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Medical Supply Management after Natural Disaster
Scientific Publication No. 438

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HEALTH FOR ALL BY THE YEAR 2000

In 1977, the World Health Assembly decided that the main social target of the governments and of WHO should be the attainment by all people of the world by the year 2000 of a level of health that would permit them to lead a socially and economically productive life, that is, the goal popularly known as "health for all by the year 2000."

In 1978 the International Conference on Primary Health Care (Alma-Ata, USSR) declared that, as a central function of the national health system and an integral part of economic and social development, primary health care was the key to achieving that goal. Subsequently, the governments committed themselves—at the global level at the World Health Assembly, and at the regional level at meetings of the PAHO Governing Bodies—to implement the resolutions adopted for attaining health for all. In the Americas the high point of these mandates was reached on 28 September 1981 when the Directing Council of PAHO approved the Plan of Action for implementing the regional strategies for health for all by the year 2000. These strategies had been approved by the Directing Council in 1980 (Resolution XX) and today constitute the basis of PAHO's policy and programming, and represent in addition the contribution of the Region of the Americas to the global strategies of WHO.

The Plan of Action approved by the Directing Council contains the minimum goals and regional objectives, as well as the actions governments of the Americas and the Organization must take in order to attain health for all. The Plan, continental in nature, is essentially dynamic and is addressed not only to current problems but also to those likely to arise from the application of the strategies and the fulfillment of regional goals and objectives. It also defines priority areas that will serve as a basis, in developing the program and the necessary infrastructure, for national and international action.

The exchange and dissemination of information constitutes one of the priority areas of the Plan of Action. PAHO's publication program—including periodicals, scientific publications, and official documents—is designed as a means of promoting the ideas contained in the Plan by disseminating data on policies, strategies, international cooperation programs, and progress achieved in collaboration with countries of the Americas in the process of attaining health for all by the year 2000.

Medical Supply Management after Natural Disaster



1983 Scientific Publication No. 438



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Contents

Foreword	vii
Acknowledgment	ix
Introduction	xi

Part I: Problems in Medical Supply Management

Background	3
Type of Disaster	3
Site	3
Magnitude	4
Local Assistance	5
External Assistance	6
Examples of Medical Supply Mismanagement	6
Lack of Coordination	6
Unsolicited Medical Supply Donations	7
Packaging	9
Size of Packaging	10
Type of Packaging	11

Part II: Planning Medical Supply Management

Organizational Structure for Medical Supply Management	15
Standardized List of Medical Supplies	19
Ensuring the Availability of Stocks	20
Disaster Designated Stockpile	22
Modified Annual Stock Rotation	22

iv Contents

Regional Stockpiles	24
Current Stock Levels as Emergency Reserve	24
Commercial Stocks	26
Local Production on Short Notice	27
Securing Locations and Access	27
Acquisition and Requisition	28
Distribution and Transportation	29
Inventory of Equipment and Human Resources	29
Communication	32
Training Personnel	35
Inventory Preparation and Control	35
Acquisition and Requisition	36
Distribution	37
Transportation and Communication	38
Coordination with Agencies and Governments	38
Legal Aspects of Disaster Relief	39
Legal Status and Registration of Medical, Pharmaceutical and Paramedical Staff	41
Import Regulations	42
Licenses and Patents	42
Reimbursement for Supplies	42
Transportation	44
Audits of Medical Supply Management Plan	44

Part III: Responding to Disaster

Centralized Reporting System	47
Preparation of a List of Essential Medical Supplies	48
Length	90
Generics	50
Recognized Efficacy	50
Shelf Life	50
Availability	50
Packaging	50
Disaster use	50
Cost	51
Inventory Preparation and Control	52

Compiling the Inventory of Supplies Available in the Nation	52
Filling Requests with Public and Voluntary Sector Supplies	54
Acquisition from Private Sources	55
Medical Supply Distribution, Field Receipt (Sorting and Storing), and Requisition of Supplies	56
Checking Distribution Networks	58
Arrival of Incoming Supplies	60
Liaison with Transportation and Communication	60
Storage Sites	61
Appointing and Recruiting Personnel	61
Sorting Supplies	62
Storing Supplies	64
Processing Requisitions	66
Requisition from the Field	67
Training New Members of the Medical Supply Management Relief Team	68
International Medical Supplies Assistance	69
Requesting Donations	69
Receiving Donated Medical Supplies	71
Instructions for Donors	74

Part IV: Annexes

A. Emergency Health Kit—World Health Organization/UN High Commissioner for Refugees	79
B. Replacements for Items on the List of Essential Drugs for Emergencies	91
C. Essential Medical Supplies for Disaster Relief: Quantities and Bulk Procurement Costs	93
D. Quantities and Gross Weight of Essential Medical Supplies	95
E. Cross-index INN/Proprietary Names of Pharmaceuticals	97
F. The Role of Vaccines in Disaster-related Medical Supply Management	115

vi Contents

- G. Marking and Labeling of Relief Consignments (League of Red Cross Societies) 117
 - H. Medical Supply Management Component in Disaster Relief Legislation 121
 - I. Evaluating the Relief Effort 125
-

References 129
Index 131

Foreword

Natural disasters have been a significant cause of morbidity and mortality in the Americas. In the last decade alone, major earthquakes hit Nicaragua, Guatemala and Peru, with a total of over 101,000 deaths and three times again that many injuries. During the same period, hurricanes have caused severe damage, economic setbacks, and a considerable number of deaths in Honduras, Haiti, Jamaica, Saint Lucia, Dominica and the Dominican Republic. Earthquakes, hurricanes, floods, landslides or volcanoes have affected the majority of the countries in the Region of the Americas, and they will continue to occur. Along with increased population density and rapid industrialization, man-made or technological disasters will increasingly visit the countries of the Region as well.

Whether produced by natural or manmade disasters, emergencies of national scale require the sudden use of specific medical items that may be in short supply. Medical supplies frequently are not produced nationally or even within the subregion of which the country is a part, and they are expensive to obtain from abroad. Even if the supplies are available within the country, they may not be accessible due to damage and disruption caused by the disaster. Special instructions for storing, packaging, transporting and distributing many pharmaceuticals and delicate medical instruments make it necessary to employ qualified manpower. Even during normal times, when procedures are fairly routine, medical supplies management can thus be a sizeable undertaking. This situation is aggravated during times of national emergency caused by disaster. Complex coordination thus is required between the public and private sectors and between national authorities and foreign agencies and institutions that may be the source of emergency supplies.

The immediate saving of lives and rapid recovery from the effects of major natural disasters are best accomplished if a response plan has

been devised and tested well beforehand. In the area of medical supplies management, this implies that specific planning measures should be taken during normal periods. In fact, if implemented, these measures will help to make routine medical supplies administration more efficient.

In response to concern expressed by the governments of its Member Countries, the Pan American Health Organization's Plan of Action for the implementation of regional strategies for Health for All by the Year 2000 calls for several measures to improve the general availability of critical health supplies. Emphasis is placed on the "development of programs for the preparation of basic lists, specifications and standardization of supplies and equipment." The overall strategy aims to "strengthen the national and/or regional capacity for achieving self-sufficiency in the production of critical supplies and equipment, [and] for the maintenance and repair of equipment and facilities." The Organization has also targeted for action "strengthening the purchasing processes and the negotiation capacity of the institutions of the [health] sector, [to] optimize inventories and perfect the process of storage, conservation and distribution."

This manual addresses these regional priorities by suggesting procedures for the management of medical supplies during emergencies caused by natural disasters. It has been prepared as a supplement to the guide *Emergency Health Management after Natural Disaster* (PAHO Sci. Pub. No. 407, 1981) and provides a technical elaboration of specific chapters contained in the parent guide. This manual is intended for an audience that consists of the senior technical officers involved in postdisaster health relief.

The general principles and observations in this manual are relevant throughout the developing world. Special emphasis is, however, given to the experiences and needs of Latin America and the Caribbean. It is hoped that the manual will serve as a framework for developing national manuals adapted to local circumstances and that disaster preparedness will become an integrated component of national plans of action toward Health for All by the Year 2000.

Héctor R. Acuña, M.D., M.P.H.
Director

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Introduction

The objectives of this manual are twofold: to promote predisaster planning in the area of medical supply management (detailed in part II) and to provide guidelines for the management of medical supplies during emergencies if no preparedness plans exist (detailed in part III). Medical supplies are defined as pharmaceuticals and other supplies required for the medical treatment of victims. Medical supplies constitute a subset of the larger group of health supplies required in time of emergency. Health supplies include, but are not limited to, hospital, clinic laboratory, x-ray, and environmental health supplies and equipment.

This manual is intended for use by the health administrators and coordinators at national and local levels who are responsible for and depend on effective management of medical supplies in areas affected by natural disasters. It is an elaboration of the information concerning the management and distribution of medical supplies contained in the more general parent publication, *Emergency Health Management after Natural Disaster* (Scientific Publication No. 407, PAHO, 1981).

The scope of this manual is limited to natural disasters. As in the parent manual, the disasters referred to here include such sudden-onset events as earthquakes, volcanic eruptions, floods, tidal waves, and destructive winds such as cyclones, tornadoes, and hurricanes. Manmade catastrophes and slow-onset disasters such as famine and drought are not included. Nevertheless, much of the information presented here may also be applicable to such events.

The sudden and overwhelming impact of natural disasters is followed by an initial postdisaster emergency phase. The effects of natural disaster do not disappear once the emergency has passed, however, and

long-term reconstruction and rehabilitation must also be addressed. This manual nevertheless focuses on the most critical, emergency phase.

Like the parent publication and others in this series, this guide has been prepared with Latin America and the Caribbean specifically in mind. It should, however, prove useful to governments in other parts of the world as well. The structures and procedures recommended in this manual are not intended as a strict model for all countries; rather, they are elaborations of basic principles gleaned from previous disaster experiences. These guidelines should be adopted, modified, or discarded as national realities dictate. Experience from future disasters undoubtedly will provide the opportunity to make further improvements in preparedness.

Part I

Problems in Medical Supply Management

Background

Natural disasters have been defined as "ecological disruptions exceeding the adjustment capacity of a community and calling for outside assistance."¹ Although some disasters that affect large segments of a population can be prevented, technology cannot prevent sudden-onset natural disasters such as the hurricanes, floods, earthquakes, and volcanic eruptions that occur in the Caribbean and Latin America. Countries prone to such hazards therefore must develop plans to avoid the loss of lives, ameliorate suffering, and prevent serious health consequences.

Medical supply management is a critical part of both overall preparedness for disasters and effective relief efforts after disasters. Major factors affecting the medical supply needs that emerge from a natural disaster include the type of disaster, the site of impact, and the magnitude of the disaster.

Type of Disaster

There is often a direct relationship between type of disaster and its effects on health (see figure 1). Earthquakes cause many injuries and deaths; floods leave most of the survivors uninjured. Medical attention and supplies thus are more urgent after earthquakes. On the other hand, local medical supplies are more likely to be salvageable after an earthquake; although earthquakes crush and displace objects, they do not necessarily destroy medical supplies. Flood waters, however, can contaminate them.

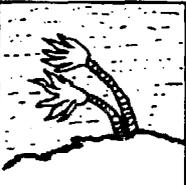
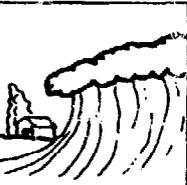
Site

If the area affected is densely populated, the number of victims will be higher than can be expected in a sparsely populated zone. Ware-

1. E.H. Spirgi, *Disaster Management—Comprehensive Guidelines for Disaster Relief* (Bern: Hans Huber Publisher, 1979), 14.

4 Medical Supply Management

Figure 1. Effects of Natural Disasters on Health

Frequently Observed SHORT TERM HEALTH EFFECTS OF MAJOR NATURAL DISASTERS				
	EARTHQUAKE	HIGH WINDS	TIDAL WAVE FLASH FLOOD	FLOOD
DEATHS	MANY	FEW	MANY	FEW
SEVERE INJURIES REQUIRING INTENSIVE MEDICAL CARE	OVERWHELMING	MODERATE	FEW	FEW
INCREASED RISK OF INFECTIOUS DISEASE	POTENTIAL PROBLEM IN ALL MAJOR DISASTERS (Probability rises with overcrowding and deteriorating sanitation)			
FOOD SCARCITY	RARE (May occur due to factors other than shortage of food)	RARE	COMMON	COMMON
MAJOR POPULATION MOVEMENTS	RARE (May occur in heavily damaged urban areas)	RARE	COMMON	COMMON

houses and storage facilities also tend to be located in populated areas, as are large treatment facilities.

Magnitude

If the disaster is fairly localized and of a slight or moderate impact, medical supplies required for the emergency will tend to be manageable at a local level. If the magnitude is great, large quantities of medical supplies may be needed urgently, and it may be necessary to request assistance from abroad.

The specific type and degree of assistance required also depend on the availability of local resources and the level of disaster preparedness prior to the event.

In natural disasters, the most critical medical supply demands are often noted within the first 48 hours after impact. This initial time period is part of the emergency phase of disaster relief. It is during the emergency phase of disaster relief that the primary problem in medical supply management—the lack of planning—becomes most evident. All too often, a community becomes aware of the value of disaster preparedness planning only after a disaster has struck and while it is attempting to “crisis manage” its relief activities.

Medical supply management has one primary obligation during an emergency: maintaining control of all available health supplies and their distribution. Most medical supply problems stem from either inaccurate assessment of disaster needs or inability to mobilize and control the distribution of available medical supply inventories. Failure in either area can lead to increased morbidity and mortality and increased operational costs for the relief effort.

Local Assistance

Because most emergency needs usually surface within the first 48 hours after impact and external assistance probably will not be available within that time period, efficient medical supply management at the local level is essential. To meet anticipated demands, health authorities must know what medical supplies are available, where they are located, and how best to acquire and distribute them.

In most disaster situations, immediate needs usually can be met from existing local resources if access to them is efficiently organized. By maintaining inventories of available and salvageable medical supplies, most demands can be met and requests for external assistance during a crisis can be kept to a minimum. Awareness of likely demands common to different types of disasters also contributes to efficiency in health relief. For example, during the first few weeks after impact, health relief supply needs will consist mainly of pharmaceuticals and medical equipment for treating casualties and preventing communicable diseases. Later needs may include environmental health supplies and equipment necessary to restore public services.

Assessment of needs, inventory preparation and control, and distribution of medical supplies are sufficiently complex in normal times. In disaster situations, however, they are complicated by a number of

6 Medical Supply Management

factors: lack of access to key individuals; lack of central direction in early phases of relief operations; confusion at all levels of government during the first chaotic hours; constant changing of priorities; sudden arrival of large quantities of unsolicited and unsorted medical supplies and the legal prerequisites concerning such arrivals; and competition for scarce resources (personnel, space, supplies and equipment). Another complication is the fact that the most critical demands surface immediately after impact, when a medical supply management system is least prepared to cope unless there has been careful predisaster planning.

External Assistance

Unless properly planned, requested external assistance is unlikely to arrive within the emergency phase of a disaster relief effort. Although some consignments of medical supplies may reach the affected nation within 24 hours, unloading, sorting, and delivering them to the area of need is likely to take much longer. The bulk of medical supplies usually is received well after most urgent health needs have been met with local supplies. To effectively control the flow of supplies during relief operations, the national relief organization should establish within its health structure a component responsible for the management of medical supplies. Such a unit should be established before a disaster strikes so that it will not be forced to contend with the chaos of a disaster at the same time that it is attempting to define its roles.

Examples of Medical Supply Mismanagement

In recent years medical supply management has emerged as a critical component of total health relief in disaster situations. Effective medical supply management can save lives, alleviate suffering, and control operational costs, yet examples of medical supply mismanagement continue to surface at all levels of health relief.

Lack of Coordination

In the aftermath of the 1974 earthquake in Nicaragua, a report was issued that a large government warehouse and all of the supplies it

contained had been destroyed. No search was undertaken to confirm the report. Later, when the warehouse was finally examined, over \$1,000,000 worth of salvageable supplies were found—supplies that were needed during the emergency but were not used because of an incorrect intelligence report.

Although individual agencies and authorities in their respective areas of competence may anticipate and make preparations for their participation in disasters, there is repeatedly a lack of coordination at the field level of medical supply management. In past disasters integrated reporting networks have also been missing. As a result of this lack of coordination, the chaotic conditions that follow a disaster are aggravated by:

- imprecise assessment of needs
- no inventory control
- inadequate distribution and storage systems
- inadequate access to internal and external communication
- inadequate access to transportation
- inadequate quality control of pharmaceuticals
- improper material requisitions or acquisitions
- unsatisfactory utilization of international medical donations.

Unsolicited Medical Supply Donations

Natural disasters frequently prompt a humanitarian response from many people throughout the world. Individuals, organizations, and governments go to tremendous personal effort and expense to provide assistance in the form of personnel, supplies, equipment and funds. The more severe and newsworthy the disaster, the more likely it is that a stricken nation will find itself overwhelmed by the arrival of massive consignments of unsolicited donations of medical supplies.

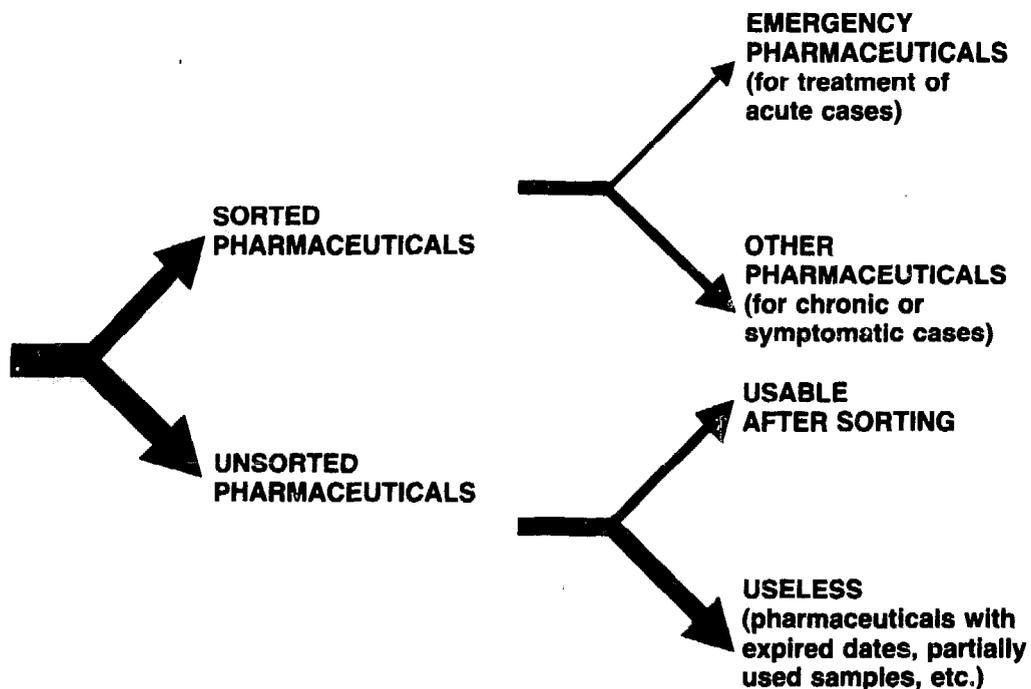
However, recent relief efforts following natural disasters continue to demonstrate that unsolicited donations in general, and especially unsolicited medical supplies, do more to impede than to help relief activities. Medical supply management problems develop when such assistance is not based on assessment of actual medical needs.

8 Medical Supply Management

Most unsolicited medical supplies are relatively useless (see figure 2). They generally arrive unsorted, unlabeled, poorly packaged, used, and outdated, or they are not for emergency use. They require extensive processing, which is not always possible under emergency conditions. Most unsolicited donations are not used in the emergency phase of disaster relief efforts, but they often create logistical nightmares that interfere with critical disaster relief functions—a problem commonly termed the “second disaster.”

A classic example of unsolicited donations actually hampering relief activities occurred in the aftermath of the earthquake that struck Guatemala in 1976. Within a few days of the initial impact, unsolicited

Figure 2. Relative Usefulness of Unsolicited Pharmaceuticals



medical supplies began converging on the Guatemala City airport. On the 11th day, over 30 tons of such supplies were scattered throughout the city. By day 16, the volume of goods had exceeded 100 tons. By this time, the emergency phase of the relief operation was essentially over and a transition to rehabilitation and reconstruction was taking place; nevertheless, unsolicited medical supply donations continued to arrive at increasing rates.

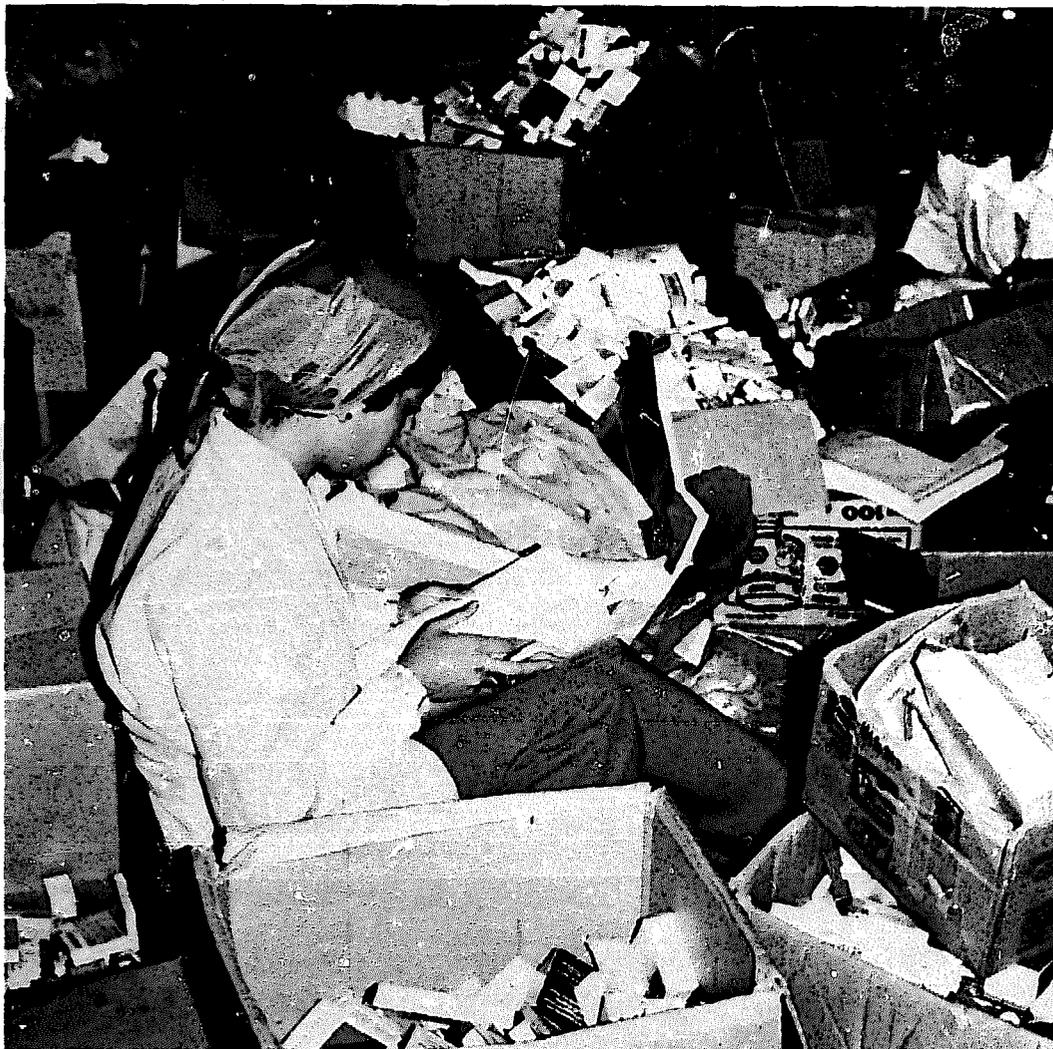
Less than 10 percent of all the unsolicited aid that arrived was immediately usable. Shipping boxes contained a mixture of pharmaceuticals and supplies that could not be readily or safely extracted for use. Most boxes required extensive classification by scarce health professionals before salvageable items could be retrieved. As relief workers opened the boxes, they found that a large part of the shipments consisted of vitamins, appetite suppressants, antacids and a range of similar items of no use to the victims. Many pharmaceuticals were expired, partially used, or damaged.

Another reason that unsolicited medical supplies are of little value to nations stricken by natural disaster is that most begin to arrive at the very end of the emergency phase. Medical supplies that have been specifically requested also tend to arrive too late to be of immediate aid to victims. Solicited supplies ordered for the reconstruction and rehabilitation phases are useful for those purposes, however.

In summary, unsolicited medical supply donations complicate already complex situations. They tie up valuable personnel, space, equipment and supplies and strain already overburdened transportation systems by diverting attention away from the emergency needs of the disaster area. The ideal medical supply donation is one that meets a specific, requested need and arrives ready to be used without further processing.

Packaging

Even solicited medical supplies may present problems—for example, when packages are too large to handle efficiently, when the goods in them are in bulk form, or when the supplies are poorly packaged and become contaminated or ruined. Improper labeling, or no labeling at all, can waste large amounts of time and resources.



Claude de Ville/PAHO

Volunteers worked long hours in a warehouse trying to sort the tons of unsolicited or unmarked relief supplies that arrived as donations after a major earthquake shook Guatemala in 1976.

Size of Packaging

Generally in disaster situations and specifically in recent disasters in the Caribbean and Latin America, field relief personnel have complained that medical supplies arrive in bulk quantities or large containers weighing several hundred kilograms or pounds. These large

containers are very difficult to transport under emergency conditions because of the absence of heavy duty lifting equipment and suitable vehicles; the disruption of internal road, railway, and airport facilities; and the inability of relief workers to handle these unwieldy packages.

As an example, a shipment of tetracycline hydrochloride was sent to a stricken nation in four fiberboard drums, each of which contained 250,000 hard gelatin capsules, each holding 250 mg of the drug. Under the adversities that prevailed after the impact, supportive containers, closures, and labels—not to mention personnel trained in repackaging—were not available in time to permit the tetracycline hydrochloride to reach the victims.

Bulk supplies of needed medical goods require too much handling to deliver them during the emergency; moreover, bulk supplies often arrive without the materials necessary for unit packaging before dispensing. The goods thus may prove useless because it is very difficult to obtain adequate amounts of dispensing materials, from envelopes and labels to bakelite caps, under emergency conditions. Considerable thought should be devoted to the practical aspects of distributing and dispensing medical supplies *under field conditions*, which unfortunately do not always receive sufficient attention.

Type of Packaging

Labels. The use of labels that are not weather resistant and other improper labels or labeling procedures can render needed supplies useless. Some labels cannot withstand rough handling and peel off or become too defaced to read. If they are not printed and written in the language of the receiving country and do not follow international color coding (green for medical supplies and equipment, red for food, and blue for clothing shipments), delivery of shipped goods may be delayed.

Weather resistance. Requested pharmaceuticals often are not usable in Latin America and the Caribbean because they are shipped in packaging suitable only in the technologically advanced nations from which they originate, where the climatic conditions in which they are kept can be controlled. In Latin America and the Caribbean, suitable storage facilities may not be available and the pharmaceuticals may be left outside to face the effects of environmental extremes. For this reason, the outer and inner packaging of all medical supplies, especially of perishable supplies sent to this part of the world, must be weather

resistant. The inner container used for pharmaceuticals and similar supplies should always be resistant to light and should have reusable lids or outer seals that keep the contents impervious to moisture or leakage. Whenever possible, desiccants should also be used in the final packaged dosage form to reduce excess humidity.

Overpackaging. Large amounts of solicited medical supplies fail to reach their ultimate destinations in time because they are shipped in inadequate packaging. In other instances, the supplies do not reach the sites of disaster because even the most determined of workers cannot open packages to get to the materials inside. Out of zeal to make containers impervious to the assaults of humidity, precipitation, and temperature, or to prevent pilfering and in-transit damage, some medical supplies are overpackaged. Hammers and screwdrivers should always be sufficient tools for opening containers.

Cold chain. A final reason that solicited perishable supplies may never reach their ultimate destination is that a continuous cold chain is not always guaranteed before shipment. Consequently, the supplies can be contaminated even before reaching their destination.

In summary, the frequent inadequacy of both unsolicited and solicited supplies highlights the importance of local availability of medical supplies for the survival or restoration to health of disaster victims during the acute emergency phase. Many of the problems mentioned can be circumvented or diminished through preparedness planning.

Part II

Planning Medical Supply Management

Medical supply management is expected to provide the necessary supplies to areas of need, often within hours after the impact of a natural disaster. Without an existing national preparedness plan with a medical supply component, this is a most difficult task. The chaos and confusion that usually accompany a disaster are not conducive to effective improvised responses.

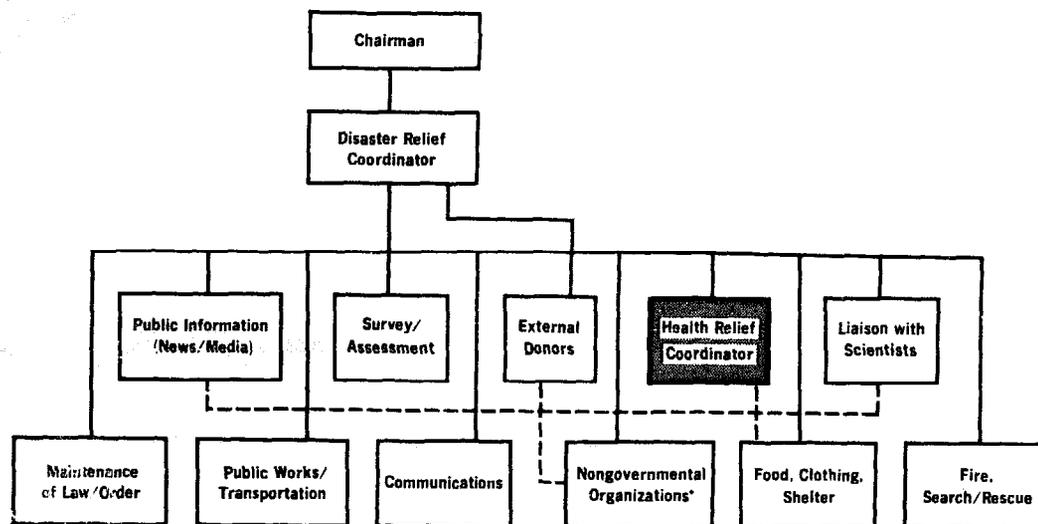
Organizational Structure for Medical Supply Management

After a natural disaster, all resources of the affected country are mobilized. Often they are placed under the direction of a single national authority in accordance with emergency legislation adopted beforehand.

An emergency committee or a civil defense agency attached to the presidency, defense, or interior ministry will assume the overall coordination and sometimes the command of emergency activities related to health. The emergency committee is likely to be organized as shown in figure 3. Each country's organization will reflect its specific administrative, social, and political structure. Final responsibility for equipment such as heavy vehicles and telecommunications and authority to request or accept external assistance and issue news releases on health matters probably will lie outside the health sector.

Within the health sector, the establishment of a single focal point for coordination is essential to ensure the optimal use of the health care resources available to the health ministry, social security agency, armed forces, and private sector. A Health Relief Coordinator should be designated before a disaster as part of the country's predisaster planning. If this step was overlooked, a senior official must be appointed to represent the health sector within the national emergency committee, direct the sector's relief activities and set its priorities, clear news releases, approve requests for external cooperation, and accept or reject offers of assistance.

Figure 3. Organization of a National Emergency Committee



*also called voluntary agencies

Legend:

— Lines of Direction

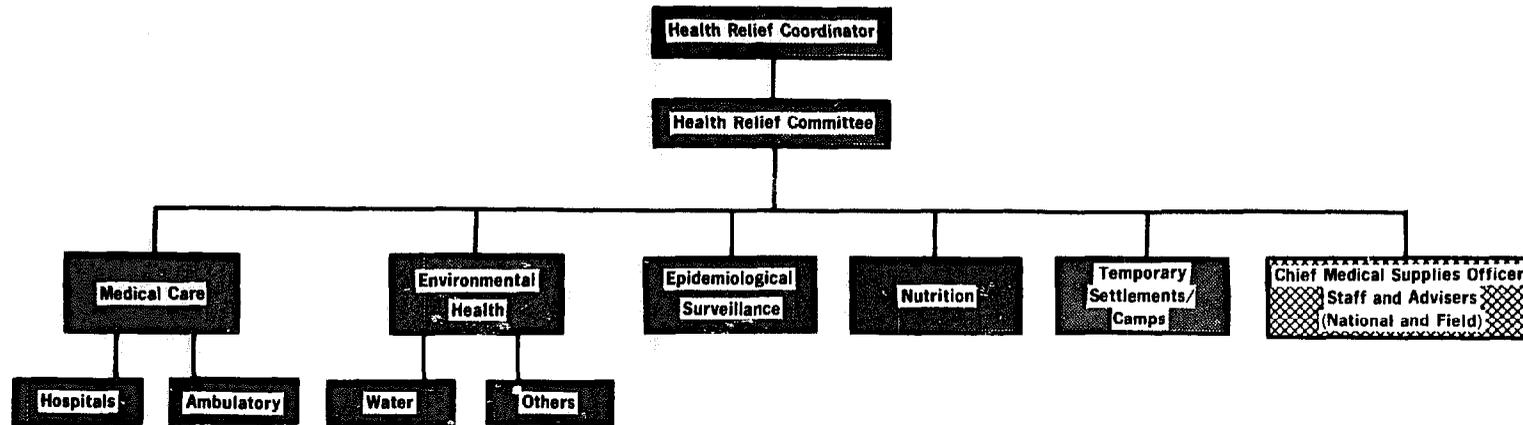
- - - Lines of Collaboration and Communication

Coordination of all components—public and private—of the health sector requires setting up a small committee to assist the Health Relief Coordinator. Representatives of all major government agencies providing health care, the Red Cross, voluntary agencies, and perhaps the international community will meet occasionally or regularly to advise the Health Relief Coordinator and integrate their agencies' activities with the overall relief and rehabilitation effort.

Figure 4 illustrates the various functional areas that the Coordinator and the committee should consider in organizing relief operations. Several components, such as supplies, transportation, and volunteer coordination, must be integrated with the corresponding areas in the national emergency committee (see figure 3). The organization responsible for medical supply management should be part of the broader structure responsible for all health-related activities in response to potential and actual natural disaster.

Under the supervision of the Health Relief Coordinator, the Chief Medical Supply Officer is responsible for assessing national vulnerability to medical supply shortages during disaster, drafting the medical

Figure 4. Coordination of Health Relief Activities



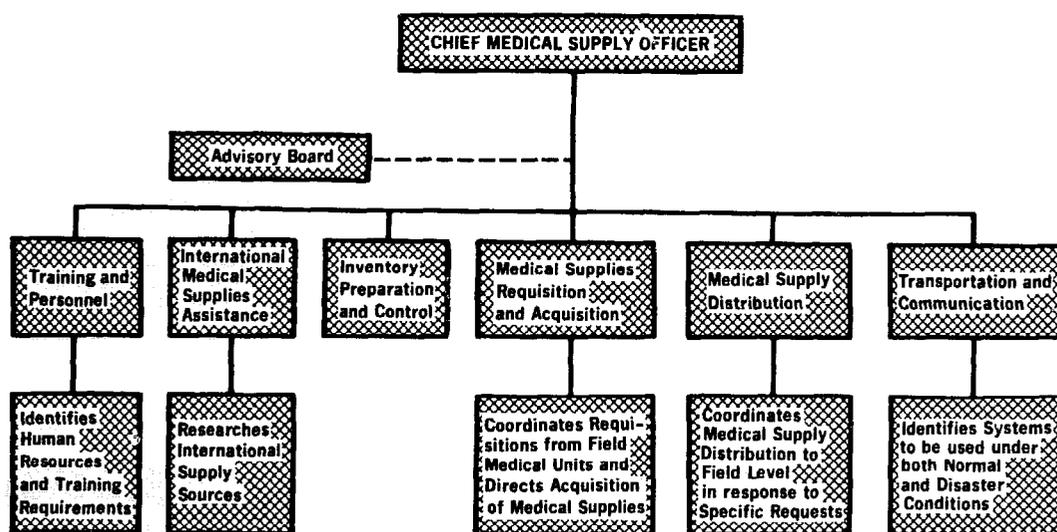
Note. In this figure and figure 5 cross-hatched boxes are subsets of the grey boxes.

supply management disaster preparedness plan, and strengthening national coordination throughout the health sector. This position should be filled as soon as possible in an ad hoc relief effort.

It may or may not be advisable to create a Crisis Medical Supply Management Advisory Board to assist the Chief Medical Supply Officer in carrying out these functions. Whether or not to form a board depends on the magnitude and type of the disaster and also the size of the stricken country. In large nations or in nations with well-developed health resources, the Chief Medical Supply Officer may elect to establish an Advisory Board; members may come from the ranks of professionals in the public, private, and voluntary sectors of the health care system. If the stricken country is small or has scarce health resources, however, the Chief Medical Supply Officer may personally have to direct and coordinate all of the functional activities in the medical supply management component of the Health Relief Committee.

Figure 5 provides a breakdown of the medical supply management organization that should be created as part of predisaster planning. The functions of the various internal components of the organization are schematically outlined.

Figure 5. Medical Supply Management Organization and Functions in Disaster Preparedness



The medical supply management organization depicted in figure 5 is headed by the Chief Medical Supply Officer or another official with corresponding responsibilities. The officer's tasks include the development of policies and procedures for the operational areas depicted. Depending on the size of the country and its existing infrastructure, several of the functional units represented in figure 5 may actually be merged under one person's leadership.

Effective management depends on anticipating and identifying problems as they arise and delivering specific items at the precise times they are needed; it is not the ability to rush the largest amount of every conceivable drug to the disaster zone. This chapter treats the major areas of preparedness in medical supply management:

- standardized list of medical supplies
- ensuring the availability of stocks
- securing locations and access
- acquisition and requisition
- distribution and transportation
- communication
- training personnel
- coordination with agencies and governments
- legal aspects of disaster relief
- simulation and audits of medical supply management.

Standardized List of Medical Supplies

A standardized list of medical supplies essential during the emergency phase of a disaster should be drawn up at national level. The list should correspond to expected needs according to the type or types of disaster to which a country is prone, and it should be ordered according to category of supply and priority of need. Part III, pages 49–51, describes in detail how to create this type of list.

The standardized list of essential drugs for emergencies presented here (see figure 6) was developed by the World Health Organization Expert Committee on the Use of Essential Drugs and the United Nations High Commissioner for Refugees (UNHCR). The entire standard emergency kit prepared by these organizations is provided in annex A.

Organizations involved in disaster relief, such as the United Nations Children's Fund (UNICEF), the League of Red Cross Societies, the U.S. Agency for International Development's Agency for Foreign Disaster Assistance (OFDA), and others have developed similar lists that are available as references in the preparation of national lists. It is important to consult these lists for another reason as well: many agencies use them as guides to determine whether relief requests from affected countries should be considered legitimate emergency needs. The closer the correspondence between such lists and relief requests, the shorter the time lag in obtaining requested supplies from abroad.

The finalized list is based on:

- local vulnerability
- records of the predisaster availability of supplies at national level
- morbidity and mortality patterns usually associated with the specific type of disaster
- typical use of specific items.

Small amounts of a few types of medical supplies can meet most of the health needs during an emergency. The list should, therefore, be short. A short list also promotes familiarity with smaller numbers of supplies, which in turn promotes effective and efficient use of the individual items; permits the selection of products in desired types of packaging; promotes cost containment and high quality of supplies; and helps to reduce problems in acquisition and logistics, thus speeding up delivery.

Ensuring the Availability of Stocks

Once the tailored list of essential medical supplies is finalized, their availability in appropriate locations should be assured before the disaster occurs. There are several ways of ensuring that needed stocks are available in the event of disaster. These include:

- a disaster designated stockpile
 - modified annual stock rotation
 - inventory of current stock levels
 - regional stockpiles
 - local production on short notice.
-

Figure 6. WHO/UNHCR List of Essential Drugs

List A Basic drug requirements for 10,000 persons for 3 months			
Ref. No. A/	Drug (WHO reference)*	Pharmaceutical form and strength	Total required for 3 months (rounded up)
1.	Analgesics (2.1) 1 acetylsalicylic acid 2 paracetamol	tab 300mg	17,000 tabs
		tab 500mg	4,500 tabs
2.	Anthelmintic (6.1) 1 mebendazole* 2 piperazine	tab 100mg	2,100 tabs
		syrup 500mg/5ml (30ml bottle)	5.1 liters
3.	Antibacterial (6.3) 1 ampicillin* 2 benzylpenicillin 3 phenoxymethylpenicillin 4 procaine benzylpenicillin 5 sulfamethoxazole + trimethoprim* 6 tetracycline*	suspension 125mg/5ml	420 bottles 60ml
		inj 0.6g (1 million IU)	500 vials
		tab 250mg	9,500 tabs
		inj 3.0g (3 million IU)	375 vials
		tab 400mg + 80 mg	7,500 tabs
		tab 250mg	9,000 tabs
4.	Antimalarial* (6.7) 1 chloroquine* 2 chloroquine	tab 150mg	8,000 tabs
		syrup 50mg/5ml	3 liters
5.	Antianemia (10.1) ferrous salt + folic acid	tab 60mg + 0.2mg	30,000 tabs
6.	Dermatological (13) 1 benzoic acid + salicylic acid 2 neomycin + bacitracin* 3 calamine lotion* 4 benzyl benzoate 5 gentian violet	oint, 6% + 3%, 25g tube	100 tubes
		oint, 5mg + 500 IU/g, 25g tube	50 tubes
		lotion	5 liters
		lotion 25%	35 liters
		crystals	200 g (8 botts.)
7.	Disinfectants (15) chlorhexidine*	solution 20%	5 liters
8.	Antacid (17.1) aluminium hydroxide	tab 500mg	5,000 tabs
9.	Cathartic (17.5) senna*	tab 7.5mg	400 tabs
10.	Diarrhea (17.6.2) oral rehydration salts	sachet 27.5g/liter	6,000 sachets
11.	Ophthalmological (21.1) tetracycline*	eye oint 1%, 5g tube	750 tubes
12.	Solutions (26.2) 1 water for injection 2 water for injection	2ml	500 amps
		10ml	500 amps
13.	Vitamin (27) 1 retinol (vitamin A) 2 retinol (vitamin A)	caps 60mg (200,000 IU)	500 caps
		caps 7.5mg (25,000 IU)	400 caps

This figure is excerpted from annex A. Footnotes 3 and 4 refer to those footnotes in annex A. See annex A, paragraph 3, for an explanation of asterisked items.

Disaster Designated Stockpile

Having to wait for supplies from even the best organized foreign emergency stockpile may cost lives. The most useful pharmaceuticals for disaster relief are those that are available in the immediate vicinity of the stricken area; they can be obtained relatively rapidly, and health workers will be familiar with them.

In some countries special stockpiles of supplies that may be required in emergency situations are kept for that purpose alone. This may be an effective method, but it is generally too expensive for most countries. Procurement, storage, quality control, stock control, rotation and updating of composition, administration, security, and so on require constant attention. Furthermore, without an efficient staff on standby for immediate dispatch of supplies, communication equipment, means of transportation, and so on, an emergency stockpile would be of only limited value. In addition, comprehensive national stockpiles usually are impractical. Waste may result because many of the goods deteriorate or their expiration dates pass before disaster occurs. In most countries, the valuable warehouse space and professional staff time required to maintain such stocks would be more advantageously employed in day-to-day health operations during normal times.

The cost of maintaining comprehensive stockpiles is generally prohibitive. To set up such an emergency stockpile requires considerable investment and a continuous flow of funds for proper maintenance. Politically, it may also be difficult if—as is the case in many developing countries—essential drugs for even day-to-day health care are scarce.

Modified Annual Stock Rotation

A de facto national stockpile of standard emergency medical supplies can be created in the public and private sectors through modified annual stock rotation. To do this, public and private organizations need only increase the size of their normal inventories of standard emergency medical supply items by 15 percent during the first fiscal or procurement year the plan is put into effect. Such a procedure increases the availability of emergency medical supplies without creating an elaborate infrastructure and by using existing facilities and human resources.

In the *public sector*, the items increased by 15 percent should be clearly identified as the medical supply stockpile to be used in the



Julio Vizcarra Brenner/PAHO

Members of the emergency medical team inspect the supplies that the Chilean interior ministry keeps ready for use in the event of disaster.

event of emergency during that particular year. If an emergency does not occur, the stocks set aside for that purpose should be employed as regular stocks and replaced by 15 percent of the supplies ordered for the next year. Emergency medical supplies thus can be updated, and financial provision for them is made only once.

In the *private sector*, all local and foreign manufacturers of emergency medical supplies marketed within the country should be asked to permit their local representatives to carry annually on a consignment basis an additional 15 percent of the emergency supply items (and only those items) in their inventory. These items can be set aside and earmarked as the suppliers' contribution to the national stockpiling effort. As with the publicly acquired items, the cost of the extra

stocks is incurred only once. If the stocks have not been used between shipments, they can be moved into the distributors' normal inventories and replaced with newly arriving goods.

Regional Stockpiles

Smaller countries, such as those of the Caribbean, may wish to establish regional stockpiles for specialty medical supplies to supplement national stocks. These should be reserved for use only within those territories of the region in which the stockpiles are located. Regional stockpiles should be placed in two or three separate, strategic locations so that they are readily accessible to all participating countries. International organizations that are regionally represented, such as the United Nations Children's Fund, the Office of the United Nations Disaster Relief Coordinator, the World Health Organization/Pan American Health Organization and the International Red Cross, should be invited to assist national governments in establishing these regional stockpiles.

Area authorities of the United Nations Children's Fund might be asked to control the stockpiles since they possess more experience in this area than other organizations. The financial costs of procurement and control of such regional stockpiles could be equitably assumed by the regional governments, or the items could be procured by using rotating fund reimbursement procedures.

Current Stock Levels as Emergency Reserve

Maintaining a regularly updated national inventory of essential drugs that are held by the national public, private and voluntary health care sectors makes it possible to readily assess the adequacy of local resources. If a regular (for example, quarterly) stock level report can be obtained (see figure 7), it is possible to estimate fairly accurately the supplies available in the country and in a particular area. The national inventory should include the regular stocks of the central medical stores and other major government stores. In an emergency in an isolated area, however, these stocks may be of value only as a second line of defense.

The number of levels of inventory records to be maintained depends on the economic, administrative, and topographic features of the country. For instance, in small territories such as St. Kitts, Dominica, and

Figure 7. Sample Cover Letter for Average Current Stock Level Inquiry

**To the Senior Medical Officer and Pharmacist
RE: AVERAGE STOCK ASSESSMENT FOR NATIONAL PREDISASTER
PLANNING**

The accompanying survey form is part of an exercise of critical importance, carried out by the Health Relief Coordination Committee of the Ministry of Health. It is intended to estimate our national resources in pharmaceutical and medical supplies in the event of a sudden disaster.

Pharmaceutical and medical supplies obtained from abroad after a disaster strikes cannot arrive in time to save the majority of lives which may be threatened. Since the greatest demand for pharmaceutical and medical supplies following a violent natural disaster falls within the first 48 hours, we must be able to use local resources at a moment's notice. The list enclosed is limited to "first-line medicaments" for emergency situations related to natural disasters.

Please be assured that this is not a means of investigating your stock level in such a way that will have any implications for your health unit under normal circumstances. If a national emergency situation is declared following a natural disaster, this information will indicate to us how much "lead time" we might have independent of outside resources. In the event of a declared national emergency, the ordering of stock for emergency use will be carried out as required in accordance with the relevant legislation. There is no liability involved for stock levels falling below your current average stock level estimates. Please complete the attached form and return it to the Ministry in time to arrive by _____.

**Ministry of Health
c/o Health Relief Coordinator**

Health Services Unit: _____

Name: _____

Location: _____

Date: _____

Please report only on items mentioned on list of drugs for disaster relief or their acceptable replacement.

Current Stock Level Inventory Survey for Emergency Preparedness

No.	Item from list of essentials	quantity per pack	estimated no. of packs in stock	total stock
-----	------------------------------	----------------------	------------------------------------	-------------

Item (acceptable alternative)

Date:

Signature Pharmacist or
Medical Officer

Jamaica, where medical supplies are controlled in a small number of government depots and by private wholesalers and distributors, maintaining inventory records is a relatively simple matter. In larger countries such as Brazil and Venezuela, maintaining a periodic running inventory of supplies in the public and private sectors is complex, and several levels of records should be kept.

Knowing what is locally and immediately available and accurately estimating anticipated needs will allow the responsible authorities on the national emergency committee to determine how much and what kinds of outside aid will be required. The baseline data to be collected and periodically updated include the type, quantity, and location of supplies in the:

- public sector (including hospitals, health centers, pharmacies, schools, etc.)
- private sector (including manufacturers, importers, wholesalers, retailers, etc.)
- national defense forces (including army, militia, civil defense, navy, police, etc.)
- any armed forces or other institutions of foreign origin that may be stationed within the territory
- voluntary, missionary, Red Cross and other nongovernmental organizations
- stockpiles of international agencies within national territory or in the vicinity.

Commercial Stocks

Stocks held by pharmacists, medical practitioners and wholesalers must be included in the national stock inventory for emergencies. They may, however, pose certain problems. Such stocks will contain a substantial number of items kept and supplied under proprietary brand names. Using a cross-index of local brand names/International Non-proprietary Names (INN) (see annex E) can solve the problem of identification.

The matter of replacement of (or payment for) supplies on emergency order needs further consideration. To illustrate the problem, consider the following situation: A local pharmacist supplies an emergency or-

der of 2,000 tablets of acetylsalicylic acid 300mg. This product is stocked and sold by him under a well-known brand name and packed in boxes containing fifty tablets in press-out strip foil. The pharmacist may very well have paid ten times the price paid by the central medical stores of the Ministry of Health for this product, which is procured, supplied, and stocked in 1,000-tablet jars. To give the pharmacist two jars of 1,000 tablets as replacement is unacceptable to him. To pay him an amount ten times that usually paid by the Ministry of Health for this product may be unacceptable to the Ministry. Even if acceptable, the pharmacist would not be receiving remuneration for his retail services, which normally increase the price by 33 percent.

To pay a premium for immediate availability is acceptable only if the financial consequences can be forecast with reasonable accuracy and such additional charges are considered feasible. Annex C lists prices obtainable through (joint) procurement of pharmaceuticals under generic names.

Local Production on Short Notice

Local pharmaceutical and surgical supply manufacturers can design contingency procedures for manufacturing standard supply items on short notice. Because of the economies of scale, for example, many local pharmaceutical manufacturers carry a supply of raw materials for approximately 6 to 12 months of production. To produce, test, and package 250,000 tetracycline hydrochloride capsules of 250 mg, using the simplest of blending and filling equipment, requires approximately 10 hours of labor. Assuming that manufacturing facilities are intact and the raw materials needed are on hand, a properly coordinated plan can ensure that this quantity of capsules is ready for distribution to disaster victims within the first 72 hours of the postdisaster emergency period. Depending on the country, it may not be possible to do this for all items on the list of essential medical supplies.

Securing Locations and Access

Whatever method or combination of methods is chosen to ensure that needed stocks are available within the country, medical supply authorities should take measures to protect those that will be most useful during emergencies. Permanent storage sites should be located in sturdy,

secure buildings and be accessible to a pool of vehicles and drivers and to reliable communications systems.

Sites that meet these criteria usually are located within the capital city—for example, central medical stores, military and civilian; public and private hospitals; medical supply manufacturers, wholesalers and distributors. Alternate sites may be chosen from:

- government buildings with good security
- large food manufacturers, wholesalers, and distributors
- universities, colleges, and other educational facilities
- airports, steamship, bus and train terminals
- fire stations, hotels, motels, markets and arenas.

Acquisition and Requisition

Acquisition. Acquisition refers to the procurement at the national level of medical supplies from national or international sources in order to maintain appropriate inventory levels. Steps required during the preparedness phase include:

- meeting with local manufacturers, wholesalers, and distributors to establish procedures for the emergency acquisition of supplies
- developing a standard acquisition form and making it available to public and private sources of supplies, as well as to the inventory preparation, acquisition and control staff
- preparing and periodically updating the list of stock levels with the relevant price and delivery time information, according to source.

Requisition. Requisition refers to the procurement of supplies within the medical supply management organization itself, whether it be from central to field level or vice versa. Each requisition form (see figure 8) should include the following information:

- number and date of requisition
 - name of requesting field depot
 - name of person to contact
 - depot address
-

- description of item including: name, unit of issue, quantity, and item number
- packaging and transportation instructions, including alternate routing
- priority status of the order
- justification of unusual requests
- name and signature of responsible for requisition.

Distribution and Transportation

Distribution from central stores requires the movement of relatively large quantities of supplies. Therefore, these goods should be moved along primary air, land, and water routes. In view of the uncertain effects of disasters on these primary systems, alternate routes should always be planned. Officers in charge of planning distribution should designate primary and alternate routes for the delivery of medical supplies in the event of disaster and maintain an inventory of equipment and human resources that may be needed. Alternate routes should cover delivery from international sources to national central inventories, from national central inventories to field depots, and from field depots to potential disaster sites.

In planning the modes of transportation and routes of distribution, the availability of various routes, the density of the population, and the nature of the geographic areas to be serviced should be considered. The routing details should be updated periodically and circulated to those who need to be familiar with the system in time of emergency.

Routings should be ranked according to their favorability, taking into account their specific vulnerabilities to different types of disasters. For example, airport traffic control guidance systems can be damaged during hurricanes; coastal roads are often flooded and impassable; and earthquakes frequently destroy railway lines and road and railway suspension bridges.

Inventory of Equipment and Human Resources

Human resources and equipment should be inventoried and updated periodically to ensure effective distribution to disaster sites. These

Figure 8. Sample Order Form for Emergency Medical Supplies

This order is only valid:
A) after formal Declaration of a State of Emergency by or on behalf of the Health of State and only during the period stated in this Declaration.
B) if pre-signed by the Chief Pharmacist
C) if signed by the Medical (Liaison) Field Officers for receipt of the goods.

To: Name, address of institution supplying (to be entered by the officer).
The Officer: Name, address, status/authority (to be entered by the Ministry of Health).

is authorized to take delivery from stock for emergency requirements of the hereunder specific supplies. The Ministry of Health will arrange for replacement of such items as soon as possible after a receipt of a copy of this order.

For the Ministry of Health, the Chief Pharmacist,

Signature and seal.

The above goods received by me on (date)

Medical Field Officer, Signature

include all types of motorized land, air, water vehicles and their operators in the public, private and nongovernmental organization sectors who can be called upon in time of emergency.

A vital consideration in determining modes of transportation is the nature of the relief supplies themselves. Not all relief supplies are required immediately; some are urgent, but others are needed mainly for long-term medical and public health measures or for the replenishment of local supplies. The mode of transport should be selected

Figure 8 continued

Emergency Relief Committee

Acquisition No.

To: (Name and address of supplier)

Ship to: (Name and address of Consignee)

Attention: (Name of contact person)

Attention: (Name of contact person)

Phone No: _____

Item No.	Item Description	Quantity: Unit size x No. of units	Unit Cost	Total Cost
1.	Tetracycline HCL HG Capsules	100 x 50	4.50	225.00
2.	prednisolone CT 5 mg.	100 x 20	6.67	33.40
3.	_____etc.			
4.	_____etc.			

TOTAL _____

Payment Terms: (As defined per local agreement, i.e. 90 days net).

Shipping Instructions: Pack each item separately in light, water-resistant containers, each container not to exceed 25 kg. in weight.

Labeling: Each outer label, in addition to name and address of consignee, must carry acquisition number and *caption* in bold print: **EMERGENCY MEDICAL RELIEF SUPPLIES—URGENT.**

Invoicing Instructions: Please send: Original and 2 copies to Chief Medical Supply Officer (name and address); 3 copies (packing slips) to consignee, one of which will be returned to you signed by consignee as proof of delivery.

Additional Documentation:

Certificate of Analysis (when applicable)

Custom Entry No. (when applicable for refund of customs duties, as these goods are to be used for disaster relief)

Signature: _____

Title: _____

Office: _____

Address: _____

Telephone: _____

Distribution: Supplier	original + 1 copy
Inventory Preparation and Control	2 copies
Acquisition Office	2 copies (1 copy for supplier's file & 1 copy for acquisition numerical sequence file)

accordingly, saving scarce and expensive resources such as aircraft for priority items.

Emergency transport may require the use of private vehicles that are not employed during normal times, such as trucks and small aircraft belonging to private industry. The unit in charge of distribution should therefore maintain and update an inventory covering:

Air

- all available routes
- airports
- permanent and emergency landing sites
- ancillary facilities such as storage warehousing, hangar space and length of runways
- flying clubs, individual private pilots, etc.

Land

- road and railway systems
- buses, trucks, vans, and other vehicles
- drivers in the public and private sectors

Water

- coastal and inland watercraft
- owners and operators of these craft.

Communication

When the first news arrives of a violent disaster it is essential for the Health Relief Coordinator to maintain direct contact with field workers at the disaster site and with international donors and suppliers of pharmaceuticals and medical relief materials. The standard methods of communication—telephone, telex or teletype, facsimile transmissions, and shortwave radio—are invaluable for adequate control of emergency relief operations. However, these systems might fall victim to the conditions of the disaster and might not function when they are most needed.

Of this standard range of methods of communication, by far the surest and quickest for the transmission of specialized medical information is the telex. It does, however, require training to accurately

transmit detailed pharmaceutical and medical information. When telephone lines and telex relay stations between the disaster site and the Health Relief Coordinator are down, and governmental or military shortwave radio services are not immediately available, private citizen's band and amateur radio operators can be used effectively. Again, to be effective, they must be prepared in advance of requiring their services under emergency conditions.

The following communication aspects are necessary parts of any local disaster preparedness plan:

1. *Advance telex/teletype operator training.* Where telex services are available, Ministries of Health or national telecommunications agencies must arrange for the training of telex operators in medical and pharmaceutical terminology to be transmitted in an emergency.

2. *Advance shortwave radio operator training.* It is essential that all shortwave radio operators—government officials, members of the military, or amateur radio operators—receive special instructions both in the parameters of their authorized role in emergencies and in the accurate transmission of specialized pharmaceutical and medical terminology in disaster situations.

3. *Emergency preparedness legislation on communication priorities.* Unless measures are taken to guard against the private use of public communications systems directly following a disaster, the heavy post-disaster traffic on available lines will severely hamper official relief communications. National emergency preparedness legislation therefore should safeguard that designated relief operations coordinators have exclusive or priority access to and use of communications facilities.

4. *Prearrangement for instant international contact.* After a major natural disaster it may be necessary to contact immediately as many as 100 or more international embassies and international organizations involved in relief operations. Usually there are not enough telex machines or time to do this effectively. For a small fee, however, professional communication companies will, on the receipt of a prearranged emergency code, transmit a standardized message to a large number of addresses internationally. Western Union in the United States, for example, markets these services under the name PR—Newswire, and its services are complemented in Europe, Japan, and the Middle East. A message can reach PR—Newswire from a South or Central American

country and within an hour make contact with 120 addresses all across Europe.

Although most nations have systems for maintaining contact with their embassies abroad, it may be necessary after a major disaster to provide official background information about the situation to a larger number of a country's diplomatic missions than the regular system can handle. Inevitably, news of a disaster reaches the press and the embassies are approached for further information before the embassies themselves have received any substantiating data on which to base official statements to the press. This can confuse and delay relief efforts. The use of professional communication services avoids such potential confusion.

5. *Advance research in facsimile transmission.* When transmitting long lists of technical data, as is the case with pharmaceutical and medical communications, the best method for ensuring accurate representation is to transmit these messages in the form of facsimile reproductions. The same equipment must be available at both the sending and receiving ends of the transmission. A number of telecommunication manufacturers can make such equipment available at short notice (Rank-Xerox/Siemens/Infotec and others).

6. *Courier services.* The numerous relief flights likely to be taking place provide an opportunity for the crew and other professionals to transmit information. This method provides the best means of communication because these personnel can provide the full context, including unexpected contingencies that not even the most comprehensive preparedness schemes of both donors and high-risk nations could have anticipated.

7. *Foreign diplomatic missions' communications systems.* When everything else fails, arrangements can be made through diplomatic channels to make use of the shortwave and special satellite-assisted communication systems to which certain foreign diplomatic missions may have access.

From 0600 hrs to 1700 hrs daily, contact can be made by shortwave radio with the International Committee of the Red Cross (ICRC) in Geneva through its monitoring services on these frequencies: 27.998,5 kHz; 20.998,5 kHz; 20.753,0 kHz; 13.998,5 kHz; 6.998,5 kHz; 3.801,5 kHz. The call sign is HBC-88.

In emergencies, it is often necessary to enlist the help of private

citizens and businesses with means of transportation and communication (e.g., trucks, vans, cars, motorcycles, motorboats, CB and ham radios, and taxi dispatch systems) to form transportation and communications resources in the field. Procedures for engaging the private sector should specify the following:

- where to meet in emergencies
- instructions for servicing vehicles before reporting to the assembly points
- instructions about routings for vehicle operators
- instructions on the care and handling of medical supplies
- communications network between the field and national headquarters
- how to make use of all means of transportation and communications resources: bicycle, horse, donkey, bullock, mule, boat, human resources, and so on.

Training Personnel

As in other areas of disaster preparedness, an essential part of preparedness in medical supply management is the training of personnel who will be expected to act rapidly during an emergency. The training program should include short-term courses and seminars to ensure that permanent and voluntary personnel at all levels of medical supply management know their delegated responsibilities and are capable of executing these duties. These courses and seminars also should include training material for short "crash courses" for volunteers and advisers from other countries who may arrive in the territory immediately following a disaster. Particular attention should also be paid to training pharmacist assistants, who will be called upon to dispense drugs under adverse field conditions after a disaster.

Staff will have to be trained—preferably in-service—through short courses and seminars in the areas of inventory preparation and control, acquisition and requisition, distribution, and transportation and communication.

Inventory Preparation and Control

Pharmacists, nurses, veterinarians, midwives, sanitarians, pharmacy clerks, and community volunteers who have been trained in Red

Cross or St. John's Ambulance procedures should be trained in basic procedures in this area, in the event they are required to assist during the emergency. Similar short training courses could be considered for pharmacy, nursing, and other students, who can be of great assistance in routine tasks during the relief effort, freeing up more qualified personnel for the complex administrative and decision-making responsibilities. Representatives of international organizations such as UNICEF or of other specialized agencies could be asked to develop training programs for this purpose. Topics that should be covered include:

- recording, receipt, and disbursement of stock
- stock rotation
- quality control
- repackaging bulk consignments
- packaging for insulation against damage
- criteria for the selection of sites
- acquisition and requisition procedures.

Acquisition and Requisition

Physicians, veterinarians, pharmacists, nurses and other professionals should possess the technical ability to easily identify medical supplies, to distinguish between drugs with names that sound alike (such as prednisone and prednisolone), and to recognize trade names (such as Tetracycl) and generic drugs (such as tetracycline hydrochloride). Short courses for this level of staff should cover:

- generic and trade names of the essential list of medical supplies
 - regulations concerning drugs of restricted acquisition and distribution
 - procurement methods and sources
 - preparation of proper documents and administrative routing procedures
 - backordering and transfer of supplies from one inventory to another
 - writing and reading prescriptions for pharmaceuticals and medical devices.
-

Distribution

Individuals employed or experienced in warehouse management at the senior level and individuals responsible for medical supply distribution in the private or public sectors should be identified and selected for training in medical supply distribution in times of disaster. Their training should include instruction in:

- assessment of vulnerability of different modes of distribution
- preparation of detailed routing maps between central stores and field depots
- assessment of priorities in medical supply distribution
- appropriate methods for seeking assistance from air, land, and water vehicle owners
- consulting personnel in management of distribution systems in public, private, and nongovernmental organization sectors
- designing precise forms and documents for requesting medical supplies and ensuring expedient delivery
- recommending security measures to guarantee that supplies reach their intended destinations.

Transportation and Communication

Personnel selected for training in the transportation and communication component of the medical supply management relief effort ideally should come from the ranks of senior managers of vehicle maintenance organizations concerned with public works, medical supply, and military, civil defense, and police services. At the field level, participants should have some background or responsibility in the area of transportation and logistics.

Training should encompass:

- identification of transportation and communication systems that could be useful during disaster
 - operation of communication systems such as CB and ham radios, telexes, and walkie-talkies
 - procedures for loading vehicles (e.g., last in, first out procedures and methods for protecting fragile equipment and containers)
 - servicing of vehicles, including ways to procure fuel, oil, parts and maintenance during emergency periods
-

- procedures to foster the cooperation of authorities in charge of various systems that may affect the distribution of medical supplies.

Coordination with Agencies and Governments

If the medical supply items within the nation's borders are known to be insufficient, it is possible to decide before disaster strikes whether or not it will be necessary to request assistance from international sources. Responsible officers should meet with international agencies, bilateral institutions, and nongovernmental voluntary organizations to determine if they are willing to provide assistance in time of disaster and, if so, what kind of assistance. As part of preparedness planning, the following should be contacted:

- representatives of regional stockpiles of medical supplies
- military and civilian medical stores in neighboring countries
- foreign military medical health services located within the territory
- nongovernmental organizations with medical supply facilities in other countries
- international agencies with stockpiles (e.g., UNICEF, International Red Cross)
- consular and other diplomatic corps offices
- private sector manufacturers, wholesalers, and distributors within the broader region of which the country is a part
- transnational companies that manufacture medical supplies.

Once sources of international medical supply assistance have been identified, their cooperation should be sought. By holding meetings with such agencies the terms and conditions for a formal agreement of cooperation may be established; in this way, both parties will understand the procedures to follow when emergency provisions are requested.

Successful cooperation depends partly on national authorities' providing these agencies or representatives with the national list of essential medical supplies. Advance distribution of the list will facilitate procurement and reduce confusion in the emergency period. It is also

necessary to provide all the relevant information regarding packaging, labeling, formulation, and shipping for most efficient use by relief personnel. The method of payment or reimbursement should also be stated when a formal request is made, as set forth in the formal agreement or letter of understanding.

Formal requests for international medical supply assistance during times of disaster should contain:

- the national list of essential medical supplies
- the types, quantities, formulation or other specifications and standards of the specific items needed
- precise instructions for packaging, labeling, and shipment
- a statement requesting that the receiving nation be advised of the details of the shipment, the expected arrival time, and the waybill or shipping document number of the goods
- the method of payment or reimbursement for the shipped medical supplies, as set forth in the formal letter of understanding.

The prototype telex request presented in figure 9 gives the pertinent details for the expeditious shipment of such a request.

Legal Aspects of Disaster Relief

A national disaster relief plan should be based on a legally constituted act, law, or executive order establishing a central body and subsidiary bodies for the planning and implementation of any disaster relief action (a model act of legislation is included in annex H). Such legislation should include recommendations similar to those made by the UN General Assembly Resolution 2816, inviting potential recipients of its disaster relief to:

- establish disaster contingency plans with appropriate assistance from the Disaster Relief Coordinator of the UN Disaster Relief Office (UNDRO)
 - appoint a single national disaster relief coordinator to facilitate the receipt of international aid in times of emergency
 - establish stockpiles of emergency supplies such as tents, blankets, medicines and nonperishable foodstuffs
-

Figure 9. Prototype Telex Request for International Assistance

TELEX/TELEGRAPH NO.:

**FROM: DISASTER RELIEF COORDINATOR (NAME OF COUNTRY)/
HEALTH RELIEF COORDINATOR (NAME OF COUNTRY)**

**TO: NAME OF GOVERNMENT/INTERNATIONAL AGENCY/
NONGOVERNMENTAL ORGANIZATION, AND ADDRESS**

ATTENTION: NAME OF LIAISON WITHIN RECIPIENT ORGANIZATION.

**COPY: REGIONAL AND/OR INTERNATIONAL DISASTER RELIEF
COORDINATOR, UNITED NATIONS DISASTER RELIEF
ORGANIZATION**

**AS PER DISASTER RELIEF AGREEMENT NO. ____/LETTER OF IN-
TENT DATED ____PLEASE AIRFREIGHT AS SOON AS POSSIBLE (ASAP)
REQUISITION NO. ____ITEMS: ORAL REHYDRATION SALTS PKS 1000
FORMULA NACL GM. 3.5, NAHCO3 GM. 215 KCL GM. 1.5, DEXTROSE
GM. 20 STOP CHLORAMPHENICOL 250 MG PKS 100 × 500 GELATIN
CAPSULES (GC) STOP TRIPLE ANTIBIOTIC OINTMENT OPHTHALMIC
FORMULA NEOMYCIN AS BASE 3.5 MG., POLYMYXIN B SULF. 5000 I.U.,
BACITRACIN ZINC 400 I.U. PKS 1/8 OZ (3.54 GM.) × 1000 STOP ETC.
ETC. AS REQUIRED STOP**

**PAYMENT 120 DAYS SIGHT DRAFT (OR WILL REPLENISH YOUR STOCK
ON DIRECTION, OR AS PER AGREEMENT, OR AS PER LETTER OF
UNDERSTANDING ETC.) STOP EACH SHIPPING CONTAINER WATER-
PROOF AND NOT TO EXCEED 25 KGM. (60 LBS.) STOP**

**LABEL DISASTER RELIEF COORDINATOR, ADDRESS _____,
REQUISITION No. _____, ATTENTION: NAME OF CHIEF MEDICAL SUP-
PLY OFFICER OR HEALTH RELIEF COORDINATOR OR OTHER AU-
THORITY STOP**

**ADVISE ROUTING, WAYBILL NO. (WBN), ESTIMATED TIME OF AR-
RIVAL (ETA), ACKNOWLEDGE STOP THANK YOU STOP**

- make necessary arrangements for the training of administrative and relief personnel
- consider appropriate legislation or other measures to facilitate the receipt of aid, including overflight and landing rights and necessary privileges and immunities for relief units
- improve national disaster warning systems.²

2. Stephen Green, *International Disaster Relief* (New York: McGraw Hill, 1977).

Based on such legislation, the resulting terms of reference and protocol in addition would:

- establish the organizational plan of its national relief office
- delineate responsibilities of and the means for specific cooperation between government bodies, the Red Cross, community officials and private relief organizations
- determine the channels of communication with the Disaster Relief Coordinator of UNDRO
- require regular assessment of local resources
- establish the procedures for indenting local private and commercial stocks in emergencies
- provide for the organization of emergency health relief services
- arrange for the provision and storage of shelter, food and clothing
- guarantee effective, internal, alternate communication systems
- call for mobile disaster relief units where there is little or no infrastructure
- establish the practice of central receipt and handling of international assistance
- make customs arrangements for duty-free entry of international relief supplies
- create adequate tracing services
- establish various contingency and evacuation plans
- ensure that the public, both within the stricken nation and abroad, is provided with up-to-date and accurate information
- provide for simultaneous monitoring, evaluation, and reporting to build a more responsive service based on past experience
- designate full-time, on-call personnel and a means for establishing a roster of volunteers to ensure that personnel needs are adequately met in time of a disaster.³

Legal Status and Registration of Medical, Pharmaceutical and Paramedical Staff

An emergency situation may require temporary assistance from foreign medical, pharmaceutical and paramedical staff. If their licenses

3. UN General Assembly Resolution 2816, Assistance in Cases of Natural Disaster and Other Disaster Situations, 2018th Plenary Meeting, 14 December, 1971.

to practice in their home countries are not recognized in the country where the emergency occurs, these professionals may hesitate to participate. Awarding a legal status in emergencies for foreign medical, pharmaceutical and paramedical staff could be considered as part of the preparedness measures. The formal declaration of a state of emergency for a particular area could enact this legal status.

It is advisable to make the emergency status subject to registration. Obviously, the best location for such registration would be the health ministry. However, since this ministry and others may be impaired in an emergency, the legal measures could stipulate that registration may take place with the Ministry of Health of the donor country and the Regional Office of the World Health Organization.

Import Regulations

The importation of drugs and medical supplies also may pose a problem unless emergency preparedness measures include the drafting, formal acceptance, and communication of regulations valid only during a formally declared state of emergency. Although it might seem an attractive idea to include regulations dealing with unsolicited gifts of useless items, handling the problem in this way is fraught with legal, diplomatic, and practical pitfalls.

Licenses and Patents

The manufacture and distribution of many drugs is subject to licenses and patents, particularly if drugs are presented under proprietary names. Of course, licenses and patents are intended to put their owners in control of the marketing and distribution of their items under normal circumstances. To date, there have been no reports of problems encountered in this area during or after disaster relief operations; nevertheless, licenses and patents are potential problems, particularly with regard to product liability.

Reimbursement for Supplies

Supplies from the public sector and voluntary agencies usually are obtainable after disaster without reimbursement, but supplies from the private sector often must be used to meet immediate critical needs

and must be paid for. Both the costs of these supplies and the mechanisms for reimbursement of private groups should be specified in advance to avoid later disagreement. During cost negotiations it is important to remember that even if goods acquired from the private sector are expensive, it almost always costs less to acquire stocks from the private sector than to import medical supplies from abroad during the disaster period. Also, the ready availability of supplies from the private sector contributes to the saving of a greater number of lives.

The cost agreed upon for imported medical supplies should be the landed cost—that is, the cost of the goods plus the cost of the insurance and freight from the country of origin to the warehouse of the supplier. Landed cost includes neither the expense of administrative overhead nor the profit gained from use of the supplies. The national government should, however, ensure that customs duties are refunded to the private sector for supplies acquired for disaster relief, regardless of whether they arrived in the country before or after the disaster. The government should also be aware that the per-item cost to a private supplier is usually higher than that paid by a government because the private sector pays import taxes and because the government usually receives volume discounts.

The cost that the government pays the private sector for medical supplies manufactured within the country should be free-on-board (FOB) cost. This consists of the cost of manufacturing the items plus all expenses charged (such as freight, cartage and portage) to get the goods from manufacturer to warehouse.

This discussion of costs assumes that the medical supplies acquired from the private sector will be paid for by cash reimbursement. However, a government and a supplier can agree to reimbursement in kind, replacing supplies considered to have been borrowed from the private sector with identical items in the inventory of the public sector. The private sector suffers no loss under such an arrangement except that of time, and the sooner the items are replaced, the less the private suppliers are disadvantaged. It is recommended that reimbursement in kind be considered seriously during predisaster planning of medical supply management. Not only do private organizations generally find it a reasonable arrangement, but the government may be able to procure replacement supplies at a significantly lower cost than is possible with cash reimbursement and thus may benefit substantially.

Transportation

If owners of air, land and water vehicles and transportation systems in the private sector fail to cooperate with the distribution system for emergencies, legislation should be drafted to mandate their cooperation while ensuring adequate postdisaster remuneration for their services.

Audits of Medical Supply Management Plan

Once a disaster preparedness plan has been developed and put into effect, relief authorities cannot simply wait for disaster to occur. Because the contingencies upon which many aspects of the plan are based may change before disaster strikes, and because authorities must maintain familiarity with the plan and its procedures, audits should be conducted periodically to evaluate the current appropriateness of the preparedness plan.

From time to time one or more components of the medical supply management plan should be simulated to rehearse and assess its overall effectiveness and efficiency. Periodic updating and assessment of preparedness capabilities ensure that the nation is as prepared as possible to handle the needs for medical supplies after disaster.

Part III

Responding to Disaster

The following chapter is a walkthrough of a generic disaster. For countries that are designing medical supply plans, this chapter will give a sense of the sequence and detail of an unfolding disaster. In countries that are not developing plans and have none on file, this chapter can provide a rule-of-thumb guide for coping with an emergency if one occurs before a plan is developed. Whether planning has taken place beforehand or not, these guidelines for postdisaster response should be modified to meet the contingencies of each particular disaster and the conditions of each particular country.

If no organized activity to prepare for a disaster has taken place before one occurs, the system for medical supply management will have to be established quickly. Access to supplies, equipment, and facilities and to channels of communication, transportation, and distribution, as well as emergency financing, will all have to be arranged during the emergency. The single most important step to ensure the best response under these conditions is to centralize coordination of the relief activities.

During the emergency, most medical supply needs can be met with the use of local supplies. The primary problem in crisis management is distributing the supplies that are locally available. Other significant areas are inventory preparation and control and the use of donated international supplies. These areas are the primary subject of this section. The organizational structure to carry out these functions is described in part II.

Centralized Reporting System

Centralized coordination of activities during the emergency phase of a disaster is vital to the smooth operation of relief activities. Once a disaster has occurred, the offices and facilities set aside as the emergency coordination center for activities are the first that should be examined for damage. If the permanent office is damaged, an alternate



Claude de Ville/PAHO

The most critical medical needs usually have to be attended by national resources, in whatever condition they may be found.

is chosen. Records and equipment from the permanent office are salvaged to the extent possible. If the different units of the Health Relief Committee have to be set up in different locales and the communication system between them is out of commission, walkie-talkie, CB radio, human messenger, and other forms of communication must be set up.

The second step is to obtain a report on the status of field personnel and facilities in and near the disaster site. The first status report—however provisional—is used to select the contingency plan that will be put into effect. As relief operations begin, regular updates will permit officers in charge to modify the response actions accordingly.

Throughout the emergency a predetermined reporting system should be employed for careful registering of needs, requisition, acquisition and distribution of supplies, and a running balance of all medical supplies entering the disaster zone. Clear lines of communication should be established among different field sites and between field sites and the central coordination point. The management component of the na-

tional emergency committee in turn provides regular reports to the committee as events unfold. A reliable reporting system reduces the confusion and allows informed decisions to be made regarding the optimal deployment of supplies and personnel.

Preparation of a List of Essential Medical Supplies

The first step in crisis medical supply management is for representatives from the medical attention, environmental health, epidemiological surveillance and medical supplies relief sections of the Committee to prepare the list of essential medical supplies. For each item, the list should indicate its priority, type of supply category, and a detailed description.

Assigning priority ensures that the first supplies located and acquired are those that are the most needed. Also, if funds for acquiring medical supplies are scarce, the most critical needs will be met before monies and effort are expended on less critical medical problems.

Organizing the list into categories of supply types facilitates the location, acquisition, requisition and use of medical supplies. Supply categories should include storage requirements, as follows:

- **Pharmaceuticals**
 - a) at room temperature
 - b) air-conditioned (keep cool)
 - c) refrigerated (keep cold)
 - **X-ray supplies**
 - a) at room temperature
 - b) air-conditioned
 - **Laboratory**
 - a) ingredients
 - b) equipment
 - **Surgical dressings**
 - a) sterile
 - b) nonsterile
 - **Medical instruments**
 - **Environmental health**
 - **Substances controlled by law**
 - **Other categories**
 - **Unsorted supplies**
-

Pharmaceutical supplies are further ordered according to therapeutic type, and within each of the therapeutic types, drugs are listed in alphabetical order by generic name. For example, under antinfective drugs, ampicillin, phenoxymethylpenicillin potassium and tetracycline are listed in that order. Providing details on each item on the list of essential supplies guarantees that sufficient information is available for relief workers in field locations to order directly from the list. Examples of detailed descriptions are: ampicillin capsules, 250 mg, 100/bottle; phenoxymethylpenicillin potassium tablets, 250 mg, 100/bottle.

Items to be placed on the list of essential medical supplies should be chosen on the basis of the magnitude of the disaster and the patterns of morbidity and mortality associated with the type of disaster that has taken place. Established lists of essential medical supplies such as that provided in figure 6 (part II) can be used as a guide and amended to suit the needs of the affected nation.

Length. The list of essential medical supplies should always be short, since the number of supplies that meet most disaster-related medical needs is relatively small. It should, however, encompass the full range of types of supplies that will be required (major categories into which the list should be subdivided).

Generics. To facilitate acquisition, international, nonproprietary generic terms *always* should be used. If items ordered by specific brand name are not available, orders may be delayed significantly or even cancelled. It is also cost effective to order drugs and other medical supplies by generic name; brand name supplies are almost invariably more expensive.

Recognized efficacy. The effectiveness of drugs cannot be tested in emergency situations. Each item on the list must be of proven effectiveness for the particular use for which it is intended.

Shelf life. All items should be relatively stable and should not tend to degenerate rapidly when conditions of storage are less than ideal. In addition, most expiration-dated items should have an expiration date of at least 6 months.

Availability. It is difficult to know whether all of the supplies selected for inclusion on the list of essential medical supplies will be readily available, but whenever possible the items placed on the list should be easy to obtain within the affected nation's borders. This increases the likelihood of access to the supplies during an emergency. They also

are more likely to be used properly if workers in the field are familiar with handling and dispensing them. Familiarity with medical supplies is an asset in effectively providing relief to victims under the stressful conditions of operating in the field after disaster.

Packaging. Ready-to-use packaging of medical supplies should be a priority in considering the items to include on the list of essential medical supplies.

Disaster use. Each item placed on the essential list should be intended for use only in response to the conditions caused or aggravated by the disaster. For reasons of cost, among others, a disaster should not be used as the excuse to acquire medical supplies not previously available in the nation, except when the supplies are critical to the success of the relief effort. Vaccines should not be placed on the essential supplies list or used in emergency disaster relief for many reasons, including the inability to control a proper and complete mass campaign (see annex F). In addition, nonemergency items such as multivitamins, appetite suppressants and antacids, which contribute nothing to relieving emergency conditions and divert scarce human and material resources from meeting critical needs, should never be placed on a list of essential medical supplies or be sent by donors.

Cost. So far as possible, only relatively inexpensive items should be placed on the list. Lower cost makes more resources available for more needs. Although cost should be a critical consideration whenever there is a choice between items of essentially equal efficacy, cost should never be a primary determining factor in deciding whether or not to acquire medical supplies critically needed to treat affected populations.

Once the list is complete, it should be circulated among members of the Health Relief Committee and all relief participants at field facilities. These individuals should be informed that the list is to serve as the emergency medical supply formulary throughout the period of relief activity, although authorities of the medical supply management team may fill requests for specific medical supplies with substitute items as needed.

Inventory Preparation and Control

When the list of essential supplies has been finalized, the next task is to check existing inventory records to see if they are sufficiently up-

to-date for immediate use. If they are not, the task is to review salvageable stocks and report back to the national level authorities.

As in all areas of disaster relief management, the speedy and accurate assessment of needs is essential for saving time and making good use of available resources. After the inventory records have been checked, the staff should identify the national (or, if necessary, international) locations of all needed supplies. Within national borders, supplies may be found in the public or private sectors or in the possession of nongovernmental voluntary organizations.

In most instances of crisis management of medical supplies it is impossible to compile a completely accurate inventory; there is never sufficient personnel for the task, and breakdowns in normal lines of communication and transportation severely hinder such an effort. However, it is possible to estimate the availability of supplies in different locations and under the control of the different sectors. Three basic steps involved: compiling an inventory of supplies, filling requests with other suppliers, and acquiring from private sources.

Compiling the Inventory of Supplies Available in the Nation

The first thing to do is to contact exhaustively all large facilities in the vicinity of affected areas. As these stock levels are added to the inventory, the search for available stocks can be extended to smaller facilities in the area and to other inventories within the country that are beyond the vicinity of the impact. Stocks in facilities that have been reported as damaged or destroyed should not be neglected in this effort; the availability of supplies in any facility should not be discounted until there has been an actual physical inspection.

Persons who should be contacted in the public, private, and voluntary sectors include the following individuals and representatives of organizations and facilities:

Public sector:

- representatives of central and district hospitals and medical stores
 - social service hospitals and medical stores
 - military and paramilitary hospitals and medical stores
-

- government dispensaries
- rural dispensing physicians

Private sector:

- medical supply wholesalers, distributors and manufacturers
- hospital and retail pharmacies
- dispensing physicians

Voluntary sector:

- missionary hospitals and medical supply depots
- Red Cross depots
- United Nations/United Nations Children's Fund
- any other volunteer agency stores in the area.

Contact should be made by whatever means of communication is available. Every person contacted should receive an oral or written copy of the list of essential medical supplies needed. These persons should then check the inventory levels at their respective facilities and report back with their findings, using the standard inventory preparation resource form shown in figure 10.

A master list of available supplies then is compiled from these resource forms. The format for a master list presented in figure 11 is suitable for listing available supplies on either a blackboard or a control sheet with pencilled entries. Data gathered from all sources—including information about inventories from international donations collected at ports of entry and about supplies that are available after sorting at storage sites—should be entered on the master list. The list should be updated continuously to reflect the balance and storage locations of all items issued and new items received.

Forms and charts other than the one presented in figure 11 can always be developed as they are needed, but it is best to keep types of records to a minimum. This reduces both the complexity of inventory control activities and the number of staff members required for this task during the emergency.

Figure 10. Sample Standard Inventory Preparation Resource Form for Use in Reporting Inventory Levels to Medical Supply Management Authorities

Source		
	Name:	
	Address:	
	Phone number:	
	Contact:	
List of Essential Medical Supplies (in order of importance, by category)		
Item No.	Item Description	Quantity Available
Pharmaceutical Medical Supplies		
1.		
2.		
3.		
4.		
5.		
Non-Pharmaceutical Medical Supplies		
Minor Surgical Instruments and Medical Equipment		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
etc.		

Filling Requests with Public and Voluntary Sector Supplies

The Chief Medical Supply Officer or the responsible unit receives and reviews requests from the field for medical supplies included in the inventory. In reviewing the request, it should be decided whether

Figure 11. Sample Format for Control of Available Inventory
(List of Essential Medical Supplies)

Item No.	Item Description	Source Location				Total Balance
		A*	B	C	D etc.	
1.	_____	5	10	15	20	50
2.	_____	2	2	2	2	8
3.	_____	5	5	5	5	20
4.	_____					
5.	_____					
etc.						

Source Identification
A* = Name of source, location, storage site contact, phone number.
Entries are made by line item, under the appropriate source, and total balance adjusted as items are received and issued, to maintain a running balance of available line items

the items are of an emergency nature. If they are not, the requisition form is filed for later action or returned to the requestor with an explanation of nonfulfillment. If there is no time or if resources are not available for returning the form and explaining the denial, the requisition order form should simply be destroyed.

If the requisitioned item is of emergency need, on the other hand, the request is processed immediately. The responsible officer reviews the master rough list of supplies to locate the requested goods. If they are found within the public or voluntary sectors, their release and distribution may be authorized. If there is a separate medical supply distribution section, it should receive three copies of each requisition form received so that distribution and transport of the supplies can proceed on schedule.

Acquisition from Private Sources

Field assistants in medical supplies acquisition and requisition maintain close contact with their counterparts in inventory prepara-

tion and control throughout the relief effort. It is their duty to:

- replenish field stocks continually as medical supplies are used in treating the affected populations
- inform inventory control about incoming supplies as they arrive and about requirements for additional storage space, cold chain, or other facilities that must be provided
- inform the national-level acquisition and requisition unit of changing needs and priorities of medical supplies in the field.

If supplies are not available from the public or voluntary sectors, it may be necessary to acquire them from a private source. The source of the supplies is identified from the list of local, regional, and national wholesalers, distributors, pharmacies and hospitals that normally stock the item. Possible sources close to the impact zone should be asked first if they have the needed supplies on hand. If they do not, the search is then extended to other areas within the broader area, and then within the nation. If necessary, sources outside the country also are asked. Whatever source is finally used should receive three copies of each requisition order whenever possible.

At times, the private sector donates medical supplies requested from the field. Usually however, the goods must be paid for under contract. Government policy establishes the nature of the contract authorities sign with a private organization. The same considerations of cost apply in developing policy as in planning acquisition (specified in detail in part II, pages 42–43). Briefly, the private supplying organization is encouraged to provide the needed goods under the terms of reimbursement in kind, or, at most, to provide them at cost. Cost is defined as landed cost for imported medical supplies or free-on-board (FOB) cost for medical supplies manufactured within the nation's borders. Extended terms of credit should always be requested. The actual form for medical supply acquisition is the same as that described in part II and depicted in figure 8.

Medical Supply Distribution, Field Receipt (Sorting and Storing), and Requisition of Supplies

Treatment of numerous injuries caused by a natural disaster may rapidly deplete those medical supplies that were available in and near

zones of impact and field medical units. Hospitals, clinics, mobile and other medical teams that treat victims must be able to replenish their supplies expeditiously through an efficient system of distribution of requisitioned goods. At the same time, to maintain an efficient distribution system medical units in the field are responsible for keeping their requests for supplies both simple and specific.

In most ad hoc responses to disaster, a Chief Medical Supply Officer or an assistant designated to direct distribution is responsible for coordinating all activities related to the distribution of medical supplies.



Guglielmo Esposito/Il Mattino

Rescue workers rush victim to nearest treatment center after removing him from the rubble left by a major earthquake in Italy in November, 1981.

Medical supply distribution, requiring both skilled and unskilled personnel, is the most labor intensive of all the components of disaster medical supply management. It involves complex efforts devoted to receiving, sorting, storing and initiating requisition of the needed supplies at national or field levels. Distribution systems should always be adapted to the requirements of unique local conditions, but a model distribution system that can be followed for crisis medical supply management is presented in figure 12. As the figure shows, the Chief Medical Supply Officer is responsible for:

- checking distribution networks
- coordinating the successful arrival of incoming supplies
- liaison with members of the transportation and communication component of the National Health Relief Committee
- locating and mapping sites for storage of supplies.

The Officer is also responsible for coordinating the appointment and recruitment of personnel.

Checking Distribution Networks

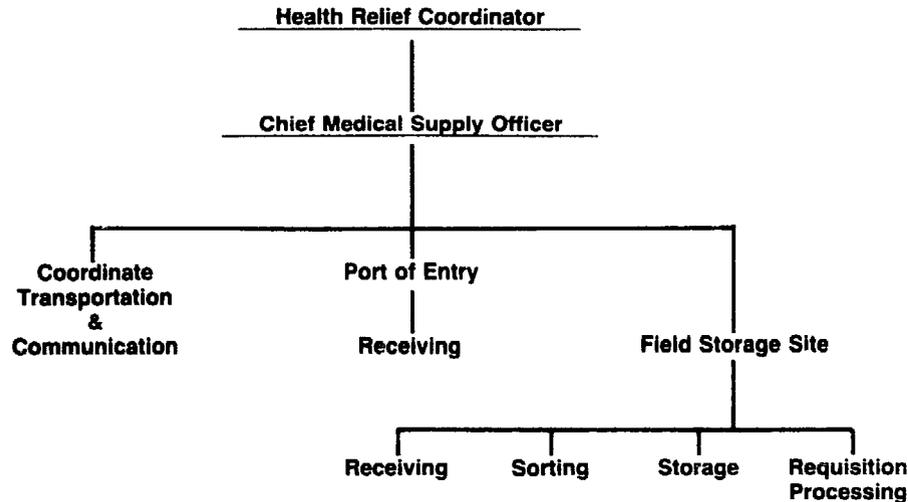
The first imperative is to determine which distribution networks are still functioning, checking at three levels: from international sources to points of entry to the nation, from central national stores to field depots, and from field depots to the workers treating victims at the sites.

The operational status of the following should be checked as well:

- all air, land, and water points of entry to the nation
- airports and airport operating equipment that allows incoming flights to land
- docks and operating equipment on docks for unloading medical supplies
- navigable rivers
- primary and secondary highways, rural routes, and railway lines.

If preferred routes for effective distribution have been destroyed, the most appropriate alternate routes should be chosen. On being informed

Figure 12. Model Medical Supply Distribution System for Use in ad hoc Medical Supply Management



that particular goods must be moved from one point to another, the distributions unit must oversee the transfer. Special attention should be paid to the arrival of medical supplies from international sources and the transfer of supplies from wholesalers to warehouses. Duties include:

- verifying that the consignees' names and addresses are current
- arranging for the transportation of the supplies
- acknowledging receipt and condition of supplies on the acquisition record accompanying shipment
- overseeing the loading of supplies onto transportation vehicles.

Operators of the vehicles should also acknowledge receipt of the goods in writing and obtain the signatures of the recipients upon delivery.

The field and national levels of the distribution unit must cooperate extensively after a disaster. The central level is well situated to identify

the distribution routes to use for transporting supplies from central to peripheral points. Field personnel, meanwhile, know very well the conditions of transportation routes; they may, in fact, be in a better position to make the final decisions about which of all the available negotiable routes should be used.

Arrival of Incoming Supplies

One qualified individual should be appointed to each major port of entry to screen incoming medical supplies and oversee their transfer to those in charge of distribution. Even during the difficult period following the disaster, all medical supplies received—regardless of the source—must be checked carefully for their condition and ultimate dispensation. Both the distribution staff, who receive goods at ports of entry and from local suppliers, and those in inventory control at storage sites in the field should check the condition of all the medical supplies passing through their hands and should keep a master inventory. The inventory should register:

- date of receipt
- type of supply
- quantity
- source of shipment
- destination
- running balance of supplies in each depot
- running balance of the total of all medical supplies in all locations throughout the nation.

When medical supplies are lost or damaged en route from a port of entry or from a warehouse, the exact quantity of goods actually received should be recorded on the original requisition form, the receiving documents, and the master inventory file card. The loss or damage should then be reported to the distribution team.

Liaison with Transportation and Communication

The transportation and communication component of the Health Relief Committee may be responsible for delivering supplies to the storage sites. At the national level, the primary concern in transportation is

access to messenger vehicles and to motor vehicles to use for the inspection of sites. At the field level, it is important to obtain access to all land, air, and water vehicles of any size that can be used to transfer medical supplies from one location to another. With regard to communication, the main concern is to assess the functioning of and access to equipment that is intact in pertinent locations at the national level (e.g., telex/teleprinter/telecopiers, field radios, shortwave radios, foreign embassy communication equipment, diplomatic courier services, and general-use messenger services). Telephones, field radios, and messengers must be located in the field and kept available for use.

Storage Sites

Access to needed supplies and equipment should be guaranteed at headquarters, at each major port of entry, and at all field storage sites. The medical supply unit is responsible for selecting and mapping central, satellite, and alternate storage sites (where needed). Major considerations for selection are:

- proximity to land, air, and water routes
- safety from flooding or other damage
- adequate security
- existing or easily established systems of communication
- electrical or other means of providing lighting and refrigeration around the clock
- sufficient interior space for receiving, sorting, storing, order processing and shipping.

The large, open rooms found in airplane hangars, gymnasiums, schools and auditoriums and on military bases are good storage sites. The master map of all storage sites in the field should list the location and the capacity of each site chosen, as well as the types and requirements of the medical supplies and the key personnel stationed at each site.

Appointing and Recruiting Personnel

Field-level personnel should be authorized to recruit professional and other individuals as support staff. The exact number and kinds of field

personnel required to assist in the distribution depend on the type and magnitude of the disaster, the size of the affected nation, and the availability of skilled human resources.

Two major types of supervisors should be appointed: storage site supervisors, to be stationed at each of the major sites of storage; and sorting supervisors, to be stationed at the primary sites where unsorted medical supplies are stored. Storage site supervisors are responsible for the storage and subsequent distribution of the supplies to operating field medical units. Their task is to ensure access to the vehicles and communication equipment necessary for national and field distribution. Sorting supervisors preferably should be practicing pharmacists or individuals familiar with pharmaceuticals and other health supplies. The sorting team can include other pharmacists, pharmacy students, and health professionals and students familiar with pharmaceutical and health supplies and available to work around the clock each day in which sorting must be undertaken.

Sorting Supplies

Each sorting supervisor should be assigned to one specific storage site. Sorting may be undertaken at scattered storage sites in the field, but because of the scarcity of staff it is more practical to conduct all sorting in one central facility. All supplies that arrive unsorted can be directed to this facility and from there directed back out to the various field sites where they are needed.

It must be emphasized that the sorting of medical supplies during an emergency should be undertaken *only as a last resort*, when all other sources of medical supplies have been exhausted. The activity demands the time and energy of a skilled pharmaceutical labor force, and the process is a slow and tedious one. Usually at a minimum it involves:

- going through thousands of boxes filled with mixed contents
 - inspecting each item
 - classifying each item according to established priorities
 - integrating the newly sorted supplies into the channels of emergency distribution.
-

Because of the time involved, the sorting of medical supplies cannot fill all demands for these items during an emergency. However, when local supplies are depleted faster than they are replaced and unsorted supplies are available, sorting is justified to replenish the stores.

When the decision is made to proceed with sorting, the supervisor first notifies the storage site supervisor of the amount of space the activity will require and then identifies the health resources needed and the labor pool that will do the job. Resources may include tables and chairs; packaging materials, such as boxes, tape, and scissors; office materials, such as labels and marking pens; international pharmaceutical reference texts; and skilled and unskilled volunteers.

Each member of the sorting team should receive a copy of the list of essential emergency supplies. The categories in the list should serve as the basis for sorting materials, and only items appearing on the list or their equivalents should be kept. If an essential supplies list does not exist or a copy of it cannot be obtained, the sorting supervisor should promote and assist in developing one. In the meantime, until a list becomes available, sorting can still be performed along the lines of the categories established on such lists. To review, the categories are:

- type of supply (pharmaceutical, x-ray, laboratory and so forth)
- in the case of pharmaceuticals, the type of therapy provided (antifective, analgesic, and so forth)
- storage conditions required (room temperature, refrigeration, etc.).

Professional team members can work individually or in groups comprising students plus at least one professional to oversee the group's activity. Each professional or professionally headed team checks every item in the boxes of unsorted medical supplies for the following:

- inclusion on the list of essential supplies (set aside or discard if not included)
 - the expiration date (set aside or destroy if outdated)
 - the label (set aside if not readable and if not in the language of the affected country)
 - quality of the contents (destroy if contaminated, used or damaged).
-

In general, pharmaceuticals held beyond their expiration date should be disposed of. Indicating a date of expiration often is employed to impose a definite limit on the liability of the manufacturer. In other instances, the law stipulates that expiration dates must appear on labels. These dates are usually conservative, however, and the drug's safety and potency do not fall from 100 percent to nil in a day. Many can still be used. However, no supplier or donor agency should dispatch expired drugs to an emergency situation unless retesting and recertification have been arranged in advance. If the only drugs that are available have expired, in emergencies pharmaceutical reference laboratories, associations of the pharmaceutical industry, and suppliers of the product in question can be requested to supply data on potency and safety of specific items after the expiration date. The World Health Organization/Pan American Health Organization also can assist in retesting when large quantities justify the costs involved. Drugs of uncertain quality in small volumes should be discarded.

Items that pass inspection are:

- grouped according to category
- alphabetized by generic name within each category
- reboxed
- relabeled
- submitted to the storage site supervisor for further storage or distribution to the field.

Storing Supplies

The storage site supervisor maintains an inventory of all sorted supplies and communicates this inventory to the Chief Medical Supply Officer or the advisor appointed to oversee inventory preparation and control. Information to record includes:

- dates
 - sources
 - contents
 - conditions of the contents of all shipments received
 - bills of lading
-

- invoices
- records of disposition sites of the goods within the storage areas.

With this information in hand, upon receiving a request from a field medical unit the storage site supervisor is in a position to coordinate the transfer of medical supplies from storage to the arena of the field relief.

Storage site supervisors are responsible for recruiting professional and nonprofessional staff members on a voluntary basis—local university students, members of professional organizations, and other volunteers who are willing to work toward the relief effort in exchange for food and shelter. The tasks in which these volunteers participate under the direction of the storage supervisor fall into four basic categories: receiving, sorting (when done at the field site), storing supplies, and processing requisitions from field medical units to individuals at the national level.

The storage site supervisor or a designated assistant coordinates the receipt of all medical supplies at storage sites. The person responsible for receiving supplies meets each new shipment as it arrives, coordinates unloading, and places the shipments in designated holding areas. Supplies are kept in holding areas until the invoices or bills of lading available have been verified (or the contents of the shipments examined, if no supporting documents accompany the shipments). Then they are rough sorted at the holding area.

Rough sorting is a complex process. Unsorted supplies are stored together in one location. Once sorted, they are divided into three groups for separate destinations. Those on the list of essential supplies are designated as *sorted emergency* supplies and are stored in a separate area for subsequent distribution to operating field units. Medical supplies not included on the essential supplies list are designated as *sorted nonemergency* supplies and are destroyed or stored in an area reserved for supplies that can be used after the emergency. *Controlled and perishable* medical supplies are marked separately and are secured or placed in an ensured cold chain.

Stored items must be organized by generic name. Expiration-dated supplies should be placed so that those with the shortest expiration dates are used first. Other supplies should be placed for use on a first-in, first-out basis. All items should be stored off the floor (on pallets,

boards, straw or whatever is available); they should not be stacked so high that the contents of bottom containers can be damaged and should be placed away from the walls for protection from water damage. Supplies should be stored unmixed in the following categories:

- pharmaceuticals
- x-ray supplies
- laboratory supplies
- hospital supplies
- surgical/first aid supplies
- environmental health supplies
- perishable supplies
- controlled substances
- unsorted supplies
- other supplies.

In storing medical supplies, it is necessary to allow sufficient aisle space so that persons or mechanical devices can readily retrieve the supplies. Adequate space within the storage facility must be arranged for the separate activities of receiving, storing, sorting and processing requisition orders.

It should be noted that the field storage site usually distributes medical supplies to field units, but occasionally it may also dispense supplies directly to patients. In these cases, the patients usually have been directed to the storage site by health professionals practicing in a field medical unit in the vicinity.

Processing Requisitions

Processing medical supply requisitions by field storage sites begins when the availability of supplies (for which requests are sent to the national level) is verified. Upon receiving a requisition (in triplicate when the forwarded request is a written one), the storage site supervisor or assistant reviews it, locates the items or acceptable substitutes at the storage site, and has all of the requisitioned items retrieved and consolidated. Each item is then checked against the list on the requisition order to make certain that no supplies have been overlooked and that all of the items are packaged together.

The packaged container should weigh no more than 25 kg and contain a copy of the requisition order or bill of lading. Contents should be carefully packed to protect them from breakage. The label should show clearly the name and addresses of the consignee and the storage site, and the container also should have a large, green label marked: **FRAGILE—MEDICAL SUPPLIES**.

Once suitably packaged, the medical supplies are transported to the field medical unit that requisitioned them, according to arrangements made with the transportation component of the Health Relief Committee. Supplies are transferred to field medical units according to their urgency and, to some extent, according to the size and weight of the packages. The storage site supervisor provides this information. When vehicles arrive to pick up the supplies, the storage site supervisor oversees the transfer of the supplies to the vehicles. Each driver should sign a copy of the bill of lading, noting the number of boxes received, the date, the site from which they were picked up, the final destination and acceptance of the shipment.

Processing of a requisition order is completed when a second copy of the bill of lading, with the information above noted on it, is sent to the national headquarters and a third copy is filed at the storage site. Filing these copies in permanent data files guarantees that if questions arise about the distribution of specific supplies they can be followed up.

Requisition from the Field

Supplies to be used in field medical units should be requisitioned after the senior individual in a unit has taken an inventory of the unit's stocks, identifying specific items as exhausted or as being so rapidly used that they will be depleted before the emergency mission is completed. Using the essential list, the senior individual makes a written request and transmits it in any way possible to the medical supply management headquarters. This request includes, at the minimum, the name, address, and telephone number of the medical unit and the name, title, and signature of the unit's senior medical or health professional. (In most countries, the signature of a physician is required before any substance controlled under law can be dispensed.) Phar-

maceuticals should be named by generic term and the quantity needed and other pertinent details about the supplies should be described.

If the field medical unit is an established facility such as a hospital or a clinic, the official requesting the supplies can also ask in the requisition that medical supply management officials arrange the delivery of the supplies to the unit. If the requesting unit is a mobile medical team, however, the team must arrange to have the supplies shipped to a convenient point for pickup. Alternatively, the requesting official of a mobile unit can provide for pickup at the field depot by sending a worker from the unit to the depot once the supplies have been packaged.

At this point, the cycle of the ad hoc medical supply acquisition, requisition and distribution has been completely described—assuming that, as is usually the case, the medical supplies needed during the emergency are available within the disaster-stricken nation. However, the medical supply management team has further duties to perform. Authorities in the medical supply management organization should replenish supplies taken from stocks used to treat patients in normal times and analyze the efficiency and effectiveness of the entire medical supply management team's effort to respond to the health needs of disaster victims. The results of the analysis should be used in preparing for future natural disasters, and action should be taken to create a disaster relief committee to plan the response to the next disaster. A checklist of the types of questions that can be used for this analysis is provided in annex I.

Training New Members of the Medical Supply Management Relief Team

The occurrence of natural disaster attracts untrained volunteers to relief operations. Relief workers from abroad also are likely to appear. To ensure the efficient use of these last-minute additions to the relief team, short-term emergency training programs should be initiated during the emergency period.

Also, more field workers in medical supply management may be needed than had been estimated or enlisted before the disaster. After the disaster, these individuals can be recruited as additional members of the staff of the overall field-level medical supply management effort.

Particularly important for the success of the relief effort are persons from the affected communities who can easily be trained in the identification of pharmaceutical dosage forms; they can receive crash courses and then participate in the actual dispensing of drugs to victims.

International Medical Supplies Assistance

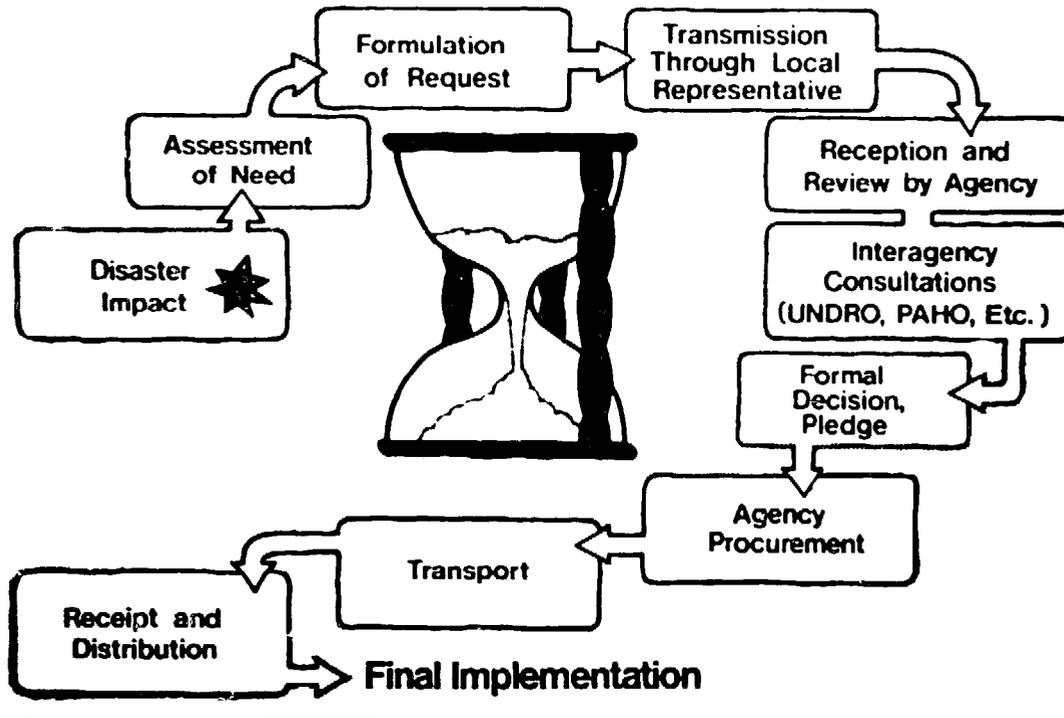
Even though medical supply relief during the acute emergency phase of most disasters is effected through use of locally available medical stocks, the magnitude and type of disaster or the undersupply of stocks of medical goods within the stricken nation may make it necessary to seek medical supplies from abroad. As soon as possible after the onset of the disaster, it should be determined whether medical supplies must be acquired from international sources. Requests for donations of specific medical supplies can be placed with foreign sources once it is known what available supplies are lacking or insufficient for immediate assistance and for the long-term rehabilitation and reconstruction periods. If urgently needed medical supplies must be acquired from abroad, the order for them should be placed within 48 hours after the onset of the disaster. Even replenishment supplies for the rehabilitation phase should be requested promptly so that donors have an accurate description of needs before committing their resources (see figure 13). If more than one source of an item exists, the decision must be made of whether or not to split the order between sources.

Requests to foreign sources for supplies should always be coordinated by a single representative—the Chief Medical Supply Officer or a designated alternate—of the stricken nation. This coordination simplifies the procedure for placing requests, and it assists donors in forwarding and handling supplies because all requests are placed by a single authority. This authority should preferably be from the health ministry.

Requesting Donations

Donors should be requested to provide a limited number of items of medical supplies, each in a significant amount, rather than a large number of supplies in smaller amounts. This sort of request makes it easier for donors to locate and provide donations, thus increasing the likelihood that the supplies that arrive are the ones needed. In addition,

Figure 13. It Takes Time to Implement International Assistance



requests should specify the priority of need of each type of item. In this way, the donor government or agency that cannot provide everything can send the most needed items.

All agencies approached to provide the same items should be listed, and the list should be given to each agency from which a request is made. Also, items requested should be drawn from the list of essential medical supplies and described to the agency in complete detail.

Supplies to replenish reserve stocks should not be requested except insofar as they help meet the relief, rehabilitation, and reconstruction objectives shared by the stricken nation and the specific donor nation or agency. If this rule is not observed the result may be hesitation, delay, or outright refusal to ship supplies upon which lives may depend during the postdisaster emergency. Along with the detailed description of medical supplies needed, the requesting nation should provide as much documentation as possible justifying the perceived need as ur-

gent. This includes area affected, number of injuries, size of affected population, estimated damage to health facilities, and so forth.

Pharmaceuticals should be requested using generic nomenclature. A brand-name drug may not be available in the donor's country, and the donor may not know if a suitable substitute will be considered adequate in the receiving nation and may therefore not fill the request for a brand-name drug at all. Brand names can be appended, however, if doing so clarifies the request. Providing special packaging instructions mandated by local storage and distribution conditions will facilitate the distribution and use of the donated goods. Instructions should include:

- the maximum size and weight of each package, described in detail
- the local weather conditions in which the goods will be stored and transported
- the mode of transportation that will be used
- the language and color coding requirements.

Perishable supplies must be kept under a continuous cold chain during shipment—and after, for which arrangements must be made from the point of receipt—and should not be ordered unless this can be guaranteed. The request also should specify the receiving country's shipment preference, the preferred port of entry, and the preferred means of communication.

In describing the means of communication to be used, relevant telephone, telex, and cable numbers should be given. The donor should also be informed about the existence of facilities for duty-free importation of medical supplies when such are available, and about other legal prerequisites related to the shipping and receipt of the donated supplies. Finally, the donating nation or agency should be asked to notify the receiving nation of the estimated time of arrival and port of entry of the shipments. The receiving country, in turn, will notify the donor that the supplies have been received once they are in hand.

Receiving Donated Medical Supplies

The medical supply staff appointed to each of the major ports of entry should be notified of the pending arrival of all shipments. The staff

then will meet the shipment and expedite the processing and distribution of the goods to the ultimate destination—storage or a field medical unit. Before the arrival of the supplies, the staff should designate a port site that is protected from the weather, such as a warehouse or an airplane hangar, to serve as a temporary storage site for incoming supplies. The equipment and supplies necessary for managing, protecting, and processing incoming medical supplies from abroad should be secured, as should refrigerators, hand trucks, forklifts and manpower to move the packages.

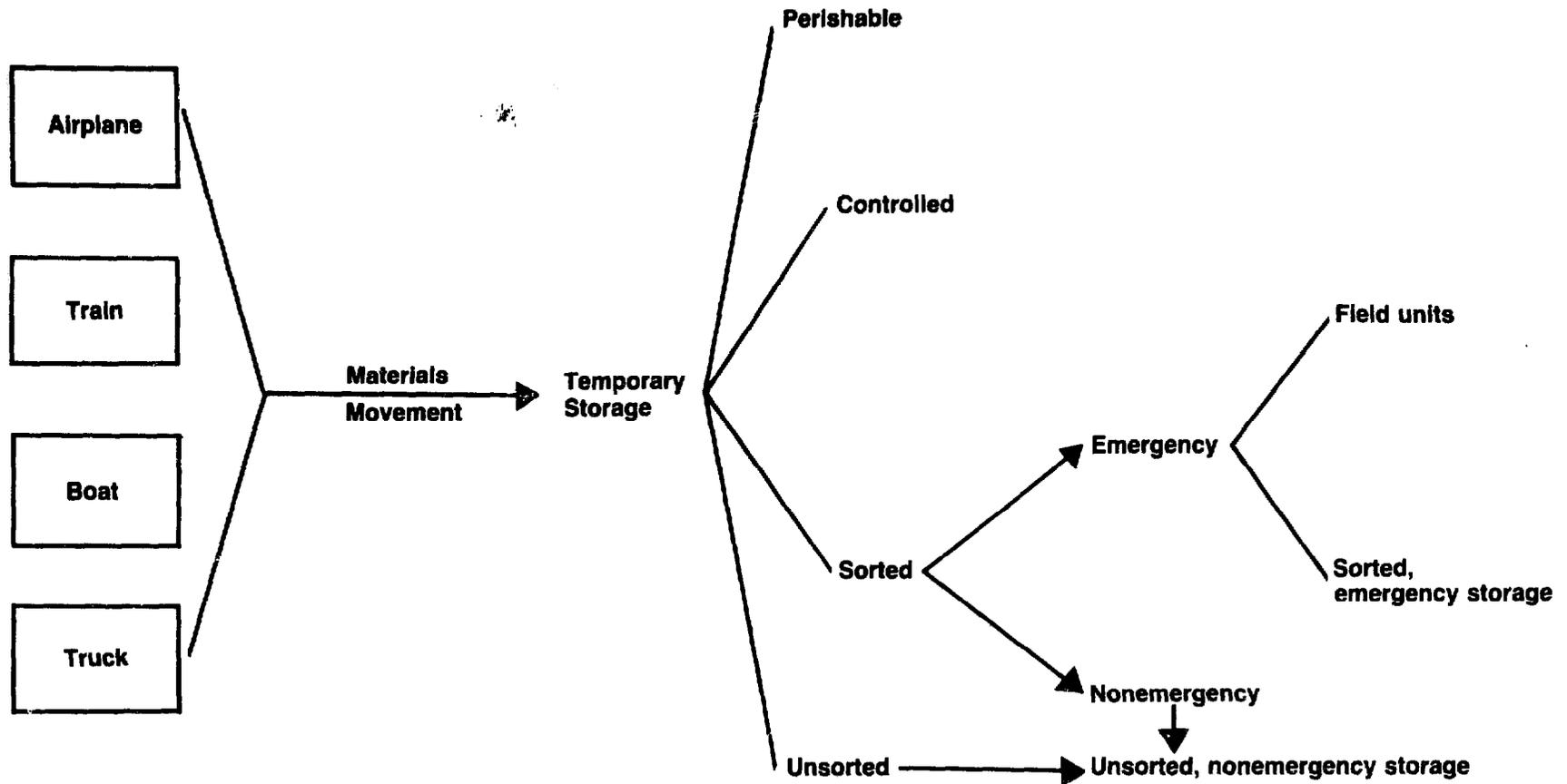
With these facilities set up, all key persons involved in unloading the emergency supplies should be instructed to direct them to the temporary storage site and to check whenever a question arises about whether or not any given item is a medical supply. In addition to those mentioned earlier in this chapter, the following procedures should be observed:

- review the bill of lading for each shipment
- ensure the continuing use of a cold chain for shipped perishable supplies
- separate controlled substances
- arrange for the security of temporary storage and the transfer of controlled goods to field sites
- rough sort each shipment after unloading.

If medical relief supplies have been ordered from foreign sources, suppliers should be asked for progress reports on the processing of orders. Whenever undue delays in sending the supplies are uncovered, they should be brought to the attention of the Central Medical Supply Office, which should then take whatever further action is necessary.

The patterns of movement of internationally acquired medical supplies after rough sorting are shown in figure 14. The contents of shipments are separated according to category at the temporary storage site. Unsorted emergency supplies are sent to an inactive warehouse along with unsorted nonemergency medical supplies. Useful emergency supplies that have been sorted are sent to an active storage site for subsequent distribution to the field, or they are sent directly to the field for immediate use without passing through an intermediary storage warehouse.

Figure 14. Movement of Internationally Acquired Medical Supplies after Rough Sorting at Port of Entry



Upon sorting and dispensing each shipment of internationally donated medical supplies, the central medical supply office should be informed of the following for all items received:

- source
- date of arrival
- time of arrival
- mode of transportation
- contents
- condition of contents
- storage destination
- further transportation requirements.

The transfer of the supplies to the next point of destination may then be coordinated.

Instructions for Donors

National authorities should keep donors informed of all policies, as soon as they are adopted, regarding international medical supply assistance. Policies on the acceptance of unsolicited supplies, conditions for the receipt of goods, and the proper channels of distribution should all be made clear to donors to avoid confusion and ill feelings. National authorities must also be prepared to provide additional documentation of need or to facilitate on-site inspection and damage assessment for representatives of donor agencies, should they request it.

The do's and don't's presented here are addressed not to the nationals of stricken nations but to those who donate supplies from abroad. Donating agencies and donating nations should *not* send the following:

- unsolicited medical supplies
 - expired or soon to expire medical supplies
 - used medical supplies
 - poorly packaged medical supplies
 - unsorted medical supply packages
 - unlabeled medical supply packages
 - medical supply packages that weigh more than one person can pick up, or 20–25 kilograms
-

- nonemergency medical supplies during the emergency phase of disaster relief.

Donors *should* do the following:

- send medical supply donations that meet specific emergency requests from a stricken nation's Health Relief Committee or a recognized relief agency
- send medical supply donations in care of a specific individual or organization at a specific address at a specified port of entry
- send medical supply donations with viable expiration dates
- send medical supply donations in well-packaged containers labeled in the language of the stricken nation and using international color codes on the labels
- coordinate shipment of medical supply donations with a responsible official at the receiving end

Figure 15. National Authorities Must Deal with a Wide Assortment of International Donors



- communicate shipment information to the receiving official: the port of entry, anticipated date and time of delivery, description of containers and contents, mode of transportation, and flight or freight numbers.

In summary, all supplies sent from abroad to the disaster-stricken nation should be monitored. During the chaotic conditions that often follow disaster, the medical supplies requested or donated from foreign sources often arrive before members of the National Emergency Committee or the Health Relief Committee know about the arrivals. This invariably causes confusion and waste. Continuous contact should, therefore, be maintained with foreign donors in order to inform national authorities about incoming shipments (see figure 15). Authorities in turn must inform members of the inventory preparation and control unit about the particular types of supplies that are being sent from abroad; these individuals then can list the supplies in the national inventory and guarantee that they will be used when and if needed.

Part IV

Annexes

Annex A

WHO/UNHCR Emergency Health Kit

Standard Drugs and Clinic Equipment for 10,000 Persons for 3 Months¹

Explanation

1. There are two drug lists (lists A and B) and one equipment list (list C). Together, the items make up one complete emergency kit. Drugs are listed in the order in which they are expected to appear in the third report² of the WHO Expert Committee on the Use of Essential Drugs, but consecutive numbers are allocated to facilitate reordering. The reference numbers shown on lists A and B are not, therefore, those which will be used in the third report, which are given in brackets after the heading. The drugs on list A are for use by basically trained health workers, while those on list B are for use by doctors and senior health workers. The equipment in list C is generally available, standard clinic equipment.

2. The purpose of the lists and emergency kit is twofold: to encourage a standardization of drugs and equipment and to enable swift, initial outside supply in an emergency if local supply is not immediately possible.

3. The drugs shown on lists A and B are those actually supplied in the kit. Where local supply is immediately possible, attention is drawn to the fact that in many instances various drugs could serve as alter-

1. Developed jointly by UNHCR and WHO. Copies are available in English and French from UNHCR or WHO. The kit will be revised in light of experience.

2. The Expert Committee met from November 29–December 3, 1982 and their third report will be published in 1983 in the WHO Technical Report Series, superseding TRS 641 (the second report).

natives to those on the lists. In these cases, the substance selected by the Expert Committee provides an example of a therapeutic group and, as in the WHO Revised Model List of Essential Drugs, is indicated by an asterisk (*). It is important that this is understood when drugs are selected at national level, since choice is then influenced by the availability and comparative cost of equivalent products.

4. The Health Kit is based on:

- an assumption that clinics will usually be staffed by health workers with basic training who will treat symptoms rather than diagnosed diseases, and will refer patients who need more specialized treatment
- half the population being 0–14 years of age (5,000 persons) and half 15+ years of age (5,000 persons)
- an estimate for each half of the likely numbers of the more common symptoms/diseases presenting in a 3-month period at the early stage of an emergency (table 1), and standardized treatment schedules (table 2).

5. The drugs on the lists are *intended to cover initial needs only* pending a proper assessment, *inter alia*, of:

- the demographic pattern of the community
- the physical condition of individuals
- the incidence of symptoms/diseases as determined, for example, from clinic and health center records and nutritional surveillance
- the prevalence of symptoms as determined, for example, from household and nutrition surveys
- the causes of mortality and morbidity
- likely seasonal variations of symptoms and diseases
- the likely impact of improved public health measures
- local availability of drugs and equipment, taking account of national drug policies (see paragraph 3)
- drug resistance
- the capabilities of the health workers
- the referral system.

Once this assessment has been made, a situation-specific list should

be drawn up and appropriate arrangements made to supply the necessary quantities. Much time and trouble can be saved by drawing up a reorder form based on this list and standardizing reordering procedures, regardless of whether supplies are available locally or must come from abroad.

6. Whatever the source of drugs, it is important that:

- no drugs are sent from a donor country without prior clearance
- no drugs arrive with a future life (before expiry date) of less than 6 months
- the labelling on containers is in the appropriate language(s) and gives the generic name plus strength and quantity of the drug
- drugs are packaged to withstand rough handling and likely climatic conditions.

7. When prescribing any drug, attention must be paid to possible contraindications, the risk of adverse reactions, drug interactions, irritant factors, and the special risks associated with pregnancy, children, especially neonatals, and the malnourished. *Patients must be given clear instructions in their language on how to take/use the drug.*

8. *Exclusions.* Lists A and B do not include vaccines, nor drugs to control certain communicable diseases. In order that action conforms to national policies—for example, for an expanded program of immunization (EPI) or tuberculosis or leprosy control programs—the vaccines and drugs needed and the best methods of supply should be discussed with the national health authorities without delay. Particular attention should be paid to ensuring a cold chain.

82 Medical Supply Management

List A Basic drug requirements for 10,000 persons for 3 months

Ref. No. A/	Drug (WHO reference) ³	Pharmaceutical form and strength	Total required for 3 months (rounded up)
1.	Analgesics (2.1) 1 acetylsalicylic acid 2 paracetamol	tab 300mg tab 500mg	17,000 tabs 4,500 tabs
2.	Anthelmintic (6.1) 1 mebendazole* 2 piperazine	tab 100mg syrup 500mg/5ml (30ml bottle)	2,100 tabs 5.1 liters
3.	Antibacterial (6.3) 1 ampicillin* 2 benzylpenicillin 3 phenoxymethylpenicillin 4 procaine benzylpenicillin 5 sulfamethoxazole + trimethoprim* 6 tetracycline*	suspension 125mg/ 5ml inj 0.6g (1 million IU) tab 250mg inj 3.0g (3 million IU) tab 400mg + 80 mg tab 250mg	420 bottles 60ml 500 vials 9,500 tabs 375 vials 7,500 tabs 9,000 tabs
4.	Antimalarial⁴ (6.7) 1 chloroquine* 2 chloroquine	tab 150mg syrup 50mg/5ml	8,000 tabs 3 liters
5.	Antianemia (10.1) ferrous salt + folic acid	tab 60mg + 0.2mg	30,000 tabs
6.	Dermatological (13) 1 benzoic acid + salicylic acid 2 neomycin + bacitracin* 3 calamine lotion* 4 benzyl benzoate 5 gentian violet	oint, 6% + 3%, 25g tube oint, 5mg + 500 IU/g, 25g tube lotion lotion 25% crystals	100 tubes 50 tubes 5 liters 35 liters 200 g (8 botts.)
7.	Disinfectants (15) chlorhexidine*	solution 20%	5 liters

*See explanation, paragraph 3.

3. See explanation, paragraph 1.

4. For chloroquine-resistant treatment, see list B item 6.2.

(These footnotes also apply to list B, pages 86-88.)

List A Basic drug requirements for 10,000 persons for 3 months

Ref. No. A/	Drug (WHO reference)³	Pharmaceutical form and strength	Total required for 3 months (rounded up)
8.	Antacid (17.1) aluminium hydroxide	tab 500mg	5,000 tabs
9.	Cathartic (17.5) senna*	tab 7.5mg	400 tabs
10.	Diarrhea (17.6.2) oral rehydration salts	sachet 27.5g/liter	6,000 sachets
11.	Ophthalmological (21.1) tetracycline*	eye oint 1%, 5g tube	750 tubes
12.	Solutions (26.2) 1 water for injection 2 water for injection	2ml 10ml	500 amps 500 amps
13.	Vitamin (27) 1 retinol (vitamin A) 2 retinol (vitamin A)	caps 60mg (200,000 IU) caps 7.5mg (25,000 IU)	500 caps 400 caps

Table 1 Likely symptoms and proposed treatment (List A)

Symptoms	Possible percentage = numbers with symptoms	Persons-treatments
0-14 years of age (5,000 persons)		
Respiratory	30% = 1,500	750 upper respiratory tract - 400 paracetamol tabs - 350 acetylsalicylic tabs 750 lower respiratory tract - 650 phenoxymethylpenicillin tabs - 100 benzylpenicillin injections
Diarrhea	30% = 1,500	1,500 oral rehydration sachets

Table 1 Likely symptoms and proposed treatment (List A)

Symptoms	Possible percentage = numbers with symptoms	Persons-treatments
Malaria	15% = 750	550 chloroquine tabs 200 chloroquine syrup
Helminths	20% = 1,000	250 piperazine syrup (under 2 yrs of age) 750 mebendazole tabs (over 2 yrs of age)
Skin, trauma	10% = 500	200 benzyl benzoate lotion 150 chlorhexidine solution 100 benzoic acid + salicylic acid cream 25 calamine lotion 25 gentian violet
Anemia	10% = 500	500 ferrous salt + folic acid tabs
Eyes	10% = 500	500 tetracycline ointment 100 vitamin A caps (100,000 IU) 400 vitamin A caps (200,000 IU)
Ears	5% = 250	250 ampicillin suspension
15 years of age + (5,000 persons)		
Respiratory	20% = 1,000	700 upper respiratory tract - acetylsalicylic acid tabs 300 lower respiratory tract - tetracycline tabs
Musculoskeletal	15% = 750	500 acetylsalicylic acid tabs 250 paracetamol tabs
Digestive	15% = 750	300 mebendazole tabs 250 aluminum hydroxide tabs 200 senna tabs
Diarrhea	10% = 500	500 oral rehydration sachets
Genitourinary	15% = 750	375 sulfamethoxazole + trimethoprim tabs 375 procaine benzylpenicillin injections
Malaria	10% = 500	500 chloroquine tabs
Skin, trauma	5% = 250	125 benzyl benzoate lotion 50 neomycin & bacitracin ointment 25 calamine lotion 25 gentian violet 25 chlorhexidine

Table 1 Likely symptoms and proposed treatment (List A)

Symptoms	Possible percentage = numbers with symptoms	Persons-treatments
Anemia	5% = 250	250 ferrous salt + folic acid tabs
Eyes	5% = 250	250 tetracycline ointment 100 vitamin A caps (200,000 IU)

Table 2 Standardized treatment schedules (List A)

Drug	Age group	Form/ strength	Course/quantity	Total requirement ⁵
acetylsalicylic acid	ped	tab 300mg	1/2-1 tds 2/7 = 6 tabs	= 2,100 tabs
acetylsalicylic acid	adult	tab 300mg	2 tds 2/7 = 12 tabs	= 14,400 tabs
aluminum hydroxide	adult	tab 500mg	1 qds 5/7 = 20 tabs	= 5,000 tabs
ampicillin	ped	suspension 125mg/5ml	125mg qds 5/7 = 100 ml	= 420 botts. (60 ml)
benzoic acid + salicylic acid	ped	oint 25g	(external use)	= 100 tubes
benzyl benzoate	both	lotion 25%	100 ml = 100 ml	= 35 liters
benzylpenicillin	ped	inj 0.6g (1 million IU)	1 od 5/7 = 5 vials	= 500 vials
calamine lotion	both	1 liter botts.	(external use)	= 5 liters
chlorhexidine	both	solution 20%	(external use)	= 5 liters
chloroquine	ped	syrup 50mg/ 5ml/base	10mg/kg = avg 15ml	= 3 liters
chloroquine	ped	tab 150mg/ base	varies = 5 tabs (full dose)	= 2,750 tabs
chloroquine	adult	tab 150mg/ base	varies = 10 tabs (full dose)	= 5,000 tabs
ferrous salt + folic acid	ped	tab 60mg/base	1 od 30/7 = 30 tabs	= 15,000 tabs
ferrous salt + folic acid	adult	tab 60mg/base	1 bd 30/7 = 60 tabs	= 15,000 tabs
gentian violet	both	25g bottles	(external use)	= 8 botts.

5. Using numbers treated from table 1. Quantities are rounded up in list A.

Key. od = take daily; bd = twice a day; tds = 3 times a day; qds = 4 times a day; stat = at once; x/7 = x number of days treatment.

Table 2 Standardized treatment schedules (List A)

Drug	Age group	Form/strength	Course/quantity	Total requirement ⁵
mebendazole	both	tab 100mg	2 stat = 2 tabs	= 2,100 tabs
neomycin + bacitracin	adult	oint 25g	bd 7/7 = 1 tube	= 50 tubes
oral rehydration	both	sachet 27.5g	varies = 3 sach	= 6,000 sachets
paracetamol	ped	tab 500mg	1/4-1/2tds 2/7 = 3 tabs	= 1,200 tabs
paracetamol	adult	tab 500mg	2 tds 2/7 = 12 tabs	= 3,000 tabs
piperazine	ped	syruap 500mg/5ml	20 ml stat = 20 ml	= 5 liters
phenoxymethylpenicillin	ped	tab 250mg	125mg qds 7/7 = 14 tabs	= 9,100 tabs
procaine benzylpenicillin	adult	inj 3g (3 million IU)	1 stat = 1 vial	= 375 vials
retinol	infants	caps 25,000 IU	4 stat = 4 caps	= 400 caps
retinol	children and adults	caps 200,000 IU	1 stat = 1 cap	= 500 caps
senna	adult	tab 7.5mg	2 stat = 2 tabs	= 400 tabs
sulfamethoxazole + trimethoprim	adult	tab 400 mg + 80mg	2 bd 5/7 = 20 tabs	= 7,500 tabs
tetracycline	adult	tab 250mg	1 qds 7/7 = 28 tabs	= 8,400 tabs
tetracycline	both	eye oint 1% 5g tube	qds 7/7 = 1 tube	= 750 tubes

List B Drugs for use by doctors and senior health workers,
 in addition to List A

Ref. No. B/	Drug (WHO reference) ³	Pharmaceutical form and strength	Total amount
1.	Local anesthetic (1.2) lidocaine*	inj 1% vial/50ml	10 vials
2.	Analgesic (2.2) pethidine * ⁶	inj 50mg in 1ml amp	10 amps

6. Subject to international control under the Single Convention on Narcotic Drugs (1961) and the Convention on Psychotropic Substances (1971). *Not included in the kit:* to be obtained locally in accordance with national procedures.

List B Drugs for use by doctors and senior health workers,
 in addition to List A

Ref. No. B/	Drug (WHO reference) ^a	Pharmaceutical form and strength	Total amount
3.	Antiallergic (3) chlorphenamine*	tab 4mg	100 tabs
4.	Antiepileptic (5) diazepam	inj 5mg/ml, 2ml amp	10 amps
5.	Antiinfective (6) 1 metronidazole*	tab 250mg	1,500 tabs (2 tds 5/7 for 50 patients)
	2 benzylpenicillin	inj 3.0g (5 million IU)	100 vials
	3 chloramphenicol*	caps 250mg	2,000 caps (2 qds 5/7 for 50 patients)
	4 cloxacillin*	caps 250mg	3,000 caps (2 qds 7/7 for 35 adults) (1 qds 7/7 for 30 children)
6.	Antimalarial (6.7) 1 quinine	inj 300mg/ml	20 amps (2ml) (avg of 4ml per patient)
	2 sulfadoxine + pyrimethamine	tab 500mg + 25mg	150 tabs (2-3 stat for 50 patients)
7.	Plasma substitute (11.1) dextran 70	inj sol 6%/500ml with 10 giving sets	5 liters
8.	Cardiovascular (12) 1 glyceryl trinitrate	tab 0.5mg	100 tabs
	2 propranolol*	tab 40mg	100 tabs
	3 digoxin	tab 0.25mg	100 tabs
	4 digoxin	inj 0.25mg/ml, 2ml amp	10 amps
	5 epinephrine	inj 1mg/ml, 1ml amp	10 amps
9.	Dermatological (13) 1 nystatin	cream 100,000 IU/g, 30g tube	10 tubes
	2 hydrocortisone*	1% cream, 30g tube	10 tubes

88 Medical Supply Management

List B Drugs for use by doctors and senior health workers,
 in addition to List A

Ref. No. B/	Drug (WHO reference) ³	Pharmaceutical form and strength	Total amount
10.	Diuretics (16) 1 furosemide* 2 furosemide*	tab 40mg inj 10mg/ml, 2ml amp	100 tabs 10 amps
11.	Gastrointestinal (17) 1 promethazine* 2 promethazine* 3 codeine* ⁶	tab 25mg syrup 5mg/5ml, bottle of 250ml tab 30mg	100 tabs 10 bottles 100 tabs
12.	Hormones (18) hydrocortisone	inj 100mg	10 vials
13.	Ophthalmological (21.1) Sulfacetamide	eye oint 10%, 5g tube	250 tubes
14.	Oxytocics (22) 1 ergometrine* 2 ergometrine*	tab 0.2mg inj 0.2mg/ml, 1ml amp	100 tabs 10 amps
15.	Psychotherapeutic (24) diazepam*	tab 5mg	100 tabs
16.	Respiratory (25) 1 aminophylline* 2 salbutamol* 3 beclomethasone	inj 25mg/ml, 10ml amp oral inhalation, 0.1mg per dose oral inhalation, 0.05mg per dose	10 amps 5 aerosols 5 aerosols
17.	Solutions (26.2) 1 compound solution of sodium lactate* 2 glucose 3 sodium chloride 4 water for injection	solution/500ml inj sol, 50% hyper- tonic, 10ml amp inj sol, 0.9% isotonic, 500ml with 10 giving sets 10ml amp	10 liters 10 amps 5 liters 100 amps

List C Basic medical equipment for a clinic
 (equipment marked with two asterisks may need replacing every 3 months)

Ref No C/	Description	Quantity
1	Sterile disposable syringes, Luer 2ml	4,000**
2	Sterile disposable syringes, Luer 10ml	1,000**
3	Sterile disposable needles 0.8 × 40mm/G21 × 1 1/2"	2,500**
4	Sterile disposable needles 0.5 × 16mm/G25 × 5/8"	2,500**
5	Interchangeable glass syringes, Luer 2ml	5
6	Interchangeable glass syringes, Luer 10ml	5
7	Interchangeable needles, 144 assorted, Luer	2 pkts
8	Sterile swabs	5,000
9	Emergency suture sets with needles, pkt 12	15 pkts**
10	Needle-holder	1
11	Scalpel handle No. 3 size	2
12	Artery forceps	2
13	Dissecting forceps	2
14	Blades, disposable size 10	100**
15	Scissors, straight	6
16	Scissors, suture	1
17	Thermometers	10
18	Stethoscope, standard and fetal	2 of each
19	Sphygomanometer, anaeroid	1
20	Diagnostic set (auroscope, ophthalmoscope)	1
21	Battery alkaline dry cell "D" type 1-5 v for item 20	4**
22	Vaginal speculum, Graves	2
23	Metal syringes for ear washing, 90ml	1
24	Tongue depressor, metal	1
25	Nasogastric tubes size Ch.5 (premature), polyethylene	5*
26	Nasogastric tubes size Ch.8 (infant), polyethylene	10
27	Nasogastric tubes size 12, polyethylene	5*
28	Scalp vein needles	50
29	Gloves, reusable small	100
30	Gloves, reusable medium	100
31	Gloves, reusable large	100
32	Dressing tray with lid, stainless steel	4
33	Basin, kidney 350ml, stainless steel	2
34	Bowls, round with lid 240ml, stainless steel	4
35	Bowls, round 600ml, stainless steel	4
36	Gauze swabs 5 × 5cm in packets of 100	10 pkts
37	Gauze swabs 10 × 10cm in packets of 100	10 pkts**
38	Sterile gauze swabs 10 × 10cm in packets of 5	50 pkts**
39	Eye pads (sterile)	6 pkts**
40	Paraffin gauze dressings 10 × 10cm in tins of 36 pieces	3 tins**

90 Medical Supply Management

List C Basic medical equipment for a clinic
(equipment marked with two asterisks may need replacing every 3 months)

Ref No C/	Description	Quantity
41	Sanitary towels	200**
42	White cotton wool, rolls of 500g	2 rolls**
43	Zinc oxide plaster 25mm × 0.9m roll	120 rolls**
44	Gauze bandage, 25mm × 9m	50**
45	Gauze bandage, 50mm × 9m	50**
46	Gauze bandage, 75mm × 9m	50**
47	Plaster of Paris bandages 3" × 3yds, packs of 1 dozen	1 pkt**
48	Pneumatic splint sets, multipurpose	1 of each**
49	Safety pins, 40mm	500**
50	Hand towels	2**
51	Soap, cleansing	60 bars**
52	Nail brush, surgeons	5**
53	Health cards with plastic envelopes	10,000**
54	Plastic envelopes for drugs	10,000**
55	Plastic sheeting 910mm wide	2m
56	Apron, plastic	2
57	Tape measure 2m/6'	2
58	Weighing scale, adult 140kg × 100g	1
59	Weighing scale, infant 25kg × 20g	1
60	Height measuring board	1
61	Sterilizer dressing pressure type, 350mm diameter × 380mm	1
62	Stove for 61, kerosene single burner pressure	1
63	Basic laboratory kit and spares	1
64	Filter, water candle aluminum, 9 liters	1
65	Clinitest tabs	5 botts.**
66	Multistix	5 botts.**
67	Airway (children's set)	1

Annex B

Replacements for Items on the List of Essential Drugs for Emergencies

Other drugs, if available, can replace items on lists of essential drugs for emergencies. Especially with regard to antibiotics, sulphonamides, and antiallergics, a range of similar preparations are available. Proprietary (brand) names begin with a capital letter.

thiopental sodium

If thiopental sodium is not available, a choice can be made from the following drugs: hexobarbital, methoxital, narcobarbital, thialbarbital, thiamylal.

pentazocine

Pentazocine is preferred to morphine and pethidine because its potential for producing dependence is much less. Also, the use of pentazocine is not restricted under the opium law in several countries. This facilitates the indexing, distribution and dispensing under emergency conditions by medical personnel not qualified to handle opiates. If pentazocine is not usually available locally, however, the assessments of local stocks will have to concern morphine and pethidine.

promethazine

The choice of promethazine is arbitrary; antiallergic drugs such as chlorpheniramine, brompheniramine, antazoline, diphenhydramine, tripellenamine and mepyramine (pyranisamine) are often available under generic name at reasonable price. They have similar properties and uses as promethazine.

metronidazole

Instead of metronidazole, emetine or dehydro-emetine (which has fewer side effects than emetine) injections can be used. However, they are much more expensive than metronidazole.

ampicillin

Becampicillin, amoxicillin, epicillin, hetacillin and pivampicillin have actions similar to those of ampicillin (with the exception of amoxicillin, the rest are available only as brand products). They are more expensive than ampicillin.

chloramphenicol

Thiamfenicol (available as a brand product under names such as Thiofenicol or Urfamycine) behaves like chloramphenicol.

phenoxymethylpenicillin

Available products whose properties are similar to those of phenoxymethylpenicillin are azidocillin, fenbenicillin, pheneticillin and propicillin.

sulphadimine

Triple sulpha (available in several formulas), sulphamerazine, sulphardiazine and sulphisomidine also can be used.

tetracycline

Oxytetracycline is also available as a generic drug. It has the same price level as tetracycline. Several tetracyclines--such as chlortetracyclin, metacyclin, minocyclin, lymecycline, democycline, doxycycline and rolitetracycline (only available as injections)--are marketed under brand names.

chloroquine

In malaria treatments, amodiaquin (Camoquin, Flavoquin) and hydroxychloroquine (Ergoquin, Palaquenil) behave similarly.

dextran 70

If dextran 70 is not available, polyvidon (Subtosan, Protagent, Persiton), polygeline (Haemacel) and injectable gelatin preparations (Plasmagel, Plasmion) also may be used.

phtalylsulphathiazole

Instead of phtalylsulphathiazole, succinylsulphathiazole can also be used; it is slightly more expensive. Sulphaguanidin is not recommended because it is much more toxic and less potent and therefore is considered obsolete.

ergometrine

Methylegometrine (Methergin), normal strength 0.125 mg, can be used when ergometrine is not available.

cetrimide, chlorhexidine

These preparations can be used as disinfectants individually, but they are also often used in a combination of 15 mg chlorhexidine digluconate and 150 mg cetrimide per ml (1 part chlorhexidine digluconate 20% solution, mixed with 5 parts cetrimide 40% solution). Note that, before use, the chlorhexidine/cetrimide mixture is diluted with water (1:200 for rough disinfection, 1:100 for disinfection of hands and wounds) or with alcohol (1:30 for preoperative disinfection or disinfection of instruments, 1:200 for preservation of instruments).

Annex C

Essential Medical Supplies for Disaster Relief: Quantities and Bulk Procurement Costs

Quantities per 10,000 inhabitants

Approximate cost when purchased in bulk as generic, in US \$

	Item Specifications	Quantity	Unit Cost	Total Cost
01	acetylsalicylic acid, 300 mg	20 × 1,000 tabs	\$2.05	\$41.00
02	adhesive woundplaster, 8 cm × 3m	100 pcs	1.75	17.50
03	adrenalin, 1 mg/ml, 1 ml	2 × 100 amps	2.75	5.50
04	ampicillin, 250 mg	10 × 1,000 caps	31.00	310.00
05	atropine sulphate, 1 mg/1 ml	2 × 100 amps	2.00	4.00
06	bars of soap	5,000 pcs	0.20	1,000.00
07	benzathinepenicillin compound, 1,200,000 IU	15 × 100 vials	15.00	225.00
08	cetrimide 0.5%/chlorhexidine 0.1%, cream, 30 g	1,000 tubes	0.50	500.00
09	cetrimide 40%	100 × 5 l	20.00	2,000.00
10	chloramphenicol, 250 mg, sugar coated	5 × 1,000 tabs	15.00	75.00
11	chlorhexidine (digluconate) 20%	20 × 5 l	115.00	2,300.00
12	chloroquine, 150 mg base tablets	20 × 1,000 tabs	11.50	220.00
13	chloroquine, 50 mg/ml dry powder for 100 ml syrup	1,000 flasks	0.75	750.00

94 Medical Supply Management

	Item Specifications	Quantity	Unit Cost	Total Cost
14	cotton wool, 500 g	500 rolls	1.20	600.00
15	dextran-70, 6% in dextrose/ normal saline, 500 ml	300 bags *	9.00	2,700.00
16	dextrose 5%, 1,000 ml	1,000 bags *	1.50	1,500.00
17	digoxin, 0.25 mg	1,000 tabs	4.50	4.50
18	ergometrine maleate, 0.2 mg	1,000 tabs	6.00	6.00
19	gauze impregnated with par- affin, 20 cm × 14 cm (ster- ile)	500 pcs	0.20	100.00
20	hydrophylic bandages, 10 cm × 10 cm	2,000 rolls	0.35	700.00
21	hydrophylic gauze, 80 cm × 40 m	50 rolls	8.00	400.00
22	lidocaine HC1 1%, 50 ml	100 vials	0.40	40.00
23	metronidazole, 250 mg	10 × 1,000 tabs	8.25	82.50
24	oral rehydration salts	2,000 sachets	0.06	120.00
25	pentazocine, 30 mg/1 ml	5 × 100 amps	25.00	125.00
26	phenobarbitone, 50 mg tablets	2 × 1,000 tabs	2.00	4.00
27	phtalylsulphathiazole, 500 mg	10 × 1,000 tabs	10.00	100.00
28	phenoxymethyl- penicillin, 250 mg	10 × 1,000 tabs	16.00	160.00
29	prednisolone, 5 mg	2 × 1,000 tabs	7.00	14.00
30	promethazine, 25 mg	10 × 1,000 tabs	3.50	35.00
31	sodium chloride 0.9%, 1,000 ml	1,000 bags *	2.00	2,000.00
32	sulphadimidine, 500 mg	20 × 1,000 tabs	8.00	160.00
33	tetracycline, 250 mg	20 × 1,000 tabs	12.00	240.00
34	tetracycline, dry powder for susp., 25 mg/5 ml, 100 ml	500 flasks	0.75	375.00
35	sulphacetamide ointment 10%, 4 g	1,000 tubes	0.30	300.00
36	thiopental sodium, 1 g	00 vials	1.15	115.00
37	water for injection, 10 ml	15 × 100 amps	5.50	82.50
38	zinc oxide ointment, 450 g	20 tins	6.50	130.00
39	zinc oxide plaster, 10 cm × 10 m	1,000 rolls	1.75	1,750.00
40	scissors	50 pc	1.50	75.00

* sterile, sets complete with needle

Annex D

Quantities and Gross Weight of Essential Medical Supplies per 10,000 Inhabitants

	Item Specifications	Quantity	Kg
01	acetylsalicylic acid, 300 mg	20 × 1,000 tabs	10
02	adhesive woundplaster, 8 cm × 3m	100 pcs	12
03	adrenalin, 1 mg/ml, 1 ml	2 × 100 amps	1.5
04	ampicillin, 250 mg	10 × 1,000 caps	4
05	atropine sulphate, 1 mg/1 ml	2 × 100 amps	1.5
06	bars of soap	5,000 pcs	400
07	benzathine penicillin compound, 1,200,000 IU	15 × 100 vials	35
08	cetrimide 0.5%/chlorhexidine 0.1%/cream, 30 g	1,000 tubes	50
09	cetrimide 40%	100 × 5 l	550
10	chloramphenicol, 250 mg, sugar coated	5 × 1,000 tabs	2
11	chlorhexidine (digluconate) 20%	20 × 5 l	110
12	chloroquine, 150 mg base tablets	20 × 1,000 tabs	8
13	chloroquine, 50 mg/ml dry powder for 100 ml syrup	1,000 flasks	250
14	cotton wool, 500 g	500 rolls	260
15	dextran 70.6% in dextrose/normal saline, 500 ml	300 bags *	165
16	dextrose 5%, 1,000 ml	1,000 bags *	1,100
17	digoxin, 0.25 mg	1,000 tabs	0.5
18	ergometrine maleate, 0.2 mg	1,000 tabs	0.5
19	gauze impregnated with paraffin, 20 cm × 14 cm (sterile)	500 pcs	25
20	hydrophylic bandages, 10 cm × 10 cm	2,000 rolls 30	
21	hydrophylic gauze, 80 cm × 40 m	50 rolls	25
22	lidocaine HC1 1%, 50 ml	100 vialr	12

96 Medical Supply Management

	Item Specifications	Quantity	Kg
23	metronidazole, 250 mg	10 × 1,000 tabs	4
24	oral rehydration salts	2,000 sachets	1.5
25	pentazocine, 30 mg/1 ml	5 × 100 amps	3
26	phenobarbitone, 50 mg tablets	2 × 1,000 tabs	0.5
27	phtalylsulphathiazole, 500 mg	10 × 1,000 tabs	8
28	phenoxymethylpenicillin, 250 mg	10 × 1,000 tabs	4
29	prednisolone, 5 mg	2 × 1,000 tabs	0.5
30	prometazine, 25 mg	10 × 1,000 tabs	1
31	sodium chloride 0.9%, 1,000 ml	1,000 bags *	1,100
32	sulphadimidine, 500 mg	20 × 1,000 tabs	16
33	tetracycline, 250 mg	20 × 1,000 tabs	8
34	tetracycline, dry powder for susp., 25 mg/5 ml, 100 ml	500 flasks	125
35	sulphacetamide ointment 10%, 4 g	1,000 tubes	5
36	thiopental sodium, 1 g	100 vials	3
37	water for injection, 10 ml	15 × 100 amps	27
38	zinc oxide ointment, 450 g	20 tins	10
39	zinc oxide plaster, 10 cm × 10 m	1,000 rolls	300
40	scissors	50 pcs	5

* sterile, sets complete with needle

Annex E

Cross-Index INN/Proprietary Names

The cross-index first lists pharmaceuticals alphabetically by generic name and then lists proprietary (brand) names alphabetically. The list is not exhaustive of all pharmaceuticals or of all possible brand names, since the variation from country to country is enormous.

It is hoped that the list will serve as a guide for each country to develop a similar cross-index, covering at least those pharmaceuticals included on its list of essential medical supplies. Once completed, the cross-index should be made available to international and donor agencies.

Generic	Proprietary (Brand)
acetylsalicylic acid	Aspirin
acetylsalicylic acid	Enterosarine
acetylsalicylic acid	Rhonal
acetylsalicylic acid	Acetylosal
aminophylline	Aminocardol
aminophylline	Cardophyllin
aminophylline	Corophyllin
aminophylline	Euphyllin
aminophylline	Somophyllin
ampicillin	Alpen
ampicillin	Amblosin
ampicillin	Amcill
ampicillin	Amfipen
ampicillin	Amipenix
ampicillin	Ampikel
ampicillin	Ampibel
ampicillin	Ampilux
ampicillin	Ampipenin
ampicillin	Amplital

Generic	Proprietary (Brand)
ampicillin	Austrapen
ampicillin	Deripen
ampicillin	Doktacillin
ampicillin	Domocillin
ampicillin	Fortapen
ampicillin	Omnipen
ampicillin	Pen Ampil
ampicillin	Pen A
ampicillin	Penbritin
ampicillin	Penbrock
ampicillin	Penicline
ampicillin	Pentrexyl
ampicillin	Principen
ampicillin	RoAmpen
ampicillin	Totacillin
ampicillin	Totapen
ampicillin	Vidopen
antazoline	Antasten
bamipine	Soventol
bamipine	Taumidrine
benzathine benzylpenicillin V	Neolin
benzathine benzylpenicillin V	Permapen
brompheniramine	Dimegan
brompheniramine	Dimetane
brompheniramine	Dimotane
brompheniramine	Ilvin
brompheniramine	Veltane
carbinoxamine	Allergefon
carbinoxamine	Clistin
carbinoxamine	Histex
chloramphenicol	Alficetyn
chloramphenicol	Ambofen
chloramphenicol	Amphicol
chloramphenicol	Biophenicol
chloramphenicol	Catilan
chloramphenicol	Chemicetina
chloramphenicol	Chlomin
chloramphenicol	Chloramex
chloramphenicol	Chloromycetin
chloramphenicol	Chlorocol
chloramphenicol	Chloronitrin
chloramphenicol	Chloroptic
chloramphenicol	Comycetin
chloramphenicol	Desphen
chloramphenicol	Emetren
chloramphenicol	Enicol
chloramphenicol	Ertilen
chloramphenicol	Farmicetina
chloramphenicol	Globenicol

Generic	Proprietary (Brand)
chloramphenicol	Halomycetin
chloramphenicol	Hortfenicol
chloramphenicol	Isicetin
chloramphenicol	Isophenicol
chloramphenicol	Juvamycetin
chloramphenicol	Kamaver
chloramphenicol	Kemicetine
chloramphenicol	Leukomycin
chloramphenicol	Levomycetin
chloramphenicol	Médiamycétin
chloramphenicol	Micochlorine
chloramphenicol	Novophenicol
chloramphenicol	Oleomycetin
chloramphenicol	Otophen
chloramphenicol	Pantovernil
chloramphenicol	Paraxin
chloramphenicol	Rivomycin
chloramphenicol	Septicol
chloramphenicol	Sificetina
chloramphenicol	Synthomycetin
chloramphenicol	Tifomycine
chloroquine	Aralen
chloroquine	Avloclor
chloroquine	Bemaphate
chloroquine	Bemasulph
chloroquine	Imagon
chloroquine	Malaquin
chloroquine	Nivaquine
chloroquine	Resochin
chloroquine	Silbesan
chloroquine	Tresochin
chlorpheniramine	Allerbid
chlorpheniramine	Allergex
chlorpheniramine	Allergisan
chlorpheniramine	Allertab
chlorpheniramine	Antagonate
chlorpheniramine	Chloramin
chlorpheniramine	Chlormene
chlorpheniramine	Chloroton
chlorpheniramine	Chlor-Trimeton
chlorpheniramine	Chlor-Tripolon
chlorpheniramine	Chlortrone
chlorpheniramine	Destral
chlorpheniramine	Haynon
chlorpheniramine	Histadur
chlorpheniramine	Histalon
chlorpheniramine	Histaspan
chlorpheniramine	Histol
chlorpheniramine	Histaids

Generic	Proprietary (Brand)
chlorpheniramine	Lorphen
chlorpheniramine	Niratron
chlorpheniramine	Piriton
chlorpheniramine	Teldrin
chlorpheniramine	Telodron
cinnarizine	Apomiterl
cinnarizine	Corathiem
cinnarizine	Glanil
cinnarizine	Midronal
cinnarizine	Roin
clemastine	Tavegyl
clemastine	Tavist
dexbrompheniramine	Disomer
dexchlorpheniramine	Polaramine
dexchlorpheniramine	Polaronil
dextran 70	Hyskon
dextran 70	Lomodex
dextran 70	Macrodex
dextrose infusion	Glucolest
dextrose infusion	Jonosteril
dextrose infusion	Glucose
digoxin	Cedoxin
digoxin	Digacin
digoxin	Eudigox
digoxin	Lanacrist
digoxin	Lanicor
digoxin	Lanoxin
digoxin	Natigoxine
diphenhydramine	Alergicap
diphenhydramine	Benadryl
diphenhydramine	Bidramine
diphenhydramine	Dabylen
diphenhydramine	Desentol
diphenhydramine	Lensen
diphenylpyraline	Allerzin
diphenylpyraline	Anti-Hist
diphenylpyraline	Belfène
diphenylpyraline	Diafen
diphenylpyraline	Eskayol
diphenylpyraline	Hispril
diphenylpyraline	Histalert
diphenylpyraline	Histryl
diphenylpyraline	Kolton-Gelée
embramine	Lergoban
embramine	Bromadryl
hexobarbital	Mebryl
histapyrrodine	Evipan
isothipendyl	Domistan
	Andantol

Generic	Proprietary (Brand)
narcobarbital	Venopan
narcobarbital	Enibomalum
paracetamol	Panadol
paracetamol	Atasol
penicillin G	Abbecillin
penicillin G	Cidan-Ciclina
penicillin G	Cilloral
penicillin G	Cosmocillin
penicillin G	Cosmopen
penicillin G	Crystapen
penicillin G	Dramcillin
penicillin G	Dropcillin
penicillin G	Dymocillin
penicillin G	Eskacillin
penicillin G	Fivepen
penicillin G	Forpen
penicillin G	Hyasorb
penicillin G	Hylenta
penicillin G	Juvanesta
penicillin G	Liquacillin
penicillin G	Nalpen G
penicillin G	Purapen G
penicillin G	Spécillin G
penicillin G	Sugracillin
penicillin G	Vagicillin
penicillin V	Aciphen-V
penicillin V	Apopen
penicillin V	Beromycin
penicillin V	Bramcillin
penicillin V	Calcipen
penicillin V	Calcipen
penicillin V	Cliacil
penicillin V	Crystapen V
penicillin V	Distaquaine VK
penicillin V	Dowpen VK
penicillin V	Econopen VK
penicillin V	Fenoxypen
penicillin V	Icipen
penicillin V	Isocillin
penicillin V	Ledercillin VK
penicillin V	Meropenin
penicillin V	Oracilline
penicillin V	Ospen
penicillin V	Penagen
penicillin V	Penicals
penicillin V	Primcillin
penicillin V	SK Penicillin VK
penicillin V	Stabillin VK
penicillin V	Star-Pen

Generic	Proprietary (Brand)
penicillin V	Uticillin VK
penicillin V	V-Cil-K
penicillin V	V-cillin K
pentazocine	Fortal
pentazocine	Fortalgesic
pentazocine	Fortral
pentazocine	Fortralin
pentazocine	Sosegon
pentazocine	Talwin
pheniramine	Daneral
promethazine	Atosil
promethazine	Diphergan
promethazine	Diprozin
promethazine	Fargan
promethazine	Fellozine
promethazine	Fenazil
promethazine	Ganphen
promethazine	Histantil
promethazine	Lemprometh
promethazine	Lergigan
promethazine	Pelpica
promethazine	Phenergan
promethazine	Provigan
promethazine	Promethapar
promethazine	Prorex
promethazine	Prothazin
promethazine	Provigan
promethazine	Quadnite
promethazine	Remsed
promethazine	Thiergan
promethazine	Zipan
pyrrobutamine	Pyronil
sulphadimidine	Diazil
sulphadimidine	Dimethazine
sulphadimidine	Rigesol
sulphadimidine	Sulfadine
sulphadimidine	Sulphamezathine
sulphadimidine	Sulphix
sulphadimidine	Vertolan
tetracycline	Achromycin
tetracycline	Ambramycin
tetracycline	Austramycin
tetracycline	Bristacycline
tetracycline	Cefracycline
tetracycline	Centet
tetracycline	Chemcycline
tetracycline	Chymocyclar
tetracycline	Cyclopar
tetracycline	Decabiotic

Generic

tetracycline
 tetracycline
 tetracycline
 thenalidine
 thialbarbital
 thiamylal
 thiamylal
 thiopental
 tripeleennamine
 triprolidine
 triprolidine

Proprietary (Brand)

Tetrosol
 Triacycline
 Wintracin
 Sandosten
 Kemithal
 Surital
 Thioseconal
 Bitaryl
 Farmotal
 Intraval
 Leopental
 Nesdonal
 Omexolon
 Pentothal
 Trapanal
 Thionembutal
 Pyribenzamin
 Actidil
 Pro-Actidilon

Proprietary (Brand)

Abbecillin
 Acetoxyline
 Acetylosal
 Achromycin
 Aciphen-V
 Actidil
 Alergicap
 Alficytyn
 Allerbid
 Allergan
 Allergefon
 Allergex
 Allergisan
 Allertab
 Allerzin
 Alpen
 Amblosin
 Ambofen
 Ambramycin
 Amcill
 Amfipen
 Aminocardol
 Amipenix
 Amphicol
 Ampibel
 Ampikel

Generic

penicillin G
 lidocaine
 acetylsalicylic acid
 tetracycline
 penicillin V
 triprolidine
 diphenhydramine
 chloramphenicol
 chlorpheniramine
 mepyramine
 carbinoxamine
 chlorpheniramine
 chlorpheniramine
 chlorpheniramine
 chlorpheniramine
 diphenylpyraline
 ampicillin
 ampicillin
 chloramphenicol
 tetracycline
 ampicillin
 ampicillin
 ampicillin
 aminophylline
 ampicillin
 chloramphenicol
 ampicillin
 ampicillin

Proprietary (Brand)

Ampilux
 Ampipenin
 Amplital
 Andantol
 Anestacon
 Antagonate
 Antasten
 Anthisan
 Anti-Hist
 Apomiterl
 Apopen
 Aralen
 Aspirin
 Atasol
 Atosil
 Atrivyl
 Austramycin
 Austrapen
 Avloclor
 Belfene
 Bemaphate
 Bemasulph
 Benadryl
 Beromycin
 Bidramine
 Biophenicol
 Bitaryl
 Bramcillin
 Bristacycline
 Bristaline
 Bro.nadryl
 Calciopen
 Calcipen
 Cardophyllin
 Catilan
 Cedoxin
 Cefracycline
 Centet
 Chemcycline
 Chemicetina
 Chlomin
 Chlor-Trimeton
 Chlor-Tripolon
 Chloramex
 Chloramin
 Chlormene
 Chlorocol
 Chloromycetin
 Chloronitrin

Generic

ampicillin
 ampicillin
 ampicillin
 isothipendyl
 lidocaine
 chlorpheniramine
 antazoline
 mepyramine
 diphenylpyraline
 cinnarizine
 penicillin V
 chloroquine
 acetylsalicylic acid
 paracetamol
 promethazine
 metronidazole
 tetracycline
 ampicillin
 chloroquine
 diphenylpyraline
 chloroquine
 chloroquine
 diphenhydramine
 penicillin V
 diphenhydramine
 chloramphenicol
 thiopental
 penicillin V
 tetracycline
 methdilazine
 embramine
 penicillin V
 penicillin V
 aminophylline
 chloramphenicol
 digoxin
 tetracycline
 tetracycline
 tetracycline
 chloramphenicol
 chloramphenicol
 chlorpheniramine
 chlorpheniramine
 chloramphenicol
 chlorpheniramine
 chlorpheniramine
 chloramphenicol
 chloramphenicol
 chloramphenicol

Proprietary (Brand)

Chloroptic
Chloroton
Chlortrone
Chymocyclar
Cidan-Ciclina
Cilloral
Cito-Optadren
Cliacil
Clistin
Clont
Comycetin
Corathiem
Corophyllin
Cosmocillin
Cosmopen
Crystapen
Crystapen V
Cyclopar
Dabylen
Daneral
Decabiotic
Decycline
Dema
Deripen
Desentol
Desphen
Destral
Diafen
Diazil
Digacin
Dimegan
Dimetane
Dimethazine
Dimotane
Diphergan
Diprozin
Disomer
Distaquaine VK
Doktacillin
Domistan
Domocillin
Dowpen VK
Dramcillin
Dropcillin
Dulcaine
Dumocycline
Duncaine
Dymocillin
Econopen VK

Generic

chloramphenicol
chlorpheniramine
chlorpheniramine
tetracycline
penicillin G
penicillin G
lidocaine
penicillin V
carbinoxamine
metronidazole
chloramphenicol
cinnarizine
aminophylline
penicillin G
penicillin G
penicillin G
penicillin V
tetracycline
diphenhydramine
pheniramine
tetracycline
tetracycline
tetracycline
ampicillin
diphenhydramine
chloramphenicol
chlorpheniramine
diphenylpyraline
sulphadimidine
digoxin
brompheniramine
brompheniramine
sulphadimidine
brompheniramine
promethazine
promethazine
dextbrompheniramine
penicillin V
ampicillin
histapyrrodine
ampicillin
penicillin V
penicillin G
penicillin G
lidocaine
tetracycline
lidocaine
penicillin G
penicillin V

Proprietary (Brand)	Generic
Efloran	metronidazole
Elyzol	metronidazole
Emetren	chloramphenicol
Enibomalum	narcobarbital
Enicol	chloramphenicol
Enterosarine	acetylsalicylic acid
Entizol	metronidazole
Ertilen	chloramphenicol
Eskacillin	penicillin G
Eskayol	diphenylpyraline
Eudigox	digoxin
Eunarcon	narcobarbital
Euphyllin	aminophylline
Evipan	hexobarbital
Fabahistin	mebhydrolin
Fargan	promethazine
Farmicetina	chloramphenicol
Farmotal	thiopental
Fellozine	promethazine
Fenazil	promethazine
Fenoxypen	penicillin V
Fivepen	penicillin G
Flagemona	metronidazole
Flagyl	metronidazole
Florocycline	tetracycline
Forpen	penicillin G
Fortal	pentazocine
Fortalgescic	pentazocine
Fortapen	ampicillin
Fortral	pentazocine
Fortralin	pentazocine
GT-250	tetracycline
Ganphen	promethazine
Gene-Cycline	tetracycline
Glanil	cinnarizine
Globenicol	chloramphenicol
Glucolest	dextrose infusion
Glucose	dextrose infusion
Halomycetin	chloramphenicol
Haynon	chlorpheniramine
Hexacycline	tetracycline
Hispril	diphenylpyraline
Histadur	chlorpheniramine
Histaids	chlorpheniramine
Histalert	diphenylpyraline
Histalon	chlorpheniramine
Histantil	promethazine
Histaspan	chlorpheniramine
Histex	carbinoxamine

Proprietary (Brand)

Histol
Histryl
Hortfenicol
Hostacyclin
Hyasorb
Hydracycline
Hylenta
Hyskon
Icipen
Ilvin
Imagon
Incidal
Intraval
Isicetin
Isocillin
Isophenicol
Jonosteril
Juvamycetin
Juvanesta
Kamaver
Kemicetine
Kemithal
Kesso-Tetra
Klion
Kolton-Gelée
Lanacrist
Lanicor
Lanoxin
Latycin
Ledercillin VK
Lemprometh
Lemtrex
Lensen
Leopental
Leostesin
Lergigan
Lergoban
Leukomycin
Levomycetin
Lexacycline
Lidocaton
Lignostab
Liquacillin
Lomodex
Lorphen
Macrodex
Malaquin
Mebryl
Médiamycétin

Generic

chlorpheniramine
diphenylpyraline
chloramphenicol
tetracycline
penicillin G
tetracycline
penicillin G
dextran 70
penicillin V
brompheniramine
chloroquine
mebhydrolin
thiopental
chloramphenicol
penicillin V
chloramphenicol
dextrose infusion
chloramphenicol
penicillin G
chloramphenicol
chloramphenicol
thialbarbital
tetracycline
metronidazole
diphenylpyraline
digoxin
digoxin
digoxin
tetracycline
penicillin V
promethazine
tetracycline
diphenhydramine
thiopental
lidocaine
promethazine
diphenylpyraline
chloramphenicol
chloramphenicol
tetracycline
lidocaine
lidocaine
penicillin G
dextran 70
chlorpheniramine
dextran 70
chloroquine
embramine
chloramphenicol

Proprietary (Brand)

Meronal
 Meropenin
 Micochlorine
 Midronal
 Myriamycin
 Mystecline
 Nalox
 Nalpen G
 Narcotal
 Natigoxine
 Neo-Antergan
 Neo-Tetrine
 Neo-Tric
 Neolin
 Nesdonal
 Nida
 Nilergex
 Niratron
 Nivaquine
 Novonidazol
 Novophenicol
 Novotetra
 Oleomycetin
 Omeril
 Omexolon
 Omnipen
 Oppacyn
 Oracilline
 Oспен
 Otophen
 Panadol
 Panmycin
 Pantovernil
 Paraxin
 Pelpica
 Pen A
 Pen Ampil
 Penagen
 Penbritin
 Penbrock
 Penicals
 Pénicline
 Pentothal
 Pentrexyl
 Permapen
 Pexobiotic
 Phenergan
 Phenocillin
 Piriton

Generic

metronidazole
 penicillin V
 chloramphenicol
 cinnarizine
 tetracycline
 tetracycline
 metronidazole
 penicillin G
 narcobarbital
 digoxin
 mepyramine
 tetracycline
 metronidazole
 benzathine benzylpenicillin V
 thiopental
 metronidazole
 isothipendyl
 chlorpheniramine
 chloroquine
 metronidazole
 chloramphenicol
 tetracycline
 chloramphenicol
 mebhydrolin
 thiopental
 ampicillin
 tetracycline
 penicillin V
 penicillin V
 chloramphenicol
 paracetamol
 tetracycline
 chloramphenicol
 chloramphenicol
 promethazine
 ampicillin
 ampicillin
 penicillin V
 ampicillin
 ampicillin
 penicillin V
 ampicillin
 thiopental
 ampicillin
 benzathine benzylpenicillin V
 tetracycline
 promethazine
 penicillin V
 chlorpheniramine

Proprietary (Brand)

Polaramine
 Polaronil
 Polycycline
 Primcillin
 Principen
 Pro-Actidilon
 Promethapar
 Prorex
 Prothazin
 Provigan
 Purapen G
 Pyramal
 Pyribenzamin
 Pylonil
 Quadcin
 Quadnite
 Quadracyclin
 Quatrax
 Remsed
 Resochin
 Rhonal
 Ricyclin
 Rigesol
 Rivomycin
 Ro-cycline
 RoAmpen
 Roin
 SK Penicillin VK
 SK-Tetracycline
 Sanatrichom
 Sanclomycin
 Sandosten
 Septicol
 Sifacycline
 Sificetina
 Silbesan
 Somophyllin
 Sosegon
 Soventol
 Spécillin G
 Stabillin VK
 Star-Pen
 Statomin
 Steclin
 Sugracillin
 Sulfadine
 Sulphamezathine
 Sulphix
 Sumycin

Generic

dexchlorpheniramine
 dexchlorpheniramine
 tetracycline
 penicillin V
 ampicillin
 triprolidine
 promethazine
 promethazine
 promethazine
 promethazine
 penicillin G
 mepyramine
 tripelennamine
 pyrrobutamine
 tetracycline
 promethazine
 tetracycline
 tetracycline
 tetracycline
 promethazine
 chloroquine
 acetylsalicylic acid
 tetracycline
 sulphadimidine
 chloramphenicol
 tetracycline
 ampicillin
 cinnarizine
 penicillin V
 tetracycline
 metronidazole
 tetracycline
 thenalidine
 chloramphenicol
 tetracycline
 chloramphenicol
 chloroquine
 aminophylline
 pentazocine
 bamipine
 penicillin G
 penicillin V
 penicillin V
 mepyramine
 tetracycline
 penicillin G
 sulphadimidine
 sulphadimidine
 sulphadimidine
 tetracycline

112 Medical Supply Management

Proprietary (Brand)	Generic
Supramycin	tetracycline
Surital	thiamylal
Sustamycin	tetracycline
Svedocyklin	tetracycline
Synthomycetin	chloramphenicol
T-Caps	tetracycline
Takimetol	metronidazole
Talwin	pentazocine
Taracyl	methdilazine
Taamidrine	bamipine
Tavegyl	clemastine
Tavist	clemastine
Teldrin	chlorpheniramine
Telodron	chlorpheniramine
Telotrex	tetracycline
Tetrabid	tetracycline
Tetrabiotic	tetracycline
Tetracap	tetracycline
Tetrachel	tetracycline
Tetracrine	tetracycline
Tetracyn	tetracycline
Tetracyn	tetracycline
Tetradecin	tetracycline
Tetral	tetracycline
Tetraleam	tetracycline
Tetramycin	tetracycline
Tetrarco	tetracycline
Tetrex	tetracycline
Tetrosol	tetracycline
Thiergan	promethazine
Thionembatal	thiopental
Thioseconal	thiamylal
Tifomycine	chloramphenicol
Totacillin	ampicillin
Totapen	ampicillin
Trapanal	thiopental
Tresochin	chloroquine
Triacycline	tetracycline
Trichazol	metronidazole
Trichex	metronidazole
Trichomol	metronidazole
Trikacide	metronidazole
Trikamon	metronidazole
Uticillin VK	penicillin V
V-Cil-K	penicillin V
V-cillin K	penicillin V
Vagicillin	penicillin G
Veltane	brompheniramine
Venopan	narcobarbital

Annex F

The Role of Vaccines in Disaster-Related Medical Supply Management

Medical authorities are often under considerable public and political pressure to start mass vaccination programs after a disaster, most commonly against typhoid, cholera, and tetanus. This pressure may be increased by two factors: exaggerated reporting of the risks of these diseases in the local and international press, and the ready availability of vaccines that arrive unsolicited from international sources or were ordered from them without an actual need for these vaccines.

Vaccines should not be widely used just because they are suddenly more available, and only national authorities should decide what specific policies to adopt after disaster. Individual voluntary agencies should never decide on their own to vaccinate after disaster. In addition, unless specifically exempted by the Health Relief Committee, the use of all vaccines in a country or arriving into a country in the form of solicited or unsolicited donations should be placed under the control of the Health Relief Committee. A decision about whether to initiate a mass vaccination program should involve members of the medical supply management organization, so that if it is decided to vaccinate a population, adequate supplies of the necessary paraphernalia to administer the vaccine are available.

A decision about whether or not to conduct mass vaccination campaigns should take the following points into consideration:

- Significant increases in tetanus have not been noted after natural disasters. Mass vaccination of populations against tetanus is unnecessary and cannot be expected to reduce the risk of tetanus in

casualty victims. However, if a patient with a high level of immunity has sustained an open wound, administering a tetanus toxoid booster is an effective preventive measure.

- No documented large-scale outbreak of cholera or typhoid has occurred after natural disaster, and cholera is not endemic in the Americas in any case.
- The World Health Organization does not recommend typhoid or cholera vaccines for routine use even in endemic areas. Such vaccines offer only low and short term individual protection and do little to stop the spread of the disease.
- Continuous cold storage of all vaccines must be assured, yet it is difficult to achieve continuous cold storage after natural disaster.
- Vaccines are expensive, and their purchase therefore compromises the nation's ability to secure other required medical supplies with limited resources. This is true even if they are donated, since their cost to the donor agency is subtracted from the overall funds available for relief.
- Complete coverage probably is impossible to achieve, because individuals once vaccinated are difficult to track down for the administration of subsequent doses.
- Unless vaccination can be done without needles (for example, by using high-pressure injectors), mass vaccination is likely to invite the reuse of inadequately sterilized needles, which may transmit hepatitis B. Even if disposable equipment is available, it may not be possible to supervise the injection technique adequately.
- Vaccination programs require large numbers of workers who could be employed more productively in other areas of disaster relief.

Although improvised mass vaccinations are not recommended, routine vaccination programs should not be set aside during the emergency. In fact, government expanded immunization programs that are part of normal primary health care should continue throughout the emergency period or be reestablished as promptly as possible, especially in temporary settlements; in these areas there may be increased risk of preventable childhood diseases because of crowding and unsanitary conditions.

Annex G

Marking and Labeling of Relief Consignments—League of Red Cross Societies

The following procedures involving colours, symbols and numbers should be followed, to designate the kind of relief supplies, their quantity, and clear instructions as to donor, recipient, destination, weight, means of transport, port of arrival, etc. The text is kept to the minimum to obviate any language problems in international consignments.

1. **Colour code** for the relief supplies most often required in disaster situations:

- RED** Foodstuffs
- BLUE** Clothing, plus household equipment
(to include blankets, bedding, tents, cooking utensils, toilet and comfort articles).
- GREEN** Medical supplies and equipment.

Although, in emergencies, it is not always possible to adhere to this colour code, strenuous efforts should be made to conform to these recommendations. The colour band could be applied directly to the container, on a label.

a) **RED — Foodstuffs**

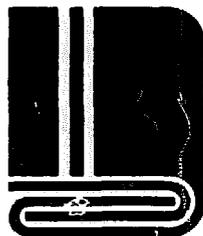
There is no simple way of designating the kind and quantity of food contained in a package, except by text and numbers. It is, of course, understood that many food items are packed in bulk, such as powdered milk, baby food and cereals, and are recognisable without further marking.

b) **BLUE — Clothing, household items**

(Including blankets, bedding, tents, cooking utensils, toilet and comfort articles.)

Clothing is donated in great quantities in every large relief operation and it presents the greatest problems at the receiving end, with respect to both warehousing and distribution. Therefore, observance of the special markings (colour code, symbols and numbers) will be of immense help in the disaster-stricken country.

Only in the case of **blankets** should the outside of the container be marked with a symbol (see below) and the **number** of items in the package.



Symbol for *BLANKET*

Because of the variety of items which may be included in the term "toilet and comfort articles", it is advisable to enclose in each container a packing list describing the kind and quantities sent.

c) **GREEN — Medicaments and medical supplies**

It is recommended that consignments of medicines, banded with green, should bear on the outside of the package (where applicable) firstly, the expiry date of the medicaments; and secondly, whatever caution might be necessary with regard to exposure to heat or cold.

2. **Symbols** recommended to be stencilled on the bales or cartons are as shown: these can be obtained from the League of Red Cross Societies without charge, in the form of one sample symbol of each kind in plastic. It is suggested that each donor should then use this sample as a model for the local manufacture of the quantity needed. It would be preferable, however, that those in constant use be made of metal.

There are two sets of symbols for **clothing**: one set of five primary symbols designating the different sex and age groups —



Men
15 years
and
upwards



Women
15 years
and
upwards



Boys
4-14 years



Girls
4-14 years



Infants
0-4 years

and a set of six secondary symbols designating the kind of garments packed according to five broad groupings, with shoes constituting a sixth grouping —



Outergarments
Overcoats, raincoats for men, women, boys and girls



Suits
Suits, trousers, jackets, blazers and shirts for men and boys



Frocks
Frocks, skirts and blouses for women and girls



Pullovers, jumpers, cardigans, sweatshirts, track suits for men, women, boys and girls



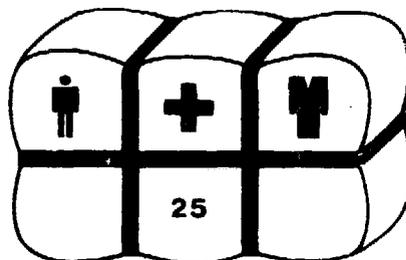
Shoes
Shoes, boots, sandals for men, women, boys and girls



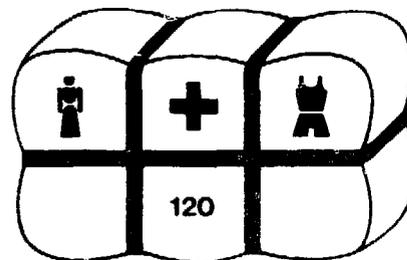
Underwear
Undergarments, socks, night attire for men, women, boys and girls

One of the primary symbols and one of the secondary symbols should appear on each container.

3. **Numbers:** on containers of clothing, the addition of the quantity (as well as the type indicated by the symbol) is a further aid to the receiving country, facilitating speedy sorting and distribution. See illustration below:



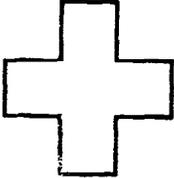
This stencilled designation on a bale of clothing would indicate 25 men's overcoats



This would indicate 120 undergarments of various kinds for women

D. Labelling or other marking on the outside of containers

1. Where labels are used, these can be printed in advance, bearing one of the three colour bands mentioned (red, blue, green). An illustration of such a label is shown:

	Name of sender _____ _____ _____	Case No. _____
Colour band 		
Consignee address _____ _____ _____ Port of _____		

2. It is recommended that English be used on all labels and stencilled markings, even though a second language may be added. It is essential that the final destination (and/or the arrival port) should appear at the bottom of the label and in very large letters.
3. **Protection against humidity** — if articles can be damaged by moisture, this should be clearly indicate by the words "KEEP DRY".

Reproduced from:
 RED CROSS DISASTER RELIEF - HANDBOOK
 (League of Red Cross
 Societies, 1976) pp. 98-102.

Annex H

Medical Supply Management Component in Disaster Relief Legislation

There are several ways to model the medical supply management component of the legislation that should be enacted into disaster relief law. In one model, the legislative act establishes the National Emergency Committee, the mechanism for the development of the preparedness plan, the mechanism for implementing the plan during relief operations, and the provisions for orders and resolutions that assist in executing extraordinary emergency measures. This annex presents a second model of the type of legislation that incorporates the medical supply management component of disaster relief law.

Title: Emergency Planning and Relief Act Number: _____

Definition of the scope of the act, to read, for example, "An act to prepare for and give relief to the the population, during and after disasters."

Description of types of emergencies and disasters for which the legislation will plan preparedness and grant relief.

The **preparedness section** of the legislation establishes the National Emergency Committee for planning and relief of natural disaster, defines the scope of the Committee, defines the composition of the Committee, describes the preparedness functions of the Committee, and describes the responsibilities of each sector of the Committee. This

section of the legislation addresses the health relief sector and its medical supply management component in the following ways:

1. Provides for:

- establishing the post of the Chief Medical Supply Officer and defining the responsibilities of the post
- establishing the Medical Supply Management Advisory Board and defining the responsibilities of its members
- establishing the administrative support staff and defining their responsibilities
- establishing the field level medical supply management assistants and defining their responsibilities.

2. Establishes the scope of the medical supply management preparedness plan in a preamble such as: "The medical supply personnel will promote emergency preparedness in the country through designing in their section of the plan the means to strengthen the national coordination mechanisms in the health sector in the following areas of essential medical supply management, with the described functions:

- inventory preparation and control (function to be written)
- medical supplies distribution (function to be written)
- medical supplies acquisition and requisition (function to be written)
- international medical supplies assistance (function to be written)
- transport and communication (function to be written)
- training and personnel (function to be written)."

The **relief coordination section** follows the same layout as the preceding preparedness section, except that the *implementation* functions of the Chief Medical Supply Officer and of the members of the Medical Supply Management Advisory Board are explicated in each of the six areas of activity named in the preparedness section.

In the **general section** of the Act, the following types of exemptions

granted under the emergency legislation are defined for all components of the National Emergency Committee:

- waiving of customs duties for emergency supplies
 - temporary licensing privileges for foreign health and other professionals and vehicles
 - the appropriation of inventories and transportation
 - other such exemptions.
-

Annex I

Evaluating the Relief Effort

To update or improve plans for future emergencies, it is essential to evaluate the country's recent experience in medical supply management. The postdisaster analysis of the effectiveness of the supply system can divide relief operations into two phases: short term (the immediate postdisaster period) and long term (the extended rehabilitation period).

The areas of concern on which analysis should concentrate and some sample questions that need to be answered are presented here. The questions also can serve as a checklist for the periodic updating of national plans.

Inventory Preparation and Control

Was the essential medical supply list adequate?

Were the inventories in the public sector adequate?

Were the inventories in the private sector adequate?

Was the packaging of the medical supplies adequate?

Was the storage of the medical supplies adequate?

Were the sites identified as temporary and permanent depots satisfactory?

Was the cooperation from the private sector and local nongovernmental organizations satisfactory?

Were inventory records easily accessible from the field and reasonably well maintained at headquarters?

Adequacy of Medical Supplies

What medical supplies were considered essential for treatment of injuries and disease resulting from the disaster (using the national List of Essential Medical Supplies)?

Were the dosage forms of the medicines supplied suitable for disaster relief dispensing? If not, what would be the preferred dosage form?

Were the minor surgical instruments and syringes supplied suitable for use? If not, what would be the preferred size, type and quality?

Was the medical equipment supplied suitable? If not, what would be the preferred size, type, and quality?

Were the types of medical dressings supplied suitable? If not, what would be the preferred size, type and quality?

Were the packaging and quantity of the medicaments supplied suitable for transportation, distribution, and dispensing under disaster conditions to adequately meet the needs of the population? If not, what would be the preferred type and quantity of medicines required for future disasters?

Were the packaging and quantity of surgical instruments, syringes, medical dressings and supplementary equipment supplied suitable? If not, what would be the preferred type and quantity required for future disasters?

International Medical Supplies Assistance

Did the international donors respond promptly to requests?

Were requests for international supplies suitably prepared?

Did the international supplies arrive in suitable form and packaging?

Were the supplies suitably labeled by generic name in a familiar local language or with international symbols to render them easily identifiable?

Did the quantity of supplies requested arrive? If not, what percentage did?

What percentage of medical supply donations were unsolicited? Unsorted? Expired?

Was the handling of supplies acceptable to protect the quality of the contents?

Transportation and Communications

Were the standard transportation and communications sufficient to move medical supplies from points of entry to central stores and to the field stations?

Were the emergency transportation and communications systems adequate?

Training and Personnel

Did the national advisers have the necessary expertise?

Did the field personnel have the necessary expertise?

Were the training courses given (if any) adequate for the purpose?

Did the foreign medical supply management personnel make meaningful contributions?

Administrative and Support Personnel

Were the administrative support personnel adequate?

Were the office equipment and systems adequate to assist the Chief Medical Supply Officer, and the staff effective in the performance of their functions?

General Questions

Was there adequate interaction between the various sections of the Health Relief Coordinator and the medical supply management section? At headquarters level? At field level?

Was there adequate interaction between the medical supply management section and other units of the National Emergency Committee? At headquarters level? At field level?

Were exit interviews conducted with the foreign medical supply management workers before they left the country after assisting in the relief effort?

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Index

- Acquisition (See also Procurement)*
ad hoc, 68
and list of essential supplies, 49, 50
at field level, 55
forms for, 30-31, 56
international, 50, 69
preparedness, 18, 28
records, 59
training in, 35, 36
- Advisers, foreign, 35*
- Agencies, regional, 16*
- Armed forces (See also Military)*
and needs assessment, 26
and organization for supply management, 15
- Assessment, 44, 52, 74*
and armed forces, 26
and supply problems, 7, 44
inaccurate, 5, 7
of needs, 5, 52, 74
of local resources, 41
vulnerability, 37
- Audits, 19, 44*
- Bills of lading, 64-65, 67, 72*
- Brand-name, of drugs, 26-27, 50, 71*
- Brazil, 26*
- Caribbean, 3, 10, 11, 24*
- Categories*
and essential supplies, 49-51, 63, 66
and storing supplies, 65
- Chief Medical Supply Officer, 16-19, 54, 57, 64, 69*
- Civil defense, 15, 26, 37*
- Classification (See also Categories, Sorting), 9*
- Clinic, 68*
- Cold chain (See also Refrigeration), 12, 56, 65, 71, 72*
- Color coding, 11, 71, 75*
- Communication, 32-35, 47, 52, 58, 71*
and inventory control, 53
and legislation, 33, 41
and organization of supply management, 19, 22
and reporting system, 47-48
component of Health Relief Committee, 60-62
training in, 37
- Containers, 10-12, 67, 75*
- Coordination, 6, 7, 16, 19, 38, 47-48, 69, 75*
- Costs, 5, 6, 24, 42, 43, 105-106*
- Courses*
for volunteers and foreigners, 68
in acquisition and requisition, 36
in inventory preparation, 35-36
- Depots, 26, 28, 37, 53, 58*
- Distribution, 16, 29, 32, 37, 47, 56-62, 64, 65, 68, 71-72*
and instructions for donors, 74-75
and reporting system, 48
and transportation, 29, 44
coordination of, 7, 27
disruption of, 5-6
legal aspects of, 41
training in, 35, 37

Dominica, 24

Donations

- filling requests for, 55, 69-71
- guidelines for, 74-75
- unsolicited, 7-12

Earthquake, 3, 6, 8, 29

Emergency committee

- and health sector, 15-16
- reporting to, 76

Emergency phase

- and crash courses for volunteers, 68
- and external assistance, 6, 8-9, 12, 74-75
- and medical needs, 4, 19
- and reporting system, 47

Environmental health, 5, 49, 66

Essential drugs, 19

Evaluation, 41, 44

Expired drugs (See also Storage), 64

Field depot (See also Storage), 28, 68

Field, 7

- and distribution, 29, 37, 65-68, 71-74
- and packaging, 10, 51
- communication with, 32, 34, 48
- requisition from, 28, 50, 54-62, 67
- training for, 35

Financing (See also Costs), 47

Flood, 3

Generics (See also Pharmaceuticals), 27, 36

- and acquisition, 50, 68, 71
- supply categories, 49, 64, 65
- training in recognition of, 36

Green, Stephen, 40

Guatemala, 8-9

Health

- and local availability of supplies, 12
- and relief requests, 19-20
- consequences of disaster, 3-4, 50
- labeling supplies, 67

Health Relief Committee, 18, 51, 58, 60, 67, 75, 76

Health Relief Coordinator, 15, 16, 32, 33

Health sector (See also Health Relief

Coordinator and Health Relief Committee)

coordination with Relief Committee, 32-33

Hospitals, 26, 28, 52, 53, 56, 57

Human resources, 22, 29, 30, 35, 62

Hurricanes, 3, 29

Importation (See also Procurement), 42, 43, 71

legal requirements for, 42

Information

- and communications, 32-35
- and requests for assistance, 39, 50, 53, 76
- and storing supplies, 64-65, 67
- public, 41
- required for acquisitions, 28

Inspection

- and damage assessment, 74
- of pharmaceuticals, 63-64
- of vehicles, 61
- of warehouses, 7

International sources

- acquisition from, 28, 69
- and distribution, 58-59
- requesting assistance from, 38

Inventory

- and distribution, 29, 60
- of arriving supplies, 60, 64
- of field supplies, 67
- of human resources, 29
- preparation and control, 5, 7, 24, 26, 28, 35, 51-56, 64, 76
- public sector, 22, 26, 42
- private sector, 23, 26, 42
- training in, 35

Inventory preparation (See Inventory)

Jamaica, 26

Labeling

- and sorting, 63
- improper, 9, 11, 63
- information for, 39
- proper, 11, 67

Laboratories

- reference, 64
- supplies, 63, 66

League of Red Cross Societies, 20, 79

- Legal**
status of foreigners, 42
- Legislation, 15**
and communication, 33
and liability, 42, 64
and transportation, 44
preparation of, 39-41
- Liability (See Legislation)**
- Licenses**
and patents, 42
for foreign medical staff, 41-42
- List of essential supplies**
and international donors, 39, 70, 75
and sorting, 63, 67
and training, 36
preparation of, 19-20, 49-51
use in acquisition, 20, 51
- Magnitude of disaster**
and Advisory Board, 18
and health effects, 3-4, 50
and personnel requirements, 62, 68
- Manufacturers, 38**
and communications, 34
and local emergency production, 27
and stockpiles, 23, 26, 53
coordination with, 38
- Manufacturing (See also Manufacturers)**
costs of, 43
- Medical instruments (See Supplies)**
- Military, 28, 33, 37, 38, 52, 61**
- Ministry of Health, 15, 27, 42, 69**
- Monitoring**
of relief, 41
radio, 34
- Nicaragua, 6**
- Nongovernmental organizations, 26, 38**
- Office for U.S. Foreign Disaster Assistance, 20**
- Organization**
international, 16, 24
legal aspects, 41
national, for relief, 6, 16, 76
supply management, 15, 28, 68
- Packaging, 12, 20, 29, 36, 51, 63, 67, 71, 74-75**
of perishable supplies, 11
- Pan American Health Organization, 64**
- Paramedical (See Volunteers)**
- Patents, 42**
- Perishable supplies (See Storage)**
- Personnel**
and distribution, 60
and inventory preparation, 51
and reporting system, 48
and unsolicited donations, 6, 7, 9, 10
legal status of, 41
recruitment of, 58, 61
training of, 35-38, 40
- Pharmaceuticals**
and communications, 32-34
as relief supplies, 5, 7
categories of, 50
expired, 9, 63-64
legal aspects of, 42
packaging of, 9, 11
procurement of, 20, 27, 67-68, 71
production of, 27
quality control of, 7, 22, 36, 63, 64
sorting of, 9, 62-64, 65
- Pharmacist, 26, 35**
as sorting supervisors, 62
stocks held by, 26
training of, 35
- Physicians, 36, 53**
- Private sector, 22, 23, 24, 26, 32, 34, 38, 42-43, 52-53, 56**
- Procurement, 28, 36, 38**
and stockpiles, 22, 24, 27
joint, 27
national, 36
training in, 36
- Quality control (See Pharmaceuticals)**
- Receipt of supplies, 36, 39, 41, 56, 59, 60, 64, 71, 74**
- Reconstruction phase, 9, 69, 70**
- Refrigeration, 61, 63**
of perishable supplies, 71-72
- Rehabilitation (See Reconstruction phase)**

- Reimbursement*, 42-43
and foreign donations, 39
and the private sector, 56
procedures for, 24
- Relief*
and emergency stocks, 24
and international assistance, 69, 70,
72, 74-75
and volunteers, 65
legal aspects, 39-43
organizational aspects, 15-19
planning for, 3
training for, 35
urgency of needs, 4, 30, 70-71
- Reporting*
centralized system, 47-49
legislation, 41
networks, 7
- Request for external assistance*, 4, 6, 38,
39, 56, 69-71, 74-75
- Requisition*, 19, 28, 29, 35, 36, 49,
54-56, 60, 66-68
- Routes*
alternate, 29
designation of, 29-30, 32, 60
maps of, 37
operational status of, 58
ranking of, 29
- Security*
and distribution, 37
of stockpiles, 22, 27
of storage facilities, 61, 72
- Shelf life*, 50
- Shipment*
and cold chain, 12, 71
and proper packaging, 9-12, 67
information for, 39
international, 59, 60-61, 65, 71-72,
74-75
- Shortwave radio*, 32, 33, 34
- Sorting*, 6, 53, 56, 62-64, 65, 66, 72
categories, 63
procedures, 62-64
rough, 65, 72
supervisors, 62
- Spirgi, E.H.*, 3
- St. John's Ambulance*, 36
- St. Kitts*, 24
- Standardized list of essential supplies*
(See List of essential supplies)
- Stock*
availability of, 19, 20-27
legislation regarding, 41, 42
national, 52
replenishing, 56, 67-68, 70
rotation of, 20, 22, 36
- Stockpile*
foreign, 20, 24, 26
regional, 20, 24, 38, 56
- Storage*
and distribution, 32, 58, 64-66, 72
and expiration date, 50, 64
and stockpiles, 22
inadequate, 7, 11
legislation for, 41
of perishable supplies, 49, 50, 65-66
planning, 4, 72
requirements for, 49
securing, 27
sites, 27-28, 53, 60-62, 65, 66
- Stores*
government, 24, 29, 58
medical, 24, 26, 28, 38, 52
voluntary agency, 53
- Structure* (See also Organization), 6, 15,
47
- Students*, 36, 62, 63, 65
- Suppliers*, 23, 32, 43, 52, 60, 64, 72
- Supplies*
and communications, 32
categories of, 49
foreign, 69, 72, 76
legal aspects, 6, 42-43
local availability of, 5, 47
perishable, 50, 65-66, 71-72
training in management of, 36
unsolicited, 6, 7-9, 12, 42, 74
unsorted, 8, 63, 65, 66
X-ray, 66
- Telecommunications*, 15, 33
- Telex*, 32-33, 37, 39, 61, 71
- Test*, 27
- Trade names*, 36
- Training*, 19, 32, 33, 35-38, 40, 68
for volunteers and foreigners, 68
in acquisition and requisition, 36
in distribution, 37

- in inventory preparation, 35
 - in transmission of medical information, 32-33
 - in transportation and communication, 37-38
 - legal provision for, 40
 - requirements for, 19
 - Transportation (See also Distribution)*, 60
 - vehicles for, 11, 28, 30, 32, 35, 37, 44, 59, 62, 67

 - UN General Assembly Resolution*, 39, 41
 - United Nations*, 24, 53, 79
 - United Nations Children's Fund (UNICEF)*, 20, 24, 36, 38, 53, 79
 - United Nations Disaster Relief*, 24

 - Vaccines*, 51
 - Vehicles (See Transportation)*
 - Venezuela*, 26
 - Volcanic eruptions*, 3
 - Voluntary agencies*, 16, 42
 - Volunteers*, 16, 53, 63, 65, 68
 - legal status, 41
 - paramedical, 41
 - training of, 35, 41
 - Vulnerability*, 16, 20, 37

 - Warehouse*, 6, 7, 22, 37, 43, 60, 72
 - World Health Organization*, 19, 64

 - X-ray supplies*, 66
-



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