model could be restructured to include estimates of casualties of different types by applying multiple casualty ratios to the occupants of damaged buildings, and then using distinct model parameters for each injury type. It is felt that this refinement should only be introduced after the robustness of the simpler model has been well tested.

**Time intervals**

The model focuses on the immediate post-earthquake period of peak demand on the health-care system. This critical period is divided into discrete time intervals, in its current form the model uses 48 time intervals of two hours, covering the first 96 hours (four days) after the earthquake. The number and duration of time intervals could be varied for different applications.

The model simulates what happens to the casualties in each time interval. There are five possibilities.

- receive pre-hospital immediate care,
- receive hospital treatment,
- move to another zone seeking hospital treatment,
- stay in the same zone waiting for hospital treatment;
- die.
In addition, further casualties may be rescued in the time interval. At the end of each time interval the number of casualties in each zone becomes the input data for the next time interval (see Figure 1).

**Pre-hospital treatment**

Some casualties receive pre-hospital immediate care on site from mobile emergency teams. Pre-hospital immediate care is an important and developing aspect of modern health-care systems (Brismar 1997), with a particularly critical role in disaster response. In the model, the parameter \( \kappa \) (kappa) is a measure of the proportion of casualties who receive this type of care. The value of this parameter can be varied for different model runs, it indicates the effectiveness of the pre-hospital immediate care systems.

Pre-hospital care provision builds rapidly up to the proportion represented by \( \kappa \), reaching this level within 12 hours (six time periods) after the earthquake. Casualties who receive this pre-hospital treatment are subject to a lower mortality rate (see section on mortality below).

**Hospitals**

Two factors have to be considered for each hospital in the region:

- capacity for treating earthquake casualties, and
- vulnerability to earthquake failures which would prevent treatment

There is very little information in the literature for estimating the first factor. De Boer (1995) suggests that:

the number of patients per unit of time that can be admitted and treated according to present medical standards is not dependent on the number of beds, but rather on the hospital treatment capacity. For the case of injuries requiring surgery, this capacity depends on the number of surgeons, anaesthesiologists and scrub nurses available.

In addition, the stocks or availability of medical supplies can be a constraint on treatment capacity. However, there is no well-established way of deriving emergency treatment capacity from available hospital data.

An approximate approach has been adopted in the current version of the model. The number of operations that can be carried out per day in emergency conditions is estimated by applying a multiplier to the number of surgical cases treated per day in normal conditions, where the value of the multiplier depends on the overall status of the hospital, reflecting the quality of staff, equipment, management, etc. In the case study the multiplier values were six, eight, 10 and 12 for hospitals of increasing status, and they were assigned to the hospitals in the study area on the basis of local expert judgement. A multiplier of 12 was observed after the Azores 1980 earthquake (Oliveira et al., 1996). In estimating emergency treatment capacity it is also assumed that an equal number of additional casualties receive non-operative...
treatment as are operated on. The model takes into account the delay between the earthquake event and the time when hospitals are able to provide full emergency services, it is assumed that the initial delay is two hours, then the emergency capability rises rapidly to reach the maximum after 24 hours.

The capacity for casualty treatment is highly dependent on the time of day when the event occurs, and whether it is on a weekday or holiday.

The second factor, hospital failures, depends on the vulnerability of hospitals to situations that would cause failure. The model allows for three kinds of failure. The first is complete failure, where structural damage prevents the hospital contributing to the emergency response and also requires the evacuation of current patients to backup hospitals (Tanaka et al., 1998). The second is short-term failure, where a hospital is put out of action by earthquake damage to secondary or service systems but restored during the emergency period. The third is delayed failure, where a hospital functions after earthquake but fails during the emergency period due to exhaustion of essential medical supplies, equipment or human resources, according to de Boer et al. (1989) medical staff can no longer perform efficiently after eight hours.

To estimate complete and short-term failures each hospital is assigned to a vulnerability class high, medium and low. Probabilities of failure depend on seismic intensity and the vulnerability class, as shown in Table 1.

Complete and short-term failures are modelled stochastically at the beginning of a model run. If a short-term failure occurs, it is assumed that on average it takes 24 hours to restore services.

Delayed failure is independent of vulnerability class, but still depends on earthquake intensity. The probabilities used for delayed failures are shown in Table 2.

Delayed failure occurs only after the first 24 hours have elapsed. Once a delayed failure has occurred, the average period before recovery is 24 hours. A further development of the model could link the probability of delayed failure to the scale of demand for treatment at individual hospitals.

Each time the model is run it uses the probabilities described above to produce a unique estimate of the number of casualties that can be treated in each hospital per two-hour time interval. These results are then grouped by the study area zones.

The model does not consider the movement of casualties to hospitals outside the model area for treatment.

A further aspect of hospital capacity is the possible introduction of one or more field hospitals. The model can include units of this type which become operational after a delay of 12, 24 or 48 hours from the time of the earthquake.

**Transport network**

The model requires inter-zone travel times between all pairs of zones in the study area. This is built up from the times between pairs of adjacent zones that are directly connected by a transport route. A shortest-path algorithm calculates the minimum times between non-adjacent zones. Within-zone transport times also have to be estimated.

Pre-earthquake travel times are based on the actual transport network of the region.
Table 1 The probabilities of complete and short-term hospital failures associated with seismic intensity and the vulnerability class

<table>
<thead>
<tr>
<th>Earthquake intensity</th>
<th>High vulnerability</th>
<th>Medium vulnerability</th>
<th>Low vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td>IX</td>
<td>90</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>VIII</td>
<td>40</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td>VII</td>
<td>15</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>VI</td>
<td>5</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Earthquake intensity</th>
<th>Probability of short-term failure (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IX</td>
<td>95</td>
</tr>
<tr>
<td>VIII</td>
<td>65</td>
</tr>
<tr>
<td>VII</td>
<td>50</td>
</tr>
<tr>
<td>VI</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 2 The probabilities of delayed hospital failures associated with seismic intensity

<table>
<thead>
<tr>
<th>Earthquake intensity</th>
<th>All vulnerability bands probability of delayed failure (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IX</td>
<td>40</td>
</tr>
<tr>
<td>VIII</td>
<td>15</td>
</tr>
<tr>
<td>VII</td>
<td>4</td>
</tr>
<tr>
<td>VI</td>
<td>0 5</td>
</tr>
</tbody>
</table>

Transport links are vulnerable to earthquake damage and disruption. Unlike hospital failures, the model does not simulate transport failures. To take account of post-earthquake failures, the travel times between particular pairs of connected zones can be increased manually, particularly in the area of highest earthquake intensity, the shortest-path algorithm re-calculates the shortest times between all zones.

**Rescue**

The total number of casualties is established by the method described above. Some of the casualties will be trapped in damaged or collapsed buildings, they cannot travel to hospitals until they are rescued. Recent experience indicates that 85–95 per cent of casualties who are rescued alive are rescued within 24–48 hours (Schultz et al., 1996, Roces et al., 1992).

In its present form, the model assumes that 40 per cent of casualties in each zone are not trapped, while 60 per cent of casualties are trapped and need to be rescued. The rate at which the trapped casualties are rescued is estimated in the model on a zone-by-zone basis, on the assumption that the rate of rescue is quicker in zones where a small proportion of the population is injured, because there will be less disruption in these zones and greater resources will be focused on the rescue effort.
As the percentage of the population that is injured increases, it takes longer to rescue the trapped casualties.

The numbers of casualties rescued in each zone in each time period are simulated with an exponential decay function which depends on a parameter equal to the casualty percentage of the zone. The function is calibrated so that in the zones with the highest percentages of casualties, the last trapped casualties are rescued in day three after the earthquake. In zones with low percentages of casualties, the trapped casualties are all rescued before the end of day one.

**Mortality**

During the first four to six hours after trauma there is a high mortality rate for severely injured victims. According to Coupland (1994) this mortality rate is about 20–25 per cent. Then in the period from six hours to a week the mortality rate is almost constant, varying from 1 per cent per day for casualties who receive hospital treatment to 3 per cent per day for untreated casualties. The mortality rate for untreated casualties is reduced to about 2 per cent per day if they receive non-operative management during the period when they are waiting for treatment. This pattern of mortality rates is represented in the model with an exponential decay function.

In each time period the casualties are multiplied by the relevant mortality rates to give the expected number of deaths. A reduced number of casualties is then taken forward to the following time interval.

**Assignment of casualties to hospitals**

The model assigns untreated casualties to zones, where they can receive hospital treatment. It is assumed that casualties prefer to move to zones with more attractive hospital resources in preference to zones with less attractive resources, and to nearby zones in preference to zones that are further away. In addition, casualties who are at hospitals prefer to stay where they are rather than move to other zones. At present, the model uses emergency treatment capacity as the measure of attractiveness. If there were data about other attributes of hospitals that would affect their attractiveness, for example, their reputation or familiarity to the population in the stricken areas, then additional weights could be attached to the zone attractiveness values.

The attractiveness and distance factors are taken into account in a fairly typical transportation-type formulation (see, for example, de la Barra, 1989), which uses a negative exponential function for the effect of distance

\[ c_{ij} = C_i \times A_j \times e^{-\lambda t_{ij}} / N_j \]

where

- \( c_{ij} \) = number of casualties that move from origin zone \( i \) to destination zone \( j \)
- \( C_i \) = number of untreated casualties in zone \( i \)
- \( A_j \) = attractiveness of zone \( j \), \( A_j = r_j \) for \( i \neq j \), \( A_j = r \times r_j \) for \( i = j \)
\[ r_j = \text{hospital resources in zone } j \]
\[ \rho = \text{calibration parameter for the reluctance to leave a hospital queue} \]
\[ \lambda = \text{calibration parameter for the effect of distance} \]
\[ t_{ij} = \text{time to travel from zone } i \text{ to zone } j \]
\[ N_j = \text{normalising factor to ensure that } \sum_j c_{ij} = C_i \]

This expression is used to assign untreated casualties in each zone in each time period.

The parameter \( \lambda \) (lambda) expresses the relative impact of hospital resources and distance. If \( \lambda \) is high, there is a strong preference for nearby zones even if they do not have the most attractive hospital resources. If \( \lambda \) is small, casualties are willing to travel to zones with attractive hospital resources even if they are distant. A parameter \( \rho \) (rho) is used to represent the likelihood that untreated casualties waiting in a zone with functioning hospital resources will prefer to stay where they are rather than move to other zones seeking treatment. The value for the hospital resources in the "home" zone in the above assignment function is multiplied by the parameter \( \rho \). The value of \( \rho \) can be varied.

Although attraction is based on pre-earthquake data, the actual transits between zones are based on the post-earthquake travel times. If the time between zones is less than two hours, it is assumed that the casualties arrive in the following two-hour time period, if the time is more than two hours they arrive in the next time period after that, and so on as the travel times increase.

**Simulation program**

The simulation is performed by a program written in Visual Basic for Applications, embedded in an Excel workbook. The data describing the elements of the system as set out above are entered on Excel worksheets which are called by the simulation program. The simulation program iterates through the time periods in the model, and in each time period it iterates through all the zones. As the simulation progresses it takes account of casualties that are rescued from damaged buildings, receive hospital treatment, travel between zones or die. When the iterations have been completed, the program writes statistics to further worksheets. The model runs on a micro-computer.

Each run of the model is based on a specific set of values for the input parameters, the parameters are set by the user, who then instructs the model run to begin. The user can inspect the output data from the model, and in addition some graphs are automatically generated. The model can be run in batch mode where parameter values are systematically varied.

**Further development**

A number of issues have been identified where the model could be improved with further development (given the availability of the appropriate empirical data).
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- The model treats all casualties in an identical way. A more accurate approach would involve distinguishing subgroups of casualties by injury type or severity of injury.
- The model assumes that casualties make independent decisions about moving from the stricken areas to hospitals. If, on the other hand, casualties were directed by civil authorities, the pattern of movement and number of deaths might differ from the model predictions.
- The model does not take account of capacity constraints on movement from the stricken areas to hospitals. These constraints might be due to the availability of transport (for example, ambulances) or congestion.
- The model does not consider real-time updating of information about the region when assigning casualties to hospitals. With updating of information about post-earthquake hospital capability and travel times, a more optimal assignment of casualties to hospitals ought to be achievable.
- The model does not take account of any treatment of casualties in hospitals outside the study area.
- The model could simulate transport failures due to damaged bridges and tunnels or road obstructions, using appropriate vulnerability functions.

Case study

Case study data

In order to develop and demonstrate the model case study was developed with the data from the Lisbon area of Portugal, a seismically active area (see Figure 2). The results from this case study are preliminary and are used to illustrate the operation of the model.

A single earthquake scenario was used in this case study, although the model is intended to consider a variety of earthquake scenarios covering the range of possible events in a study region. The case study had 28 zones. Population and building-stock data were derived from census data and previous studies (Vicencio, 1996). Damage and casualty estimates were based on a model previously developed for Lisbon (Oliveira et al., 1993). The total number of casualties requiring hospital treatment was estimated to be 10,042. It was a large event, and would have a value of 10 or 11 on the Disaster Severity Scale (de Boer, 1997), which has a maximum value of 13.

In the case study region 25 hospitals were equipped for treating earthquake casualties. The total emergency treatment capacity estimated by multipliers was 3,237 casualties per day, without hospital failures. Simulation of failures reduced the capacity, typical values were in the range 2,500–3,000 casualties per day, i.e., up to 30 per cent reduction.

For the case study region only road transport was considered. The road links between adjacent zones were identified and distances measured between the approximate centroids of the zones. To establish the inter-zone times, road links were allocated to three classes with different average speeds (see Table 3).

For the very small zones in and around the city of Lisbon, this method produced unrealistically short travel times, so longer travel times were substituted to
Figure 2. The case study region in Portugal, showing the 28 zones and the isoseismals from the 1909 Benavente earthquake (which were used for the modelled earthquake scenario). The zone shading indicates the estimated number of casualties, which reflects seismic intensity, population density and building-stock vulnerability. Allow for congestion. The average inter-zone travel time before the earthquake was 1.66 hours (for all zone pairs, not just adjacent pairs).
Table 3  Description and average speed of different road types

<table>
<thead>
<tr>
<th>Road type</th>
<th>Description</th>
<th>Average speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Motorway</td>
<td>60 km/h</td>
</tr>
<tr>
<td>2</td>
<td>Main road</td>
<td>45 km/h</td>
</tr>
<tr>
<td>3</td>
<td>Minor road</td>
<td>35 km/h</td>
</tr>
</tbody>
</table>

General characteristics of simulation

It is interesting to note some characteristics of the model results for a typical run. The first point is the number of casualties queuing for hospital treatment during the time period covered by the model.

In the model, both the number of casualties rescued and the number of untreated casualties in each two-hour time interval throughout the period are portrayed (see graph, Figure 3). In the first time interval, when few casualties can reach hospitals, the number of casualties rescued is almost equal to the number of untreated casualties. In the first few time intervals the number of casualties rescued is greater than the number of casualties treated, so the total number of untreated casualties increases. But before the end of the first day the rate of treatment exceeds the rate of rescue, so the total number of untreated casualties begins to fall. However, the number of casualties is extremely large so it takes a further two days for the hospitals to clear the backlog of treatment. During this long period the hospitals must work round the clock on emergency treatments. Among the other statistics generated by the model for each run are the maximum queue length, the time when it occurs and the average casualty waiting time before treatment.

Most of the deaths caused by the earthquake occur either instantaneously or in the first four to six hours after the event. Instantaneous deaths are not included in the model, but the chart of deaths per two-hour time interval (Figure 3) shows the pattern of high mortality in the first few time intervals with a much lower number of deaths thereafter. In this model run, the number of deaths of casualties who are rescued alive is 592.

A first observation from the simulation is that this large event can be dealt with by the existing hospital facilities if the system is able to perform during the immediate post-earthquake period at the level anticipated in the model assumptions. After four days the intense pressure on the hospitals begins to relax and they begin to return to normal conditions.

A second observation is that the death toll among casualties rescued alive is quite high—about 60 per cent of the number of instantaneous deaths, emphasising the great importance of good management in first few hours after the event.

It is also possible to look at data for individual zones. First, consider a zone with the highest hospital capacity. The maximum queue length in this zone occurs rather later than for the region as a whole, reflecting the travel time for casualties to reach the zone from the strucken areas. Despite the high hospital capacity, the size of the queue of untreated casualties in this case would impose very severe logistical problems.
Figure 3 Graph showing the number of casualties rescued per two-hour time interval (histogram) and number of untreated casualties awaiting treatment (continuous line with dots)

By comparison, consider a zone with much smaller hospital capacity. Because the smaller hospital capacity this zone is less attractive, casualties only arrive from neighbouring zones, and therefore the peak queue occurs earlier. The ratio of queue length to hospital capacity is smaller than in the zone with high capacity, so the logistical problem of handling the queue should be less severe. Note, however, that the model predicts that the last casualties are treated at about the same time in this zone as in the larger zone.

Pre-hospital treatment of casualties and impact of hospital and transport failures

As described earlier, the model parameter $\kappa$ measures the proportion of casualties who receive pre-hospital immediate care on site from mobile emergency teams. The effect of varying $\kappa$ in the model had a significant impact on the total number of deaths, thus the higher the value of $\kappa$ the lower the number of deaths (see Table 4).

The model indicated that variations in pre-hospital care had a much greater impact on the number of deaths than variations in hospital failure rates. Model runs were carried out with various hospital failure and transport scenarios. From these runs the observation was that the number of deaths was more dependent on hospital failures than on transport failures. The reason is that travel times to
Table 4: Impact of travel times and hospital failures on the number of deaths

<table>
<thead>
<tr>
<th></th>
<th>No transport failures</th>
<th>Some transport failures</th>
<th>Severe transport failures</th>
</tr>
</thead>
<tbody>
<tr>
<td>No hospital failures</td>
<td>554 deaths</td>
<td>559 deaths</td>
<td>563 deaths</td>
</tr>
<tr>
<td>Some hospital failures</td>
<td>582 deaths</td>
<td>588 deaths</td>
<td>592 deaths</td>
</tr>
<tr>
<td>Severe hospital failures</td>
<td>662 deaths</td>
<td>667 deaths</td>
<td>672 deaths</td>
</tr>
</tbody>
</table>

All other model parameters held constant

Table 5: Hospital failure rate impact on outcome

<table>
<thead>
<tr>
<th></th>
<th>More short-term failures</th>
<th>More delayed failures</th>
</tr>
</thead>
<tbody>
<tr>
<td>No hospital failures</td>
<td>563 deaths</td>
<td></td>
</tr>
<tr>
<td>Some hospital failures</td>
<td>584 deaths</td>
<td>576 deaths</td>
</tr>
<tr>
<td>Moderate hospital failures</td>
<td>601 deaths</td>
<td>596 deaths</td>
</tr>
</tbody>
</table>

All other model parameters held constant

Hospitals are of the order of a few hours, whereas the time scale for the hospitals to deal with the emergency loads are of the order of a few days. Therefore, travel times affect the time when casualties join the queues at hospitals, but have little impact on when they actually get treated.

The model distinguishes between three types of hospital failure: complete failure, short-term failure, and delayed failure. Model runs indicated that the impact of short-term failures was slightly more severe than that of delayed failures. The reason is probably the following: if the hospital failure occurs early on, everyone in the queue for treatment will be delayed, but if the failure occurs later it will only affect the casualties who are still in the queue — it cannot affect those who have already been treated. But in the case study the effect of hospital failures on the overall number of deaths was low compared to the impact of pre-hospital care.

Conclusions

This paper has demonstrated an approach to the regional dimension of response to earthquake events, using a mathematical model of the health-care system in the immediate post-earthquake period. Many theories were used in defining the model.
and improved understanding of each of these theories would improve the calibration of the model. However, it seems likely that the model is able to indicate general tendencies in post-disaster response.

Besides the possible improvements noted above, the following topics could be addressed using a similar modelling approach:

- casualties caused by secondary events associated with earthquakes, such as aftershocks, fire, mudslides,
- casualties from other types of disaster, such as volcanic eruptions, typhoons and hurricanes,
- development of real-time disaster management systems.

The main purpose of the model is to investigate planning and policy options. It is quick and can operate in batch mode, so it can be run many times with systematic variation of input data representing the range of options under consideration. It could be of immense value to planners and policymakers in anticipating the impact of many possible disaster scenarios. It would help them to formulate and evaluate alternative plans for disaster mitigation and disaster response.

The model could be an extremely valuable resource for training courses and preparedness exercises. Results can be interpreted to derive information about the importance of many aspects of the regional system, including the following:

- concentration or dispersion of health-care resources,
- resource requirements for medical personnel, medical supplies and wastes,
- pre-hospital emergency care and triage;
- emergency field hospitals,
- transport vulnerability and capacity, and
- structural vulnerability of the general building stock and the hospital stock.

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