

A Programme for Improving the Health Care of Mothers and Children During the War in Mostar, Bosnia and Herzegovina

D. Southall,* P. McMaster,** H. Muhiudeen**
P. Chappell,*** J. Hewertson,** I. Macintosh,***
K. Marinaki**

Editor's Note: Solely on the grounds of limited space in this Digest, many detailed lists provided by the authors have been excluded. They are, of course, contained in a full publication available from Professor Southall.

Summary

Objectives: To redress some of the effects of war on maternal/child health by:

- Making improvements to existing but damaged health centres and hospitals, including the provision of essential equipment.
- Discovering the health problems in children; organising investigation and treatment where appropriate; creating a clinical database for the community.
- Providing health education for parents, young persons and health professionals, including the distribution of parent- and young person-held record and advice booklets (PHRA); holding seminars and tutorials; providing apprenticeships; establishing a modern medical library for all doctors and nurses in Mostar.

Setting: The Municipality of East and West Mostar from April 18, 1994, to June 1, 1995.

* Professor of Paediatrics; Project Director, Academic Department of Paediatrics, University of Keele, North Staffordshire Hospital, Stoke-on-Trent, ST4 6QG, United Kingdom.

** Registrar in Paediatrics; Project Coordinator, Academic Department of Paediatrics, University of Keele.

*** Logistician; Project Coordinator, Academic Department of Paediatrics, University of Keele.

Main Outcome Measures

- Evidence of improved primary and secondary health care facilities for mothers and children.
- Acquisition of information on immunisation, infant feeding, social and family status, height and weight, medical histories and examination, with subsequent implementation of health care based on these findings.
- Evidence of successful education of families and professionals.

Results

On the East Bank of Mostar, medical resources for mothers and children improved, but remained unacceptably poor. Continuing division of the city made all efforts limited in their effectiveness.

Of the 7352 children seen in three mobile clinics:

- Only 3% were more than two standard deviations below the mean of weight-for-height measurements.
- 85% had major dental problems.
- 126 children had respiratory problems.
- 103 had cardiovascular findings.
- 89 had locomotor problems.
- 62 had neurological problems.
- 35 had hearing loss.
- 233 had visual disorders.
- 99 had ENT disorders.
- 133 had skin conditions.

Eighty-eight percent of 494 infants were breastfed; 149 fathers and 34 mothers were reported to have died. In addition:

- 221 children had major psychological or emotional problems (the most serious medical problem identified).
- 152 children of 110 mothers who stated that they had been held in camps where they had been subject to physical, sexual, and emotional abuse were identified and given support.
- 14 children with chronic medical and surgical conditions which would permanently damage their lives and which could not be treated in Bosnia were evacuated to the U.K. with their mothers and sometimes with their siblings.

Parent- and young person-held record and advice booklets were distributed to 7175 mothers and young persons. Seminars were established and held for the education of local health professionals. Two local doctors and six local nurses received in-service training from international paediatricians and health visitors. A medical library was established.

Introduction

This paper describes one approach to the health care of children during a war in Europe, a project undertaken by the University of Keele, as an implementing partner of UNICEF, in Mostar, Bosnia and Herzegovina, with funding from the Overseas Development Administration (ODA). The intervention was varied and in no way constituted a research study that, in the circumstances, would have been unethical. Work on the project was started on April 12, 1994, and continued to June 1, 1995, in a difficult period immediately following a fragile cease-fire and in the context of a divided city.

The war in the former Yugoslavia has had profound effects on Mostar. The city, situated in western-Herzegovina and divided by the river Neretva, has historically been split into two parts. The old town, on the east bank, has always contained a majority of Slavic Muslims who traded

on the route from Sarajevo through to the coast. The west bank, the city's new town, grew rapidly with twentieth century industrialisation and, as the depopulation of the countryside relocated the rural, predominantly Catholic, Croatian population into Mostar, the population balance changed in their favour. Overlaid on this demographic configuration was the Serbian population that, although numerically inferior to the Muslims, was equally established in the city.

Mostar, in recent times, has been affected by two distinct wars. The first, in 1992, started with the Serbian invasion of the east bank. The second soon followed, with the erstwhile allies, Croatian and Muslim forces training their weapons on each other. The Muslim army was driven over to the already damaged east bank of the city, together with civilians of Muslim ethnicity. This war lasted a year, with the east bank essentially under siege, the civilians surviving daily bombardment from the more heavily armed Croatian forces by taking shelter in basements, sustained by sporadic aid supplies from international organisations. The ranks of the beleaguered civilians were further swelled by an influx of Muslim refugees from surrounding rural areas. The situation on the west bank of the city during this second war was less desperate; contact with surrounding Croatian-controlled areas was maintained and buildings behind the front line sustained relatively little damage.

The international community's efforts to broker cease-fires in the city have met with greater success than subsequent attempts at reunification of the component parts. Although the guns were silent, those on the east remained trapped; road blocks prevented free movement between east and west and made access to other Muslim-controlled areas virtually impossible. The east bank was still largely dependent on supplies from international aid organisations.

It was against this backdrop of mistrust that the project set out to improve the health care of the indigenous population – irrespective of either their religion or ethnicity. Subsequently, the European Union Administration for Mostar (EUAM) have been attempting to unite the city following the

Washington agreement and a federation between Bosnian Muslim and Bosnian Croatian peoples.

The essential problem that the project aimed to redress was the unacceptable level of maternal/child health care for the city – the paucity of trained staff and the lack of adequate medical facilities. The work was undertaken within a framework of three main objectives: (1) improvements to existing health centres and hospitals, (2) community child health screening and treatment where appropriate, and (3) health education for families and health care professionals.

1. Improvements to Existing Health Centres and Hospitals

Before the conflict, the hospital for the total child population of the whole of greater Mostar was partially built (only one floor of the hospital had been commissioned) and located in the west bank. Although still standing, the hospital (Bijeli Brijeg) was poorly equipped, particularly in terms of ancillary services like laboratory and radiological facilities. There was an adequate children's ward and a low-dependency special care baby nursery, but no facility for neonatal or paediatric intensive care. One of the three mobile screening clinics was sited in the hospital's carpark.

The east bank had a primary health care centre (Brancovac) and a "war hospital" which had once been a public health laboratory and medical museum. The latter was turned by necessity during the second war into an underground conglomeration of theatre, radiology room, and two cramped wards with just enough space for the injured and most seriously ill. Since August 1994, a container-based field hospital became operational, situated in a former industrial zone (Velmos), some four kilometers from the city centre. Although well equipped, it is difficult to reach and potentially vulnerable to separation from the population it serves should hostilities resume.

Paediatric staff, both medical and nursing, were depleted on both banks of the river; those who remained were largely unpaid. On the west bank, an effective team of paediatricians and nurses was

located in the White Hill Hospital, Bijeli Brijeg. On the east, there were practically no suitable inpatient facilities for paediatric or maternity care; two paediatricians had responsibility for all children within the area of control of the Bosnian government – an area stretching some 60km along the steep-sided river valley. Access to many of the outlying villages continues to prove impossible without international support, and even so, travel has been both difficult and, at times, dangerous.

Equipment

After a preliminary visit and discussions with doctors on both sides of the city, the most urgent needs were assessed. Although doctors on the west were always willing to provide treatment for children on the east, their facilities had become limited, and access for those on the east remained strictly controlled. It was clear that adequate basic equipment had to be provided as a priority for the east bank. Equipment for donation was selected on the basis of ease of training in its use and maintenance, reliability and costs of consumables.

Laboratory Equipment: In April 1994, in East Mostar there was no functioning laboratory equipment. The war hospital had a few trained laboratory technicians, but the only facilities they were able to offer were basic blood grouping and measurement of erythrocyte sedimentation rate. For each piece of laboratory equipment (Table 1), manuals were translated and training provided in their use by an international senior laboratory scientist, who also helped to organise the day-to-day running of the new services. The laboratory was sited in the Brancovac health centre, as its central position facilitated maximum use of the service. Consumables were provided by the project for the first year.

Electricity for the first six months was supplied to Brancovac for short periods during the day by a diesel generator. A computerised power protector and booster (Bowthorpe) had to be provided as some of the equipment would not run on the weak and often variable current supplied.

Table 1. LABORATORY EQUIPMENT PROVIDED
FOR THE EAST BANK BRANCOVAC HEALTH CENTRE

Item	Qty	Cost (Pounds Sterling)
Kodak Ektachem DT60 Biochemistry Analyser and Consumables	1	£10418
Coulter CBC5 Haematology Analyser	1	£602 (R)
Blood Culture Incubators	2	Donated
Centrifuges	2	Donated
Diamed Cross Match and Transfusion Kit	1	£2182
Hepatitis B and HIV Serology Kit	1	£497
Microscopes	2	Donated
MSU Slides		Donated
Multistick Urine Tests		Donated
Haemaccues	4	£1615
Power Booster	4	£384
Boehring Chemicals	1	£378

(R) = Reconditioned

Other Equipment: In addition to an ambulance, a car for the home-visiting of sick children, and a minibus, three second-hand vehicles were provided for use on the east bank. The minibus was used for the children's home, which cared for 24 children who had no living parents. An emergency resuscitation pack was provided for Brancovac. This included bag-and-mask ventilation equipment, portable oxygen, and emergency drugs. The pack was also used when transferring sick or injured children who could not be treated on the east, to the hospital on the west bank or to Split in Croatia. These emergency transfers were implemented by international paediatricians working on the project (strictly a Keele University activity, independent of UNICEF).

A large supply of paediatric drugs was also donated to the pharmacist responsible for the children's unit on the east bank. Toilet and shower containers, air conditioners for the operating

theatres, together with other essential resources such as oxygen were provided for the container hospital at Velmos. The Macintosh computers and software were provided to establish a database from the information obtained in the community screening programme on each side of the city.

Medical Staff

At one stage, the war hospital on the east was without an anaesthetist and at another time without a surgeon. The project recruited at short notice an international anaesthetist and surgeon to assist local doctors during these critical periods. The project also arranged for other international specialists to visit once needs had been identified in the course of the community screening. International paediatricians were regularly consulted by doctors on the east to help treat sick or injured children admitted to the war hospital.

Table 2. ITEMS SUPPLIED TO THE PAEDIATRICIANS AT BIJELI BRIJEG HOSPITAL, MOSTAR WEST BANK

<i>Item</i>	<i>Qty</i>	<i>Cost (Pounds Sterling)</i>
Nellcor Pulse Oximeter	1	Donated (New)
Hewlett-Packard Fetal Ultrasound/Contraction and Heart Rate Monitor	1	Donated (R)
Hewlett-Packard ECG	1	Donated (R)
Ultrasound Probe	1	£2300
Macintosh LC475 Desktop Computer, Software, and Printer	1	£1595

(R) = Reconditioned

Table 3. EQUIPMENT SUPPLIED TO THE BRANCOVAC HEALTH CENTRE ON THE EAST BANK OF MOSTAR AND TO THE MOBILE CLINICS

<i>Item</i>	<i>Qty</i>	<i>Cost (Pounds Sterling)</i>
Aloka Portable Ultrasound	1	£11000 (R)
EEG Machine	1	Donated (R)
Defibrillator	2	Donated (R)
Fetal Ultrasound/Contraction Monitor	1	Donated (R)
Operating Microscope	1	Donated (R)
Nebulisers	6	Donated (R)
Nellcor Pulse Oximeter	4	Donated
Retinoscope	1	£306
Set of Pharmacy Scales	1	Donated (R)
Paediatric Infant Scales and Stadiometer	6	} £3393
Ophthalmoscope and Auroscope Diagnostic Set	6	
Paediatric Stethoscope (Littman)	6	Donated (R)
Macintosh LC475 Desktop Computer, Software, and Printer	1	£1595
Portable Computers and Printers	6	£10351
Resus	2	£634

(R) = Reconditioned

Renovation of the Health Centre (Brančovac)

As with so many places in Bosnia and Herzegovina, the hospital facilities on the east bank for mothers and children in April 1994 were unacceptable and remain so today (June 1995). After discussion with local doctors and government officials, it was agreed in June 1994 that the health centre in the middle of east Mostar (Brančovac) should be refurbished into a centre for child and mother care, with a maternal emergency unit (including delivery rooms and operating theatre) and a psychotherapeutic treatment unit for children. There would be 20 inpatient beds for sick children as well as outpatient clinics. Outline plans were drawn up with local architects to a design agreed upon by local doctors in collaboration with an international Professor of Paediatrics. At this time, the health centre had no windows, two intermittently working toilets, no running water, no heating, and no laboratory services for an estimated population of 12,000 children.

After failing to motivate local authorities to utilise local labour and materials for the renovation, an appeal was launched in the U.K., and approximately £75,000 of materials and tools were donated or loaned (scaffolding). The renovation was begun by a UNICEF logistician/builder, using these materials with local labour and expert volunteer international labour. Within three weeks, however, work was stopped by local government officials, stating that the renovation was not being undertaken to former Yugoslavian building regulations! It was now October 1994. UNICEF agreed to pay local government architects to draw up further detailed plans that did conform, and these were finished in November 1994. The EUAM have now agreed to a large grant of 1.3 million DM to establish this hospital, including services such as a lift which could not be funded by UNICEF.

By June 1995, however, renovation had not commenced. At this stage the project's investment of approximately £106,000 was in peril. These funds had been spent on (1) the salaries, travel, insurance for a succession of three highly motivated, competent but now disillusioned and demoralised

international logisticians/builders and engineers, (2) funds to local architects, and (3) the cost of transporting as well as the inherent value of donated building materials and tools. Security is now worsening, and unless immediate renovation begins, the mothers and children of east Mostar may remain without adequate inpatient facilities for some time to come.

2. Community Child Health and Screening

In addition to providing equipment essential to the primary and hospital care of sick children, the project aimed to establish a database of medical and social information on all children remaining in and around the city. According to local data, there were approximately 20,000 children in the greater Mostar area; this figure could not be substantiated, however, in view of population movements and the difficulties of census.

The screening programme was also designed to benefit any individual child who had a medical problem. The condition would either be treated immediately or referred to the established local medical facilities. For those who could not be investigated or treated within Bosnia and Herzegovina, Keele University (specifically without the involvement of UNICEF and not as part of the joint project) arranged medical evacuation along with family support to the U.K.

The Mobile Clinics

In the absence of suitable buildings on the east, and with restricted movement between the two sides of the city (still the case as of May 1995), screening for both east and west Mostar was conducted in three 17-ton, second-hand donated trucks purposely refurbished as mobile clinics. Each was self-contained, with two examination couches and surrounding curtains, medicine lockers, drawer units with work surfaces, water heater, refrigerator for storage of vaccines, sink and toilet. The clinic was accessed through a door at the back, with built-on folding-down steps. The power supply came from a generator or, where practical, from an electricity

supply cable connected to a nearby building. This provided lighting and air conditioning in the summer and backup power for the portable computers used to collate data. Each clinic was supplied with basic drugs for management of minor acute problems, immunisation materials, a resuscitation pack and a portable nebuliser.

Portable computers (Macintosh Powerbook 145) were supplied to each clinic, and every child seen during the screening was entered onto a database; problems requiring further investigation were identified and flagged for referral or specialist intervention.

Each truck was staffed by one local nurse, one local doctor, an interpreter, one international paediatrician, and initially a senior health visitor. Due to a shortage of trained nursing staff, the majority of "nurses" were volunteers from the local community who were given instruction in medical history-taking, in the use of digital infant scales, standing scales, a stadiometer attached to the wall, an infant stadiometer with head and footboard, the use of centile charts and sphygmomanometers. The international doctors ranged in seniority from Consultant to Registrar. Doctors were recruited from the U.K., Czech Republic, and Finland. Each international doctor spent a minimum of three weeks seeing between 18 and 80 children a day. The clinics operated six days a week. Two local paediatricians, together with five local nurses, were also recruited, and during the last two months, they ran clinics and entered data into computers without the international paediatricians.

Families were made aware of the clinics through community centres and their leaders, schools, radio stations, and message boards. Local authorities provided lists of children. Maps of the city were utilised and front-line positions, where there had been very little input from health professionals, were specifically targeted. The trucks were, at times, parked outside schools, where all the school children were screened, class by class. At other times, the trucks were moved to previously inaccessible areas outside central Mostar. Often this required driving along mountain tracks and manoeuvring the truck around impossible junctions (undertaken by our

logistician). In those instances where security remained a major concern, a satellite telephone was used for communication.

The population seen included all-comers. A surprisingly large number of young children attended without parents. Some were orphaned and others lived much of the day on the streets. Essential health details were recorded by the local nurse, who would weigh and measure them. This was recorded on a slip of paper and passed to the paediatrician with the child, whilst the next child would be seen by the nurse. The paediatrician would take additional history, including data on infant feeding, immunisation, family and past medical history, and then perform a routine and specialist examination as appropriate. Any child with a problem was referred to hospital or treated with drugs or immunisations available in the truck.

Home visits to help disadvantaged families to care for their children, particularly those with disabilities, were set up using the locally trained nurses, in the hope of encouraging the concept of health visiting. These children were also entered onto the database. Similarly, weekly visits were made to refugee camps where the clinic was made available to all – adults and children. One of these camps at Grabvica had not received any medical service for two years.

At the end of the project, one of the three mobile clinics that had not been transferred to Bihac and to Kreina, was handed to local doctors in central Bosnia to use for continuing primary health care.

The two databases (from the east and west banks) containing health and social information on the children who were screened were given at the end of the project to the Director of the Regional Medical Centre on the east bank and to the Head Paediatrician on the west bank. These two doctors were given a course of training in the use of computers and the management of the database. The database also provided a list of children requiring followup in outlying villages, some of which have become inaccessible due to increased fighting.

The heights and weights of those children under 140 months were used for database analysis, using

Epi Info 6.01 and Epi Nut 5.02 statistical programmes for U.S. National Center for Health Statistics (NCHS) reference values for nutrition.

Results of Screening

- A total of 7352 children (including 3706 boys) were screened – 3215 from the west bank and 4137 from the east bank.
- The age range was 2 weeks to 18 years.
- 275 (3.7%) were less than one year of age.
- 1631 (22%) were less than six years of age.
- 3802 (51%) were between six and 12 years.
- 1919 (26%) were between 12 and 18 years.

Height and Weight: In the absence of standardised charts and pre-war records for this population, Tanner-Whitehouse (1975) and Gairdner-Pearson (1988, preterm to two years) growth charts were used. For height, 195 (2.7%) were less than or at the 3rd centile. The median height percentile for Mostar children was equivalent to the 70th percentile on the Tanner charts.

For weight, there were 257 (3.5%) children less than or at the 3rd centile. The median weight percentile for Mostar was equivalent to the 50th centile for Tanner.

Infant Feeding: Analysis of the 494 children on whom there were data on infant feeding shows that 432 (88%) were breastfed; 48 (14.4%) were exclusively breastfed at least initially; 34 mothers who breastfed also gave formula from birth; 12 mothers who breastfed also gave additional cow's milk from birth. It also appeared to be a local custom to add weak sweet tea to the infant's diet from an early age.

Mothers were asked at which age the child was weaned; unfortunately, the responses could not be analysed as some mothers gave the age at which solids were introduced, and others the age when breastfeeding stopped.

Immunisation Status: It was extremely difficult to obtain details concerning immunisation from parents. Most were unsure what had been given to their child or the dates on which it had been given. Only a small proportion held records.

In only 39 children was the date of the first DPT-Polio immunisation recorded in our database; in 30, the second was dated, and in 24, the date of the third was recorded. In only 19, the MMR was recorded; in 683, the date of the BCG was recorded.

A BCG scar was seen in 148 (54%) of 275 children from birth to one year; 497 (65%) of 769 from birth to three years, and 5760 (88%) of 6577 over three years of age. Thus, there appeared to be a fall-off in BCG immunisation during the war. The high level of BCG scars suggested that most were given immunisation, but the problem appeared to be a lack of information given to parents. It is known from our programme that it was local practice for injections to be given to children for many reasons, such as gastroenteritis or minor infections. Six children had BCG-induced abscesses.

At the clinics, 211 children were given some form of immunisation; others requiring vaccination were referred to their local clinics.

Health Status: Overall, the physical health of most children was good. Following diagnosis at the clinic, the majority of medical problems were dealt with adequately; minor problems were treated immediately; referrals were made when appropriate to local doctors or to specialist clinics held by international doctors from the project. Medical evacuation to the U.K. (by the University of Keele) was undertaken for problems that could not be managed locally (only 14 children). In some cases when investigations could not be done locally, specimens were taken to appropriate laboratories either in Mostar, Zagreb, or the U.K.

Respiratory: Respiratory problems were seen in 126 children. The most common complaint was of asthma – rarely called that, but described by various terms such as bronchitis. Interestingly, spacers or inhaled steroids were not used widely, even before the war.

Cardiovascular: 103 children had cardiovascular findings, the most common of which was a functional murmur. The majority of patients were seen by an international consultant paediatrician and had an ECG and CXR as indicated. On the west bank, the ultrasound probe for echocardiography was broken and replaced by the project only at the end of the programme. Nine patients were then able to undergo echocardiograms. Four children with potentially serious congenital heart problems were evacuated to the U.K. by Keele University (separately from UNICEF) for further investigation and treatment. The remainder are to be followed up by local paediatricians.

Gastroenterology: Four children had been diagnosed before the war as having coeliac disease. Provision of a gluten-free diet during the war had been impossible; arrangements were made for this special food to be provided. Eleven children attended with diarrhoeal disease and were treated with oral rehydration solution (WHO). Many had already been given intramuscular antibiotics by local doctors before being seen at the clinic. One child with recurrent episodes of bowel obstruction and one with severe liver failure were evacuated to the U.K. by Keele University.

Neurological: 62 children had neurological problems, including three with a history of possible epilepsy. Those with the most severe handicaps were seen at home. A paediatric specialist physiotherapist working with a non-governmental organisation was provided with a list of children with neurological and locomotor problems who were to be followed up and treated. One child with a previously undiagnosed posterior fossa tumour and the twin of a child with congenital heart disease (also evacuated) who had severe cerebral palsy were evacuated to the U.K. by Keele University. One child with muscular dystrophy had a muscle biopsy analysed in London (Duchenne's). Blood samples from first degree relatives were sent to the U.K. for DNA analysis. The diagnosis of one child with a suspected mucopoly-saccharoidosis was discounted on urine and blood specimens analysed in the UK.

Growth and Endocrine Problems: Three children (a girl aged 15 with undiagnosed Turners syndrome; a girl aged 7 with virilisation; a boy aged 15 with delayed puberty due to severe psychological disturbance) were evacuated to the U.K. Only seven children had a goitre; all had normal thyroid function tests. One very short boy, aged 14 years, was treated with donated daily growth hormone injections imported from Keele.

Locomotor: 89 children had locomotor problems, including 16 from shrapnel, 1 from a grenade, and 3 from sniper injury. Twelve children were seen by a team of international orthopaedic surgeons, and two were evacuated by Keele University to the U.K. for treatment.

Vision: 233 children had problems with their eyes. One hundred had strabismus, and 82 needed glasses. Many children had worn glasses before the war, but these had been lost, stolen, or damaged. One child with near blindness due to retrolental fibroplasia was evacuated to the U.K.

All the children with visual problems identified by screening were seen by an international consultant ophthalmologist who visited for four weeks. Prescriptions for glasses for 82 children were filled in the U.K. and dispatched back to the individual child. Additional glasses were made to prescription in a nearby town (Medjugorje) largely unaffected by the war. A further screening programme by a local ophthalmology team on the east bank was subsequently undertaken in one of the mobile clinics after the main project had finished. Approximately 600 reading glasses donated from the U.K. were distributed. A retinoscope was donated to help local ophthalmologists to diagnose refractory problems. An operating microscope was also donated and used by an international ophthalmic surgeon from the U.K.

Ear, Nose, and Throat: 99 children had ENT problems – 80 with large tonsils and/or symptoms of upper airway obstruction. Thirty five children

had hearing problems, mainly related to acute or chronic otitis media.

Skin Problems: 133 had dermatological problems – 25 (19%) had infections of which 14% were fungal; 23 (17%) had scabies; 15 (11%) had eczema.

Dental Problems: 85% of children were found to have serious dental problems, mostly severe dental caries. There was, and is, a major shortage of dentists, dental equipment, and materials. A custom in Mostar has been to feed children from birth with water and/or tea sweetened with sugar. Children also consume a high level of sugar in their general diet. This, coupled with the lack of toothbrushes, toothpaste, and fluoridated water, could have contributed to the high prevalence of caries.

Haematological: Haemoglobin was measured with a haemacue only when there were clinical observations suggesting anaemia (in 69 children). Thirteen children had values less than 10g; six had values less than 9g; and there was one child who had a haemoglobin of 5.1g with an MCV of 57. The low level of anaemia for the screened population could have been confirmed by checking each child's haemoglobin, but this was not felt to be ethically justified.

At the start of the project, a 15-year-old girl was found to have clinical features of acute leukaemia. The project approached UNCHR to arrange for her transfer to the hospital on the west bank for confirmation of the diagnosis and treatment. Although the seriousness of her condition had been explained to the family, they refused transfer, choosing instead to take her along the still dangerous route to Sarajevo. She did not survive the journey.

Psychological and Emotional Problems: 221 children were found by the paediatricians to have severe psychological problems – 49 (22%) were depressed; 38 (17%) were anxious and frightened. This was only the tip of a very large iceberg.

The children were and continue to be reviewed by an international child psychologist from the Czech Republic (who could speak the local language). For one month, an international child psychiatrist visited and treated some of the most severe cases. Another international child psychologist visited for four weeks and with the help of UNICEF, started a long-term psycho-social programme.

Of the children we saw, 149 had fathers who had either died or been killed in the war. One father had "disappeared." This information is likely to be underestimated.

Thirty four of the mothers of the children had either died or been killed. For seven children, both parents had died.

At least 176 children, therefore, had either lost their mother or their father. It was often difficult to ask for further details about these deaths as the bereavement was so recent.

Shortly after the start of the screening programme, a group of 110 women, with their 152 children, who had stated that they had been imprisoned in camps where they had been subject to physical, sexual, and emotional abuse, contacted us for help. They met three times a week with an international paediatrician/child psychologist. They discussed problems with their children and their own health. All the children were examined as part of the screening programme, and most of the mothers underwent clinical examination. Advice was given on general medical issues and on some more specific worries such as childhood stresses. The group were introduced to Marie Stopes International and to the Biser organisations. Aid in the form of foodstuffs, clothing, sewing machines and haberdashery items and kitchen goods were sent to this group from women's groups in the U.K. (through University of Keele contacts).

Screening was successful in determining the medical problems of the paediatric population, but less so the psychological problems. The alien environment of the mobile clinics – with minimal privacy, lack of time because of queues outside the clinics, and the use of an interpreter – was not the most conducive atmosphere for psychological

assessment. These mobile clinics were probably successful in finding only the most severely affected, either by observation or history.

Clearly, psychological problems represented the most serious and prevalent of the medical/social conditions identified.

With respect to psychological problems, we all felt that our work in Mostar was appreciated on an "emotional support" level by local people. We were frequently informed that our presence gave them hope that the war would not return.

3. Health Education for Families and Health Professionals

Training in community paediatric care was an integral part of the project, carried out on a one-to-one level, working with the two local doctors and five nurses in the mobile clinics. Local nurse practitioners were taught to make growth measurements, plot centile charts and assess infants and children for developmental progress and problems, and to measure blood pressure.

The international consultants (all but five volunteers and paid only subsistence) including eight paediatricians, an ophthalmologist, a laboratory scientist, three psychologists/child psychiatrists, a surgeon, an anaesthetist, and a paediatric surgeon, gave individual training to their counterparts. This training included the provision of translated manuals for the laboratory equipment, translated 1994 paediatric guidelines and protocols from Keele University (North Staffordshire Hospital), and obstetric guidelines from the University of Cape Town (1990). Weekly seminars were also held. For monthly periods, an international consultant community paediatrician and a professor of primary health care gave seminars and tutorials to local paediatricians and family doctors. Eight local laboratory staff received one month's training from the international laboratory scientist.

Training of mothers themselves was considered essential, particularly in view of the damaged (and in some areas absent) health service – both in lack of staff and premises. This was aided by the

development and distribution of parent- and young person-held records and advice booklets (PHRA) which were translated into the local language. PHRA (prepared with the assistance of local parents, adolescents, and doctors) were available in three age groups: 0-6 and 6-12 for parents; 12-18 years for young persons. [These three booklets, written in English, Bosnian, and Croatian, are available upon request to Professor Southall.]

Within the scope of the joint project, PHRA were distributed to 0-6 year old children only; additional PHRA were distributed separately by Keele University for children 6-12 and 12-18 years of age. Each booklet contained a summary of past and present medical history, including family details, growth and development charts and tables, immunisation record, pregnancy and birth history, and allergy and they included a section for new medical consultations. The second part (approximately 75%) of each booklet contained health education and accident prevention information appropriate for the age of the child. For example, the adolescent book contained information on puberty, sexual health (including family planning), protection from abuse and injury when away from parents, common medical problems such as acne, dangers of drug abuse, and sexually transmitted diseases. Booklets for both 0-6 years and 6-12 years contained advice on infant feeding (promoting exclusive breastfeeding, including colostrum, in the perinatal period), child development, the importance of play, and strategies for caring for young children. Booklets for all age groups contained information and advice on immunisation, pregnancy and safe motherhood, the management of common childhood illnesses, smoking, dental and general hygiene, AIDS, firearms and mines, accident prevention, resuscitation, and child abuse.

A total of 7175 booklets were distributed through schools, in the mobile clinics, and through extra clinics as part of an overall health education exercise. Subjects within each book were debated and taught in special lessons at school and on the local radio – using both the child-to-child and the teacher-to-child approaches. At the end of the

project, a supply of booklets was left with local doctors to continue the distribution. The effectiveness of the booklets has been evaluated by questionnaires (both before and after distribution of the booklets).

A "child-friendly" approach to assessing and treating children was also demonstrated to local doctors and nurses. This included decoration of the mobile clinics in a way suitable for children of all ages, a demonstrated policy of avoiding the separation of children from their mothers during examinations, and the avoidance of intramuscular injections. The use of local anaesthetic cream prior to venous cannulation was demonstrated. It was noticeable to all internationals working in the clinics that children were often very frightened when seeing the doctor or nurse. Parents informed us that this related to the almost universal practice of giving injected treatment for illnesses such as gastroenteritis; a standard treatment for otitis media might have been five days of intramuscular antibiotics. The problems inherent in this approach were discussed.

Local staff were also shown the importance of playing with the children as part of their treatment and investigation. The concept of play therapy was introduced.

Also demonstrated to local nurses and doctors was hand-washing and the cleaning of examination couches between patients, and the promotion of exclusive breastfeeding (including colostrum) in the perinatal period. Local doctors were shown the use of inhalers with spacers and coffee cups for the treatment of young children with asthma.

International paediatricians regularly attended ward rounds in the local hospital on the west and the east bank health centre, thereby exchanging paediatric practice.

An attempt to reduce road accidents was undertaken, using local radio stations, special road signs, and a poster campaign in both Bosnian and English languages. It was noticeable that some local and international drivers frequently drove dangerously in the centre of the city. A number of children were injured and two were killed in road accidents during our time in Mostar. Given the lack

of adequate hospital resources, it was essential to minimize the occurrence of such avoidable tragedies.

A medical library (including 80 boxes of books and journals), CD ROM for complete contents of four major journals with summaries of a group of the most clinically relevant, a slide projector and a screen were delivered to the main hospital on the west bank for use by all doctors in Mostar.

Funding

The total costs of the project, excluding a large amount of donated and/or second-hand equipment, was just under £350,000 (see Table 4).

Lessons for Future Projects

1. Funds (actual and donated) were wasted on attempts to renovate the hospital for mothers and children on the east bank of Mostar. We regarded this as an essential project which should have been completed. Local government were in part responsible for this failure. With 80% of buildings severely damaged or destroyed on the east, it was inappropriate, in our opinion, to insist on conformation with pre-existing building regulations and, in any event, these should have been considered by the local government architects before materials were raised by donation in the U.K. We should have been more careful with our dealings with local government.
2. We became aware that non-government organisations (NGOs), subsequent to donations, provided laboratory equipment with overlapping function – without discussions with us or with one another. Such funds could have been better used in providing ongoing disposables for existing equipment, or salaries for local professionals. Although there were regular meetings of the United Nations and the NGOs, there was a tendency to provide glamorous equipment rather than supplies. Some local doctors were often complicit in such deals, playing one organisation against another.

Table 4. EXPENDITURE ON PROJECT
(December 4, 1994, to January 6, 1995)
(Figures in Parentheses = Donated)

	Combined UNICEF/ Keele Univ. (£)		Keele University Only (£)
1. Screening/Treatment:			
Salaries	82,885		
Travel	30,237		
Operational Costs	11,059		
Insurance	61,162		
Equipment	18,777	Mobile Clinics	
Consumables	4,712		
Subtotal	208,832		(75,000)
2. Education:			
PHRA Development	2,702		
PHRA: Printing (0-6)	9,762		
PHRA: Printing (6-12; 12-18)	—		4,003
Salaries	15,327		
Insurance	428		
Travel	2,138		
Operational Costs	1,292		
Library Equipment	1,619		
Subtotal	33,268		
3. Renovation/Support of Hospitals (East and West):			
Salaries	42,379		
Insurance	31,222		
Travel	12,977	Hospital Car	(1,000)
		Minibus for Children's Home	(3,000)
Operational Costs	67		
Medical Equipment	5,957	Ultrasound Scanner	(11,000)
		Operating Microscope	(22,000)
		Ambulance	(2,000)
		Pulse Oximeters (4)	(6,600)
		Pharmacy Scales	(150)
Materials and Drawings	14,330	Building Materials	(75,000)
Tools	—		(1,120)
Subtotal	106,932		(121,870)
TOTALS:	A. 349,032		B. (200,873)

	<i>Combined UNICEF / Keele Univ. (£)</i>	<i>Keele University Only (£)</i>
4. Medical Evacuation:		
Documents		945
Travel		8,856
Subsistence		5,040
Accommodation		Donated
Hospital Costs		Donated
Operational Costs		4,150
Subtotal		C. 18,991
5. Humanitarian Aid to Individual Families:		
Paediatric Drugs		(24,000)
Children's Clothes (Second-Hand)		
Children's Toys (Used)		
Children's Glasses		(1,200)
Subtotal		D. (25,200)
<hr/>		
OVERALL TOTAL COST OF PROJECT (A + B + C + D) = £594,096		

From the onset of the relief operation, there should have been established a small coordinating group, including a representative of the local doctors, through whom all NGOs and other donors provided medical aid. The UN organisations were probably in the best position to achieve this.

It may be appropriate for a separate UN agency to be appointed whose sole function is to coordinate the provision and use of health-related aid; in this respect, the Department of Humanitarian Aid (DHA) at the UN might be in the best position to manage such an essential activity.

3. There was a need to acquire a less expensive form of war-risk insurance. UNICEF was initially unable to provide insurance for institutional partners, and the project was forced to purchase commercial insurance at much higher rates. Eventually, this was achieved by UNICEF, but not until almost £100,000 had been spent.

4. At times during the project there were conflicts between the Keele University team and UNICEF. Some of these reflected differences in experience and philosophy; others related to a lack of understanding and communication on both sides concerning the aims and methodologies of this essentially health-care-based project in an unusual setting for UNICEF – a European country with a previously established and working health care system. Much was learnt on both sides, and we are grateful for the opportunities provided by UNICEF and the education and support we received from its staff. We remain in admiration of the UNICEF project and programme staff who regularly, mostly without recognition, risked their lives and health to help children.

5. A number of team members became disturbed by the nature of the work they were undertaking, by the personal risks involved and, perhaps most difficult to deal with, the sometimes unhelpful and aggressive behavior of some local

government officials. Although the first two of these are inherent to the situation, the latter can and must be addressed. To an extent, the adverse behavior of local government can be considered part of post-traumatic stress disorder. They were also frustrated by the endless meetings which often had no immediate visible results. Some local people blamed the international community for their predicament and "took their feelings out" on aid workers as the only accessible representatives. Although understandable, aid workers are only human and are almost always doing their best under conditions of considerable risk to their own personal safety. Leaders of local government must show their appreciation by cooperation rather than by criticism.

There is also a need for a formal and ongoing counselling and support service for UNICEF members returning from work in areas of danger.

6. For security reasons (which, with hindsight, were unfounded), the project was based for the first nine months in Medjugorje, a village 45 minutes from Mostar. This caused major logistic and safety problems, since the most dangerous part of the project involved the commuting (from local driving practices, which were unbelievably dangerous, and from bandits on the roads who would attempt – usually successfully – at gunpoint to steal the vehicles of aid agencies). It would have been preferable to be based within Mostar from the onset of the project. Security decisions may have been better made locally rather than by rumour or theoretical prediction from a neighbouring country.
7. There were a number of difficulties in trying to train local professionals. Some considered that only senior paediatricians could give advice. Perhaps at times we were not as sensitive to this request as we should have been. The most difficult issue was knowing how much of what was being taught was retained or would be used after we had left the city. In retrospect, the use of logbooks to document learnt skills, as well as diplomas or certificates of accomplishment, could have been of value.

Recommendations for the Authorities in Mostar

1. Freedom of movement must be guaranteed as soon as possible for patients, their families and health professionals. The European Union Administration of Mostar is doing their best to achieve this.
2. Primary health care must be re-established, particularly on the east bank. Family doctors in Bosnia and Herzegovina have a much lower status than hospital specialists; to improve their morale, this must be changed. There is an urgent need to renovate, and in some instances rebuild, health centres staffed by doctors and nurse practitioners trained in the basics of preventive maternal and child health practices. A salary for all doctors is required; most were not being paid at all, and hospital doctors received inappropriately higher salaries than those in primary care.
3. There is a need to establish a unified public health programme including an immunisation campaign and a neonatal screening programme for thyroid disease and phenylketonuria, together with the documentation of medical data using PHRA, local family doctor records, and a centralised health information service. This service urgently needs equipment to provide a cold chain for keeping and using vaccines. The lack of information about immunisation was partly the result of the war. Many parents had their records taken from them when displaced from their homes. The immunisation programme in Bosnia is too complicated, and there have been a lot of changes within a short period of time. A unified programme of immunisation needs to be established with records kept by parents (as part of PHRA).
4. Much more work is needed to assist the many children who have serious psychological and emotional problems. This must involve both the individual counselling of affected families, as well as a global psycho-social programme working through the education and social service systems (currently being undertaken by the University of London and UNICEF).

5. Health education using PHRA needs to continue by sustained distribution; hopefully their use will extend beyond Mostar to the other areas of Bosnia and Herzegovina.
6. Attitudes towards the medical treatment of children are much too invasive – for example, the widespread use of intra-muscular injections, resulting in an unacceptable fear of doctors. There is less involvement of parents in their child's treatment. Training in currently accepted non-invasive approaches to treating children as well as up-to-date management of acute respiratory infection, control of diarrhoeal diseases, and the diagnosis and management of asthma is urgently needed for the medical and nursing personnel.
7. Medical evacuations for conditions which are seriously damaging children's health and which cannot be treated locally will need to continue. Only a relatively small number of the population (approximately 1/1000 from our data on the east bank) will require this.
8. Specific items of medical equipment will continue to be required. For example, an ultrasound probe for echocardiography has recently had a dramatic effect in enabling diagnoses of heart problems to be made locally. Equipment will need to be maintained and supplies ensured.
9. The establishment of a social services department for the needs of children, for fostering and adoption, for the handicapped, for child protection (child abuse work) and for families living under very difficult circumstances is urgently required.
10. There is a need to establish programmes to prevent health problems and accidents in children and in general, using the media and PHRA. There is a need for a road traffic accident prevention campaign, particularly since war has resulted in children and drivers being less cautious about road safety.
11. Legislation for the protection of children from abuse is required.
12. In order to utilise the database from the screening programme, a committee should be

set up comprising UNICEF, University of Keele, and Ministry of Health representatives. The database is now the property of the Ministry of Health, and they should lead its use. The data can be made available to the Ministry of Public Health in Sarajevo in whatever form they consider to be of most value. Local nurses with experience in using the database in both east and west Mostar have been identified, and interested local doctors could also be trained in the use of the computer and applications of the database. All of this could be coordinated by the committee, with technical advice whenever necessary from University of Keele staff.

13. Standard growth charts were inappropriate for the Bosnian population; children are inherently taller than those in the countries used to prepare these data. The present data could probably be used as a baseline for all children in Bosnia and Herzegovina.
14. Education about dental hygiene is essential (partly achievable through the PHRA). There needs to be an urgent fluoridization of the water supply.

Bibliography

1. Aldrich GH, van Baarda TA. *Conference on the rights of children in armed conflict*. Amsterdam: International Dialogues Foundation, Netherlands Committee for UNICEF, Defence for Children International, June 1994.
2. Strebel PM, Ion-Nedelcu N, Baughman AL, et al. Intramuscular injections within 30 days of immunization with oral poliovirus vaccine – a risk factor for vaccine-associated paralytic poliomyelitis. *New England Journal of Medicine* 1995; 332: 500-6.
3. WHO Working Group. Use and interpretation of anthropometric indicators of nutritional status. *Bulletin of the WHO* 1986; 64: 929-41.

Acknowledgements

This project was funded by UNICEF and the Overseas Development Administration. We thank them for their support.

Editor's Note: The authors also provided a list of 77 individuals and 29 commercial firms, whom they wished also to thank for their support.