

Military Medical Humanitarian Assistance Course

Manual Contents

Introduction

Overview of Humanitarian Emergencies

Preventive Medicine in Humanitarian Emergencies

Changing Your Frame of Reference

Recognition and Management of Malnutrition

Recognition and Management of Diarrhea and Dehydration

Diagnosis and Management of the Primary Infectious Sources of Mortality

Integrated Case Management Studies

Self-preparation for Deployment

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MILITARY MEDICAL HUMANITARIAN ASSISTANCE COURSE MANUAL

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Military Medical Humanitarian Assistance Course

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Acknowledgments

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The Department of Pediatrics at the Uniformed Services University of the Health Sciences sponsors this course using non-appropriated funds, in collaboration with the Henry M. Jackson Foundation for the Advancement of Military Medicine.

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Preface

Military operations other than war (MOOTW) are now the most frequent operational deployments and Military Leadership considers our ability to function in these settings an “essential capability” of the Armed Forces in the next century. Yet little formal training has been developed to help prepare military physicians for work in the post-disaster/post-war setting in the developing world. These environments offer unique medical and logistical challenges including often-overwhelming primarily *pediatric medical casualties* and severely *limited health resources*.

The Military Medical Humanitarian Assistance Course (MMHAC) was created with the explicit goal of providing training for military primary care providers in preparing for and executing appropriate medical care to civilian populations in the austere health emergency setting. The content of this two day course focuses on understanding the unique health environment, and recognizing and managing those conditions consistently associated with high mortality among the most vulnerable populations in these settings: Diarrhea and dehydration, malnutrition, epidemic measles, malaria and respiratory infections. Course scenarios focus on the role that US military medical assets would likely play as early responders to a humanitarian emergency with limited medical resources.

This course was developed by a multidisciplinary faculty assembled from individuals with experience in humanitarian operations and expertise in infectious disease, management of dehydration, malnutrition, preventive medicine and health education. In addition to traditional didactic presentations, the instructional strategy relies heavily on interactive processes (scenario exercises and case management based skill stations). The scenarios and cases are all derived from real operational experiences of instructors and allow students to problem solve and face ethical dilemmas in triage as they might in the real world and develop creative logistical and clinical solutions as is required in resource poor environments. In class instruction parallels this manual which contains complete diagnostic and treatment algorithms for the targeted clinical conditions and has been derived from publications of International Public Health authorities. The course culminates in a round robin of “skill stations” in which students must demonstrate their ability to manage a field clinical scenario in each major category: Dehydration, Malnutrition and Infections. In addition students must complete a comprehensive written exam.

Since the first MMHAC was given in May 1998, military health educators and civilian experts in international health emergencies have critiqued the course. The content and instructional strategy has been uniformly praised. The faculty is committed to the quality and credibility of this educational experience. Thus, all clinical instructors have not only mastered the written material but have had personal experience practicing medicine in an austere health environment.

The MMHAC evolved under the sponsorship of Dr. Val Hemming, Dean, School of Medicine at the Uniformed Services University of the Health Sciences and continues its current affiliation with USUHS through the Department of Pediatrics. Information regarding the course can be obtained by contacting the Education Section of the Department of Pediatrics, 301-295-9731, jlongacre@usuhs.mil

Continuing Medical Education Credit

USUHS is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians. USUHS designates this educational activity for a maximum of 14 hours in category 1 towards the AMA Physician's Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

COURSE OUTLINE

Introduction to Humanitarian Assistance Operations

- Synopsis of Players and Process
- Unique Military Assets
- Primary Causes of Mortality in Humanitarian Emergencies
- Health Priorities in Humanitarian Emergencies

Preventive Medicine in Humanitarian Emergencies

- Disease Transmission in Disrupted Populations
- Basic Public Health Strategies
- Assessing the Needs of a Population
- Surveillance and Information Systems in the Field
- The Clinicians Role

Scenario Exercise - Preventive Medicine

- Groups of eight will work with a facilitator through a list of questions/problems raised in a scenario
- Emphasis on the importance of the clinician as data collector for surveillance and the role of disease surveillance in defining medical resources priorities

Changing Your Frame of Reference

- Standards of Care and Empiricism in the Developing World and in Emergencies
- Appropriate Medical Supplies in Emergencies in the Developing World- Introduction to the WHO Emergency Health Kit

Malnutrition

- Individual Anthropometrics and Interpretation
- Clinical Manifestations and Management of Caloric and Micronutrient Deficiencies
- Therapeutic and Supplemental Feeding Strategies
- Population Anthropometrics and Survey Techniques

Malnutrition practice case

Guest Lecturer

- Non-military perspectives on humanitarian emergencies

Diarrhea and Dehydration

- Recognizing and Managing Diarrhea and Dehydration in the Health Emergency Setting

Infections

- Epidemiology and Management of the Big Killers
- Measles
- Malaria
- Diarrhea - Significant Treatable Causes
- Acute Respiratory Infections

Integrated Management

- Interactive case presentations of patients with multiple health issues emphasizing prioritizing problems and integrating algorithms learned previously.

Diagnostic and Management Skill Stations:

Groups of six will rotate through each of four skill stations.

- I. Malnutrition
- II. Infection
- III. Diarrhea and Dehydration
- IV. Written Examination

Complete Course Evaluations Forms/CME certificate distribution

Chapter V

Overview of Humanitarian Emergencies

Julia A. Lynch, MD

Goals and Objectives for the Overview Module

1. Participants will recognize the major inciting events that can lead to a humanitarian emergency, the societal and individual characteristics that create vulnerability to the effects of these disasters and the common epidemiological measure of disaster severity.
Objectives:
Participants will demonstrate the ability to:
 - Define and give examples of a natural disasters, technological disaster, and a complex emergency;
 - Differentiate a refugee from an internally displaced person (IDP);
 - List the individuals typically most vulnerable to the effects of a disaster; and
 - Define crude mortality rate.
2. Participants will appreciate the variety of organizations, national and international, active in the humanitarian emergency setting and the relative strengths and limitations of each.
Objectives:
Participants will demonstrate the ability to:
 - Define a Non-Governmental Organization (NGO) and list the general strengths and limitations of these organizations in carrying out humanitarian assistance;
 - Explain the unique mandate and neutrality of the International Committee of the Red Cross (ICRC);
 - List the major United National Agencies active in humanitarian relief;
 - Describe the way in which the Office of Foreign Disaster Assistance (OFDA) of the United States Aid for International Development (USAID) becomes involved in a humanitarian emergency and list the four main response actions it can take;
 - List and explain eight characteristics of the US military that allow it to contribute significantly to humanitarian emergency assistance; and
 - List and explain five limitations to the use of US military assets in humanitarian assistance.
3. Participants will recognize the five leading causes of death in humanitarian emergencies in the developing world and the root environmental conditions that drive disease incidence and case fatality rates.
Objectives:
Participants will demonstrate the ability to:
 - List the five leading causes of death in humanitarian emergencies; and
 - List some root environmental conditions that drive disease and mortality.
4. Participants will recognize the Ten Essential Emergency Relief Measures as defined by international relief experts to be implemented in an emergency.
Objective:
Participants will demonstrate the ability to:
 - List the Ten Essential Emergency Relief Measures.

Overview of Humanitarian Emergencies

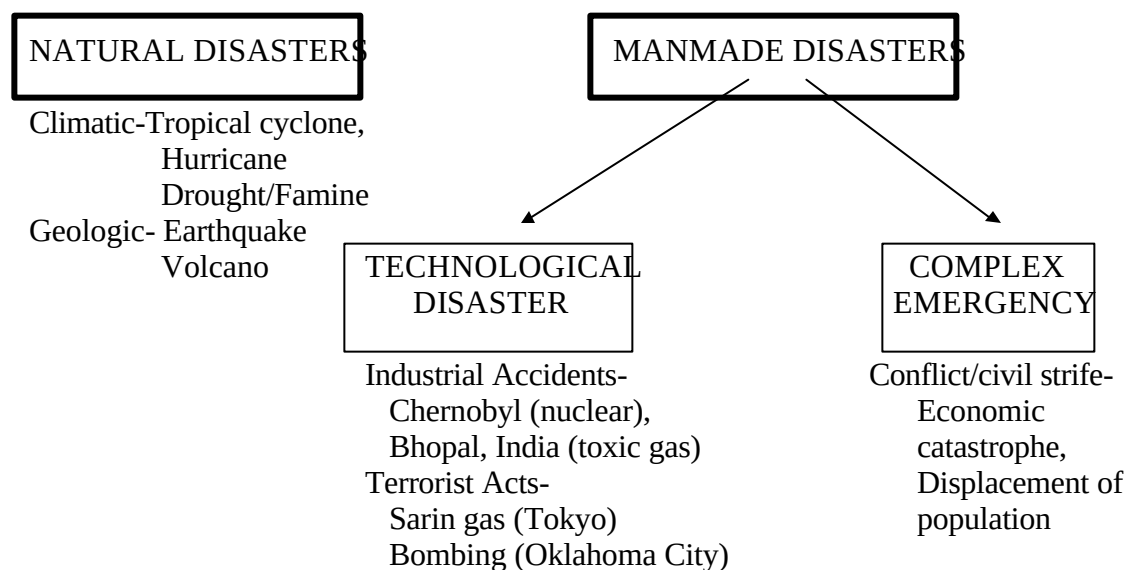
SECTION I.

What is a Humanitarian Emergency?

There is no universally accepted definition. However a reasonable description of a Humanitarian emergency is

An acute situation affecting a large population where through disruption or displacement neither the population nor it's government is capable of providing for all of the basic needs.

All such emergencies have **inciting events**. These can be classified as Natural or Manmade:



Natural Disaster

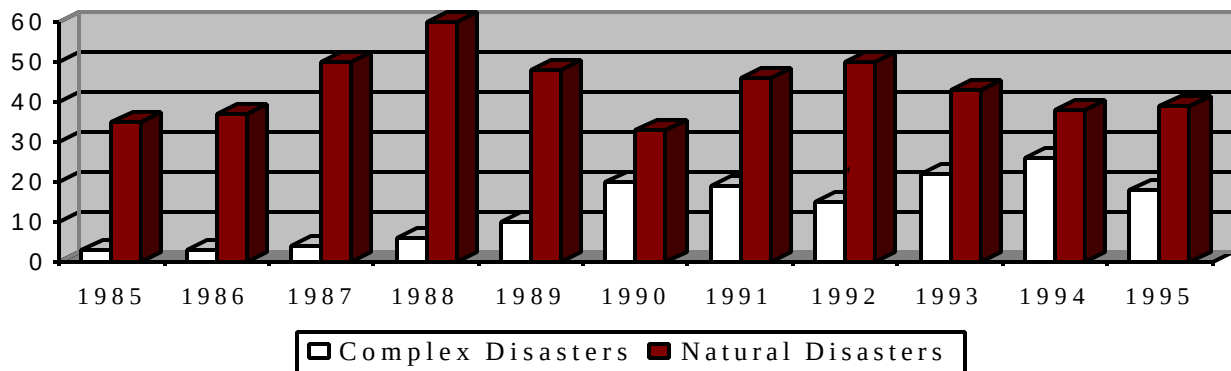
The timing of climatic and geologic events is unpredictable; however they have occurred at overall steady rates throughout history. Although strides have been made in public health and disaster response in many regions of the world, some societies are becoming increasingly vulnerable to the effects of these events because of overpopulation and frail infrastructure particularly in the developing world. Consequently, an increasing number of natural disasters have required an international assistance response. The effects of these sudden events can be phenomenal- 100,000 persons were killed as a result of the tropical cyclone in Bangladesh.

Technological Disaster

Unregulated industrialization and inadequate safety standards continue to create an increasing potential for industrial disasters like Chernobyl.

The dissemination of technology for creating weapons and biological and chemical agents has increased the threat of techno terrorism. We have the least experience in these disasters, but active development of response systems for the unique requirements of these events is underway- the US military has a leading role.

Number of Natural and Complex Disasters Worldwide, 1985-1995



Taken from "Humanitarian and Peace Operations, NGOs and the Military in the Interagency Process", Workshop Report, OFDA Briefing sponsored by the Center for Advanced Concepts and Technology

Complex Emergency

This is the commonly used term to describe the human disaster that follows war and civil strife. These events are characterized by the displacement of large populations from their homes, a near total loss of existing societal infrastructure and continuing concerns for personal security. There has been a global increase in civil/ethnic strife; in addition, in recent years it has been estimated that 90% of the war related mortality has been among civilian non-combatants. The result of these emergencies has been a remarkable increase in the number of displaced people in the world. People who leave their homes in order to attempt to survive.

The United Nations has a special agency that tracks and attempts to assist displaced persons-the United Nations High Commission for Refugees (UNHCR). The UNHCR actually refers to these individuals as "persons of concern"

Who are these "persons of concern"? There are two main categories of displaced persons who are encompassed under "persons of concern":

Refugee- Persons who flee their own country because of war, violence, famine or a well founded fear of persecution for reasons of race, religion or nationality.

-Recent estimates suggest there are at least 12-14 million refugees in the world today (2001, US Committee for Refugees).

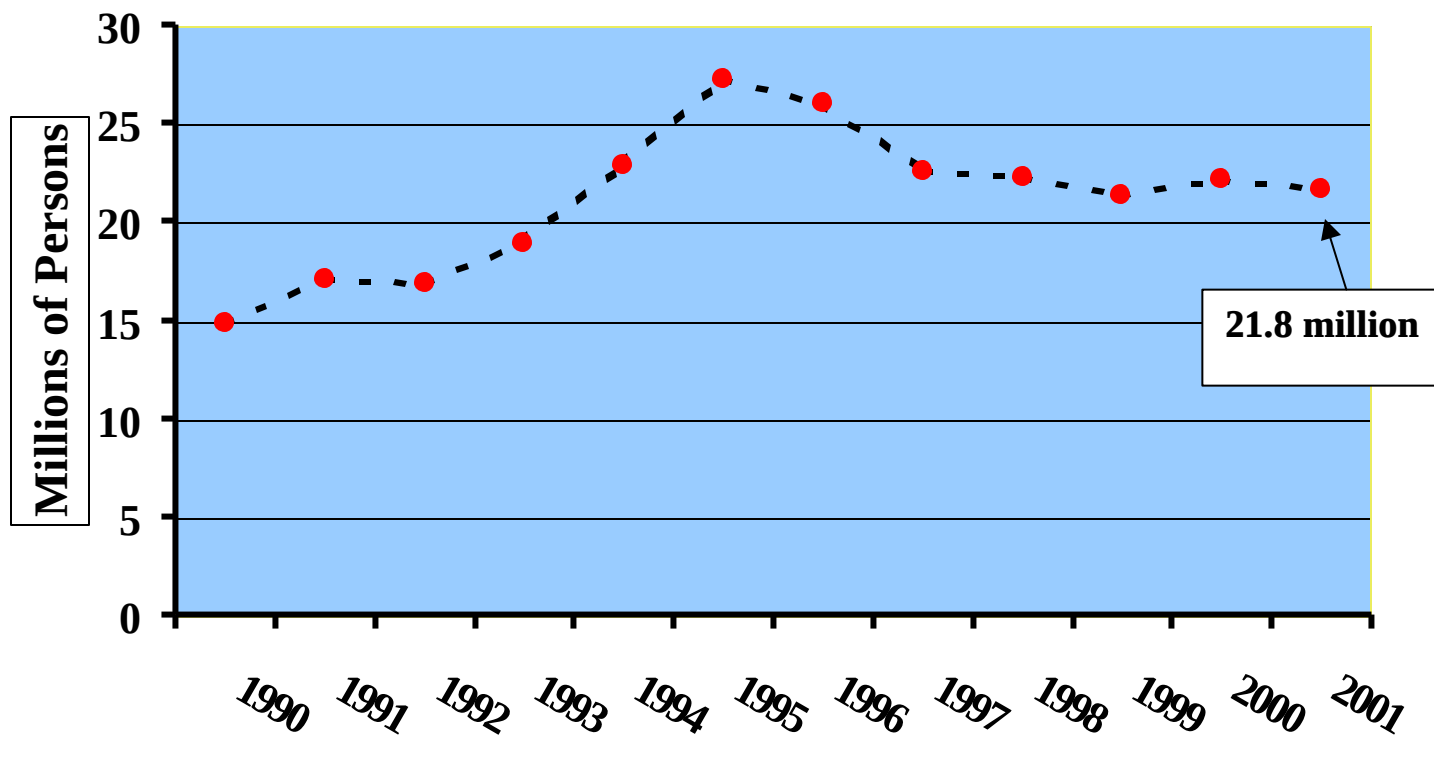
-Designation as a "refugee" entitles people to certain UN and International protections under Humanitarian Law.

Internally Displaced Person (IDP)- Individuals who leave their homes for similar reasons but do not cross a border and enter another country.

-Not afforded the same protections under law, much more difficult to assist.

- Recent estimates suggest 15-20 million IDP in the world. (2001, US Committee for Refugees)

Global UNHCR – *Persons of Concern*, 1990-2001



ECOSOC section of the United States Mission to the United Nations.

Where are the major refugee and IDP situations in 2001? These populations are always in flux, but an annual review in 2001 identified these as the major locations:

Major Refugee Locations, 2001		
<u>Nation of Origin</u>	<u>Host Nation</u>	<u>Estimates of Persons</u>
Afghanistan	Pakistan	3.6 Million
Burundi	Tanzania	0.6 million
Iraq	Iran	0.5 million

Major IDP Locations, 2001	
<u>Nation</u>	<u>Estimates of Persons</u>
Eritrea	1.1 million
Afghanistan	0.8 million
Sri Lanka	0.7 million

ECOSOC section of the United States Mission to the United Nations.

Complex Humanitarian Emergencies can result in staggering loss of life. The estimated deaths among civilians in a number of recent and ongoing crises are shown below.

Country

Deaths

Time Period

Sudan	over 1 million	1983- present
Ethiopia	750,000- 2 million	1984-1993
Rwanda	500,000- 1 million	1994- present
Cambodia	over 1 million	1975-1993
Somalia	500,000	1988- present
Bosnia-Herzegovina	200,000	1992-1996

Taken From "Global Humanitarian Emergencies, 1996" ECOSOC section of the United States Mission to the United Nations.

How do you measure disaster severity ?

The severity of disasters and complex emergencies will depend on both the magnitude of the event itself as well as the vulnerability of the population.

-How developed was the pre-disaster infrastructure?

-What was the baseline state of health of the population?

The most "disaster prone" or vulnerable populations are found in the developing world.

Severity is often measured by the **crude mortality rates (CMR)** experienced by the affected population- and is expressed as

"the number of deaths per 10,000 people per day (#deaths/10,000/day)"

Typical baseline CMR in the developing world is 0.4 - 0.7 deaths/ 10,000/ day

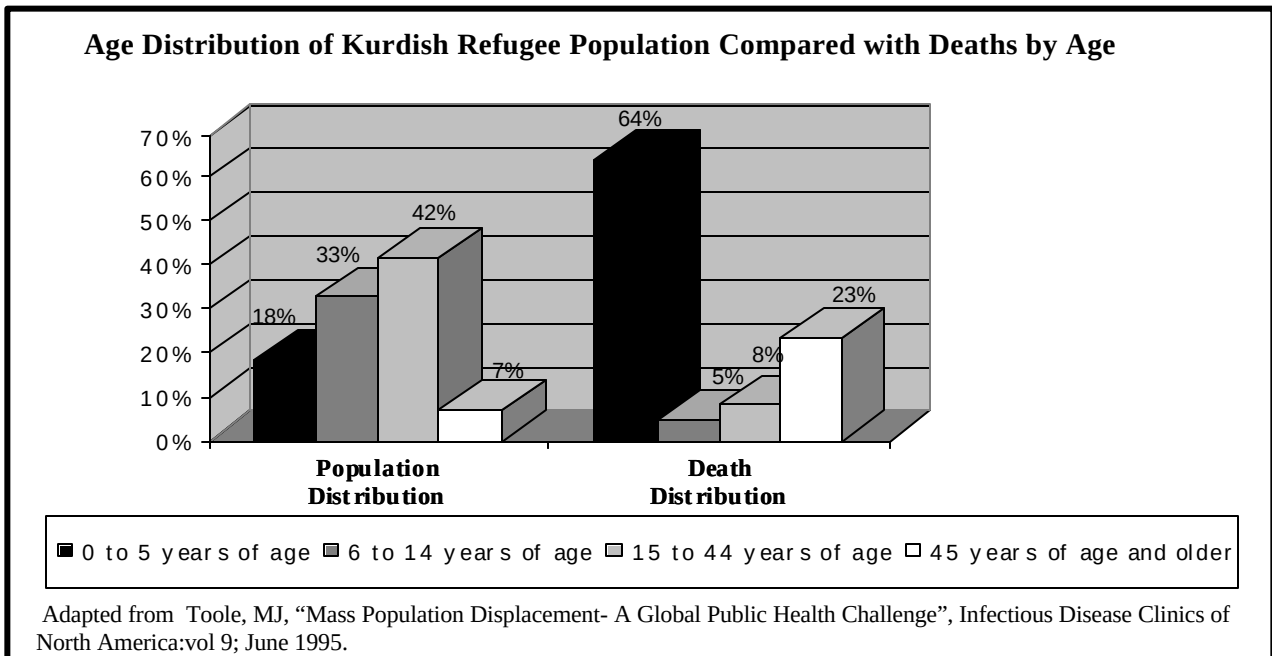
The CMR can be used to follow the progress of a disaster and assess the effectiveness of interventions. In the early phase of disasters the CMR can be extraordinarily high- during the first month after the influx of Rwandan refugees into eastern Zaire, the CMR was 40-60 times the baseline rate for that population.

<u>Date</u>	<u>Host Country</u>	<u>Country of Origin</u>	<u>Baseline CMR</u>	<u>Crisis CMR</u>
July 1990	Ethiopia	Sudan	0.6	2.3
June 1991	Ethiopia	Somalia	0.6	4.7
April 1991	Turkey/Iraq	Iraq	0.2	4.2
March 1992	Kenya	Somalia	0.6	7.4
May 1994	Tanzania	Rwanda	0.6	0.6
June 1994	Burundi	Rwanda	0.6	5.0
July 1994	Zaire	Rwanda	0.6	34.0

Adapted from Toole, MJ, "Mass Population Displacement- A Global Public Health Challenge", Infectious Disease Clinics of North America:vol 9; June 1995.

Who are the most vulnerable individuals in a population?

The immediate mortality in natural and other disasters may be random, however the long-term disaster related deaths are disproportionately suffered by the youngest and oldest members of a population. As seen below, during the Kurdish refugee crisis in northern Iraq, 18% of the refugees were 0-5 years of age. However this group suffered 64% of the mortality.



Orphaned and unaccompanied children are even more vulnerable to the adverse effects of disasters. Epidemiologic studies have documented that women and households headed only by women have less access to relief services. Women who are pregnant or lactating are another vulnerable group with increased nutritional requirements. Sexual and physical violence against women appears no less common among displaced populations.

What are the effects of disasters?

Every disaster/emergency is unique in terms of the inciting event, climate, geography, culture/social structure and pre-existing status of the population affected. National and international organizations must resist the impulse to respond before a rapid assessment of the situation is made. Relief interventions based on speculation rather than information gathered on the ground are likely to waste time and resources and ultimately prolong suffering. Although types of disasters generally result in predictable patterns of disruption (see table below), the severity of the effect will be situational. Unanticipated effects may dominate in a given situation. For example, while a diminished supply of water may not be generally anticipated following an earthquake, if a regional water purification system was destroyed, clean water may in fact be the most critical supply needed to prevent disease and excess mortality in the affected population. Although trauma is likely to be the leading cause of death immediately following an earthquake, deployable surgical trauma teams that arrive one week after the event may be an expensive resource of relatively little use. If a functioning medical care system

remains, surgical supplies and blood products rapidly brought to the region may be the most effective aid. **An appropriate response is always tailored to the needs of the disaster.**

<u>The General Effect of a Disaster on Availability of Basic Needs</u>						
	<u>Trauma</u>	<u>Loss of Shelter</u>	<u>Lack of Water</u>	<u>Lack of Food</u>	<u>Lack of Sanitation</u>	<u>Lack of Health Care</u>
Earthquake	++++	++	-	-	-	+
Flood	-	++++	++++ contaminated	+++ disrupted food economy	+++	+++
Complex Emergency	+/-	++++	++++	++++	++++	++++

Emergencies Have Phases

Emergency situations evolve and the response needs change. While this evolution is a continuum, it is useful to divide the process into phases which can help focus priorities and resources. Several authors have described three phases.

Acute (Early) Emergency (0-1 month)

Characterized by initial chaos, high CMR and the political and logistical initiation of a response to include rapid assessments of the situation by specialized response teams. With the implementation of a response focused on basic needs, CMR declines.

Late or Recovery Phase (1-6 months)

Improvement and expansion of relief interventions based on epidemiological data. Continued gradual decline in CMR.

Rehabilitation and Development Phase (6+ months)

The health profile of the camp population begins to look like a typical community in that country. Emphasis shifts from relief to development with self-sufficiency as a goal.

A Brief Descriptive Portrait of a Humanitarian Emergency

Refugees from a civil war began trickling across the border into country X at 1-2,000 per day over several weeks. Country X, having limited resources failed to respond to the impending crisis or anticipate the subsequent mass migration of 10-

50,000 per day that ensued after violence escalated in the refugee's homeland. The response of host country X was to direct movement of refugees into makeshift camps that were located away from its own local population. The geographic location of the camps had no other desirable attributes like access to water sources or major transportation routes. Although camps with <10,000 inhabitants are considered more ideal, the unplanned response resulted in camps of 20-100,000 individuals. The arriving refugees had been subjected to months of civil war, persecution and economic and social disruption and arrived malnourished and sick, some even with wounds. Until plastic sheeting and other construction materials arrive, they survive in the open or make shelters from available materials.

The initial CMR is 20/10,000/day- in a camp of 90,000 about 180 people per day, most are young children.

Disaster response teams from the CDC and other agencies arrive at the request of country X and spend several days evaluating the situation and determining response priorities and logistics. Initial food supplies are provided by the World Food Program (WFP) and consist of high protein biscuits which are air dropped to distribution sites by military aircraft. Food distribution on the ground will be organized by the host country military in conjunction with NGO relief workers and local refugee leaders. Women refugees will be included in the distribution process to improve equitable distribution of resources. As transportation and distribution improve, food supplies will be expanded to include grains, beans and oil in quantities which can provide for minimum caloric needs. As material and personnel become available, supplemental and therapeutic feeding programs for the severely malnourished will be initiated.

Sanitation quickly becomes an issue in this crowded environment. And early relief workers on the scene begin to counter the problem by defining defecation sites in an attempt to limit contamination of the living areas. However, the open defecation areas are not used by women or young children of this culture. Over the next several weeks, construction materials will become available and more culturally appropriate latrines will be constructed.

Water is more scarce than food as it is the dry season and local streams are dry. Refugees must walk great distances to obtain small quantities of contaminated water. Aid agencies provides covered buckets and chlorination supplies. It will be many weeks before well digging can begin.

Overall the effect of the relief response in the first month is to reduce the CMR to 8/10,000/day- or 72 deaths each day in a camp of 90,000- still mostly young children.

In the first month, relief workers have also begun to organize a health system which includes a system for tracking disease patterns. As expected, early information indicates that diarrhea and dehydration is the leading cause of mortality. Relief workers have already begun training refugees as community health workers to teach oral rehydration therapy (ORT) and hygiene household to household. In addition, relief workers run ORT outposts for the most severely affected. A measles vaccine campaign with Vitamin A supplementation is initiated, organization and maintenance of a cold chain are major challenges. Relief workers are putting in 18 hours per day, seven days per week. The focus of medical aid is on effective preventive health interventions rather than curative individual care. But as more

medical assets arrive in the camps, community based clinics are established- treatment protocols are written- these mimic the standard of care found among the local population as it would be inappropriate to create treatment that exceeded the care delivered in the host country.

During the second month, the CMR fell further to 5/10,000/day - still mostly children.

Fuel for fires is scarce as the camp and neighboring environs has been stripped of all vegetation. Relief workers and refugees have established routines, effective interventions are improved and expanded with increasing training and involvement of refugees themselves. The CMR will continue to fall over the next few months. Although self sustainment is a goal, the displaced population will continue to require provisions of food, water, fuel and medical supplies. Continued civil strife in their homeland will preclude re-patriation in the near future and further threaten to disrupt the precarious balance achieved in the camps by providing waves of new refugees.

SECTION II.

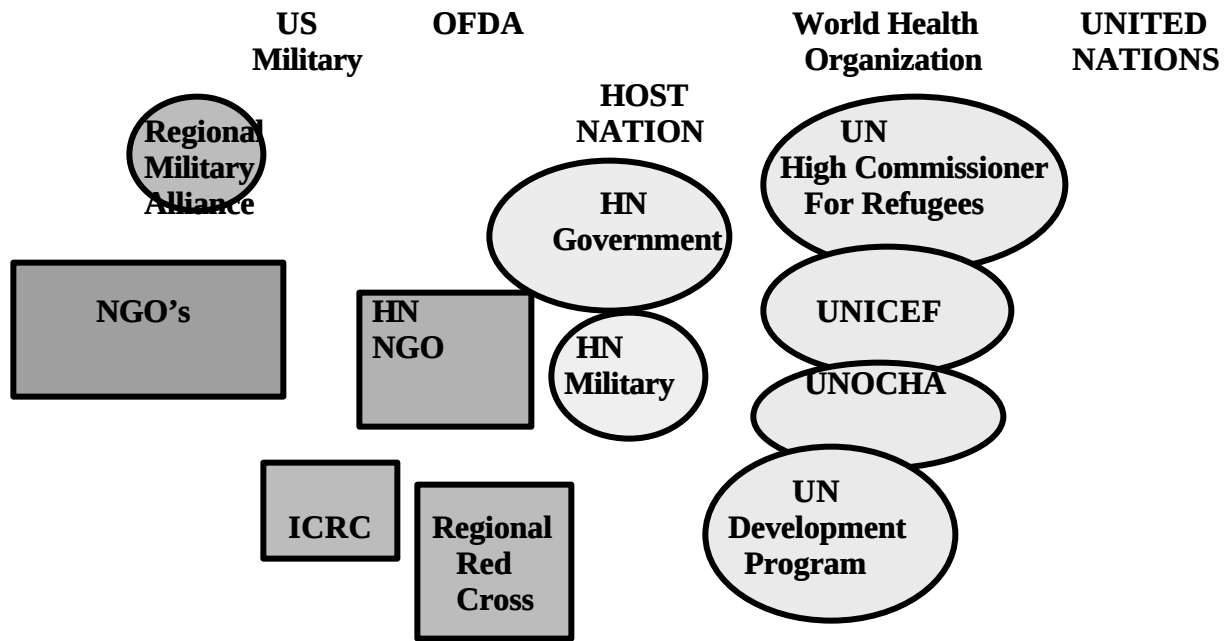
Who are the players in humanitarian emergencies?

Emergencies of a scale to exceed the capabilities of indigenous resources will typically require or draw on the collective resources of a number of agencies. Over three dozen agencies participated in Operation Provide Comfort in Northern Iraq and more than 50 in Somalia. Each of these agencies had an independent system and unique characteristics with regard to its composition.

internal organization / chain of command
response capabilities / technical and logistic resources
motive for participation / thematic and regional focus

These differences make coordination in the already chaotic environment of an emergency yet more challenging. Many of the agencies will have a presence in the host country before the “disaster” as a contributor to the national development process. The “disaster” may draw their resources away from “development” and towards emergency relief. Some understanding of agency characteristics can help facilitate operating in the emergency environment.





Adapted from "Humanitarian and Peace Operations: NGOs and the Military in the Interagency Process", 1996

The organizations or agencies can be generally divided into two types
Non-Governmental Organization (NGO) - also called Private Voluntary Organization (PVO) in the US. Non-profit organizations working in international aid, receiving some portion of their annual revenue from the private sector.

Examples:

CARE
World Vision
Save the Children
International Rescue Committee
OXFAM

Governmental Organizations

Examples:

United Nations and its agencies
US Agencies
United States Aid for International Development (USAID)
Office of Foreign Disaster Assistance (OFDA)
European Community Humanitarian Organization (ECHO)
Foreign Militaries

One of the most important organizations in these settings defies easy classification into these categories being neither private, nor under the direction of a government- that is the International Committee of the Red Cross

International Committee of the Red Cross (ICRC)

Unique among NGO's in that it's mission is mandated by international humanitarian law - Geneva Convention 1949 and the two protocols of 1977.

* Acts principally in conflict/civil disturbance and has the right and duty to intercede across borders in both national and international conflicts- regardless of whether a "state of war" has been declared.

* Brokers relief assistance during war, assures legal protection for victims, monitors treatment of POW's, has primary role in family reunification

* Will go to maximal lengths to maintain neutrality- this is essential to its mission and allows it to operate unarmed in war zones on all sides of a conflict

-fully discloses all activities to all parties in a conflict

-ICRC workers will refuse participation in any activity that may be perceived as partial- this may include riding in vehicles belonging to one party and participation in coordinating efforts with groups who have partisan interests- consequently they generally have self-sustaining capacity including airlift, communication and logistics.

* ICRC will only participate in a conflict if all parties sign an agreement to respect it's neutrality and mission

There have been recent occasions when the parties to a conflict have refused the neutrality agreements offered by the ICRC- the Iran/Iraq war, Afghanistan civil war, Sudan civil war. More disturbing have been intentional murders, often brutal, of ICRC workers in spite of neutrality agreements.

The ICRC is related to but distinct from **the National Red Cross and Red Crescent Societies**, like the American Red Cross. The national organizations provide assistance to victims of disaster and war primarily within their own country. They have similar commitments to the principle of neutrality and the provision of aid based on need only and remain independent of national governments.

The Major NGO's

There are thousands of international relief organizations active world wide- most are small with focused developmental projects (provision of shoes to children, sustainable developmental training...). Only a handful of organizations have the resources to participate in humanitarian emergencies. Each organization tends to specialize in particular emergency relief services.

Some Major NGO's

Cooperative for American Relief Everywhere (CARE)

Logistics and food aid, camp management

Catholic Relief

Annual Budget

300 million

200 million

Food distribution	
Doctors Without Borders/ Medicines Sans Frontiers	150 million
Medical care	
Irish Concern	120 million
supplemental feeding	
Oxford Committee for Famine Relief (OXFAM)	200 million
water and sanitation	
Save the Children Fund	120 million
food aid and development	
World Vision	100 million
food aid and development	
International Rescue Committee	180 million
medical care	

An unusual dichotomy exists between business and altruism as these agencies employ relief professionals and must compete for aid money from both private and government donors. The vast majority of relief money comes from government donors- greater than 5 billion dollars in 1995. The governments disperse this money to relief projects through contracts with NGO's.

Estimated Funding of Global Humanitarian Assistance, 1995	Billions of US Dollars
United States	1.2
European Union	2.1
All other Governments	0.9
European Community Humanitarian Office	0.9
Private contributions	>2.0
Total	>7.1

Taken from "Global Humanitarian Emergencies, 1997", ECOSOC section of the United States Mission to the United Nations. These figure do not include military expenditures for humanitarian assistance.

Unlike the ICRC, some NGO's maintain a "right to interfere" - they will operate across borders without the written approval of their hosts. Although generally aspiring to the neutrality of the ICRC, some NGO's may be more willing to speak out against atrocities. They function well in emergencies with regard to their area of specialty (water provision, food distribution..), but most cannot project complete self sustainment into an emergency setting and may be dependent on UN/military or other agency for

security
field access/transportation to remote sites
communication

sustainment of logistical support for their own personnel

Among the unique advantages of NGO's are their ability/willingness to provide person to person assistance. They will have pre-disaster relationships with the affected communities and understand local culture and public health status. They will also transition easily from disaster relief back to development and are willing to have long-term commitments to community development and rebuilding.

Governmental Organizations

The United Nations

The UN charter is a multilateral treaty with an administration to carry out its provisions. It has limited ability to provide aid unless invited by a host government. UN Chapter VII provides for forceful intervention only if "international security" is threatened. The UN has no military forces itself- but must depend on member nations to "donate soldier"s or it can subcontract security services from national or coalition governments (Operation Provide Comfort- UN authorized under Chapter VII and lead by the US Military using coalition forces).

What is the difference between UN Peacekeeping and Peace-enforcement operations?

Peacekeeping UN Chapter VI provides for non-combatant defensive security forces to be used to monitor peace agreements- requires consent of all warring parties. Examples include UNTAC, Cambodia; UNITAF, initial UN mission in Somalia.

Peace-enforcement UN Chapter VII provides for armed intervention to compel compliance with Security Council resolutions. Examples include UNOSOM II, a 28 nation coalition force in the later phase of the Somalia operation; UNPROFOR, Bosnia- initially Chapter VI, expanded to Chapter VII to protect humanitarian aid and establish "safe zones" for civilians.

UN Agencies

Independently funded, specialized agencies. Have tended to focus on management and will generally delegate actual field work to NGO's or other agencies.

UN High Commissioner for Refugees (UNHCR)

Coordinates a primarily material response at the request of the Secretary General. Has had a diplomatic focus on advocacy for displaced persons rather than on camp operations. Coordinates the relief response in most refugee situations.

World Food Program (WFP)

Coordination and delivery of food stuffs to areas of need.

UN Children's Fund (UNICEF)

A fund not an agency- it can provide assistance worldwide without the permission of the existing government. Focuses on support to social programs targeting children and pregnant and lactating women.

UN Development Program (UNDP)

Coordinates in country (pre disaster) UN development activities.

Department of Humanitarian Affairs (DHA)

Created in 1992 to fill the void in UN emergency response and disaster prevention. In theory will coordinate UN agencies response in disaster relief process as well as liaison with other participants (NGO's, military...). recently changed it's name to "Office for Coordination of Humanitarian Assistance".

World Health Organization (WHO)

Provides consultation and policy in preventive and curative health care.

US Government Agencies

United States Aid for International Development (USAID)

Coordinates US government programs for international development and the response to international emergencies. Emergency or disaster response is the responsibility of the **Office of United States Foreign Disaster Assistance (OFDA)** within USAID's Bureau of Humanitarian Response. USAID/OFDA becomes involved in an emergency when the US Ambassador in the affected country or the Assistant Secretary of State for that region declares a state of disaster (see figure below). OFDA can respond rapidly with

- * deployment of a **Disaster Assistance Response Team (DART)** composed of disaster assessment experts. They rapidly evaluate the emergency situation on site and identify and prioritize overall relief needs.
- * release prepositioned disaster relief commodities stockpiled in "disaster prone" regions of the world (plastic sheeting, water containers, chain saw kits, body bags, hard hats, gloves, water purification supplies..)
- * review of NGO/UN proposals for relief activities and dispensing of US government funds to these agencies who provide the hands on relief work.
- * fostering communication/coordination between government and NGO's in the disaster situation.

If the crisis primarily involves “refugees” the monetary aid response is often channeled through the **Department of State**, Bureau of Population and Refugee Migration- who in turn gives money to UNHCR.

Similar organizations exist in the governments of other frequent donor nations

European Community Humanitarian Organization (ECHO)

Overseas Development Agency (ODA) -UK

Canada’s International Development Agency (CIDA)

Japan’s International Cooperation Agency (JICA)

US Military

US military assets have been drawn into humanitarian assistance operations in a number of ways. In foreign natural disasters and some complex emergencies, a request is made by the State Department to the Department of Defense (DOD). This may result in the formation of a Joint Task Force (See figure below). The composition of the military assets deployed will be determined by the JTF Commander and based on a needs and risks assessment.

US military assets may also be used to assist civilians while the US military is an active party in a conflict or as part of a UN peacekeeping or peace-enforcement operation.

With the vast spectrum of resources available among NGO’s and other government agencies- what unique assets does the military contribute to humanitarian assistance response?

Speed- no other organization can mount a large logistical response as rapidly.

Security- arrive fully prepared to secure an environment, both people and material.

Transportation- an array of fixed wing and rotary air assets as well as land and naval providing the capability to bring anything, anywhere, anytime.

Logistics- can maintain supply lines in austere environments

Command, Control and Communication- well defined, responsive organizational structure.

Self Sufficiency in the Field- complete capability to provide for its own people: water, sanitation, rations, shelter, medical care.

Specialty Units-

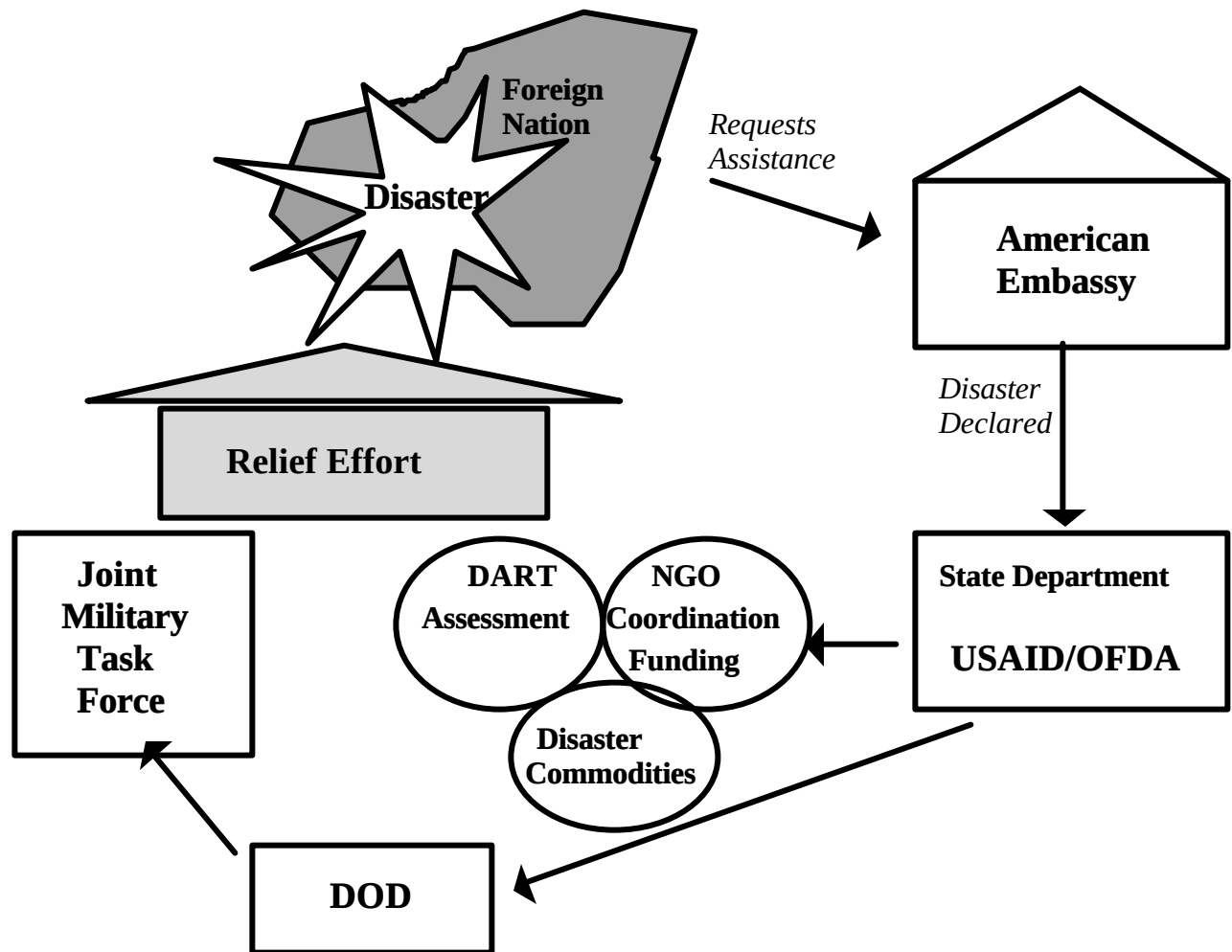
Engineers- rapid structural repairs in austere settings (roads, runways, bridges..)

Civil Affairs- specialize in public administration/infrastructure development- composed of civil engineers, lawyers, police/fire administrators...

Preventive Medicine Teams and Field Laboratories- capable of providing rapid epidemiologic assessments, managing disease surveillance, outbreak investigation, vector control, field water and sanitation.

Deployable Field Hospitals and Med-evac Capability

US Government Response to an Emergency: Initiating International Assistance



As ideal as the military appears for rapid response to humanitarian crisis, there are **significant drawbacks** to the use of these assets.

Medical Care- the structure of field units and the training of providers is oriented to combat casualty care of health young adults not to the needs of disaster victims

Logistics- the supplies available in the system may not be appropriate for a disaster setting in the developing world. Medical supplies may not reflect prevalent disease and food rations may not be culturally or physiologically appropriate.

Focus- the military mission may focus on short term objectives with little emphasis on redevelopment. It is unlikely to provide a long term commitment to the affected community.

Political- We are an extension of our government and will be used to meet political/strategic objectives- our involvement is never purely humanitarian. This may put us in conflict with elements of the population and with relief workers who must maintain neutrality for their own safety and function.

Expense- military assets are expensive.

*The military deployment to Somalia cost about \$100 million per month.

*A coalition airlift of relief supplies to Ethiopia in the 1980's while effective in limiting the effects of a famine in the shortterm , proved very cost inefficient and provided no medium or long term benefit to the region as would have been realized if the same funds had been spent in a different manner. However, the airlift received a good deal of publicity.

<u>Ethiopian Airlift</u>		
cost of <u>one flight</u> of a C130 with a capacity to carry 15 tons of grain	=	cost of purchasing a grain truck with a 30 ton capacity and fueling it for 6 months

Agencies of Other Governments

In addition to the players just described, there may be host nation agencies and other foreign militaries.

How are relief efforts coordinated with so many players?

Coordination between all of these organizations can be a monumental challenge. Some generalizations about determination of operational command in emergencies can be made.

1. During a natural disaster in a sovereign nation, the host nations government/agencies and military will likely have operational command. US assets, including military, will play a supportive role.

2. In complex emergencies involving conflict a military authority will have control of the theater - including coordinating humanitarian assistance. In recent complex emergencies, US or coalition force leadership has established a Civil-Military Operations Center (CMOC) whose purpose was to coordinate military and civilian (relief) activities in the area.

SECTION III.

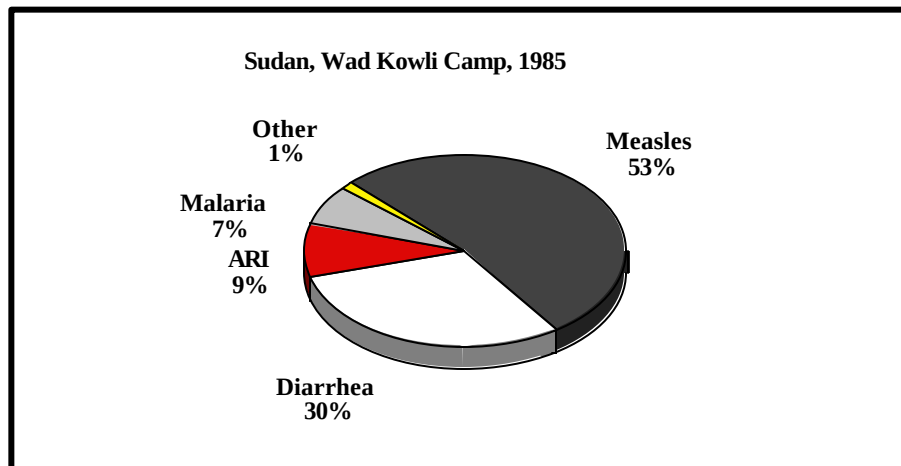
What are the primary causes of mortality in humanitarian emergencies?

The immediate objective of any intervention in a humanitarian emergency is a reduction in the death rate. Although natural disasters will be associated with immediate deaths due to accidental causes (trauma, drowning..), the long term affects on mortality of all disasters in the developing world are consistently due to preventable conditions:

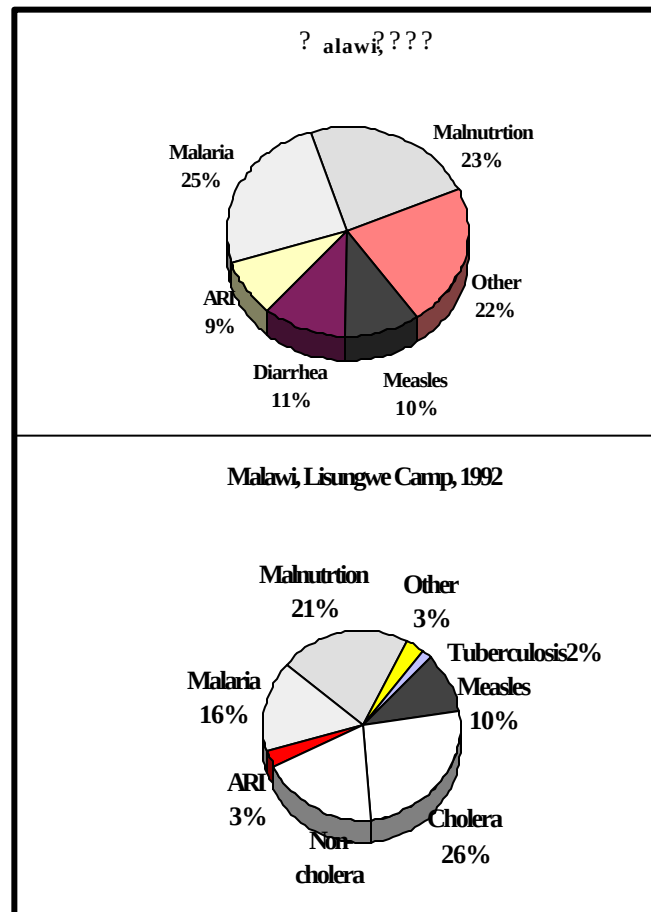
The Five Leading Causes of Death in Humanitarian Emergencies in the Developing World

Diarrhea illnesses and Dehydration
Measles
Malaria
Acute Respiratory Infections
Malnutrition

The unique circumstances of each disaster (climate, geography, pre-existing health, camp conditions...) will effect the relative contribution of each of these to total mortality. Below are three examples of mortality statistics from different refugee camps.

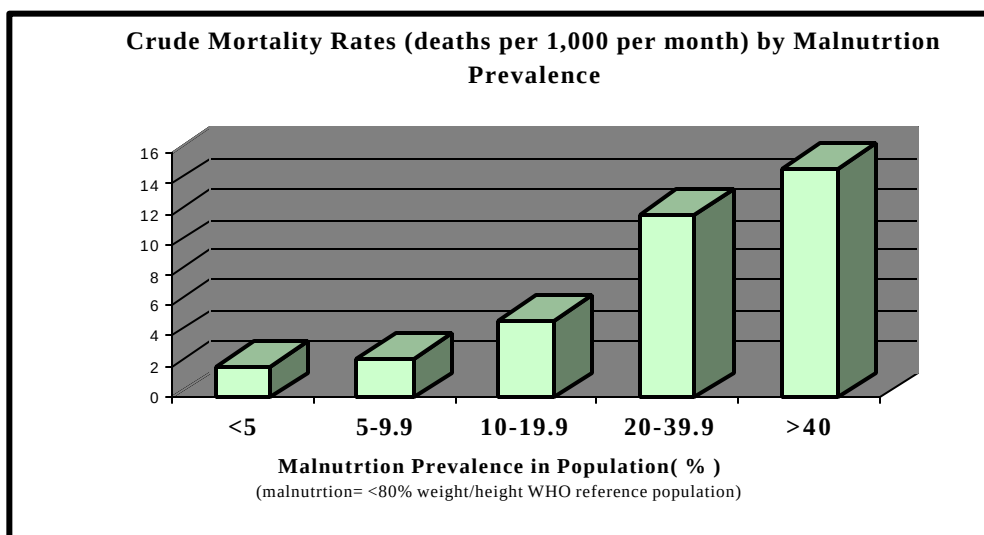


From MMWR, vol. 41/No. RR-13, Major causes of death all ages.



From MMWR, vol. 41/No. RR-13, Major causes of death in children < 5yo, Source: UNHCR, MSF, IRC monthly report

Even when malnutrition is not identified as the primary immediate cause of death, it is a major underlying synergistic factor contributing to high case fatality rates of the communicable diseases. In one study of 41 refugee camps, the crude mortality rate (from all causes) clearly correlated with the prevalence of malnutrition in the population.



Each of the leading causes of mortality has one or more **root environmental conditions** in the emergency/disaster setting that drives disease incidence and/or increases case fatality rates.

Some Root Environmental Conditions

Disruption of Food Sources/Economy	Disrupted Sanitation
Disruption of Health Services (Preventive and Curative)	Loss of Income
Loss of Shelter	Crowding
	Lack of Water

Effective relief efforts must then direct resources at preventing and correcting the root environmental contributors as well as treating the disease states themselves. A WHO conference of international relief experts identified ten essential emergency relief measures. These are founded on an understanding of the leading causes of mortality in emergencies as well as the root situational contributors. The measures are not presented in an absolute order as ***the relative priority given to each of these measures will depend on the unique requirements in each emergency.***

TEN Essential Emergency Relief Measures

1. Rapid assessment of the emergency situation and the affected population.

- carried out by expert teams focused on rapidly defining
 - *magnitude of the emergency
 - *environmental conditions
 - *major health and nutrition needs of the population
 - *local response capacity
- It is this information that will allow for prioritization of the remaining essential measures

2. Provide adequate shelter and clothing.

- exposure to elements can lead directly to death and increase caloric requirements

3. Provide adequate food.

- a minimum of 1900 kcal/person/day
- must consider mechanism for equitable distribution
- targeted supplemental and therapeutic feeding programs for vulnerable and severely malnourished when resources are available

4. Provide elementary sanitation and clean water

- minimum requirement 3-5 L/person/day of reasonably clean water

5. Institute diarrhea control program.

- community outreach for case prevention
- *education on personal hygiene and household management of diarrhea and dehydration
- appropriate case management of severe diarrhea and dehydration
- improve sanitation and water source

6. Immunize against measles and provide Vit A supplements.

- a high priority in any displaced population living in crowded conditions
- Vit A deficiency is common in malnourished populations and contributes significantly to measles case fatality

7. Establish primary care medical treatment.

- develop appropriate treatment algorithms for prevalent diseases based on treatment standards among the local population.

8. Establish disease surveillance and a health information system.

- necessary to monitor effectiveness of health interventions and realign priorities.

9. Organize human resources.

- disaster victims are not helpless- most want to help themselves but need the means
 - *identify leaders to organize food and water distribution and sanitation program
 - *identify community health workers (individuals with pre-disaster health experience)
 - *identify interpreters
 - *identify surrogate families for unaccompanied minors

10. Coordinate activities.

- local authorities, international relief organizations, governmental agencies, military...

As a military clinician functioning in a humanitarian emergency, most of the tasks associated with implementing these essential measures will fall to other civilian or military participants. The remainder of the material in this course will then focus on providing you the necessary knowledge and skills in preventive and clinical medicine to be an effective clinical provider in these settings and contribute to a relief operation. This will include gaining a general understanding of preventive public health measures employed in disaster settings and an in-depth operational knowledge of the diagnosis and management of the leading causes of mortality.

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VI. Preventive Medicine in Humanitarian Emergencies

R. Kevin Hanson, MD

Goals and Objectives for Preventive Medicine Module

The Preventive Medicine Module will consist of a 60 minute lecture and a 90 minute small group exercise.

1. **Goal:** Participants will understand the modes of transmission for the principal causes of morbidity and mortality in a humanitarian emergency involving populations which have been displaced and deprived of normal infrastructure support.

Objectives: Participants will demonstrate the ability to...

- describe the following broad mechanisms of transmission:
 - ~ enteric (fecal-oral) transmission, including waterborne, food borne, fly-borne and direct person-to-person
 - ~ respiratory transmission, including droplets and direct person-to-person
 - ~ vector borne transmission
- correlate living conditions in a humanitarian emergency with disease transmission by the above modes
- characterize the following diseases in terms of mechanisms of transmission in humanitarian emergencies:
 - ~ diarrhea, acute respiratory infections, measles,
 - ~ malaria and other vector borne infections, meningitis

2. **Goal:** Participants will understand the basic public health strategies needed to prevent transmission of disease in a humanitarian emergency, and the technical experts needed to implement them.

Objectives: Participants will demonstrate the ability to . . .

- describe the basic expertise of sanitarians, engineers, and entomologists
- describe the general environmental health strategies for the provision of safe water, proper disposal of human waste, food service sanitation, basic personal hygiene, and reduction of overcrowding
- integrate appropriate cultural norms into the provision of environmental health interventions by involving local experts who are familiar with the pre-emergency norms and standards
- outline the considerations for vector control measures in a humanitarian emergency
- identify diseases for which immunization programs are practical and effective in a humanitarian emergency
- identify diseases and situations for which chemoprophylaxis may be an effective emergency measure

3. **Goal:** Participants will understand the critical need for a population-based (as opposed to individual patient-based) assessment early in a humanitarian emergency situation

Objectives: Participants will demonstrate the ability to. . .

- formulate an overview of a humanitarian emergency through a rapid initial survey which assesses the baseline health status of the population affected, its size and approximate demographics, the overall nutritional status, the local environmental conditions, and available local resources
- predicate the immediate medical and public health response on the results of the rapid initial assessment, avoiding the temptation to begin interventions before problems are known
- prioritize resources to address the most significant public health problems

4. **Goal:** Participants will understand the “surveillance cycle” and the essential nature of disease surveillance during a humanitarian emergency.

Objectives: Participants will demonstrate the ability to. . .

- define surveillance and outline the four steps of the “surveillance cycle”: data collection, analysis, feedback and action to counter public health threats
- define the role of an epidemiologist in establishing a disease surveillance system in a humanitarian emergency
- define the clinician’s role in supporting disease surveillance system at all points where medical care is being delivered

Given a specific humanitarian emergency scenario, participants will demonstrate the ability to:

- independently keep records of all clinical encounters, organized into general disease categories appropriate for a given situation
- effectively participate in an established disease surveillance program which systematically records, categorizes, and reports patient visits at all sites where care is being delivered
- calculate illness rates whenever possible
- estimate mortality rates
- provide an example of how basic surveillance data is used to rapidly and specifically target public health interventions
- use surveillance as the ultimate outcome measure of a relief effort

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Preventive Medicine in Humanitarian Emergencies

Kevin Hanson, MD MPH

CDR MC USN (FS)

I. Introduction - Perspectives and Priorities

- A. Humanitarian emergencies have a wide variety of underlying causes. However, they all involve a similar “bottom line”: they threaten the health of large groups of people
- B. Humanitarian relief is about protecting and restoring the health of populations
 - 1. Indirectly - provision of shelter, security, food, etc
 - 2. Directly - provision of health services
- C. Perspectives in health services
 - 1. Clinician’s perspective - focus on diagnosis and treatment of the *individual patient*, one at a time
 - 2. Public Health perspective
 - a. intervene at the population level
 - b. identify and correct underlying *causes* of illness – PREVENTION
- D. Humanitarian emergencies require setting priorities
 - 1. Resources usually very constrained - can’t do everything for everyone
 - 2. Displaced population may be very large - overwhelming
 - 3. Conditions usually very conducive to epidemic disease
 - 4. Must accomplish the greatest good for greatest number with limited resources
 - 5. Population interventions usually have the greatest impact

II. Mortality in Humanitarian Emergencies

- A. Mortality is the most severe health outcome
 - 1. Mortality is what we are trying to avoid in humanitarian relief
 - 2. Mortality sets the major relief priorities
 - a. Biggest causes of death receive the most immediate attention
- B. Major causes of mortality in displaced populations - a similar pattern
 - 1. Diarrheal illness
 - 2. Measles
 - 3. Acute respiratory disease (ARD)
 - 4. Malaria (in some situations)
 - 5. Malnutrition (also contributes to the above causes)
- C. The top 4 causes of death are **communicable diseases**
 - 1. The major killers are **currently being transmitted** within the population
 - 2. Interrupting transmission (prevention) is a very high priority
 - 3. Where transmission can’t be interrupted, reducing susceptibility is a priority
 - 4. The need for treatment represents a failure of prevention

III. Understanding Disease Transmission

- A. Primitive living conditions - without the normal infrastructure of support highly conducive to disease transmission by 3 major mechanisms
 - 1. Fecal oral
 - 2. Respiratory
 - 3. Vector-borne
- B. Fecal oral transmission
 - 1. Human feces is essentially a concentrated culture of enteric pathogens bacterial, viral, parasites
 - 2. In primitive conditions, nearly impossible to avoid direct contact with feces often no alternative to indiscriminant defecation - feces everywhere personal hygiene usually compromised or non-existent
 - no hand washing, no bathing, no clean clothes
 - 3. The fecal to oral connection - it happens with remarkable ease
 - a. Fecally contaminated drinking water
 - feces get into streams, rivers, etc. used for drinking
 - b. Fecally contaminated food
 - poor food handling practices (feces on hands)
 - flies land on feces, then on food
 - c. Direct person to person transfer of fecal material
 - unclean hands from defecation touch everything
 - hand-to-hand-to-mouth
 - 4. Epidemic potential is **explosive**
 - a. Water contaminated by 1 person with diarrhea may be consumed by thousands who are forced to use that source
 - many more diarrhea patients result
 - exponential ability to further contaminate water supplies
 - b. Fecally contaminated food may be distributed to thousands
 - one sick person spreads to many others
 - c. Direct person to person transmission
 - less explosive, but significant sustained transmission
- C. Respiratory transmission
 - 1. Respiratory secretions are loaded with bacterial and viral pathogens
 - a. Usually gain entry through mucous membranes
 - 2. Direct transmission - person-to-person route
 - a. Hand-to-hand-to-mucous membrane
 - b. Infectious secretions on fomites, such as clothes, eating utensils, etc
 - 3. Direct transmission - via heavy droplets
 - a. Travel 1 meter or less from cough or sneeze
 - b. Land on nearby person, transferred to mucous membranes

4. Indirect transmission - droplet nuclei (5 microns) remain suspended in air
 - a. Less common type of respiratory transmission - seen in TB
5. Respiratory transmission is difficult to stop under *any* conditions
 - a. Primitive conditions highly conducive
 - CROWDING makes sharing secretions almost inevitable
 - person to person and heavy droplet spread is pervasive
 - no hand washing, no bathing, no laundry, etc
- D. Vector-borne transmission
 1. Human and mosquito vector habitat often coincide (near water, foliage)
 2. Lack of shelter gives vector complete access to host, day and night
 - a. Night-biting is highest risk for malaria
 3. Population shifts can result in explosive epidemics of malaria
 - a. Non-immunes move into area of endemic transmission
 - b. Displaced persons may introduce malaria to local vectors
- E. To interrupt transmission, need more than doctors and nurses
 1. A variety of public health disciplines are required
 - a. environmental health
 - b. Entomology
 - c. Epidemiology
 - d. Health education

IV. Public Health Priorities in Typical Humanitarian Emergency

- A. According to the World Health Organization, the priorities are:
 1. Provision of safe drinking water in adequate quantities
 2. Adequate handling of human waste
 3. Protection of food supply against contamination
 4. Vector control where appropriate
 5. Provision of adequate shelter (reducing crowding)
- B. Safe Drinking Water
 1. Often the HIGHEST priority
 - a. Can survive without food, not without water
 2. Requirements:
 - a. Basic survival: 3-5 liters / day
 - b. Realistic needs: 15-20 liters / day
 3. Quantity must be sufficient (even at the initial expense of quality)
 - a. Needs can be enormous
 - 10,000 people require 30,000 - 200,000 liters / day
 4. Sources in austere conditions
 - a. Springs, wells, lakes, streams, rivers
 - b. All require ***specific engineering*** to protect from fecal contamination
 - may involve piping from upstream
 - may involve well rehabilitation and protection, spring boxes, etc

5. Water sources should be tested for fecal contamination (E. Coli markers)
 6. Field water treatment may be necessary
 - a. May be as simple as covered storage for settling
 - b. May require bulk chlorination
 - c. Mobile filtration / chlorination plants
 7. Water transportation and storage containers must be disinfected
 8. Disinfection at the individual user level
 - a. Boiling - often impractical (lack of fuel, time, motivation)
 - b. Bleach or chlorine tablets
 - often impractical
 - requires massive health education effort
 9. Specific expertise is required, and is a priority in almost any situation
 - a. Water engineers
 - source protection, pipes, storage, etc
 - some NGO's specialize in this area
 - local government expertise may exist
 - U.S. Army engineers, Navy Construction Battalions may be a resource
 - b. Sanitarians
 - water testing and treatment expertise
 - NGO's or local government expertise exists
 - military environmental health / science officers, PM technicians
 - c. Expertise must be applied in a culturally sensitive manner
- C. Human waste disposal
1. Priority is to contain feces
 - a. Keep it out of the food and water
 - b. Isolate feces from human contact
 - c. Isolate feces from contact with flies (which can transport it on feet)
 2. Sanitarians have the necessary expertise
 - a. Military, NGO's, local government
 3. Cultural factors are especially critical
 - a. Latrines may not face Mecca
 - b. Privacy concerns
 - c. Local expertise is absolutely essential in this area
 4. General strategies
 - a. Defecation fields
 - better than indiscriminant defecation
 - keeps it localized to one contaminated area
 - b. Field latrines
 - basically a pit or trench with privacy
 - waste is buried or at least kept isolated from human or fly contact
 - location can be controlled (away from water, food)

- c. Considerations for field latrines
 - no more than 20 people for each
 - best to be family centered in most situations
 - MUST be maintained by designated person (if it isn't maintained, it won't be used)
 - labor and materials must be procured
- D. Food service sanitation
 - 1. Food preparation areas are high priority for preventive measures
 - 2. Sanitarians have the expertise to evaluate and monitor
 - a. Cultural factors important, best to involve local experts
 - 3. Basic measures to incorporate include:
 - a. Use of potable water in food preparation
 - b. Hand washing by everyone involved
 - c. Basic hygiene and cleanliness of utensils, food prep areas
 - d. Fly control in food preparation / serving areas
 - e. Proper cooking and storage practices
- E. Vector control measures
 - 1. Malaria has often been a significant killer
 - a. Arboviruses may also be a concern (dengue, yellow fever, encephalitis)
 - 2. Potential for vector borne epidemics must be evaluated
 - 3. Entomologists have the expertise to:
 - a. Survey the area for breeding sites
 - b. Trap and identify vectors
 - c. Develop control strategies tailored to the circumstances
 - 4. Basic control measures include:
 - a. Selection of campsites away from breeding areas
 - b. Elimination or reduction of breeding sites
 - draining swamps, eliminate water-holding containers
 - c. Application of larvicides to breeding areas
 - d. Ground or aerial spraying of pesticides when feasible
 - e. Application of residual pesticides to tents, buildings, etc
 - 5. Netting and personal protective measures may be necessary
 - a. Requires significant health education
 - 6. Selection of vector control measures is complex
 - a. Must be linked with disease surveillance to set priorities
 - b. Often very difficult in temporary field camps
- F. Malaria Chemoprophylaxis
 - 1. Some circumstances may require chemoprophylaxis of the most vulnerable
 - a. Kids under 5, pregnant women, severely malnourished
 - b. Non-immune populations may be at risk
 - c. Mefloquine is often drug of choice

2. Chemoprophylaxis program requires:
 - a. Reasonable stability of the population
 - b. Adequate medical support structure
 - c. Significant health education capability
3. Decision to undertake chemoprophylaxis is based on threat, surveillance and feasibility under the circumstances, **a public health decision**
- G. General public health measures (in addition to transmission-specific measures above)
 1. Adequate shelter
 - a. there are recognized environmental **health** standards for shelter
 - optimum density to reduce crowding
 - location near water, latrines, food, hand washing
 2. General health education
 - a. Breast feeding, hygiene, water treatment, etc.
- H. Vaccines in humanitarian emergencies
 1. Only MEASLES is a proven emergency vaccine
 - a. It is a major killer (especially in malnourished)
 - b. Highly transmissible via respiratory route
 - transmit even when the majority of the population is immune
 - "herd immunity" usually doesn't protect vulnerable few
 - c. If any doubt about measles coverage in the population, vaccinate
 - kids 6 months to 5 years in emergency phase
 - must repeat 1 month later if given under 9 months
 - in more stable situations, begin vaccine at 9 months
 - d. Prioritize to the most vulnerable if vaccine is in short supply
 2. Other vaccines may be administered if:
 - a. Population is stable for 3 months
 - b. Medical infrastructure is adequate and stable
 - c. Program is integrated with local ongoing efforts (EPI)
 - d. OPV, DPT, BCG should be considered
 - e. Meningococcal vaccine can be given if outbreaks are occurring
 - need the epidemiological data to decide
 - rifampin chemoprophylaxis can be given to close contacts
- I. The ideal camp (if camps are required)
 1. Best to establish a camp before displaced persons arrive
 2. Public health measures should be built in
- V. **The Rapid Health Assessment**
 - A. **Always** the first priority, but very often neglected in past operations
 1. Urgency of situation often prompts action before assessment
 - a. Instead of "ready, aim, fire", it is often "ready, fire, aim"
 - b. This is a formula for ineffective relief
 - great efforts expended to bring the wrong personnel, wrong supplies, culturally unacceptable measures, etc

2. What is needed is rapid DATA on the actual situation, not speculation
3. This is the cornerstone of disaster relief coordination
- B. The “big picture” - Don’t leave home without it
 1. What is the size of the displaced population?
 2. What are the major health and nutrition needs?
 3. What is the local response capability?
- C. Specific components of the rapid health assessment
 1. Obtain baseline health information
 2. Obtain basic demographics on displaced population
 3. Determine nutritional status
 4. Assess local environmental conditions
 5. Inventory local resources
 6. Establish a system of morbidity and mortality surveillance
- D. Obtaining baseline health information
 1. Sources include Ministry of Health, UN agencies, Red Cross/Crescent, NGO’s
 2. Priorities are:
 - a. identifying main health problems before displacement
 - b. evaluate the strength of public health programs (immunizations, etc)
 - c. determine “normal” health delivery structure
 - d. identify important health beliefs
 - e. characterize the social structure
- E. Establish the demographics
 1. Must count or estimate denominator
 - a. by age-group and sex
 - b. average household size
 - c. focus on vulnerable groups
 - #pregnant and lactating women
 - #kids under 5
 - #unaccompanied minors
 - #wounded or disabled
 2. Denominators are used to calculate and track **RATES**
 - a. essential to developing an epidemiologic picture
 3. Denominators are required to plan services
 - a. health care, water quantities, latrines, shelter
 4. Methods
 - a. quick visual inspection for preliminary estimates
 - b. systematic surveys visiting households to count, calculate total
 - c. CAMP REGISTRATION or census should be a priority
 - d. epidemiologist has the appropriate expertise
- F. Assess nutritional status
 1. Need hard data, especially on children
 - a. mid-upper-arm-circumference

- b. weight for height measures
 - 2. Data is obtained by:
 - a. systematically screening a sample of new arrivals
 - b. systematic surveys in existing camps
 - 3. Data is used to prioritize food shipments, medical care
- G. Assess environmental conditions
 - 1. Local water sources - quantity and quality
 - 2. Existing sanitation (or lack thereof)
 - 3. Soil, drainage, slopes, etc
 - 4. Local endemic disease risks, including vectors
 - 5. Availability of local materials for shelter, fuel, building
 - 6. Local climate factors
- H. Assess local resources
 - 1. Existing food supplies
 - 2. Logistical support
 - a. Roads, vehicles, fuel, warehouses, building material
 - b. Building materials, communications, etc
 - 3. Local health services infrastructure
 - 4. Existing temporary camp health services
- I. A properly configured on-site assessment team is essential - a coordinator function
 - 1. Should include subject matter experts in the above areas
 - a. Epidemiologist
 - b. Sanitarian
 - c. Water engineer
 - d. Nutrition expert
 - e. Logistician
 - f. Clinician
 - 2. Local expertise is preferable
 - 3. Action should be delayed until initial assessment is complete
 - a. May take several days to visit sites, report back
 - 4. List of priorities will result from rapid initial assessment
 - a. Coordinated action follows
 - 5. Clinicians must recognize that emergency care is only a part of the picture
 - a. Public health measures may take first priority
- J. Assessment is an ongoing activity to keep up with a dynamic situation

VI. Surveillance in Humanitarian Emergencies - “Vital Signs” of the Population

- A. The rapid assessment is used to initially characterize the situation and conditions
 - 1. Provides focused priorities to begin the relief effort
 - 2. Complete the picture and support the ongoing effort, need to gather data on the ultimate “bottom line” - HEALTH
- B. Surveillance is a way of measuring population health on an ongoing basis

1. Directly analogous to vital signs of an individual patient
 - a. Vital signs are the first step in a clinical evaluation
 - is the patient hypotensive?
 - is the patient in respiratory distress?
 - focuses the clinician's attention on critical interventions
 - b. In public health, surveillance is a population status check
 - is there a high diarrhea rate?
 - is measles occurring?
 - focuses public health attention on critical interventions
2. Surveillance definition (CDC) -

"... the ongoing systematic collection, analysis, and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know. The final link in the surveillance chain is the **application of these data to prevention and control**. A surveillance system includes a functional capacity for data collection, analysis, and dissemination linked to public health programs."
- C. The "surveillance cycle"
 1. Collect data - specific relevant data on morbidity and mortality
 2. Analyze and interpret in real time - identify problems early
 3. Provide immediate feedback to those who need to know
 4. Take **ACTION** to correct problems
 5. Continue to collect data to measure impact of intervention - repeat cycle
- D. Surveillance is the ultimate outcome measure for a relief effort

Remember: if the bottom line is health, doesn't it makes sense to measure it?

VII. The Clinician's Role in Surveillance - Capture the Data

- A. Clinicians start the surveillance cycle - collect the data
- B. Problem of perspective - individual care vs population
 1. Clinicians sometimes view data collection as irrelevant to patient care
 2. Sometimes viewed as "research", or "bean counting"
 3. Clinician's must understand why data collection and surveillance is vital
 - a. Requires an appreciation of the population perspective
- C. Data collection focuses on two measures - Morbidity and Mortality
- D. Health care facilities are the best place to track morbidity
 1. Providers make diagnoses on individuals
 2. Can be assembled into a window on the health of the population
- E. The key starting point of surveillance - **a logbook**
 1. A basic record must be kept on every patient visit
 - a. name, age, sex, diagnosis for every visit
 - b. indicate whether the visit is initial or follow-up

2. Keeping a basic logbook is a critical provider responsibility
3. If this is not done, there is no surveillance
- F. Step 2 of the surveillance cycle - analyze and interpret the data
 1. Epidemiologist can organize a logbook into population “vital signs”
 2. Key diagnoses grouped together into diagnostic categories
 3. Focus on main causes of morbidity
 - a. Diarrhea / dehydration
 - b. Respiratory disease (fever with cough)
 - c. Malaria (fever with chills)
 - d. Measles
 - e. Others as needed (trauma, hepatitis, cholera)
 4. These diagnoses have PREVENTIVE STRATEGIES (that’s why they’re vital)
 - a. The whole point is to trigger the preventive strategy when needed
 - b. If diarrhea rates are high, focus on sanitation, water, etc
 - c. If measles is occurring, get a vaccination program underway
 - d. There is little need to track a problem with no immediate relevance
-why track peptic ulcers or hypertension in a humanitarian crisis?
 5. Calculating morbidity **rates** - the basic analysis
 - a. Logbook provides the “numerator” - how many cases per week?
 - simple numerators or case counts are hard to interpret
 - is 20 cases of diarrhea in location X a problem?
 - how does it compare to 50 cases at location Y?
 - b. Must use best available denominator to calculate **rates**
 - ideally want rates by age and sex
 - need denominators by age and sex
 - this data can be gathered by epidemiologists
 - c. Rates allow comparisons
 - expressed as #cases per 1000 per week
 - rates at location X and Y can be compared
 - d. Rates permit the tracking of trends - are rates rising or falling?
- G. Completing the surveillance cycle - Feedback and action
 1. Public health experts need surveillance-based outcome measures
 - if diarrhea rates are high, focus on sanitation, water, etc
 - if malaria is occurring, focus on vector control, protective measures, etc
 2. The primary ACTION (step 4 of the cycle) is taken by public health personnel
 3. Clinicians also benefit from knowing the overall rates and trends
- H. Mortality surveillance and the clinician
 1. Mortality rates are a key measure of the population health
 2. Patients may die in health care facilities
 - a. Deaths should be recorded by clinicians
 - age, sex, cause

- b. Mortality data handled similar to morbidity data
 - c. Categories monitored include:
 - diarrhea
 - respiratory
 - measles
 - malaria
 - malnutrition
 - ALL OTHER DEATHS
 - d. Case fatality rates in the clinic are a measure of the effectiveness of care
 - e.g. diarrhea case fatality rate (CFR) should be under 1%
- 3. Deaths may also occur outside of the health care facility
 - a. May be necessary to gather data in other ways
 - graveyard monitoring
 - interviewing local leaders or families
 - b. Gathering this data requires an epidemiologist
- 4. Epidemiologist should make an effort to combine all available mortality data
 - a. Calculating a crude mortality rate (CMR) is very important
 - b. A daily CMR should not exceed 1 death / 10,000 people per day
 - c. Baseline mortality in the developing world is approximately
 - 0.5 deaths / 10,000 people per day
 - d. Daily CMR is an excellent overall measure of a relief effort
 - over 1 / 10,000 / day - significant crisis
 - e. Cause and age-specific death rates very desirable when obtainable
 - help focus preventive interventions
- H. A Powerful Tool
 - 1. Surveillance is one of the most power tools in public health
 - 2. It is particularly applicable in humanitarian emergencies
 - 3. Clinicians have a key role in the surveillance cycle

PATIENT LOG

Location _____ Date _____

NAME	SEX	AGE	NEW VS F/U	DIAGNOSIS	SURVEILLANCE CATEGORY
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					

KEY: D/D = Diarrhea/Dehydration

RESP = fever w/cough

CHILL = fever w/chills

MSL = measles

TR = trauma

MORBIDITY AND MORTALITY TRENDS – 0-4 AGE GROUP

Weekly Morbidity Rates in 0-4 Age Group

(cases per 1000 per week)

	Week of	Week of	Week of	Week of	Week of	Week of	Week of	Week of	Week of
Diarrhea/Dehydration									
Fever w/cough									
Fever w/chills (malaria)									
Measles									
Trauma									

Weekly Mortality Rates in 0-4 Age Group

(deaths per 1000 per week)

	Week of	Week of	Week of	Week of	Week of	Week of	Week of	Week of	Week of
Diarrhea									
Respiratory									
Measles									
Malaria									
Malnutrition									
All Other									
TOTAL									

Case Fatality Rates

	Week of	Week of	Week of	Week of	Week of	Week of	Week of	Week of	Week of
Diarrhea									
Respiratory									

MORBIDITY AND MORTALITY TRENDS – 5 AND OVER AGE GROUP

Weekly Morbidity Rates in 5 and Over Age Group

(cases per 1000 per week)

	Week of	Week of	Week of	Week of	Week of	Week of	Week of	Week of	Week of
Diarrhea/Dehydration									
Fever w/cough									
Fever w/chills (malaria)									
Measles									
Trauma									

Weekly Mortality Rates in 5 and Over Age Group

(deaths per 1000 per week)

	Week of	Week of	Week of	Week of	Week of	Week of	Week of	Week of	Week of
Diarrhea									
Respiratory									
Measles									
Malaria									
Malnutrition									
All Other									
TOTAL									

Case Fatality Rates

	Week of	Week of	Week of	Week of	Week of	Week of	Week of	Week of	Week of
Diarrhea									
Respiratory									

VII. Changing Your Frame of Reference

Julia A. Lynch, MD

Changing Your Frame of Reference

While the clinical care of patients is familiar to all of you, the circumstances which will define the way that you give care in the developing world are likely to surprise you. It is the goal of this module to attempt to prepare you for the deviations from your normal practice that you will of necessity make when working in a disaster setting. We will discuss three issues:

Standards of Care
Empiricism
Medical Supplies

Our intent is not to give you definitive rules for how you should “practice medicine”, but to make you aware of the dilemma’s created by harsh realities. In class we will discuss case scenario’s from the annals of real experience. We hope that through thoughtful consideration and discussion of the issues raised, you will be better prepared to make sound decisions that serve the patient and family and are appropriate for the circumstances when you are deployed.

Standards of Care

When we talk about differences in standards of care in the developing world, we are not talking about differences in moral or ethical standards. People in the developing world care about and assign importance to many of the same things that you do. They value their families, particularly their children, they worry about the effects of violence on their families and communities, and they want the availability of quality health care. So it is not generally values, morals or a desire for quality that drives the differences in the standards of care- but rather resources. The average annual expenditure on health care in a developing country is \$8 per person per year. Therefore resources dictate who provides medical care, sometimes who is treated, how they are cared for and what medications/supplies are available for treatment.

Who Provides Medical Care

In the developing world nurses and informally trained community health workers provide most of the direct medical care. They alone are likely to run rural health clinics and even small district hospitals where they diagnose and treat patients even admitting them overnight- without the direct supervision of a physician. In a disaster setting, another resource poor setting where there will never be enough physicians to achieve the physician to patient ratios that you are accustomed to, you should consider this model and make use of nursing and community assets as health provider multipliers. Community health workers, who may have little formal education, are trained for specific vital tasks- for example, the administration of Oral Rehydration (ORT) and the training of parents in continuing ORT at home. It can be difficult for a physician to realize that the best investment of his/her time, even amid very high patient demands, may be in training others to perform certain repetitive tasks. These tasks may include the diagnosis and management, following algorithms, of common conditions. These health provider

multipliers can provide vital medical care and allow the physician to concentrate on problems commensurate with a physicians level of training.

Who Is Treated

Among the most difficult dilemmas for those of us trained amid plentiful resources is making determinations of who should get care. In a resource poor environment you may have to decide which cases are helpless and assigned to expectant care. This includes not only the massive trauma victim, but also for example an extreme LBW infant that we might resuscitate in our delivery room. In many parts of the world that child will die quietly at home after birth because there are simply not the resources to provide life sustaining care. Resuscitation of someone who experienced cardiorespiratory arrest only makes sense if you have a facility that can support post resuscitation intensive care- this is also for the most part a luxury of the developed world. Interventions that we are trained to think of reflexively need to be considered in the context of the environment. If I initiate this intervention, can it be sustained?

How Treatment Is Carried Out

The availability of resources also determines how treatment is carried out. In the developing world IV therapy is often considered an extraordinary intervention. It is expensive, both in dollars for sterile supplies and manpower to administer and monitor medications or fluids by this route. There is a much greater reliance on oral medications, including oral rehydration, and IM injections. The oral medications for children are unlikely to be suspensions, but rather the same tablets or capsules used for adults. Convenience and ease of administration are forsaken for cost and durability. Tablets are less expensive (therefore more people can be treated for the same cost) and have longer shelf lives than suspensions. Local health workers and parents will be accustomed to administering these medications to young children by making them into pastes and various other techniques.

What Is Used To Treat

In addition to differences in formulations, the pharmaceutical choices that you will encounter in the developing world will differ substantially from those that are familiar to you. You will not find “comfort meds” like cold and cough remedies, even antipyretics will be used more conservatively- because, as much as we love Tylenol it never cured anyone of anything. In the US, children die every year from accidental overdose of these “comfort meds”. Dispensing them into cultures without awareness of the toxicity’s (No “Mr Yuck campaign”), and without the ability to secure these products in locked cupboards, is criminal. The antibiotics you are likely to encounter are of the low cost, low glamour variety that we tend to shun, like Penicillin, Septra and Chloramphenicol. These choices make sense when evaluated in the context of the desired outcome for the environment.

For example consider the treatment of pneumococcal pneumonia. Imagine a hypothetical situation in which there is Penicillin resistance in 20% of the pneumococcal isolates. In the US we would likely conclude that the anticipated failure rate of Penicillin of 20% is too high. So empiric treatment for suspected pneumococcal pneumonia is a

third generation Cephalosporin. Unsuccessful treatment of the minority is not perceived as tolerable in our environment.

Drug	Penicillin	Third Gen Cephalosporin
Pneumococcal resistance	20%	5%
Cost per person per treatment	\$1	\$100

In a resource poor country the analysis of the same data might be quite different. Penicillin is a reasonable treatment because we can afford to treat every patient and can cure at least 80% of pneumococcal pneumonias.

As you begin to appreciate that medical standards of care differ in other parts of the world, and that these differences are likely to be exaggerated in a disaster setting you may be asking yourself *“is it ethical for me to change my standards of practice because I suddenly find myself working in a resource poor environment ? To not aggressively resuscitate a very low birth weight infant? To use medications that I believe are inferior?”*

CASE DISCUSSION #1: THE DELIVERY ROOM DILEMMA

Dual Standards

In the military, we bring our “standard of care” for treating ourselves wherever we go, or we provide for rapid air evacuation to support hospitals likely located within the theater of operation.. You will always have access to the “best” medical care for yourself and your soldiers. However, even when the military participates as part of its mission statement in the care of civilian casualties, there is some limitation on the civilians access to the full medical resources. Where the access line is drawn depends on the operation and sometimes on local commanders. In Operation Provide Comfort, Army physicians and medics were used as primary care providers for civilians in refugee camps, however patients requiring higher levels of care (inpatient) had to be referred to the local civilian hospitals which were in total disarray. An Air Force Air Transportable Hospital was operational in the theater, but was exclusively reserved for the care of military casualties-since there were few, it went largely unused. Two co-existing “standards of care” are characteristic of military humanitarian operations.

CASE DISCUSSION #2: DIFFICULT DECISIONS

Resource Rules

Dual standards of care pose significant ethical dilemmas- or at least appears antithetical with altruism and “humanitarianism”. Remember that military humanitarian operations are strategic operations that also serve a humanitarian need. There are good reasons to limit elevating the standard of care of the affected population in some situations. Consider that if access to the “new standard” cannot be assured to all of the affected population then the perception of selection of the population for special treatment can occur. Imagine this example: Sector A has disproportionate admission rates of civilian casualties to the American Hospital as compared to sector B and C. The real reason for the selection might be that functioning telephone lines to sector A allowed better communication with the physicians working there thus resulting in greater referral success for the limited number of beds. But if sector A is made up of an ethnic sub-group, the perception of selection can have unanticipated implication. The political and real sequelae of such a perception can be devastating to the strategic objectives of an operation. Consequently a general rule regarding setting standards for access to resources is to be sure that universal access can be provided for all of the affected population, or not at all. If there are not enough beds in the military facility to treat all patients of equal severity of illness, then perhaps those beds should not be used at all.

Another potential pitfall is providing a resource standard to a refugee population, that exceeds what is available to the local community in the host nation. Refugees are generally not welcomed by the host population. The mass movement of thousands of people into an area causes destruction of the physical environment, exhaustion of fuel sources and economic havoc. The perception that a refugee population has a higher living standard because of foreign aid, or access to better medical care can incite local hostilities. So the circle which must be filled by relief workers enlarges. Not only must the resource standard be available universally to the affected population, but it must be available to the surrounding community. Quickly, the resources of even a large organization like the military can be overwhelmed by such a proposition. Therefore, limited access to full military resources is a necessity in large humanitarian operations.

As unfair as the dual standard appears, realize that the majority of deaths in humanitarian emergencies do not occur because of a lack of sophisticated, technical medical care, but rather inadequate basic medical care and public health. Recall that the primary sources of mortality are preventable or readily treatable diseases like dehydration, malnutrition and infections. It is far more important to provide universal basic health care than limited sophisticated treatment.

Setting Your Standard

The establishment of resource limits, like access to inpatient or surgical care, occurs at a command level. But the same principles should be applied in the use of local resources in the delivery of primary care. As a provider, you may have access to medical supplies from both a military field unit as well as typical disaster relief supplies. For example, should you treat the suspected case of pneumonia in a 12 yo with Penicillin (of

which you have 10,000 doses in your disaster relief supplies) or with Ceftriaxone (50 doses in your military medical supplies). The local population will know the difference between Penicillin and Ceftriaxone (they may not be familiar with ceftriaxone). When you choose a medication that is familiar to you, but unfamiliar to the population and perhaps unavailable to other health care providers you should at least consider the consequences. Am I creating a standard that I cannot sustain equitably with the available supplies? Am I creating a standard that differs substantially from that which is being provided by other health workers in this operation? The other providers may include NGO's working in medical care nearby. Obviously withholding a life saving drug in a critically ill patient is not ethically justifiable. But more often than not, we choose medications because they are familiar rather than necessary in that setting. Pharmaceutical supplies for short term nation building/humanitarian missions into developing countries are often derived from lists of the most frequently used medications in the pediatric clinic at the home base. In using these drugs we introduce unfamiliar medications with unfamiliar side effect profiles. Imagine the small community in Honduras attempting to explain the diarrhea outbreak caused by the Americans who had liberally dispensed Augmentin for the minor infections they encountered.

In the final analysis, the "standard of care" is a resource issue. You need to be aware of your resource limitations and the possible implications of using resources in the environment that you are working. There is no one "right" standard, but you must adopt a standard of practice that is appropriate for your environment and situation.

Empiricism

The second issue that is very striking to American trained physicians when working in an austere environment is the necessary but uncomfortable reliance on empiricism.

Empiricism is the practice of relying on observation and experience rather than data. We are trained to avoid empiricism. However, the real world environment will dictate your access to diagnostic tests (the data that you would like to guide your clinical decisions); and the magnitude of your patient load will dictate the time you will be allowed to ponder diagnostic possibilities. Military physicians in humanitarian assistance operations have frequently reported seeing or supervising the care of 60-100 patients per day. The reality is that both diagnostic resources and time will be quite limited.

CASE DISCUSSION #3: AN IRRITABLE INFANT WITH FEVER

It is desirable to pursue educated empiricism whenever possible. This is particularly important when dealing with a disease of epidemic potential. As will be discussed in more detail in the Infections module, the recognition of a possible case of cholera necessitates calling in all available public health resources. The clinical diagnosis of cholera must be microbiologically confirmed because the public health ramifications are enormous. The limited public health and diagnostic resources available

in a disaster setting will be focused on issues of greatest public health concern, thus leaving most clinical disease to be diagnosed and managed empirically.

Medical Supplies- An Introduction to the WHO Emergency Health Kit

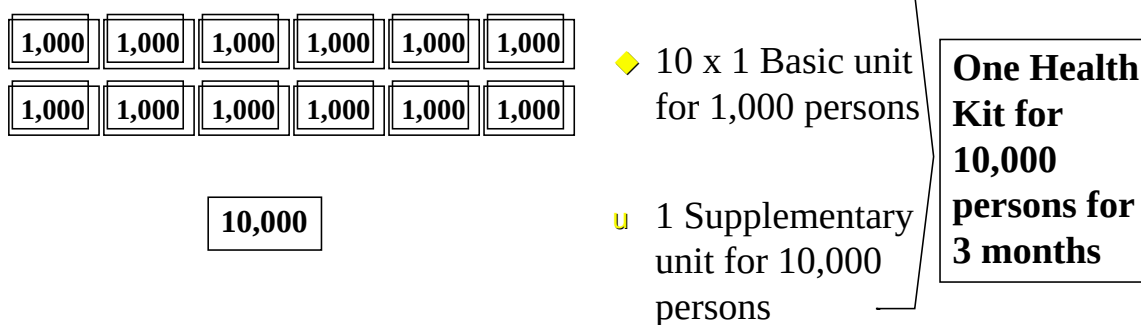
As we have already discussed, certain drugs and supplies may be more appropriate or simply more available in the disaster setting in the developing world. The World Health Organization in collaboration with several other international health organizations (UNHCR, The London School of Tropical Medicine, UNICEF, Medicins sans Frontieres, The League of Red Cross and Red Crescent Societies, the World Council of Churches, and the ICRC) developed a pre-packaged “kit” with suitable supplies for virtually any crisis in the developing world. This creation was driven by past failures in being able to obtain timely and appropriate supplies for disaster settings. Prior to the development of this kit much of the supplies donated by governments and agencies during a disaster were unsuitable, unsorted, unlabeled or expired and delivery of these supplies was often delayed. The WHO Emergency Health Kit is a reliable, standardized, inexpensive, appropriate and available source of the essential drugs and health equipment urgently needed in a disaster situation. The kits are stockpiled around the world and are packaged such that they can be air dropped into many environments. The entire contents of the kit are included in the appendix to this section. Because the inclusion criteria for meds in this kit is based on cost effectiveness and storage characteristics in difficult climates, many developing nations have used it as the model on which to stock all of their national health facilities. These are generally the supplies used by international health agencies and should serve as a model for military units deploying to care for civilians in the developing world. One complete kit is designed to provide adequate medical supplies for 10,000 persons for 3 months under most circumstances.

The total kit is divided into basic units and a supplementary unit. The basic unit contains drugs and supplies for the use of primary health care providers with limited training-like a nurse or community health worker. There are 10 basic units in a kit. None of the drugs are injectables, but there are oral and topical medications and oral rehydration salts. Simple treatment guidelines are included to help in training personnel to function somewhat independently with these supplies.

The supplementary unit contains drugs and medical supplies for the use of a physician. The injectable drugs and some other meds are only found in the supplementary unit. It does not contain any of the same supplies found in the basic unit. Therefore a physician would want to use supplies from both kits together, while it would be appropriate to supply a community health worker with more limited training only a basic unit.

There are additional supplementary kits not depicted here used for special circumstances. For example an immunization kit which contains adequate supplies for maintaining a cold chain and injection equipment for 5,000 immunizations.

THE WHO EMERGENCY HEALTH KIT



The appendix to this section reviews the characteristics of the antibiotics that are found in the kit. Antibiotics are the most commonly dispensed medications and these will be reviewed in class. You will be expected to be familiar with using these medications in the skill stations.

antipyretics/anti-inflammatory

acetylsalicylic acid	300 mg	tablets	3000	x 10
paracetamol	100 mg	tablets	1000	x 10

nutritional supplements

vitamin A	200,000 IU	caps	4000	
ferrous sulfate + folic acid	200/.25 mg	tablet	2000	x 10
folic acid	1mg	tablet	5000	
ascorbic acid	250 mg	tablet	4000	

antiseptics

benzyl benzoate	25%	lotion	1 liter	x 10
chlorhexidine	5%		1 liter	x 10

dermatologics

polyvidone iodine	10%	solution	500 ml	
zinc oxide	10%	ointment	2kg	
benzoic acid + salicylic acid	6%/3%	ointment	1kg	

antibiotic

ampicillin	250 mg	tablet	2000	
ampicillin	500 mg	inject vial	200	
benzathine benzylpenicillin	2.4 MIU	inject vial	50	
chloramphenicol	250 mg	caps	2000	
chloramphenicol	1 gm	inject vial	500	
metronidazole	250 mg	tabs	2000	
sulfamethoxazole	400 mg			
+ trimethoprim	+ 80 mg	tablet	2000	x 10
phenoxymethylpenicillin	250 mg	tablet	4000	
procaine benzylpenicillin	3-4MU	inject vial	1000	
tetracycline	250 mg	cap/tab	2000	
tetracycline	1%	ophthal	50	x 10
		ointment		
gentian violet	25 gm	powder		x 10
mebendazole	100 mg	tablet	500	x 10
nystatin	100,000 IU	tablet	2000	

antimalarials

chloroquine	150 mg base	tablet	2000	x 10
quinine	300 mg/ml	2ml inject vial	100	
quinine sulfate	300 mg	tablet	3000	
sulfadoxine + pyrimethamine	500 mg +25 mg	tablet	300	

analgesics

pentazocine	30 mg/ml	1 ml inj vial	50
probenicid	500 mg	tablet	500

anesthetics

ketamine	50 mg/ml	10 ml inject vial	25
lidocaine	1%	20 ml inject vial	50

anti-allergics

dexamethasone	4 mg/ml	1 ml inject vial	50
prednisolone	5 mg	tablet	100
epinephrine	1 mg/ml	1 ml inject vial	50

anti-epileptics

diazepam	5 mg/ml	2 ml inject vial	200
phenobarbitol	50 mg	tablets	1000

cardiovascular

methyldopa	250 mg	tablet	500
hydralazine	20 mg/ml	1 ml inject vial	20

diuretics

furosemide	10 mg/ml	2 ml inject vial	20
furosemide	40 mg	tablet	200

gastrointestinal

aluminum hydroxide	500 mg	tablets	1000	x 10
promethazine	25 mg	tablet	500	
promethazine	1 mg/ml	2 ml inject vial	50	
atropine	1 mg/ml	1 ml inject vial	50	

respiratory

aminophylline	100 mg	tablet	1000
aminophylline	25 mg/ml	10 ml inject vial	50

psychotherapeutics

chlorpromazine	25 mg/ml	2 ml inject vial	20
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solutions correcting water/electrolyte/acid-base

ORS	sachet for 1 liter		200	x 10
ringers lactate		500 ml bag	200	
glucose (D5W)	5%	500 ml bag	100	
glucose	50%	50 ml bag	20	
water for injection		10 ml vial	2000	

oxytoxics

ergotmetrine maleate	.2 mg/ml	1 ml inject vial	200
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Changing Your Frame of Reference

Case Discussions

CASE DISCUSSION #1: THE DELIVERY ROOM DILEMMA

I happened to find myself while participating in a military exercise in Africa, visiting a rural regional hospital where the local GP was about to deliver a baby by c-section. He was performing a cesarean because the women had been in labor for 36 hours, was febrile and fatigued and there had been no further progression for the last several hours. He had ruptured her membranes a few hours ago and reported thick meconium. They had no fetal monitors but together we listened to the fetal heart sounds with a fetascope and counted a HR of 70 that was persistent. He was the only physician there and had one nurse and he was waiting for the anesthesiologist to arrive who was driving from some distance away. I volunteered to assist him by taking care of the infant resuscitation after delivery. I began preparing as I had been trained and found that I would be setting up on a counter on the side of the room. I was given a heating lamp and an oxygen tank was wheeled in at my request. Unfortunately there was only a self inflating ambu bag so I would not be able to ventilate with oxygen. This struck me as strange and somewhat irritating that it was all they had- but I kept up with my preparations. I was to share the suction apparatus with the anesthesiologist. The equipment was at an inconvenient distance away, but additional tubing was rigged together so it would reach me. Next I asked for ET tubes. The nurse looked at me quite quizzically, and she and the local doctor exchanged some words in their language and I was brought a single ET tube that was a 4.0 and was in an open package. I was informed that this was the only small ET tube that they had. There was one small blade for the laryngoscope. And as I started to mentally run through my resuscitation plan, having good reason to expect a severely depressed, possibly septic or meconium aspiration infant, I suddenly had a reality flash. If this infant required intubation and ventilation what would I do with it. This regional hospital had only one doctor and one nurse. Intensive care was giving intravenous therapy. There was no ventilator, in fact I could not even hand ventilate with oxygen through the ambu bag.

The prior day I had visited the national medical center in the capitol city 100 miles away. They had a NICU; the only one in the country. But I recalled that in their 150 bed NICU they had only 2 ventilators, and one of them had been broken and waiting for a part from Europe. The other ventilator had no occupant. I'm not sure what criteria they had for putting an infant on a ventilator, but one had the impression that it was not a frequent event. I also had no means to get the child there even if I believed that they would use their resources for this situation. As they began the c-section, my heart was in my throat - not because of what I might have to do but because I had to decide what I would not do. I had to decide how far I would go with a resuscitation.

What are the choices?

What would you do?

Is it ethical to not use the technical skills that you have?

I decided to vigorously suck out meconium from the airway using the ET tube then withdraw the ET tube and provide only a few bag breaths if necessary followed by blow by oxygen. That would have to be enough. There was no place to go with anything more aggressive. As I looked around the room I realized that my dilemma. was not shared or even perceived by the others in the room.

Why is the dilemma only the American doctors?

CASE DISCUSSION #2: DIFFICULT DECISIONS

On my first day working in a refugee camp in Kurdistan, a 1 yo child was accidentally blown out of his mothers arms and into the river by a Chinook helicopter landing to bring supplies. The child was scooped out of the river several hundred yards downstream and brought to me. He was severely hypothermic as the river was ice cold and I removed his clothing and wrapped him in dry blankets. He was unconscious and responsive only to painful stimuli . He had severe respiratory distress with rales and rhonchi throughout his lung fields and persistent cyanosis. He had clearly aspirated river water and had multiple depressed and crepitant skull fractures likely from his ride over the river rocks, but no extremities appeared broken or at least were not deformed. From his general appearance it was also clear that he was severely marasmic.

When the helicopter crew became aware of what had happened they offered to change their flight plan and bring the child to one of the hospitals we were aware of in the region. We made radio contact with the Air Force Air Transportable Hospital which was about one hundred miles away - but they informed us that they were not accepting civilian casualties. There was a civilian hospital that was being resurrected from the rubble after the war in Zakho, but we had no way to contact them.. The mother and infant were quickly bundled up onto the Chinook for a flight to Zakho. We had no interpreter on the scene so I don't believe we asked her if she wanted to go. The deafening sound of the Chinook waiting in idle made communication difficult anyway. I had a sense of urgency in getting the child to a higher level of care as there was nothing I could offer the child in the primitive setting of the camp.

What would you have done?

Is sending the child to the civilian hospital a reasonable use of resources ?

It seemed like a reasonable response at the time, particularly amid the chaos and hysteria that followed the accident. Unfortunately, the civilian hospital, which we had heard about but not seen, was as yet minimally functional, poorly staffed and supplied. It was overwhelmed with literally hundreds of civilians mobbing its gates everyday- most of them turned away. When our child arrived, he was still alive according to the pilots but immediately triaged to expectant care. He never saw a physician.

As if that were not enough, our well intended decision to seek a higher level of care tied up that Chinook for several hours. The Chinooks mission was to deliver food and medical supplies to camps. However, the greatest tragedy was that the mother was of necessity left at the hospital with her son. After the Chinook left the camp we discovered that she had three other children in the camp. Her husband had not been seen for weeks and was believed to be fighting with the rebels. The mother was now impossibly separated by a hundred miles from her other children who remained unattended in the refugee camp. I realized that a woman alone in a muslim country would never be able to travel back to that mountain camp. I have often wondered if that family was ever re-united.

Does the outcome change your view about the appropriateness of the decision to send the child to a hospital ?

Do you agree that if the likely outcome of the child's death had been foreseen and accepted in the camp, the remainder of the tragedy could have been avoided ?

How do you feel about the limited access to the resources of the Air Transport Hospital ?

CASE DISCUSSION #3: AN IRRITABLE INFANT WITH FEVER

You are in the clinic at WRAMC and evaluating an irritable, inconsolable 8 mo with a temp of 105 and a non-focal exam.

What would be in your differential diagnosis?
What diagnostic tests would you like to perform?

Instead imagine that you are evaluating the same patient but are in a medical treatment tent on the side of a mountain as part of a medical response team in a humanitarian disaster. You do not have the ability to obtain a CBC, urine, blood or CSF culture. And, you do not have a reasonable referral location.

What would you do?

You also recall that you are in an area with endemic malaria.

How would this change your empiric management?

In the most austere environments empiricism is a necessary evil.
If you do not have a hospital or referral site you will likely be treating this infant for the possibility of sepsis/meningitis and malaria and sending them back to their tent for outpatient re-evaluation the next day.

VIII. Recognition and Management of Malnutrition

Carolyn Sullivan, MD

Malnutrition

Goals and Objectives

Participants will demonstrate the achievement of the following objectives through both written and practical exam.

1. Participants will understand the **general concepts and terminology** used in feeding programs in the developing world.
 - Define General food program (GFP), Supplemental food program (SFP), and Therapeutic food program (TFP)
 - Describe the types of rations typically used as food aid: wet rations (MRE, HDR...), dry rations and their nutritional content
 - Understand the epidemiology, recognize the clinical manifestations and indicate the appropriate treatment of marasmus, kwashiorkor, and the most common micro nutrient deficiencies in the humanitarian emergency setting
 - Vitamin A, Fe, B, and C vitamins
 - Recognize the importance and limitations of nutritional assessments (surveys) of anthropometric measurements in shaping feeding programs for populations
 - Define weight/height, Z scores and MUAC
 - Define a random and cluster survey
 - Differentiate cross sectional and longitudinal surveys
 - Understand the effects of sample bias, out-migration, co-morbid disease and other factors on the interpretation of simple surveys
 - Understand the importance of integration of local culture and local human resources into individual and population based feeding programs
2. Participants will be able to **assess and treat an individual** with nutritional deficiencies.
 - Characterize a patient's overall caloric nutritional status and identify the presence of a key micro nutrient deficiency through physical examination and the proper collection and interpretation of appropriate anthropometric measurements (WT/HT, MUAC)
 - Design an appropriate treatment plan for a malnourished patient in a scenario with defined but limited resources
3. Participants will be able to **assess the nutritional status of a population through sampling and implement an appropriate small scale-feeding program.**
 - Suggest a way to characterize the nutritional status of a population through a random cross sectional survey given a scenario
 - Design an appropriate feeding program for a given population with available resources including defining a target population, nutritional goals, means of monitoring efficacy and treatment endpoints.

4. Participants will understand the importance of **promoting breast-feeding** in emergency situations.
 - Understand the importance of providing supplemental feeding to breast feeding mothers
 - Understand the limited role for breast milk substitutes in emergency settings in the developing world.

Nutritional Management of Individuals in Humanitarian Circumstances

- I. Anthropometrics – ways to quantify the severity of the nutritional situation to allow planning and implementation of an appropriate response
 - A. Weight for height or length % median (**W/H**)
 1. Definition: the child's weight expressed as a percentage of the median weight of children of the same height; an individual's height and weight are compared with those of a reference population.
 2. Interpretation: Weight for length (height) percent of median curves and tables based on NCHS/WHO unisex reference population (Table 2)
 - a) <70% W/H – severe malnutrition; send to therapeutic feeding program (TFP)
 - b) 70-79% W/H – moderate malnutrition; send to supplementary feeding program (SFP)
 - B. **Z score** - expresses a child's weight as a multiple of the standard deviation of the reference population; statistically more correct than weight for height (Table 3)
 - C. **Mid upper arm circumference (MUAC)** - used to screen large numbers of children for possible malnutrition
 1. Technique: Measure MUAC on the left arm. Find the midpoint of the upper arm and wrap the tape around the arm without pulling too tightly or leaving too loose. Read the measurement to the nearest 0.1 cm. (Figure 1)
 2. Interpretation (Figure 2)
 - a) Gives larger estimates of the percentage of children who are malnourished compared with weight for height.
 - b) Used in children 6 mos-5 years old
<13.5 cm MUAC -- refer for weight and height measurement or send to SFP
< 12 cm MUAC -- send to TFP

D. **Body mass index (BMI)** - weight in kilograms divided by height in meters squared (Table 4)

1. Used in adults and adolescents
2. Reflects acute or short-term malnutrition

Nutritional status	W/H Z-score	W/H % median	MUAC
Moderate acute malnutrition	Between -3 and -2 standard deviations	Between 70% of median and less than 80%	Between 110 mm and less than 125 mm
Severe acute malnutrition	Less than -3 standard deviations or edema	Less than 70% of median or edema	Less than 110 mm or edema
Global acute malnutrition	Less than -2 standard deviations or edema	Less than 80% of median or edema	Less than 125 mm or edema

TABLE 1: The cutoff points most commonly used to define acute malnutrition for different indicators standardized by the NCHS/WHO conference (from Medecins Sans Frontieres. *Nutritional Guidelines*. 1995.)

II. Protein energy malnutrition

- A. **Protein energy malnutrition (PEM)** is a general term describing a multiple nutritional deficiency state. It focuses less on specific causality than do the historic terms marasmus and kwashiorkor, recognizing that in the majority of cases, clinical malnutrition in children results from a combination of energy and protein deficiency and may be complicated by micronutrient deficiency.
- B. Classic terminology: the importance of familiarity with these terms is to recognize the different patterns of clinical presentation of malnutrition in children.
 1. **Marasmus** -- severe deprivation of energy and protein, resulting in severe weight reduction, muscle and subcutaneous tissue wasting, marked stunting, apathy and irritability. (Figure 3)
 - a) Most common in infants under 1 year of age
 - b) Hungry
 - c) Profound emaciation
 2. **Kwashiorkor** -- results from inadequate protein intake and/or the catabolic stress of infection. Infection may stress a stable patient with

marasmus to develop kwashiorkor. It is characterized by edema, flaking skin lesions, hair changes, hepatomegaly. (Figure 4)

- a) Most common in children 1-3 years of age
 - b) Anorexic, difficult to feed
 - c) Impaired immunity, prolonged hospitalizations
 - d) Edema may falsely imply more adequate nutritional state
3. Marasmic kwashiorkor – mixed type of undernutrition with edema, gross wasting, stunting, and mild hepatomegaly

III. Micronutrient deficiencies -- seen commonly in conjunction with PEM

A. Steps to take when micronutrient deficiency is identified

- 1. Provide individual treatment and secondary prevention for the identified cases.
- 2. Population approach if deficiency diseases are prevalent on a large scale.
 - a) Advocate change in general ration composition and quantities.
 - b) Consider food fortification: cost, technical possibilities.
 - c) Stimulate garden projects.
 - d) Mass supplementation of the population with vitamin tablets.
 - e) Vitamin supplementation outreach campaigns through health service activities (feeding centers, vaccination programs).
 - f) Monitor the extent and trends of disease.

B. Specific micronutrient deficiencies (Table 5)

1. **Vitamin A**

Deficiency: xerophthalmia

- a) Predisposing diet: no/few fresh fruits; low dietary fat
- b) Solutions: dark orange fruits and vegetables (mango, papaya, orange sweet potatoes, squash), yellow corn, fortified cereal blends, animal products, red palm oil, dark green leafy vegetables
- c) Clinical manifestations: night blindness; conjunctival xerosis; Bitots spots (foamy patches at sides of eye); corneal xerosis (clouding) and ulceration; keratomalacia (cornea bursts resulting in blindness); poor growth; impaired resistance to infection; vitamin

A stores rapidly depleted by measles; measles more severe in children with vitamin A deficiency

d) Treatment

1) Supplementation

6-12 months 100,000 IU po every 3-6 months

1-6 years 200,000 IU po every 3-6 months

lactating mothers 200,000 IU at delivery or within 2 mos

2) Xerophthalmia in children > 1 year or adult males:

200,000 IU po on diagnosis; repeat the following day and 4 weeks later (note: halve doses for children < 1 year or < 8 kg)

3) Women of reproductive age with night blindness, Bitots spots: 10,000 IU po daily for 2 weeks

4) Children with complicated measles: 200,000 IU po day 1, 20,000 IU po day 2

2. **Vitamin B1 (thiamine)**

Deficiency: beri-beri

a) Predisposing diet: polished rice

b) Solutions: parboiled rice, whole grains, groundnut, legumes, meat, fish, milk, eggs, fortified cereal blends

c) Clinical manifestations: early – fatigue, anorexia, abdominal discomfort

1) “dry” beri-beri – bilateral peripheral polyneuritis with evolution to flaccid paralysis

2) “wet” beri-beri – cardiovascular syndrome with edema and heart failure, sudden death

d) Treatment

1) Supplementation: dietary fortification

2) Deficiency: Thiamine 50 mg on diagnosis, then 10 mg/day until recovery

3. **Vitamin B2 (riboflavin)**

a) Predisposing diet: few animal products

- b) Solutions: meat, eggs, fish, animal milk, leafy green vegetables
- c) Clinical manifestations: angular stomatitis, glossitis, corneal vascularization
- d) Treatment: supplement with foods – RDA 0.6 mg/1000 kcal

4. Vitamin B3 (niacin)

Deficiency: pellagra

- a) Predisposing diet: maize-based diet, low protein diet
- b) Solutions: nuts, beans, whole grain cereals, meat, fish, eggs, milk, fortification
- c) Clinical manifestations: diarrhea, dementia, dermatitis (dark, dry skin lesions in sun-exposed areas)
- d) Treatment
 - 1) Supplementation: dietary fortification
 - 2) Deficiency: Niacin 50-100 mg po daily until skin lesions recover

5. Vitamin B6 (pyridoxine)

- a) Predisposition: INH is a pyridoxine antagonist
- b) Solutions: liver, meat, whole grains, corn, soy beans
- c) Clinical manifestations: dermatitis, glossitis, cheilosis, peripheral neuritis
Infants: irritability, convulsions, anemia
- d) Treatment: RDA infants 0.2-0.3 mg/d; adults 2 mg/d

6. Vitamin C (ascorbic acid)

Deficiency: scurvy

- a) Predisposing diet: no/few fresh fruits and vegetables
- b) Solutions: onions, cabbage, peppers, oranges, tomatoes, liver, fresh animal milk
- c) Clinical manifestations: swollen, bleeding gums with loss of teeth; swollen, painful joints; internal hemorrhage

7. Vitamin D

Deficiency: rickets

- a) Predisposition: little sunlight
- b) Solutions: fortified animal milk, liver, egg yolk
- c) Clinical manifestations: rickets, osteomalacia
- d) Treatment: 400 IU po per day

8. Iron

Deficiency: anemia

- a) Predisposition: few animal products in diet; parasitic infections
- b) Solutions: animal products (liver, meat); dried fruit; green vegetables; vitamin C to enhance bioavailability of iron; iron and folate supplements
- c) Clinical manifestations: fatigue, pallor, increased susceptibility to infection and lead poisoning; reduced learning and work capacity
- d) Treatment: (children) 50 mg/day for each year of age

9. Iodine

- a) Predisposition: food grown in isolated, inland areas where soil is deficient in iodine; cabbage and cassava interfere with availability of iodine to thyroid
- b) Solutions: animal products, marine fish
- c) Clinical manifestations: goiter, reproductive failure; cretinism in children born to mothers deficient in iodine
- d) Treatment: 150 mg daily; dietary supplementation

10. Zinc

- a) Predisposition: few animal products
- b) Solutions: liver, meat, fortified cereal blends
- c) Clinical manifestations: scaling, plaque-like dermatitis; alopecia; glossitis; nail dystrophy; lethargy; anorexia
- d) Treatment: 15 mg daily; dietary fortification

IV. Infant feeding: importance of breastfeeding promotion

- A. Emergency or crisis situations result in circumstances in which bottle feeding can be **life-threatening** to the infant.
 - 1. Higher infection loads
 - 2. Contamination of water supply
 - 3. Lack of fuel for formula preparation
 - 4. Disruption of the supply of commercial formula products
- B. Benefits of breastfeeding
 - 1. Nutritional and immunologic advantages established
 - 2. Maintain essentially normal infant growth in emergency circumstances
 - 3. Promote bonding and care between mother and child
 - 4. Improve maternal sense of competence, empowerment, self esteem and stress reduction
 - 5. Conserve scarce food resources within a household
 - 6. Contributes to sustainable development and food security
- C. Correction of misconceptions about breastfeeding in emergencies
 - 1. Women can breastfeed under stressful conditions
 - a) Milk production is adequate under stress
 - b) Milk release may be affected by stress
 - 1) Suckling stimulates oxytocin release and thereby milk release
 - 2) Emotional, social and technical support for breastfeeding women in emergency situations is essential
 - 2. **Malnourished women produce enough breast milk -- quality and quantity.**
 - a) Supplement the mother, not the infant.
 - b) Supplementing the infant decreases suckling and milk production.
- D. Optimal infant feeding practices in emergencies
 - 1. **Initiate breast feeding** within one hour of birth
 - 2. Frequent, **on-demand feeding**, including night feeds
 - 3. **Exclusive breastfeeding** until 6 months of age

4. Complement breastfeeding with appropriate foods at about 6 months.
Weaning foods should be calorie-dense and micronutrient-rich.
Porridges and premixes eventually are replaced by local foods.
5. **Sustain breastfeeding until 24 months of age**
6. Increase breastfeeding frequency and continue feeding calorie-dense weaning foods during illness and for catch-up during recovery.
7. **Even women at risk for HIV infection** due to high prevalence should breastfeed. The known and potential benefits of breastfeeding together with the risks of alternatives in developing countries outweigh the relatively low risk of transmission of HIV through breastfeeding.
8. Do not employ relief policies and services that undermine breastfeeding (bottles, artificial nipples)
9. **Training and support for relief workers** with specific guidelines
10. **Breastfeeding counselors** – breastfeeding mothers need help to ensure optimal breastfeeding
11. **Supplement the lactating mother** and address fears of breastmilk insufficiency due to diet quantity or quality
12. Attempt **relactation** if infant < 6 mos
13. If mother dead or absent, consider **wet nursing or milk banking**
- E. Breast milk substitutes: an emergency should not become a new market for formula manufacturers
 1. Used in special circumstances such as orphans
 2. Used in controlled conditions such as on-site feeding, not for general distribution.
 3. Accompany with additional health care, water, fuel, and ORT for diarrhea
 4. Initiate only if supply is guaranteed as long as needed.
 5. Plan for reestablishment of breastfeeding.
 6. Sweetened condensed milk and dried skim milk are not appropriate.
- V. Feeding the malnourished
 - A. Definitions

1. **Therapeutic feeding program (TFP):** a complete regimen targeted to provide a carefully balanced and intensively managed dietary regimen accompanied by medical intervention to rehabilitate a severely malnourished child.
 2. **Supplementary feeding program (SFP):** adds foods and nutrients to an existing diet. The program may be non-targeted or targeted to vulnerable and special groups such as women and children, workers, etc.
 3. **General food plan (GFP):** provides a complete ration of energy, protein and micronutrients to all members of a population.
- B. Selection criteria for participation in feeding programs (Figure 5)
1. Anthropometric surveys
 2. Program objectives, available resources
 3. Targeting vulnerable population
 - a) Location
 - b) Age (less than 2 years is a priority), sex
 - c) Baseline nutritional status
 - d) Food intake
 - e) Health criteria (pregnant, lactating)
 - f) Others: elderly, disabled, twins, TB, AIDS
- C. Caution in nutritional therapy: **the refeeding syndrome**
1. Definition: the metabolic and physiologic consequences of the depletion, repletion, compartmental shifts and interrelationships of phosphorus, potassium, magnesium, sodium, glucose and fluid.
 2. In starvation, there is depletion of muscle mass, water, minerals, and electrolytes. Serum concentrations preserved by adjusting renal excretion rates.
 3. With refeeding, there is intracellular uptake of glucose, phosphorus, water, other electrolytes.
 - a) Hypophosphatemia results, as well as depletion of other metabolically important phosphorylated compounds: ATP, 2,3-DPG.

- b) Abnormalities of cardiac, hematologic, respiratory, neuromuscular, hepatic and skeletal systems ensue.
- c) Circulatory overload may also result from fluid and electrolyte shifts.

D. Therapeutic feeding program

1. **Severe malnutrition** (<70% W/H, -3 Z scores)
2. Resources available to combine nutritional and medical components
3. Two phases (TABLE 6)
 - a) Phase 1: Rehydration, commencement of medical treatment, initiation of nutritional treatment
 - b) Phase 2: Continuation of medical treatment, nutritional rehabilitation, transition to social environment

Care	Actions
FIRST PHASE: 24 hour care	1-7 days
- Rehydration	Special formulation
- Start medical treatment	Systematic + prescribed
- Initiation nutritional treatment	8-10 feeds/day; 100 Kcals/kg/day
SECOND PHASE: day-care	+/- 14 days*
- Continuation medical treatment	Systematic + prescribed
- Nutritional rehabilitation	4-6 feeds/day; to > 200 Kcals/kg/day
- Transition to social environment	Vary diet, psychosocial stimulation

* The length of time a child spends in Phase 1 should be limited to less than 7 days as the diet provided does not allow nutritional rehabilitation. The length of time in phase 2 depends upon the rate of recovery.

TABLE 6: Treatment Phases of Severe Malnutrition: TFP (from Medecins Sans Frontieres. *Nutritional Guidelines*. 1995.)

4. Emergency TFP
 - a) Mother primary caregiver
 - b) Importance of breastfeeding: promote and continue during therapy
5. Medical treatment addresses the **main causes of death** in severe malnutrition
 - a) **Dehydration**
 - 1) IV fluids only in cases of severe shock
 - 2) IV fluids carry significant risk of circulatory overload
 - 3) Electrolyte imbalances in PEM: sodium excess, potassium and magnesium deficiency. For severe malnutrition with dehydration, use special ORS or classic ORS diluted to half-strength with added sugar (25 g/liter) and potassium (2 g/liter)
 - b) **Infection:** respiratory, urinary tract, measles, gastrointestinal, parasitic, skin, septicemia
 - c) **Hypothermia** -- keep children warm, especially in the night and early morning when ambient temperature may drop
 - d) **Hypoglycemia** – regular feeding during day and night
 - e) **Cardiac failure** – can result from electrolyte disturbances, fluid overload, or severe anemia
 - f) **Severe anemia** – folic acid and iron supplementation
6. Micronutrient supplements encouraged
7. **Nutritional therapy: phase 1** (24 hour intensive care)
 - a) Maximum 7 days
 - b) Energy 100 kcal/kg/day, protein up to 1-1.5 gm/kg/day
 - c) Use high energy milk (HEM), 1 kcal/ml; give 100 ml/kg/day (100 kcal, 2.9 gm protein/kg/day)

	Grams per liter	Protein (gm)	Kcal
Dried skim milk	80	28.8	285
Vegetable oil	60		530
Sugar	50		200
Total*	1 liter	28.8	1,015

{*water is added to the dry ingredients to make one liter of HEM (approximately 900 mls)}
Sample composition of **High Energy Milk (HEM)** for therapeutic feeding (from Medecins Sans Frontieres. *Nutritional Guidelines*. 1995.)

- d) Frequent, small feeds: day 1-2: 12 feeds of 8 ml/kg q 2 hrs;
Day 3-7: 8 feeds of 12-15 ml/kg q 3 hrs
- e) Indications for nasogastric feedings (try oral feeds before each NG feed; limit to 3 – 4 days maximum) Note: Necessity must be explained to mother for cultural acceptance so child is not removed from program
 - 1) Complete anorexia
 - 2) Severe dehydration
 - 3) Child too weak to drink
 - 4) Repeated vomiting
- f) Potassium supplementation: 2 g KCl per 1000 ml HEM or bananas
- g) Transfer to phase 2
 - 1) Medical complications under control
 - 2) Recovery of appetite
 - 3) Change of attitude/expression (loss of lethargy)

8. **Nutritional rehabilitation: phase 2** (day care)

- a) Goal: restore normal weight for height as quickly as possible with weight gain up to 20 g/kg/day
- b) Intake: minimum 200 kcal/kg/day; 3-5 g protein/kg/day (10% of kcals from protein)
Maximum 300 kcal/kg/day on demand
- c) Small stomach capacity limits volume of feeds, requiring smaller, frequent feeds

- d) Composition: HEM or HEM alternating with porridge feeds; eventually, local foods replace porridge and transition is to family-type diet and meal frequency (Table 7)

Time	Meal
0800	HEM + banana
1000	HEM
1200	Porridge
1400	HEM
1600	Porridge
1700	Return home with package of biscuits

Example of a meal schedule in day-care: phase 2 TFP (from Medecins Sans Frontieres. *Nutritional Guidelines*. 1995.)

- e) Continue medical monitoring
- f) Vitamins and minerals
- 1) ferrous sulfate 100 mg/day from day 15 (risk of free radical formation, bacterial growth, infection promotion earlier)
 - 2) folic acid 5 mg/day
 - 3) fresh fruit and vegetables or MVI + vitamin C 125 mg/day
- g) Psychosocial stimulation

9. Anticipated results: 10-20 gm/kg/day weight gain during phase 2.
Discharge to a supplemental feeding program when they have maintained 80% W/H for at least 2 weeks, with no edema or severe medical problems.

E. Supplementary feeding programs

1. Moderate acute malnutrition (70-79% W/H, -2 Z scores)
2. Goal: supplement or address a deficient family diet and allow for catch-up growth
 - a) Target amounts around 500-700 kcals/day, 15-25 gm protein/day (10-15% of kcals as protein based on assumption that diet is otherwise low in protein)

- b) Provide excess amounts of take-home rations for other family members (double or triple quantity)
 - c) Ration composition: balanced, high concentration of energy and protein, 1 kcal/ml, 10-15% of kcals as protein
3. Two forms: wet vs. dry rations
- a) **Wet rations** are prepared/cooked on-site in a feeding center once or twice daily and are usually consumed on-site.
 - 1) Ensures that the target individual consumes the supplement
 - 2) Allows provision of complementary health care services on-site
 - 3) Participants do not need firewood supply or cooking utensils
 - 4) Provides security advantage if it is feared that women carrying dry rations will be robbed on their way home
 - b) **Dry rations** are distributed (usually weekly) for off-site preparation and consumption.
 - 1) Lower cost, fewer staff resources needed
 - 2) Reach larger numbers; larger amounts required
 - 3) Families remain in homes
 - 4) Lower transmission of communicable diseases
 - 5) Mother has less time cost for participation, maintains feeding responsibility
4. **Medical care in SFP's:** public health preventative and curative measures
- a) Treatment of infections
 - b) Treatment of diarrhea and dehydration
 - c) Treatment of specific vitamin and mineral deficiencies
 - d) Update immunizations
 - e) **Routine therapy and prophylaxis**
 - 1) Measles immunization
 - 2) Prophylactic dose of 200,000 IU vitamin A
 - 3) Mebendazole on admission for children > 1 year

- 4) Vitamin C 125 mg/day if scurvy prevalent and no fresh fruit and vegetables provided
 - 5) Chloroquine prophylaxis if indicated
 5. Anticipated results: 5-10 g/kg/day weight gain, achieving 85% W/H in 4-6 weeks, with discharge after 6-10 weeks, when child has maintained W/H>85% for one month.
- F. **Monitoring of feeding programs**
1. Record the weight gain of individual children
 2. Assessment of effectiveness
 - a) Regularity of attendance
 - b) Proportion of population of malnourished children who are included in the program (coverage)
 - c) Number of deaths
 - d) Access to feeding centers or distribution points
- G. **Criteria for closing a feeding program**
1. General food distributions are reliable and adequate
 2. Effective public health and disease control measures are in place
 3. No seasonal deterioration of nutritional status is anticipated
 4. Mortality rate is low
 5. The population is stable
 6. An adequate level of security is in place

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TABLE 7: Recipes for porridge for use in therapeutic and wet supplementary feeding programs.

E. Recipe One: Maize flour + Dried skim milk (DSM) based porridge

ITEM	Weight (g)	Kcal	Protein (g)
MAIZE	60	215	6
DSM	45	160	16
OIL	30	265	0
SUGAR	15	60	0
WATER	±400	0	0
TOTAL	550	700	22

F. Recipe Two: Corn soya blend (CSB) based porridge

ITEM	Weight (g)	Kcal	Protein (g)
CSB	100	380	18
OIL	30	265	0
SUGAR	20	80	0
WATER	±300	0	0
TOTAL	450	725	18

The porridge can be prepared for children in Therapeutic feeding as well for children in wet Supplementary feeding centers.

Usually, a porridge will provide ~ 150 Kcal/100 ml and ~ 4 grams of protein/100 ml

Preparation:

Always prepare a sample and taste the porridge before distribution. The porridge should be semi-liquid.

Generally the preparation is:

Add 1 volume of premix to 2-3 volumes of water

Boil for 10-15 minutes

Cooked porridge should not be kept for more than 2 hours.

(from Medecins Sans Frontieres. *Nutritional Guidelines*. 1995)

IX. Recognition and Management of Diarrhea and Dehydration

Clifton Yu, MD

Goals and Objectives for Diarrhea and Dehydration Module

I. **Goal**—Participants will understand the therapeutic approach to the treatment of diarrhea and dehydration in the developing world and appreciate the rationale behind this approach.

Objectives—Participants will be able to:

- a) describe the history behind our current therapies for treating diarrhea and dehydration
- b) explain the physiologic basis for the efficacy of oral rehydration solutions (ORS)
- c) List the reasons why using ORS in the majority of cases is preferable to parenteral therapy
- d) specify under what circumstances oral rehydration therapy (ORT) is indicated and when it is not.

II. **Goal**—Participants will be able to appreciate the variety of ORS formulations available, the rationale behind these formulations, and when one form or the other might be preferable.

Objectives—Participants will be able to:

- a) list the 4 basic components of WHO ORS and their concentration
- b) give examples of different formulations other than WHO ORS and the rationale as to why they might be beneficial over WHO ORS
- c) given the appropriate supplies, be able to mix a field expedient form of ORS
- d) explain when “straight” WHO ORS is appropriate and when its intake should be modified

III. **Goal**—Participants will be able to assess an individual patient and determine what form of fluid therapy should be initiated, how much to be given, and how to formulate an overall outpatient treatment plan.

Objectives—Participants will be able to:

- a) list the physical findings that might correlate with differing degrees of dehydration
- b) specify why and when these physical findings can be unreliable
- c) identify the indications for starting intravenous fluids (IVF) vs. ORS
- d) given a hypothetical caregiver in the developing world, describe how one would instruct this person to mix and administer ORS, how and what to feed the child, and how and when to follow-up.

IV. **Goal**—Participants will understand the importance of early refeeding, continued breastfeeding, as well as the cultural obstacles to following through with therapy.

Objectives—Participants will be able to:

- a) explain why continued feeding is important in the majority of cases of dehydration
- b) state the benefits of breast vs. bottle feeding in the developing world
- c) give examples of cultural impediments to implementing therapy.

V. **Goal**—Participants will learn the rules of drug therapy for the treatment of diarrhea.

Objectives—Participants will be able to:

- a) explain why anti-motility agents and indiscriminate use of antibiotics is contraindicated
- b) state under what circumstances antibiotic therapy might be indicated
- c) list two parasitic causes of diarrhea in which anti-parasitic drugs should be started.

VI. **Goal**—Participants will appreciate the practical aspects of ORT implementation in the refugee camp setting.

Objectives—Participants will be able to:

- a) outline a strategy for ORT unit set-up at the outset of a humanitarian emergency
- b) state what personnel one would need to begin implementation of ORT to patients and what skills these personnel should have
- c) list the supplies one would need to set up an ORT unit in a field setting
- d) Educate ancillary personnel in evaluating patients with diarrheal disease using standardized treatment protocols.
- e) Understand how surveillance data is utilized in assessing the epidemiology of diarrheal disease.

Management of Diarrhea and Dehydration in Humanitarian Emergencies

SCOPE OF THE PROBLEM

Worldwide, an estimated 4 million children under five years of age die every year from diarrheal disease, the overwhelming majority of these children being less than two years old. In a refugee situation involving large populations of displaced persons, diarrheal illness and its resultant dehydration becomes an even more significant cause of morbidity and mortality, in some cases comprising greater than 50% of the mortality in the initial stages of a humanitarian emergency. Although the root cause of diarrheal disease in these situations can often be linked directly to a lack of access to a clean and adequate water supply, poor sanitation stemming from overcrowding, and increased susceptibility due to malnutrition, this module will focus predominately on the therapy of the dehydration that can be the common result of untreated diarrheal disease regardless of its etiology.

TREATMENT STRATEGY

The major difference between treatment of diarrheal disease in the developing world and that utilized by most health care providers in the U.S. and other industrialized countries lies in the relative use of oral rehydration therapy (ORT). Over the past thirty years, ORT has proven to be a safe and effective treatment for dehydration caused by diarrheal illness around the world, and has been documented to dramatically reduce the mortality associated with diarrheal outbreaks such as those seen in humanitarian emergencies. During the 1971 Bangladesh War of Liberation, when cholera was present in epidemic proportions, there was a 25% mortality rate from diarrheal illness when IV therapy was the only treatment utilized. When ORT was introduced in this first widespread utilization of this form of therapy, the mortality rate subsequently dropped to 3 percent.

In a refugee situation, ORT is clearly the preferred form of rehydration and maintenance therapy versus that of intravenous fluid in the overwhelming majority of cases for the following reasons:

1. ORT is safe, simple, and inexpensive. Its main ingredients—salt, water, and sugar or starchy foods—are often present in the community even if premixed oral rehydration salts (ORS) are not readily available.
2. ORT can easily be taught to health workers and ancillary support staff, thereby freeing up the reliance on medical and hospital based personnel. These individuals can subsequently educate the community in its use at home or within the refugee camp setting.
3. ORT can be used not only to treat dehydration but to prevent it as well if it is made available and instructed to be utilized early in the course of the diarrheal episode.

HISTORICAL BACKGROUND

Despite references to forms of ORT in a variety of different cultures dating back thousands of years, our current understanding of fluid therapy in diarrheal disease, and ORT in particular, is fairly recent.

3000-1000 B.C. – Folk remedies (washed rice and honey, salt and molasses).

1832 – First global cholera pandemic. IV therapy introduced by Latta.

1930's – Hartman uses lactate in IV solution to prevent acidosis.

1940's – First oral rehydration solutions developed by Harrison and Darrow

1950's - early 1960's – Phillips and Wallace at US NAMRID in Taiwan evolve modern IV therapy for cholera patients based on electrolyte content of cholera stools.

1964 – Glucose-sodium co-transport mechanism characterized. Phillips and Wallace use ORT at US NAMRID in Taiwan.

1965 – 1970 – ORT developed further at Pakistan-SEATO Cholera Research Laboratory, Dhaka and Johns Hopkins University International Center for Medical Research and Training, Calcutta.

1971 – 1973 – ORT used successfully on large scale in cholera outbreak in Bangladesh by Mahalanabis and colleagues.

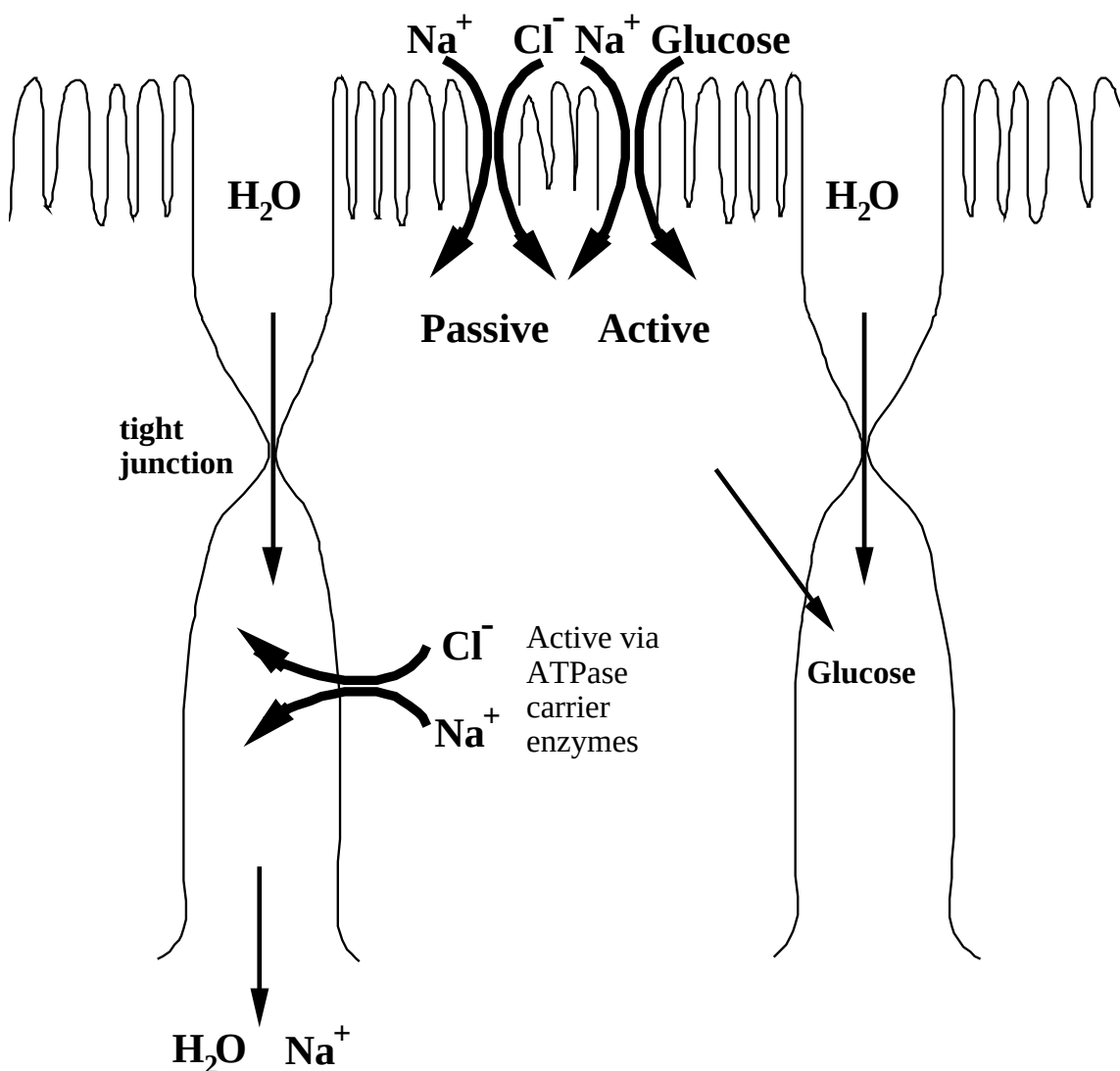
1975 – WHO and UNICEF promote a single solution (WHO ORS) for worldwide use.

1980 – WHO initiates Diarrheal Diseases Control Program in effort to promote global use of ORT.

HOW DOES ORT WORK?

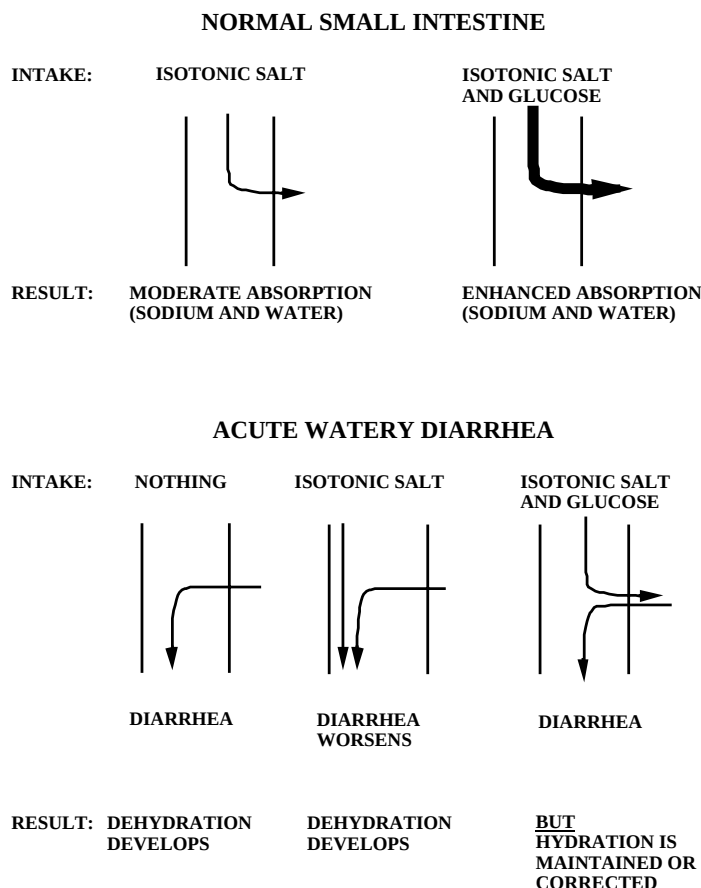
The physiologic basis behind our current understanding of modern ORT stems from the discovery in the early 1960's of the sodium-glucose co-transport system mentioned above. Under normal physiologic conditions, water is absorbed osmotically across the small bowel through “tight junctions” between epithelial cells due to a sodium gradient that is maintained by two mechanisms: passive sodium/potassium diffusion across the brush border membrane and active co-transport of sodium, along with monosaccharides such as glucose, also across the luminal membrane. The resulting intracellular sodium is then actively transported via ATPase carrier enzymes into the intercellular space, setting up an osmotic gradient between the intercellular and luminal spaces, allowing for free diffusion of water.

Figure 1.



The efficacy of ORT is based on the fact that in acute diarrhea, the passive absorptive mechanism of sodium and chloride is impaired, but glucose absorption remains largely intact, so as long as one provides adequate glucose, or as was later discovered other sugars like galactose and even amino acids, sodium can continue to be absorbed across the luminal membrane and then extruded into the intercellular space, setting up the osmotic gradient for water, as well as electrolytes like potassium and bicarbonate present in isotonic glucose-salt solutions, to be absorbed as well. This absorptive capacity can equal or exceed simultaneous stool losses even when the loss is rapid, as is seen in cholera.

Figure 2.



INDICATIONS FOR PARENTERAL THERAPY

After its widespread use around the world in millions of cases over the last 30 years, it is clear that ORT can be utilized to treat the overwhelming majority of adults, children, and infants with dehydration due to diarrheal disease, as well as to prevent dehydration from occurring; however, parenteral therapy should be available in all hospital settings, but reserved for those patients with any of the following:

1. **Patients who present acutely with severe dehydration** (hypotension, shock, stupor, or coma). After initial fluid repletion, if the patient is moderately or mildly dehydrated, ORT should be initiated. Likewise, if evidence of intestinal ileus is present, e.g. abdominal distention and/or absent bowel sounds, ORT should be withheld and IV fluids initiated until these signs are absent.
2. **Patients with severe and protracted vomiting.** The great majority of children with mild or moderate degrees of vomiting associated with their diarrheal illness can successfully tolerate ORT when given slowly by spoon or syringe.

3. **Patients with excessively high stool output.** Rates of stool output greater than 10 cc/kg/hr, or 800 ml in an adult, are usually only seen in severe cholera cases. IV fluids should be initiated without delay in these patients; however, ORT should never be denied simply because of high stool output.
4. **Patients with evidence of serious glucose malabsorption.** Glucose malabsorption can occur in anywhere from one to five percent of cases of diarrheal disease, depending on the population. The diagnosis is made on the basis of glucose or positive reducing substances in the stool **in combination with** a dramatic increase in stool output when ORS is given. When IV fluids are started, these patients show an immediate drop in stool output.

COMPOSITION OF ORS

The first successful formulations of ORT were designed specifically to replace the fluid losses associated with cholera. Many critics, particularly in the U.S., were skeptical that one oral solution designed for severe, secretory diarrhea such as that seen in cholera where stools can contain upwards of 120 –140 mmoles/L of sodium, could be successfully utilized for non-cholera diarrhea. In 1975, the World Health Organization (WHO) and the United Nations International Children’s Fund (UNICEF) decided to promote a single solution worldwide. The formula for this solution is as follows:

Glucose	20 grams
Sodium chloride	3.5 grams
Sodium bicarbonate (since changed to 2.9 grams trisodium citrate dihydrate for increased shelf life)	2.5 grams
Potassium chloride	1.5 grams
Water	1.0 liter

The concentration of this solution (in mmoles/L) is sodium, 90; potassium, 20; chloride, 80; base, 30; and glucose 111 (2%). This formulation was the result of a compromise between a solution tailored for the high stool sodium losses seen in cholera and the smaller losses seen in other forms of diarrhea such as that caused by rotavirus or enterotoxigenic *E. coli*. Despite the fact that rotavirus is known to cause a diffuse enteropathy that can

be sometimes associated with glucose malabsorption, this WHO/UNICEF form of ORS has proven to be efficacious regardless of etiology to include diarrheal disease caused by rotaviral infection.

Table 1.

Fecal Electrolyte Concentrations in Infectious Diarrhea (meg/L)				
Disease	Na	Cl	K	Bicarbonate
Rotavirus	37	22	38	6
ETEC	53	24	57	18
Cholera (Infants and Children)	88	86	30	32
Cholera (Adults)	140	104	13	44

Data from Molla et al. (1981) and Pierce et al. (1968).

Likewise, initial skepticism that a solution so high in sodium could be used in hypernatremic, hyponatremic, as well as isonatremic dehydration has proven to be largely unfounded as long as renal function is unimpaired.

In spite of the fact that WHO ORS has been so successfully utilized, it still does not reduce the duration of illness or the volume of stool output in patients with diarrhea. Over the past twenty years, a significant amount of research has been done in an attempt to improve on WHO ORS. The goal has been to devise a solution that not only treats and prevents dehydration, but one that reduces the severity and duration of the diarrhea as well. Essentially three categories of “super ORS” have been studied: ORS containing amino acids as the co-transporting molecules, ORS derived from cooked cereals, usually rice-based, and glucose-based ORS made hypoosmolar by reducing the concentration of glucose and sodium. Of these three alternative types of ORS, the rice-based formulations have uniformly demonstrated improved efficacy in both children and adults with cholera over that of standard WHO ORS in regards to decreased duration and volume of stool output, with a minimal to no significant change observed in patients with non-cholera diarrhea. The glucose-based hypoosmolar formulations have been shown to be more effective than WHO ORS in children with non-cholera diarrhea; however, although it is mildly more effective in adults with cholera, there have been case reports of significant hyponatremia developing in some of these patients when hypoosmolar solutions were used.

For now, the most readily available and standardized form of ORS worldwide continues to be the original WHO/UNICEF formulation, although this may change. The following is a list of commercially available ORS formulations in the United States. Keep in mind that diarrhea in the U.S. is rarely caused by cholera, and that viral etiologies such as rotavirus are more common; therefore, rehydration solutions with sodium concentrations in the 60 to 75 mmol/L range have been recommended by many authorities for children with diarrhea in this country.

Table 2.

ORT solution	Na (mmol/L)	K (mmol/L)	Osmolality (mmol/L)	Base ^a (mmol/L)	Carbohydrate ^b (g/L)	Calories (kcal/L)
Pedialyte	45	20	250	30	25	100
Pediatric Electrolyte	45	20	250	30	25	100
Kao Lectrolyte	50	20	232	30	20	80
Infalyte	50	25	200	50	13	50
Ceralyte-50,70,90	50,70,90	20	180,220,260	30	40	165
Rehydralyte	75	20	310	30	25	100
Rice Based ORS (Homemade)	90	20	~230	30	50	200
WHO ORS	90	20	310	30	20	80

^a Bicarbonate or citrate^b All the Commercial ORT solutions except Ceralyte contain glucose. Ceralyte contains a complex mixture of rice carbohydrates and proteins.**FIELD EXPEDIENT FORMS OF ORS**

Despite the clear need for readily available ORS in almost any humanitarian emergency, recent military deployments such as Operation Provide Comfort did not include the provision of any ORS until well in to the mission. The ability to provide a field expedient form of ORS in such instances may be life-saving. Examples include the following:

ORS mixed from readily available IV solutions:

Normal Saline	390 ml
D5W	400 ml
KCl (2 meq/ml)	10 ml
NaHCO ₃ (1 meq/ml)	30 ml
Water	170 ml

Mix together to form one liter of solution.

ORS From Table Sugar and Salt

Sucrose (table sugar)	9 level teaspoons
Table Salt	1/2 teaspoon
Sodium Bicarbonate (baking soda)—if available	1/2 teaspoon
Potassium Chloride--if available*	1/4 teaspoon
Water	1 liter

*If no potassium chloride is available, attempt to supplement with potassium-rich foods like bananas, tomatoes, or oranges.

ORS Made From Ricewater

Uncooked Rice	100 grams
Water	1 liter

Cook the rice in boiling water for 10 minutes or until the rice pops. Drain the water from the rice into a container, squeezing any remaining water from the rice with a spoon. When all the water is squeezed from the rice, add enough water to the solution to bring the total volume to one liter.

In all cases, use as clean and potable a water source as is available. Whether to use scarce energy resources to boil suspect water will be a judgment call based on a variety of factors. Families should certainly be told **not** to boil OR solution after it is mixed, since this will obviously increase the electrolyte and sugar concentrations, potentially to dangerous levels. If at all possible, a new batch should be made at least every 24 hours in the absence of refrigeration. Camp workers and family members should be instructed to discard any unused solution after 24 hours since it can be an excellent bacterial medium. If dispensing containers are available, it may be advantageous to pre-mix a 24 hour supply of solution for the individual and have them return the next day for re-evaluation and more solution if needed.

CASE MANAGEMENT

If possible, an accurate body weight should be obtained on all patients. Premorbid weights are often not available in a refugee situation, so reliance on physical findings in estimating fluid deficits is crucial. Mental status and urinary output are particularly valuable clinical signs in assessing severity of dehydration. Skin turgor can sometimes be misleading in malnourished populations; for example, marasmus is usually associated with decreased skin elasticity even in the absence of dehydration, whereas obese infants may not show decreased skin elasticity even in the presence of moderate dehydration.

In addition to assessing the degree of dehydration present, it is important to do a full physical examination as well to rule out any co-morbid conditions. Also, one must always auscultate and document active bowel sounds prior to initiating oral therapy.

Adapted from MMWR October 1992.

Table 3.

Degree of dehydration	Signs	Rehydration therapy (within 4 hrs)	Replacement of fluid losses from stool / emesis	Dietary therapy
Mild (3% - 5 %)	Slightly dry buccal mucous membranes, increased thirst	ORS 50 ml/kg	40 ml/kg or 1/2 -1 cup of ORS for each diarrheal stool 2 ml/kg for each episode of emesis	Human milk feeding, or half or full strength lactose containing milk or undiluted lactose free formula
Moderate (6% - 9%)	Sunken eyes, sunken fontanelle, loss of skin turgor, dry buccal mucous membranes	ORS 100 ml/kg	Same as above	Same as above
Severe (>10%)	Signs of moderate dehydration with one or more of the following: rapid thready pulse, cyanosis, cold extremities, rapid breathing, lethargy, coma	Intravenous fluids (Ringer's lactate), 20 ml/kg/hr until pulse, perfusion, and mental status return to normal; then 50 - 100 ml/ kg of ORS	Same as above	Same as above

In most cases, preferably a spoon or syringe should be utilized since this decreases the potential for drinking too fast which frequently results in vomiting. Avoid the use of bottles because of sterilization problems and the interference it may impose on breastfeeding. In a vomiting child it is often helpful to start off by giving one teaspoon

per minute, gradually increasing the volume as tolerated. After two to four hours, hydration status should be reassessed. If the patient has been rehydrated adequately, maintenance therapy can begin; if the patient is still dehydrated, the deficit should be re-estimated and rehydration started again.

For patients with acute diarrhea but no clinical signs of dehydration, the rehydration phase of therapy is omitted and maintenance therapy is started immediately. This maintenance therapy can be performed at home or away from the treatment facility after parental instructions are given.

In all cases, once maintenance therapy is started, it is important to realize that WHO ORS in its “straight” form was designed to restore the fluids and electrolytes lost during the acute course of diarrheal illness. **For maintenance therapy and prevention of dehydration, WHO ORS should be supplemented with an approximately equal volume of breastmilk, water, or other fluid.** Maintenance therapy can be calculated in a number of ways. A standard formulation familiar to most pediatricians is the following: 100 ml/kg for the first 10 kg of body weight, 50 ml/kg for the second 10 kg, and 20 ml/kg for every kg of body weight thereafter. Additionally, replacement fluids should be given for each episode of stool and emesis as described in Table 3.

NUTRITIONAL THERAPY

It is important to realize that nutritional therapy in the long run can be just as crucial if not more so than the ongoing fluid therapy to the overall health of the child with diarrheal disease. In many parts of the developing world, children experience on average between 7 and 10 episodes of diarrhea per year. The effect of fasting during these episodes can precipitate or in many cases exacerbate a tendency towards malnutrition that can be devastating. Besides this larger consequence of fasting, on the physiologic level it has been demonstrated that lack of food intake during diarrheal episodes inhibits the enterocyte renewal process and prolongs the intestinal permeability seen in acute infection. Mistaken beliefs that fasting is beneficial are just as prevalent if not more so in many developing countries as it is in the U.S.

As soon as the rehydration phase is completed, dietary therapy should begin. Breastfed infants should continue to nurse on demand. **Remember that in most refugee situations, a paucity of potable water and an inability to clean bottles, in addition to the hazards of inappropriate mixing and storage and the potential undermining of breastfeeding, make formula feeding in most of these situations particularly undesirable.** If formula feeding is deemed absolutely necessary, however, these infants can receive full strength formula, lactose-reduced, or lactose free formula, depending on availability and tolerance. The clinical significance of transient lactase deficiency in acute diarrhea is probably overstated, but if symptoms truly worsen on full strength

formula, then dilute or lactose free formula should be attempted. Older children can receive solid foods as tolerated. Starches, cereals, yogurt, fruits, and vegetables, should be encouraged. Foods high in simple sugars and fats should be avoided.

CULTURAL OBSTACLES TO CARE

In addition to the common practice of fasting during diarrheal episodes, there are many other potential cultural obstacles to care of the child with diarrhea. Health beliefs and practices are important in devising a treatment plan that is acceptable to the family, and it is important to attempt to find out what some of these beliefs might be. In some Asian cultures, for example, the body is considered to be made up of “hot” and “cold” forces. Diarrhea may be considered a “hot” illness, and therefore “cold” foods are encouraged to bring the body into balance; this may affect how one would introduce ORS into therapy. In Islamic cultures, it may be helpful to emphasize the Koranic charge to breastfeed for two years. During religious fasting months, emphasize that the child with diarrhea should be exempt from fasting. In some Latin American cultures, a sunken fontanelle is considered the cause of diarrhea, and some mothers may actually suck on the fontanelle to stop the diarrhea. In some African as well as Latin American societies, fathers are not expected to be involved in the day to day care of children, and with a sick, absent, or busy mother, the child may suffer adversely. Here in the U.S., the common practice of using sports drinks, gelatin, and “flat” soda to treat diarrheal disease is yet another example of a cultural practice that may actually exacerbate the problem. **The main point is to be aware of these potential obstacles to care and incorporate them into your teaching and treatment plans.**

DRUG THERAPY FOR DIARRHEA

WHO has estimated that 50% to 70% of diarrheal episodes worldwide are treated with antimicrobial and/or anti-secretory/bulking agents. A survey in 47 countries performed by WHO in 1990 showed that drug therapy was used in diarrheal illness twice as often as ORT, much of it prescribed by health professionals. It is important to remember what most pediatricians have already been taught: **the natural history of the overwhelming majority of acute gastroenteritis is that the diarrhea will stop by itself.** In most cases, antibiotics are not indicated and can actually be harmful by worsening diarrhea and causing antibiotic-associated colitis. Simple rules to remember and teach allied health workers when treating diarrheal disease are the following:

1. Antibiotics should only be used for dysentery and suspected cholera.
2. Anti-parasitic drugs should be only used for amoebiasis and giardiasis.
3. Do not use anti-diarrheal drugs or anti-emetics; they can decrease gut motility, prolong the course of diarrhea, and worsen systemic symptoms.

Remember that in most refugee camp set-ups, bacterial cultures will not be available.

Even when obtainable, results may not be ready for two to three days, by which time most cases of diarrhea will have resolved. In spite of the expense of bacterial cultures (40 to 50 times that of ORT for an average child), if resources allow, they should be obtained in cases of suspected dysentery (e.g. bloody diarrhea), or when cholera is being thought of as a possible etiology.

ORGANIZATION OF ORT UNITS IN THE CAMP SETTING

In the early phases of a humanitarian emergency, the organization and set-up of ORT units can be easily overlooked, particularly when there is no obvious outbreak of diarrheal disease. It is important to remember that **early rehydration is the most important treatment for preventing death from diarrheal disease**, and therefore ORT units should be set up at the outset of almost every emergency relief situation. If possible, an ORT unit should be placed at each health post where patients will be seen, from the smallest tent clinic to the largest hospital. If trained personnel are not available, then a separate area in the main treatment facility should be reserved for ORT set-up; ancillary personnel should then be expeditiously trained in the administration of ORT, and further ORT units set up at remaining triage and treatment areas in an effort to decentralize accessibility and increase availability. These smaller units should be manned by one to two people who have been trained in recognizing the various forms of dehydration and the algorithms for treatment (see appendix 2). Personnel at these units should be able to detect serious cases, such as suspected dysentery, cholera, or severe dehydration, and refer them rapidly to the central treatment facility, while at the same time ensuring adequate rehydration for milder cases throughout the day. An adequate amount of potable water, ORS packets, mixing containers, and syringes, spoons, and cups sufficient to treat about 50 patients a day, depending on the situation and resources, should be available at each ORT station. Recording of data is essential for surveillance purposes and can be accomplished by using a chart similar to the one in appendix 1. A chart such as this should be utilized by non-physician personnel evaluating and treating patients at these stations.

Appendix 1.

Data Collection Chart

Name	Location	Age	Duration of Diarrhea	Suspected Cholera (vomiting, abdominal cramping, voluminous stools, abrupt onset)	Suspected Dysentery (Blood)	Dehydration Severity & Treatment Algorithm		
						Mild (Plan A)	Moderate (Plan B)	Severe (Plan C)

Appendix 2

FIRST, ASSESS YOUR PATIENT FOR DEHYDRATION

A

B

C

1. LOOK AT: CONDITION EYES TEARS MOUTH/TOUGUE THIRST	Well, alert Normal Present Moist Drinks normally; not thirsty	Restless, irritable Sunken Absent Dry *Thirsty, drinks eagerly*	*Lethargic or unconscious; floppy* Very sunken and dry Absent Very dry *Drinks poorly or not able to drink*
2. FEEL: SKIN PINCH	Goes back quickly	*Goes back slowly*	*Goes back very slowly*
3. DECIDE	The patient has NO SIGNS OF DEHYDRATION	If the patient has two or more signs including at least one *sign* , there is SOME DEHYDRATION	If the patient has two or more signs, including at least one *sign* , there is SEVERE DEHYDRATION
4. TREAT	Use Treatment Plan A	Weigh the patient, if possible, and use Treatment Plan B	Weigh the patient and use Treatment Plan C URGENTLY

Appendix 2.

WHO DIARRHEA MANAGEMENT CHART PLAN A (MILD DEHYDRATION)

Treating Diarrhea at Home

Use this plan to teach the mother to

- continue to treat at home her child's current episode of diarrhea
- give early treatment for future episodes of diarrhea

Three rules for treating diarrhea at home

Give the child more fluids than usual to prevent dehydration

- use a recommended home fluid such as cereal gruel. If this is not possible give plain water. Use ORS solution for children described in the box below.
- give as much of these fluids as the child will take. Use the amounts shown below for ORS as a guide.
- continue giving these fluids until the diarrhea stops.

Give the child plenty of food to prevent undernutrition.

- Continue to breast feed frequently.
- If the child is not breast fed, give the usual milk. If the child is less than 6 months old and not yet taking solid food, dilute milk or formula with an equal amount of water for 2 days.
- If the child is 6 month or older, or already taking solid food:
 - also give cereal or another starchy food mixed, if possible, with pulses, vegetables, and meat or fish. Add 1 or 2 teaspoons of vegetable oil to each serving
 - give fresh fruit juice or mashed banana to provide potassium
 - give freshly prepared foods. Cook or grind meat well
 - encourage the child to eat, offer food at least 6 times a day
 - give the same foods after diarrhea stops, and give an extra meal each day for two weeks.

Take the child to a health worker

If the child does not get better in 3 days or develops any of the following:

- many watery stools
- repeated vomiting
- marked thirst
- eating or drinking poorly
- fever
- blood in the stool

Treatment with ORS Solution

Children should be given ORS solution at home, if

- they have been on treatment plan B or C
- they can not return to the health worker if the diarrhea gets worse
- it is national policy to give ORS to all children who see a health worker for diarrhea

Appendix 2 (cont.)

Application of ORS Solution		
Age	Amount of ORS to give after each loose stool	Amount of ORS to provide for use at home
less than 24 months	50-100 ml	500ml/d
2 to 10 years	100 -200 ml	1000 ml/d
10 years or more	As much as wanted	2000 ml/d
Describe and show the amount to be given after each stool using a local measure		

Show the mother how to mix ORS and how to give ORS

- give a teaspoonful every 1 to 2 minutes for a child under 2 years
- give frequent sips from a cup for an older child
- if the child vomits wait 10 minutes, then give the solution more slowly (e.g. a spoonful every 2 to 3 minutes)

if diarrhea continues after the ORS packets are used up, tell the mother to give other fluids as described in the first rule above or return for more ORS

Appendix 2 (cont.)

WHO DIARRHEA MANAGEMENT CHART PLAN B (MODERATE DEHYDRATION)

Approximate amount of ORS solution to give in the first 4 hours						
Age	less than 4 mo	4 -11 mo	12 -23 mo	2-4 yrs	5-14 yrs	15 yrs or older
Weight (kg)	less than 5	5-7.9	8 -10.9	11-15.9	16-29.9	30 or more
Vol (ml)	200-400	400-600	600-800	800-1200	1200-2200	2200-4000
- If the child wants more ORS than shown, give more - encourage the mother to continue breast feeding - for infants under 6 months who are not breastfed, also give 100-200 ml clean water during this period - Use the patients age only when you do not know the weight.						

Observe the child carefully and help the mother give ORS solution

- show her how much solution to give her child
- show her how to give it--a teaspoonful every 1-2 minutes for a child under 2 yr, frequent sips from a cup for an older child
- check from time to time to see if there are problems
- if the child vomits, wait 10 min and then continue giving ORS, but more slowly, for example, a spoonful every 2-3 minutes
- if the child's eyelids become puffy, stop ORS and give plain water or breast milk. Give ORS according to Plan A when the puffiness is gone

Continuation of treatment

After 4 hours, reassess the child using assessment chart, then select Plan A, B, or C to continue treatment

- if there are no signs of dehydration, shift to Plan A. When dehydration has been corrected, the child usually passes urine and may be tired and fall asleep.
- if signs indicating some dehydration are still present, repeat Plan B, but start to offer food, milk, and juice as described in Plan A
- if signs indicating severe dehydration have appeared, shift to Plan C

If the mother must leave before completing treatment Plan B

- show her how much ORS to give to finish the 4 hour treatment at home
- give enough ORS packets to complete rehydration, and for 2 more days as shown in Plan A
- show her how to prepare ORS solution
- explain to her the three rules in Plan A for treating her child at home
 - to give ORS or other fluids until diarrhea stops
 - to feed the child
 - to bring the child back to the health worker, if necessary

Appendix 2 (cont.)

WHO DIARRHEA MANAGEMENT CHART PLAN C (SEVERE DEHYDRATION)

Follow the arrows. If answer is YES go across. If NO go down.

Can you give IV fluids immediately?	start IV fluids immediately. If the patient can drink, give ORS by mouth while the drip is set up. Give 100 ml/kg Ringer's Lactate Solution (or, if not available, normal saline), divided as follows: <table border="1"> <thead> <tr> <th>Age</th> <th>First give 30 ml/kg in</th> <th>Then give 70 ml/kg in</th> </tr> </thead> <tbody> <tr> <td>Infants (under 12 mo)</td> <td>1 hour</td> <td>5 hours</td> </tr> <tr> <td>Older</td> <td>30 min</td> <td>2 1/2 hours</td> </tr> </tbody> </table> Repeat once if radial pulse is still very weak or not detectable	Age	First give 30 ml/kg in	Then give 70 ml/kg in	Infants (under 12 mo)	1 hour	5 hours	Older	30 min	2 1/2 hours
Age	First give 30 ml/kg in	Then give 70 ml/kg in								
Infants (under 12 mo)	1 hour	5 hours								
Older	30 min	2 1/2 hours								
Yes → No ↓										
Is IV treatment available nearby (within 30 minutes)?	- reassess the patient every 1-2 hours. If hydration is not improving, give the IV drip more rapidly. - also give ORS (about 5 ml/kg/hr) as soon as the patient can drink: usually after 3-4 hours (infants) or 1-2 hours (older patients). - after 6 hours (infants) or 3 hours (older patients), evaluate the patient using the assessment chart. Then choose the appropriate Plan (A, B, or C) to continue treatment.									
Yes → No ↓	- send the patient immediately for IV treatment. - if the patient can drink, provide the mother with ORS solution and show her how to give it during the trip.									
Are you trained to use nasogastric (NG) tube for rehydration?	- start rehydration by tube with ORS solution: give 20 ml/kg/hr for 6 hours (total of 120 ml/kg). - reassess the patient every 1-2 hours: -if there is repeated vomiting or increasing abdominal distention, give the fluid more slowly. -if hydration is not improving after 3 hours, send the patient for IV therapy. - after 6 hours, reassess the patient and choose the appropriate treatment plan.									
Yes → No ↓										
Can the patient drink?	- start rehydration with ORS solution: give 20 ml/kg/hr for 6 hours (total of 120 ml/kg). - reassess the patient every 1-2 hours: -if there is repeated vomiting, give the fluid more slowly -if hydration is not improving after 3 hours, send the patient for IV therapy. - after 6 hours, reassess the patient and choose the appropriate treatment plan.									
Yes → No ↓										
URGENT! Send the patient for IV or NG treatment										

Appendix 2 (cont.)

THEN, FOR OTHER PROBLEMS

ASK ABOUT BLOOD IN THE STOOL	IF BLOOD IS PRESENT: • Treat for 5 days with an oral antibiotic recommended for Shigella in your area. • Teach the mother to feed the child as described in Plan A. • See the child again after 2 days if: -under 1 year of age -initially dehydrated -there is still blood in the stool -not getting better • If the stool is still bloody after 2 days, change to a second oral antibiotic recommended for Shigella in your area. Give for 5 days.
ASK WHEN THIS EPISODE OF DIARRHEA BEGAN	IF DIARRHEA HAS LASTED AT LEAST 14 DAYS: • Refer to hospital if: -the child is under 6 months old -dehydration is present. (Refer the child after treatment of dehydration). • Otherwise, teach the mother to feed her child as in Plan A, except: -give only half the usual amount of milk, or replace milk with a fermented milk product, such as yogurt. -assure full energy intake by giving 6 meals a day of thick cereal and added oil, mixed with vegetables, pulses, meat, or fish. • Tell the mother to bring the child back after 5 days: -if diarrhea has not stopped, refer to hospital. -if diarrhea has stopped, tell the mother to: -use the same foods for the child's regular diet. -after 1 more week, gradually resume the usual animal milk. -give an extra meal each day for at least 1 month.
LOOK FOR SEVERE MALNUTRITION	IF THE CHILD HAS SEVERE MALNUTRITION: • Do not attempt rehydration; refer to hospital for management. • Provide the mother with ORS solution and show her how to give 5 ml/kg/hr during the trip.

Appendix 2 (cont.)

ASK ABOUT FEVER AND TEMPERATURE	IF THE CHILD IS UNDER 2 MONTHS OF AGE: • Rehydrate as necessary. If there is fever (38°C or above) after rehydration, refer to hospital. Do not give acetaminophen or an antimalarial. IF THE CHILD IS 2 MONTHS OF AGE OR OLDER: • If temperature is 39°C or above, give acetaminophen. • If there is falciparum malaria in the area, and the child has any fever (38°C or above) or history of fever in the past 5 days, give an antimalarial (or manage according to your malaria program recommendation).
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**X. Diagnosis and Management of the Primary
 Infectious Sources of Mortality**

Julia A. Lynch, MD

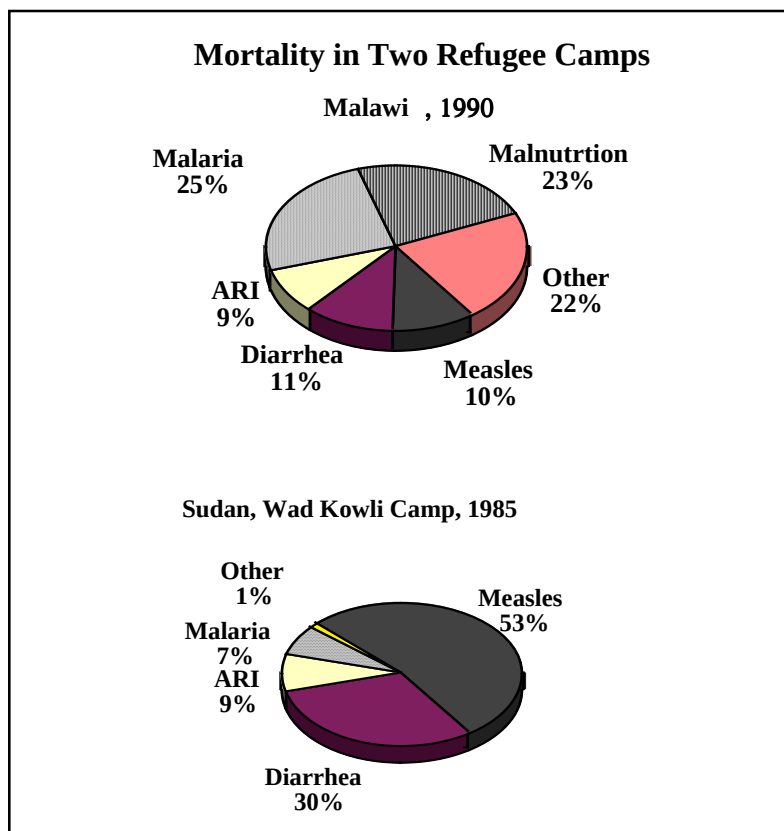
Goals and Objectives for the Infections Module

1. Goal – To recognize the public health importance of measles in an acute emergency setting and the role of the clinician in measles identification, prevention and treatment.
Objectives:
Participants will be able to:
 - Explain why measles infection can be so devastating in a refugee population;
 - Define the clinician's role in measles management in an acute emergency; and
 - List the priority target populations for the provision of measles vaccine.
2. Goal – To appropriately manage measles in the acute emergency setting
Objectives:
Participants will demonstrate their ability to:
 - Recognize Koplik spots and the classical measles rash given photo-images;
 - Describe three variations of the classical measles rash and the circumstances in which they are seen;
 - Describe the evolution of the clinical manifestation of classical measles over time;
 - List the three complications of measles that contribute most to mortality;
 - Recognize the eye manifestations of Vitamin A deficiency and measles in a photo-image; and
 - Apply the ABCs of measles management in a case scenario.
3. Goal – To understand the factors that lead to malaria illness and the species of Plasmodium that contribute most to mortality
Objectives:
Participants will demonstrate their ability to:
 - Differentiate between malaria infection and malaria illness;
 - Differentiate the species of malaria that cause “malignant” and “benign” malaria and explain the rationale behind those terms; and
 - Explain what individuals are more likely to suffer morbidity and mortality from malaria infection.
4. Goals – To recognize the clinical manifestations and understand the treatment of malaria illness in an acute emergency setting.
Objective:
Participants will demonstrate their ability to:
 - Describe the features of uncomplicated typical malaria and differentiate them from severe-complicated malaria; and
 - Make a treatment plan for a hypothetical patient with suspected malaria using available resources to include medications, appropriate supportive care and follow-up.

5. Goal – To understand when to treat diarrheal illness with an antimicrobial agent in an acute emergency setting.
Objectives:
Participants will demonstrate their ability to:
 - List the four clinical indications for treatment of diarrhea with an antimicrobial; and
 - Explain why indiscriminate use of antimicrobials can contribute to morbidity and mortality in a malnourished population.
6. Goal – To recognize the public health importance, the clinical manifestations and the treatment of cholera.
Objectives:
Participants will demonstrate their ability to:
 - Recognize cholera given a case description and suggest an appropriate treatment plan with available resources and complete an appropriate surveillance response.
7. Goal – To recognize and treat dysentery in a field setting.
Objectives:
Participants will demonstrate their ability to:
 - Distinguished dysentery clinically from diarrhea;
 - List the two major forms of dysentery and indicate which is most common; and
 - Diagnose dysentery given a clinical case description and recommend and appropriate treatment plan with available resources and complete an appropriate surveillance response.
8. To recognize and treat giardiasis.
Objectives:
Participants will demonstrate their ability to:
 - List the clinical features characteristics of diarrhea associated with giardia;
 - Given a case description diagnose and recommend an appropriate treatment plan with available resources and complete an appropriate surveillance response.
9. Goal – To manage acute respiratory tract infection in an acute emergency setting.
Objectives:
Participants will demonstrate their ability to:
 - Given a case description of either a complicated upper respiratory tract infection or an acute lower respiratory tract infection, suggest an appropriate treatment plan using available resources and complete an appropriate surveillance response.

Diagnosis and Management of the Primary Infectious Sources of Mortality During Acute Humanitarian Emergencies

Humanitarian emergencies in the developing world are consistently associated with FOUR infectious sources of mortality. **Measles, Malaria, Diarrheal Illnesses, and Acute Respiratory Infections.** The relative contribution of each varies in different settings being affected by climate, season, prior immunity (natural or immunization induced), basic health status of the population, living conditions and other factors. This module will focus primarily on the epidemiology, diagnosis and management of these four conditions with a limited additional discussion of tuberculosis, meningitis and tetanus.



From MMWR vol. 41/No. RR-13

MEASLES

Measles or Rubeola virus infection is a highly contagious disease with particularly devastating effects on malnourished individuals. Consequently...

“ Measles vaccination should be assigned the highest priority early in emergency situations”...”Immunization should begin as soon as the necessary personnel, vaccine, cold-chain equipment and other supplies are available. It should not be delayed until cases of measles have been reported.”

MMWR July 1992 vol. 41:RR-13

The “high priority” accorded measles vaccination holds true even among refugee populations with high immunization coverage.

Example: Assume a population with 80% vaccine coverage and a vaccine with 90% efficacy in a camp with a population ~50,000 therefore about 10,000 under age 5 years

there would be 2,800 children susceptible to this highly contagious virus in this densely populated refugee camp.

Your job as a clinician is to

facilitate delivery of measles immunization within your area and to recognize, treat and report clinical cases of measles.

Malnourished children under age five are the most severely affected and the vaccination strategy is directed at them.

Measles Vaccination Strategy

Target Population: during the emergency phase of relief **all children 6 mo- 5 yrs**

- any child immunized between 6-9 mo should be re-immunized at 9 mo

Target Population if Insufficient Vaccine Available:

Priorities

1. Undernourished or sick children 6 mo - 12 yr who are enrolled in a feeding program (Supplemental or Therapeutic Feeding program).
2. All children 6-23 mo.
3. Children 24- 59 mo.

Older children and adults may also be immunized if surveillance data indicate these groups are being affected.

None of the following are contraindications to immunization:

Malnutrition	Diarrhea
Fever	HIV Infection
Respiratory infection	Tuberculosis

The presence of clinical cases of measles in a camp or settlement should accelerate the immunization process.

Vitamin A and Rubeola Virus- a mutually synergistic effect

Rubeola infection unmasks underlying Vitamin A deficiency and Vitamin A deficiency (even sub-clinical) enhances virulence of infection- increasing morbidity and mortality (inefficient mucosal immune barrier).

Prophylactic Vitamin A treatments are often carried out at the same time as measles immunization. In situations where vaccine is not yet available, **Vitamin A prophylaxis alone** can be administered to the same target population outlined in the vaccination strategy. Vitamin A alone has been shown to reduce morbidity and mortality during measles outbreaks.

Prophylactic Vitamin A

< 12 mo	100,000 IU po	} Standard
> 12 mo	200,000 IU po	} dose

(Pregnant women should only receive 30,000 IU of Vitamin A)

Clinical Measles

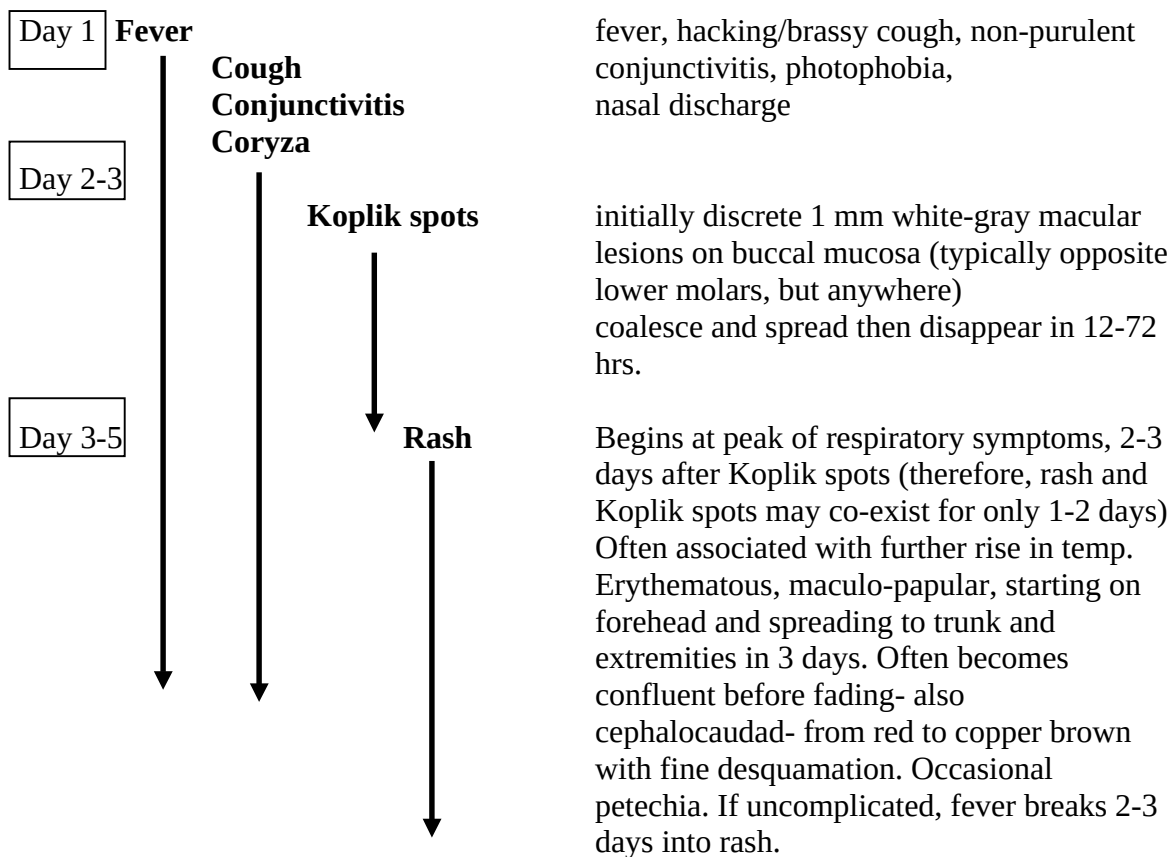
due to Rubeola Virus- an acute infection of **epithelial tissue**- affecting respiratory, dermal and intestinal epithelium.

Geography: World wide distribution

Transmission: Aerosolized particles from respiratory secretions of infected individuals
-highly contagious, essentially all susceptible exposed individuals will become infected, contagious 1-2 days before symptoms and up to 4 days after rash.

Incubation period is 8-12 days.

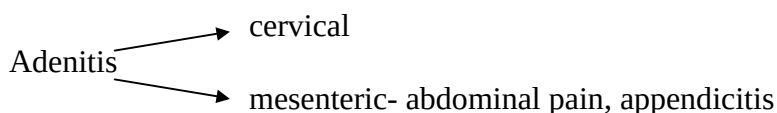
Manifestations:



Variations in the malnourished

- * Severely malnourished children may have **milder rash** (lack of CMI), but more complicated disease
- * desquamation will be deeper and lead to areas of de-pigmentation and skin infection.
- * or may have **black measles**- severe fulminant measles associated with hemorrhagic skin lesions as well as bleeding from mucosa, DIC...- rapid death.

Complications/Associated Findings



Upper Respiratory Tract- OM, Mastoiditis

Lower Respiratory Tract- croup, bronchiolitis, pneumonia →

Bacterial Superinfection

CNS- Encephalitis *A leading cause of Mortality* *A leading cause of Mortality*

Skin- Cancrum oris- necrotic ulcers of oral mucosa (appear herpetic)
 Pyoderma- bacterial infection of skin

Enteritis Diarrhea and dehydration- blood and mucous in stools
 Malabsorption/ malnutrition

significant cause of mortality

Myocarditis/Pericarditis

Glomerulonephritis

Ocular - Xerophthalmia/ ulcerating keratomalacia in **Vitamin A deficient**

Conjunctivitis xerosis of the conjunctiva Blindness
 keratitis/ulcerating keratomalacia

Case Management- A, B, C's

A. Give Vitamin A (unless previously treated)

1. < 12 mo 100,000 IU po } Standard
 > 12 mo 200,000 IU po } dose
2. Children with complicated measles (pneumonia, bacterial infection, enteritis, encephalitis...) should receive a second dose on day #2.
3. If ocular complications are present (xerosis, Bitot's spots, keratomalacia, corneal ulceration or clouding), a third dose should be given in 1-4 weeks.

B. **Be** mindful the nutritional status of the child and enroll in feeding program if necessary

C. Treat Complications

Diarrhea ORT and refeeding as tolerated
 Bacterial superinfection Antibiotics
 Purulent eye drainage Topical antibiotic
 Mouth ulcers Gentian violet

Outbreak control- isolation of patients is not practical or indicated in a camp setting. Individuals are most contagious in the prodromal period before diagnosis. Identification of cases should accelerate immunization program.

What about other vaccine preventable diseases?

Diphtheria Pertusis Tetanus Polio Tuberculosis meningitis

Only Measles immunization should be part of the initial emergency relief effort. Even in a stable camp setting, routine immunizations should not be undertaken unless the population is expected to be stable for > 3 months, the operational capacity to administer vaccine is available (don't draw resources away from other vital functions) and adequate record keeping can be done. Routine immunizations also need to follow national (host country) guidelines. (This may differ from US standards).

Special Circumstances: This general rule is based on extensive experience in humanitarian emergencies in the developing world- primarily in tropical and sub tropical climates. Exceptions have occurred- the use of meningococcal vaccine to interrupt meningitis epidemics in Sub-Saharan African "meningitis belt". Other exceptions are theoretical possibilities- the need for Diphtheria immunizations in a theoretical refugee camp in a former Soviet republic because of epidemic Diphtheria. However, in most circumstances the general rule will apply.

MALARIA

An illness due to a protozoal blood parasite- plasmodium- causing a clinical syndrome that ranges in severity depending on the species of parasite and the immune status of the individual.

Geography: widespread in tropic/subtropics

Transmission: anopheles mosquito vector

Malaria Infection

-defined as identification of the parasite in a blood smear

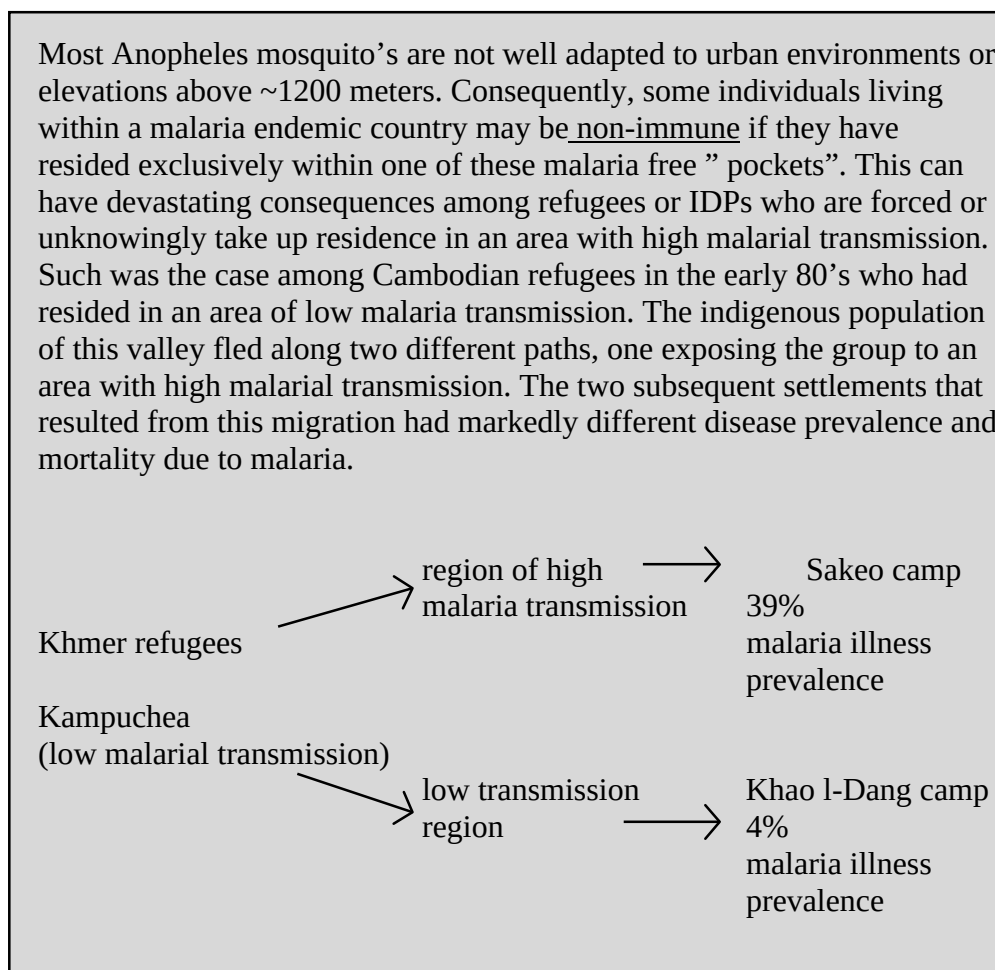
Malaria Illness

- the presence of signs and symptoms in addition to positive blood smear

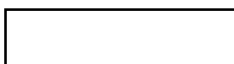
The manifestation of "illness" depends in part on the immune status of the host

In malaria endemic regions partial immunity (from past infections) will likely exist in older children and adults resulting in

- virtually asymptomatic infection (chronic mild-mod anemia)
 - modified symptoms with reduced mortality in some individuals.
- Therefore in much of the world malaria is a sub-acute or chronic disease that contributes significantly to morbidity. The individuals most susceptible to severe, fatal malaria are the non-immune or immune compromised
- infants and young children
 - pregnant women
 - malnourished
- and those infected with Plasmodium falciparum



The diagnosis of malaria infection is made by the identification of the parasite in stained (Geimsa or Wright) blood smears.



THICK SMEAR - Used to screen because low levels of parasitemia can be identified. Used to quantitate parasitemia.

THIN SMEAR - Used for morphologic identification of species.

Both require EXPERIENCE to read properly.

The quantitative level of parasitemia is a prognostic indicator, >5% parasitized RBC's being associated with high mortality. The species identification in the field setting is important only for discriminating between *P. falciparum* and other species because the treatment and outcome with *falciparum* infections can be quite different.

Plasmodium falciparum- “**malignant malaria**”-direct cause of death in a substantial number of infected
-only species associated with **drug resistance**

Plasmodium vivax
Plasmodium ovale
Plasmodium malariae

➤ ‘benign malaria’

-these infections cause morbidity and contribute to multifactorial mortality
- all are chloroquine sensitive

If experienced laboratory technicians and equipment are not available then the diagnosis and treatment of malaria must be based on the presence of clinical signs and symptoms consistent with malaria illness and a knowledge of local malaria prevalence (Educated Empiricism!). Medical intelligence regarding regional malaria prevalence will be available to you where ever you go. This information is considered critical for troop deployments, because YOU and your soldiers will be very vulnerable to illness with malaria. Since the clinical manifestations of malaria can be non-specific...

“Fever in a malaria endemic area is due to malaria unless another cause is identified”

Having said that, malaria infection/illness can coexist with other conditions causing fever and other infections can look like malaria in their clinical presentation. In the absence of specific diagnostic tests empiric treatment of any serious febrile illness should include coverage for malaria as well as other pathogens.

Determining actual prevalence of malaria illness in your population.

The proportion of febrile illness in a camp or settlement attributable to malaria at a particular time can be determined by obtaining thick (and thin, if possible) blood smears from a sample of consecutive patients under 5 yo seen with a history of recent fever and an equal number without fever.

A thick smear is easily obtained by placing a drop of blood from a finger prick onto a clean labeled glass slide and smearing it into a dime size circle with a clean instrument (like a wooden applicator). Thick smears require only air drying without fixation. After drying (10-12 hours) they can be analyzed at the nearest lab. Comparing the prevalence of malaria parasites in the blood of these two groups will give you an indication of how much malaria is contributing to acute febrile illness in your population. This may help direct your empiric management of other patients. (Educated empiricism)

If there is immunity to malaria can someone recently treated have malaria again?

Absolutely, yes. The immunity is partial at best and only for the same species. Some regions have more than one prevalent species. In addition to re-infection, relapses occur as well as re-crudescence.

- | | |
|----------------|---|
| re-infection | - any species, 1-4 weeks incubation from time of bite to symptoms |
| relapse | - vivax and ovale, due to failure to eradicate the liver stage of the parasite, occurs anytime after initial infection treated |
| re-crudescence | - any species, failure to completely irradiate blood stage of parasite due to drug resistance or patient compliance, usually occurs within 1-2 weeks of treatment |

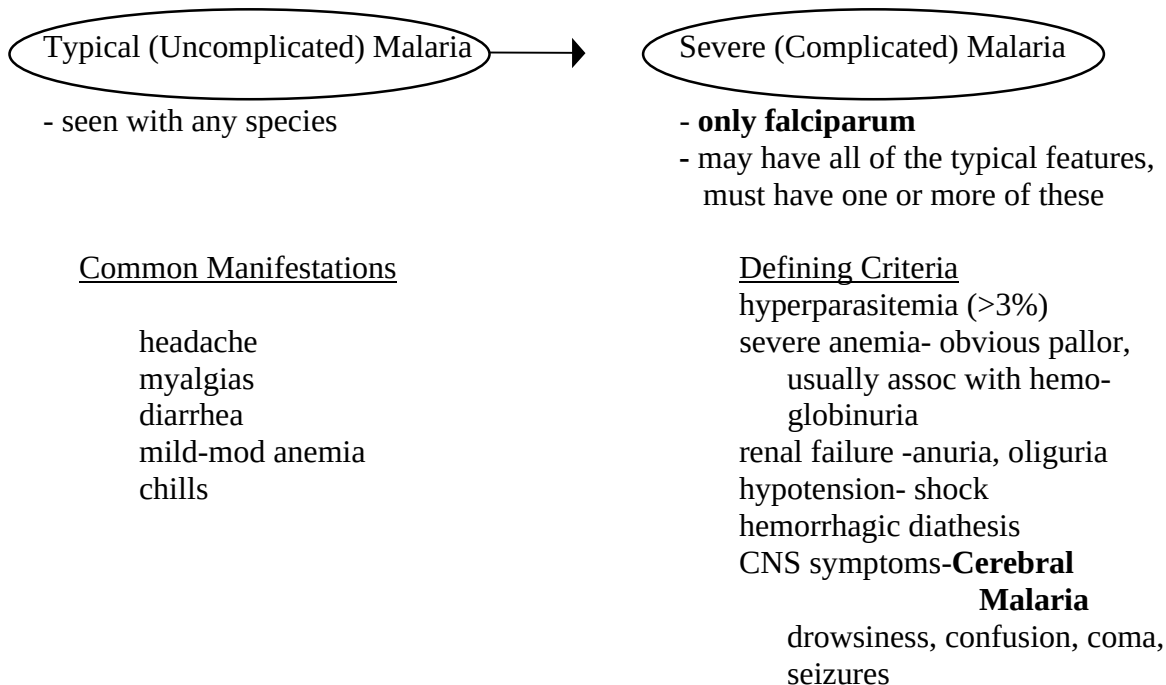
Clinical Manifestations of Malaria

There are two distinct clinical malaria presentations that differ in treatment and prognosis- typical or uncomplicated malaria and severe or complicated malaria. The later develops only with untreated *P. falciparum* infections. Both presentations have **fever** as part of their manifestations.

Classic malaria fevers have been described as paroxysms of fevers and shaking chills lasting for 8-12 hours and alternating with 2-3 day periods (depending on the species) without fever during which time the subject feels relatively well. The febrile paroxysms co-incide with the cyclical release of parasites from ruptured RBC's as they go through their replication cycle and the well period with the quiet growth of the parasite in a new crop of RBC's. This organized pattern requires the parasites in an individual to be synchronized and in reality does not commonly occur particularly early in an infection.

Partially immune individuals may have milder symptoms- to include a non-specific fever pattern. Most patients with a significant malaria infection will **look and feel ill** with their fever whatever the pattern but may appear well when not febrile. These apparently well individuals can progress rapidly to death with their next febrile episode if they are infected with falciparum malaria.

The discriminator between uncomplicated and severe-complicated malaria is not the characteristics of the fever but rather the co-existent clinical manifestations.



How can you distinguish severe malaria from overwhelming bacterial sepsis/meningitis ?

The clinical presentations can be identical. Only malaria smears, an LP and blood cultures will differentiate these illnesses. Even if you have diagnostic tests available to you- don't wait for results to begin treatment. If you are in a malaria endemic region with *P. falciparum*, or your patient population has just arrived from an area with malaria, and you have a seriously ill febrile patient begin malaria treatment along with antibiotic coverage.

Treatment

The treatment of typical or uncomplicated malaria and severe-complicated malaria differs in terms of the setting in which treatment ideally should take place, the drugs used and the degree of complications you should expect during the course of therapy.

Typical (Uncomplicated) Malaria OUTPATIENT Chloroquine Few complications expected complications	Severe (Complicated) Malaria HOSPITALIZATION Sulfadoxine-pyrimethamine and / or Quinine Anticipate and treat
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Treatment of Typical (Uncomplicated) Malaria

Children: a total dose of 25 mg/kg of **CHLOROQUINE** is given over a 3 day period

(take blood smear if lab available) t=0 10 mg/kg po
t=24 hr 10 mg/kg po
t=48 hr 5 mg/kg po

Adults: a total dose of 1500 mg (~25 mg/kg) of **CHLOROQUINE** is given over a 3 day period

(take blood smear if lab available) t=0 600 mg
t=24 hr 600 mg
t=48 hr 300 mg

Pregnant women: CHLOROQUINE is safe during pregnancy, malaria is frequently fatal- treat aggressively

Supervised therapy is ideal; at least the first dose should be administered under supervision (in your treatment area) to be sure that it is not vomited. If emesis occurs within 30 minutes of the dose- repeat the dose. If necessary the day 2 and day 3 doses can be given to the parent/guardian with appropriate instructions. If the child vomits the day 2 or 3 dose, they should return to the treatment area and get additional medication to complete treatment.

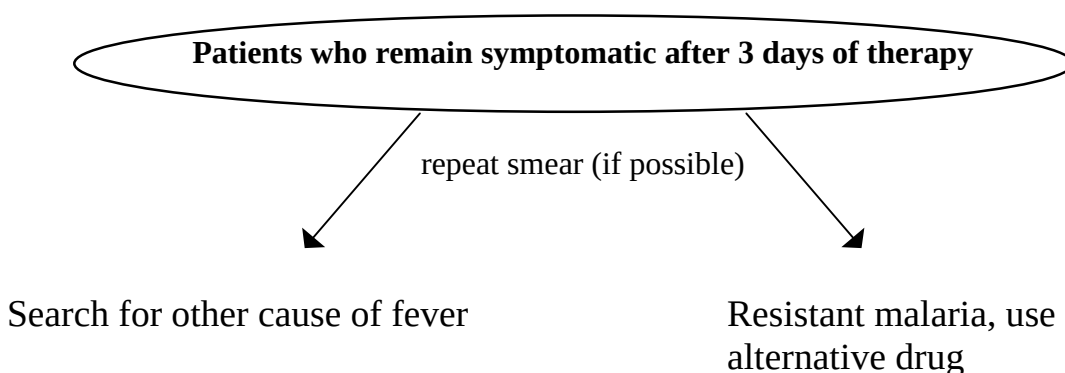
Supportive Treatment Uncomplicated Malaria

Fever control: antipyretics can be given in the treatment facility, no more than a few doses dispensed to home
sponging

Dehydration: ORS, increased fluid requirements and fluid replacement

Malnutrition: assess and treat

Follow-up patients in 48-72 hours, patients should be improved by 48 hours and virtually symptom free by 72 hours



How does treatment change when you are working in an area with resistant falciparum malaria?

Chloroquine is still likely to be the first line agent for treating indigenous people in these areas. As with bacterial drug resistance, the proportion of resistant falciparum parasites circulating in a population will vary (ie. 20% resistance). This means that the majority of individuals will still be adequately treated with chloroquine- a safe and inexpensive drug. Alternative agents will be reserved for treatment failures or for general use in areas where resistance is uniformly present. Military or local public health authorities would instruct you as to the appropriate first line regimen for that region if it differs from that stated above.

Alternative agents include:

Fansidar	mefloquine	doxy/tetracycline	quinine
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Malaria in US military personnel may be treated with a first line regimen that differs from that used to treat an indigenous or refugee population. The military will have less tolerance for "treatment failures" and will have the resources to treat all troops with the more expensive second line drugs.

What about primaquine which is effective in killing the liver stages of P. vivax and P. ovale responsible for relapsing malaria ? In general this drug is not used in emergency relief response. Whenever possible person's needing primaquine should have a blood test for G6PD deficiency because use of this drug in deficient individuals can result in severe life threatening hemolysis.

Treatment of Severe-Complicated Malaria

- Always assume that you are treating drug resistant *P. falciparum* when dealing with complicated malaria.
- Speed is everything with this rapidly progressive condition- use the best available drugs you have (ie. don't wait for the "ideal" treatment to arrive).

OUTPATIENT setting- **BEGIN TREATMENT AND TRANSFER**
if possible to a hospital.

Patients tolerating oral intake should be given one dose (see wt table in appendix) of SULFADOXINE-PYRIMETHAMINE (SP) [Fansidar] and begin QUININE SULFATE orally until iv therapy is available.

If the patient vomits within 30 min, repeat dose. If the patient vomits repeatedly or cannot swallow, then begin QUININE DIHYDROCHLORIDE IM.

Intramuscular Quinine

t=0	10 mg/kg im	repeat every 8 hours until transfer or tolerating oral meds.
t=4hr	10 mg/kg im	
t=8hr	10 mg/kg im	

OUTPATIENT supportive treatment of severe complicated malaria

Fever control: as before

Dehydration: replace fluid losses and give maintenance requirements with ORS 20 ml/kg po or ng q 4hr to which you add an additional 1 teaspoon of sugar. Care in the administration of fluid is required to prevent fluid overload which can precipitate pulmonary edema, worsen cerebral edema.

Severe malaria and quinine are associated with severe hypoglycemia.

Seizures: give sugar- glucose, dextrose...
not responsive to sugar, give
paraldehyde 0.2 ml/kg im
phenobarbitone 10 mg/kg im
or other available anti-seizure medication

If an LP and cultures cannot be performed to rule out bacterial sepsis/meningitis, give broad spectrum antibiotic coverage
chloramphenicol
(ceftriaxone)
penicillin

INPATIENT ideally the management of **Severe- Complicated Malaria is done in a hospital setting**

- obtain thick blood smear, LP and blood cultures
- obtain and monitor hemoglobin, blood sugar
- determine what meds the patient received prior to arrival at your facility

If the patient can swallow give SULFADOXINE-PYRIMETHAMINE (SP) po as above. Begin QUININE DIHYDROCHLORIDE iv as follows

initial dose = 20 mg/kg quinine iv (placed in 10 cc/kg D5 and infused over 3-4 hours). If the patient received a 10 mg/kg im dose prior to transfer, reduce initial iv dose to 10 mg/kg.

subsequent= 10 mg/kg quinine iv q12hr- continue treatment until tolerating po meds or 7 days maximum. Between doses of quinine, D5 1/2-1/3 NS at least 3 cc/kg/hr should be continued to prevent hypoglycemia.

This regimen is also suitable for **Pregnant women**. The toxicity's of quinine include cardiotoxicity (prolongs QT) and hypotension as well as hypoglycemia.

Change to an oral regimen as soon as possible:

-QUININE SULFATE 10 mg/kg/dose po TID

-SULFADOXINE-PYRIMETHAMINE (SP) one dose if not already given

In South East Asia, doxycycline for 7 days may be used instead of a single dose of SP because of Sulfa resistance in that region.

A complete course of treatment of severe malaria is **7 days of QUININE** (any combination of iv/po) and **ONE OTHER DRUG** (SP one dose, Doxy or Tetracycline for 7 days, Mefloquine in some regions). The WHO Emergency Health Kit contains Quinine, SP and Tetracycline.

Inpatient

Supportive Treatment for Severe-Complicated Malaria

Fever: as above

Dehydration: Replace losses and give maintenance requirements with 1/2-1/3 NS with dextrose. Care in the administration of fluid is required to prevent fluid overload which can precipitate pulmonary edema, worsen cerebral edema.

Change in

Mental status: 50% Dextrose iv

Seizures: 50% Dextrose iv

Seizures not responsive to sugar should be controlled with

paraldehyde 0.2 ml/kg im

phenobarbitone 10 mg/kg im

or other available anti-seizure medication.

Anemia: transfuse for

Hgb <4

Hgb <6 with dyspnea or signs / symptoms of CHF

Renal Failure: must differentiate pre-renal oliguria (dehydration) with renal failure with a fluid challenge (+/- furosemide challenge). If true renal failure then fluid restrict.

QUINIDINE iv (the antiarrhythmic drug) can be used instead of QUININE with slightly different dosing (see table in appendix). The pharmaceutical supplies of a military field unit may be more likely to contain Quinidine.

Chemoprophylaxis for Malaria

Rarely feasible in the acute emergency setting. It has been used to limit epidemics in immune naive groups and reduce mortality among targeted populations (ie. malnourished children <5 yo). The decision to employ preventative chemoprophylaxis among indigenous populations in a camp or settlement will be made by higher public health authorities and requires that adequate infrastructure and resources are available to implement the program fully.

- at risk persons can be identified and assembled
- sufficient personnel and medications are available to ensure uniform and fair administration
- the prevalent parasite is known to be sensitive to the drug used
- follow-up can be assured

Military personnel in a malaria endemic area will be required to use chemoprophylaxis as well as personal protective measures. Briefings on these measures would occur before you deploy.

DIARRHEAL DISEASES

The assessment, management and prevention of dehydration due to diarrhea will be covered elsewhere. This section will focus on the appropriate use of antimicrobials for the treatment of certain diarrheal illnesses.

Most episodes of diarrhea in the developing world are caused by self limiting infections of viruses or bacterial pathogens. The associated morbidity and mortality are primarily due to acute dehydration and their contribution to malabsorption and malnutrition through enteric inflammation. Antibiotics have the potential to prolong the disruption of intestinal homeostasis by further delaying return of normal luminal flora. Consequently, the indications for the use of antimicrobials to treat diarrhea in the developing world are LIMITED and include only the following...

Cholera
Bacillary Dysentery
Amoebic Dysentery
Giardiasis

The laboratory, or more commonly CLINICAL distinguishing features associated with these infections will be reviewed and appropriate treatment regimens outlined.

Epidemic Cholera

Disease due to infection with toxin producing *Vibrio cholera*.

Distribution: primarily tropics/sub-tropics, Indian subcontinent++

Transmission: fecal-oral, fairly fragile organism, but can survive in water for 7 -10 days.

Clinical manifestations

Infection produces acute onset disease of variable severity.



The proportion of each in an epidemic depends on the strain. In severe cholera, the stools will progress from loose to “rice water” in several hours as all of the intestinal contents are purged and toxin induced active secretion of body fluids into intestinal lumen continues.

In addition to profuse watery diarrhea, other findings include

- absence of visible blood in stool
- minimal fever
- minimal abdominal pain
- anxiety
- muscle cramps
- thirst
- weakness
- altered consciousness

→ All related to the rapid loss of fluid, depletion of electrolytes and **glucose**

Typical electrolyte composition of cholera stool

	Na	K	Cl	HCO ₃
Adult	135	15	100	45
Child	105	25	90	30

From Mandell/Douglass/Bennett: Principles and Practice of Infectious Disease, 3rd Edition. Churchill Livingstone, New York. 1990.

Your job as a clinician in a camp or settlement is to

identify suspected cases of cholera,

***adequately treat dehydration, and
notify public health authorities***

Since diarrheal illness with significant dehydration will be so common among children, the first recognition of Cholera in an area is usually based on the identification of an adult case. The CDC recommends the following clinical case definition,

severe, profuse, watery diarrhea in a person > 5 yo, with or without vomiting.

The first cases of suspected cholera in an area **need to be confirmed by culture** since Cholera is a PUBLIC HEALTH EMERGENCY. Public health authorities up your chain must be notified immediately and outbreak investigators will come to collect a specimen (stool or rectal swab) in appropriate transport media (Cary-Blain). A qualified lab will confirm the diagnosis and determine antibiotic susceptibility. Once Cholera is confirmed in an area, subsequent case identification can be based on clinical findings rather than culture.

Treatment of Cholera

Most cases can be treated with ORS alone and still achieve <1% case fatality rate (CFR). However antibiotics will reduce the volume and duration of diarrhea, thus helping to limit transmission.

Doxycycline

Adult: 300mg po x1 dose
Child: 6 mg/kg/dose po x1

Tetracycline

Adult: 500 mg po q6h x 3 days
Child: 50 mg/kg/day po div q6h x 3 days

Other agents include:

Chloramphenicol
Furazolidine
Septra
Emycin
Fluoroquinolones

Alterations in mental status should be treated with glucose as hypoglycemia does occur.

Other Management Issues

Once Cholera is confirmed in an area

- Case fatality rates (CFR) should be monitored as a measure of the adequacy/availability of rehydration therapy.

- Case finding may need to occur (milder cases that may not seek care) to interrupt continued transmission
- Community efforts at improving sanitation, education about personal hygiene and food safety need to be re-doubled.

Outbreak investigation by a qualified expert may lead to additional specific public health measures (ie. household chlorination of water if an untreatable water source is suspected-like a well or lake).

Dysentery

Dysentery can be simply defined as **infectious colitis that manifests as diarrhea with visible blood in the stool**. The two major forms of Dysentery are

Bacillary
and
Amoebic

Bacillary Dysentery is far more common than Amoebic Dysentery. In the developing world it is most commonly due to Shigella species and is also called **Shigellosis**.

Distribution: worldwide

Transmission: fecal-oral: water, food, fomite

very small inoculums produce disease (>200 organisms)

Clinical Manifestations

- acute onset** diarrhea stools change in character as inflammation descends GI tract
- initially watery stools that become bloody and mucoid, with tenesmus
- +/- vomiting
- abdominal pain and cramping**
- fever and toxemia (1/3-1/2)
- dehydration- mild- mod as stools are not voluminous
- seizures

Treatment - shortens duration of symptoms and excretion of organism. Multi-drug resistant strains are present in many parts of the world. Initial treatment should be based on medical intelligence/local health guidelines .
Commonly used drugs include

Ampicillin

Adult: 500 mg po QID x 5 days

Child: 100 mg/kg/d po div QID x 5 days

TMP/SMX

Adult: 160 mg TMP po QD x 5 days

Child: 10 mg/kg/d TMP po div BID x 5 days

Alternatives

Nalidixic acid- 55 mg/kg/d po div QID x 5 days

Tetracycline- 50 mg/kg/ po div QID x 5 days

chloramphenicol

fluoroquinolones

If there is no response in two days of beginning therapy → change therapy .
Resistant Shigella is more likely than mis-diagnosis of amoebic dysentery.

Amoebic Dysentery

Due to Entamoeba histolytica, a protozoal parasite

Distribution: tropics > sub-tropics > temperate

Transmission: fecal-oral: water, possibly food

Clinical Manifestations

The most severe disease is seen in

infants

pregnant women

malnourished

-gradual onset

-abdominal pain

-diarrhea that is not voluminous but contains visible blood

-fever (1/3)

-occasional hepatomegaly

-dehydration- mild-mod, in proportion to diarrhea

-complications

fulminant colitis, toxic megacolon, bowel perforation, liver abscess

Treatment

Consider if the patient with bloody diarrhea has failed two different treatments for Shigella or if a microscopic exam demonstrates amoebic trophozoites or cysts (requires lab facility and expertise).

Metronidazole (flagyl)

Adult: 750 mg po TID x 5-10 days

Child: 30 mg/kg/day po x 5-10 days

Giardiasis

Acute or chronic infection due to a protozoal parasite of the genus Giardia.

Distribution: worldwide

Transmission: fecal-oral, water (particularly surface water), person-person/fomite
small inoculum can result in infection

Clinical Manifestations

Severity of disease varies greatly.



asymptomatic

mild self resolving diarrhea

chronic malabsorptive
diarrhea- can contribute
significantly to malnutrition

- diarrhea that is non-bloody and without mucous, initially profuse than FOUL
SMELLING

-abdominal cramps, epigastric pain

-flatulence

-fever is rare

Treatment

Consider treatment for chronic, malabsorptive, non-bloody diarrhea without fever or if microscopic stool exam identifies cysts or trophozoites.

Metronidazole

Adult: 250 mg po TID x 5 days

Child: 15 mg/kg/day po x 5 days

ACUTE RESPIRATORY INFECTIONS

Like everywhere else in the world, the majority of acute respiratory infections you will see in the developing world, particularly under crowded living conditions, will be simple, self resolving viral upper respiratory tract infections. Antibiotics should not be used on these individuals as this will only needlessly contribute to enteral dysfunction and the emergence of drug resistance. Antibiotics should be used for most **complicated upper respiratory tract infections (C-URTI)** and all suspected **acute lower**

respiratory tract infections (ALRTI). Your diagnosis of lower respiratory tract infection will likely have to be made on physical findings and history alone. Commonly used drugs and regimens can be found in the accompanying tables.

Complicated URTI	Treatment Plan
Acute Otitis Media with Fever	Oral x 5 days (Amox, Septra) see dosing tables in appendix
Acute Sinusitis with Fever	Oral x 5-10 days if mild-mod IM/IV x 10 days if severe and hospitalize if possible
Mastoiditis	IM/IV x 10 days, hospitalized if possible

ALRTI = As indicated by the presence of fever, tachypnea, and one or more of the following : nasal flaring, retractions, cyanosis, abnormalities on physical exam suggestive of consolidation in the lungs (rales, rhonchi, decreased breath sounds, fremitus, “e to a changes”)

ALRTI	Treatment Plan
Mild-moderate respiratory distress	Oral x 5 days if intake is adequate IM/IV x 5 days if vomiting or significantly malnourished
Severe respiratory distress	IM/IV x 10 days, refer to hospital if possible.

First line oral antibiotics for Acute Respiratory Infections will typically be Amoxicillin or Septra while IM or IV Chloramphenicol will be used for severe infections or when oral meds are not tolerated.

IM Chloramphenicol is commonly used in the developing world for serious infections when oral or iv dosing cannot be done. Common regimens dose ~40 mg/kg/dose IM q 12 hours until **IV or Oral therapy (80 mg/kg/day div q 6hr)** can be accomplished safely. Remember there is no pharmacologic value to giving chloramphenicol im or iv.

See appendix for Drug Dosing Quick Reference Guide for all of the antimicrobial medications discussed in this module.

TUBERCULOSIS (Tbc)

Even though Tbc is the leading infectious cause of death in some parts of the developing world, Tbc treatment and control programs are not part of an emergency relief response. Tbc is a chronic infection and effective treatment is resource intensive.

Treatment programs require

- resources to identify and monitor true cases by exam of sputum smears
- a stable population for at least 6 months (to complete short course therapy)
- sufficient available drug to treat all cases
- sufficient personnel to supervise all therapy- generally the first 2-3 mos

Administration of anti-Tbc drugs to persons not likely to adhere to or complete treatment is likely to contribute to drug resistance in the community .

MENINGITIS

Suspected cases of severe sepsis or meningitis need to be treated promptly with the best available drug. Such cases should be reported to health authorities and attempts made to obtain appropriate samples for identification of the causative agent.

Identification of *Neisseria meningitidis* is particularly important because of its epidemic potential and the fact that a reasonably effective vaccine is available. During confirmed N. meningitidis outbreaks targeted vaccination and targeted chemoprophylaxis of household contacts are sometimes employed.

N. meningitides remains susceptible to Penicillin all over the world; however administration of penicillin is nursing care intensive. A common solution is the use of a long-acting suspension of chloramphenicol in oil called Tifomycin which is available in many parts of the developing world. A single IM dose is administered on admission; a second dose is required in 25% of cases. The efficacy of this regimen has been proven in studies in both Europe and Africa.

Dosing of Tifomycin for N. meningitidis Meningitis

<u>Age</u>	<u>Dose</u>
< 1 year	50 mg/kg
1-2 years	1 gm (2ml)
3-6 years	1.5 gm (3ml)
7-10 years	2.0 gm (4ml)
11-14 years	2.5 gm (5 ml)
>15 years	3.0 gm (6 ml)

Rifampin chemoprophylaxis should be administered to all members of a households simultaneously, and recovering patients should also receive rifampin to eliminate nasal carriage.

Adults: 600 mg BID x 2 days
Child: 10 mg/kg BID x 2 days
Neonate: 5 mg/kg BID x 2 days

Tetanus

Although routine tetanus immunization (or any routine immunization other than measles) is not recommended during an emergency relief effort, it is reasonable if vaccine is available to prophylax individuals who have received a tetanus prone wound if

- the time since their last immunization is unknown or greater than 5 years
- they have not previously completed 3 doses

The features of a tetanus prone wound include

- wound > 6hours old before cleaning
- irregular and ragged
- mechanism of injury was missile, crush, burn or frostbite
- devitalized tissue is present
- contaminants (dirt, saliva..) are present in the wound

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DRUG DOSING QUICK REFERENCE GUIDE

Anti-Malarials

Chloroquine

Age or Weight	Tablet (150 mg base)			Tablet (100 mg base)			Syrup (50 mg/ 5 ml)		
	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3
2 mo - 12 mo (4-10 kg)	1/2	1/2	1/2	1	1	1/2	7.5 ml	7.5 ml	5 ml
12 mo - 3 years (10-14 kg)	1	1	1/2	1 1/2	1 1/2	1/2	15 ml	15 ml	5 ml
3 yr - 5 yr (14 - 19 kg)	1 1/2	1 1/2	1/2	2	2	1			

Sulfadoxine-Pyrimethamine (Fansidar)

Age or Weight	Sulfadoxine-Pyrimethamine Tablet (500mg S/25mgP)
2 mo- 12 mo (4-10kg)	1/2
12 mo - 8 yr (>10 kg)	1
9-14 yr	2
>14 yr	3

Tetracycline

5 mg/kg QID for 7 days (max 250 mg QID)

Quinidine (for severe malaria)

loading dose = 24 mg/kg infused iv slowly over 3-4 hrs as with Quinine.

subsequent dose = 12 mg/kg q 8-12 hrs until tolerating oral meds.

Antibiotics

	COTRIMOAXAZOLE			AMOXYCILLIN	
	give two times daily for 5 days			give three times daily for 5 days	
Age or Weight	Adult Tablet 80 mgTMP /400mgSMX	Pediatric Tablet 20mgTMP/ 100mg SMX	Syrup 40 mg TMP/200mg SMX per 5ml	Tablet 250 mg	Syrup 125mg per 5 ml
2 mo -12 mo (4-10kg)	1/2	2	5.0 ml	1/2	5 ml
12 mo- 5 yr (10-19 kg)	1	3	7.5 ml	1	10 ml

Benzathine benzylpenicillin (Pen G, Bicillin) IM ONLY

child: 50,000 iu/kg single dose (15-30 days)

adult: 1.2-2.4 Miu “

Procaine Pen GIM ONLY

child: 25,000-50,000 iu/kg/d div q12-24
adult: 300-600,000 iu q12hr

Pen V ORAL Only

child: 25-50 mg/kg/day div q6-8hr
adult: 250 QID

Ampicillin ORAL

child: 50-100 mg/kg/day div q6h
adult: 2-4 gm/day div q6 hr

Ampicillin IM or IV

child: 100-400 mg/kg/day div q4-6 hr
adult: 6-12 gm/day div q4-6 hr

Chloramphenicol ORAL,IM or IV

< 1 week 25 mg/kg/day q 24hr
> 1 week 50 mg/kg/day div q12hr
> 4 weeks 50 mg/kg/day div q6hr
older child and adult: 100 mg/kg/day div q6

Chloramphenicol IM

<u>Age or Weight</u>	<u>IM Chloramphenicol q12hr</u>
2-4 mo (4-6kg)	180 mg im
4-9 mo (6-8kg)	270 mg im
9-12 mo (8-10 kg)	360 mg im
12mo-3 yr (10-14 kg)	450 mg im
3 yr- 5 yr (14-19 kg)	630 mg im

Tifomycin IM

Dosing of Tifomycin for N. meningitidis Meningitis

<u>Age</u>	<u>Dose</u>
< 1 year	50 mg/kg
1-2 years	1 gm (2ml)
3-6 years	1.5 gm (3ml)
7-10 years	2.0 gm (4ml)
11-14 years	2.5 gm (5 ml)
>15 years	3.0 gm (6 ml)

XI. Integrated Case Management Studies

Clifton Yu, MD

Previous modules of this course have dealt individually with key issues in preventive medicine, malnutrition, infectious disease, and diarrhea and dehydration. For many clinical situations that you will encounter in the field, however, multiple medical issues in any given patient will need to be addressed, and it will be your job as clinician to prioritize evaluation and treatment. In order to prepare you for the case scenarios you will encounter in the skills stations, and indeed for potential real-life situations in future deployments, a series of cases will be discussed with the class as a group in order to emphasize the integrate management necessary in these patients.

XII. Self-Preparation for Deployment

Weathering the Storm: an essay

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September 1998

“Older men declare war. But it is the youth which must fight and die”

--Herbert Hoover, 1944

“If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy or yourself, you will succumb in every battle.”

--Sun Tzu, 500 B.C.

On the morning of August 3rd 1990, my wife Carolyn and I were sitting down to breakfast in the cafeteria of the 130th Station Hospital, Heidelberg, Germany. Forty four days beforehand, we had finished three years of rigorous pediatric residency training and were anxious to begin our first assignment as general pediatricians and begin to live the life of a “real” married couple, without the constant separations of staggered night call and carryout meals. We had been in-country for three weeks and were excited about the prospect of travelling to new and exciting places.

The 130th Station Hospital is a former World War II German army hospital, which came into the US Army possession following the war. The compound upon which it was built, known as the “Nachrichten Kaserne”, had other military activities, the largest of which was the headquarters for the 7th MEDCOM, the Army military medical command of the US Army Europe. Because of their proximity, the staffs of the MEDCOM and the 130th frequently socialized, and we often learned sooner than our other colleagues in Europe issues of staffing and training operations that were on-going and forthcoming.

This morning, LTC Tom Hawks sat down to eat breakfast with us. LTC Hawks was the G-3, the operations officer, for the MEDCOM.

“Did you hear what happened last night?”

“No”

“Iraq overran Kuwait and now owns 25% of the world’s oil supplies. Not bad for an overnight’s work.”

“Isn’t Iraq on our side?”

Our exposure to world affairs during medical school and our residency training would be at best considered detached, if not blissfully ignorant. The last we remembered was that the Iranians took American hostages in 1979, and in 1980 Iraq invaded Iran. Therefore in my simple view of world politics, the Iraqis were our allies. I was wrong.

The fall of 1990 saw the largest deployment of American military forces since Vietnam and was unprecedented in rapidity. Not since World War II had the scope of a deployment necessitated the mobilization of reserve medical forces. Initially the deployed involved units of the Rapid Deployment Force, the XVIII Airborne Corps, which included the 82nd Airborne Division, the 101st Air Assault Division, and later, two heavy divisions, the 1st Cavalry Division, and the 24th Infantry (Mechanized) Division. Because of the relative lack of heavy armor and armament, these earliest units were referred as “speed bumps”, a reference to the impact these units would have upon a concentrated

Iraqi assault south into Saudi Arabia. The Middle East was in the US Central Command Area of Operations, thus the US Army Europe (USAEUR), under the US European Command (EUCOM) was not involved.

We took short weekend trips in our search for normalcy. But everywhere it seemed the world was preparing for war. In Paris, while crossing bridge over the Seine River, our way was blocked by a large anti-American, anti-war protest. We heard through the grapevine of acquaintances and friends who were being deployed, including two of our fellow pediatric residents and friends. One, Mark Henley, arrived at Winn Army Community Hospital in Ft. Stewart Georgia in July, a newlywed husband of less than a year and father to a newborn girl. Two weeks after arrival at Ft. Stewart, he was deployed with the 24th Mech as the Officer-in-Charge of a battalion aid station. As we tried to study for our pediatric certification boards to be held in November 13th and 14th in Washington DC, we prayed that war would never come.

In October, GEN Norman Schwartzkopf, commander-in-chief of the US Central Command and commander of Operation Desert Shield, met with President George Bush to request a heavy armored corps in order to allow an offensive option, to engage and destroy the Republican Guard, the elite divisions of the Iraqi Army. On November 8th, President Bush announced to the American public at a special press conference his intention to double the size of the American commitment to the Persian Gulf. This increase in military force would include the deployment of the VII Corps of United States Army Europe.

The next morning found our hospital in total confusion. No one knew what impact his statements would have upon our hospital, but no one was optimistic. When we departed the following morning for Frankfurt, Germany to fly to Washington DC, we left contact numbers with our clinic chief and prayed again.

We tried to relax and prepare for the boards but reminders were constant that the world was preparing for war, and we worried what this meant for us. News of the Persian Gulf situation streamed from our headsets on the airplane, and from television in the hotel room. CNN was on everywhere. Everyone was watching TV, including the hotel reservation clerk.

We arrived for the Boards. Returning to Washington DC, we met up with several old friends. The proctor of the examination, Dr. Richard Lampe, was our pediatric chief at Walter Reed Army Medical Center. Naturally the talk turned to the Gulf. Everyone tried to remain optimistic, the reality of war seemed implausible. Dr. Lampe invited us to visit Walter Reed the next day before we drove to New York to visit Carolyn's parents. We decided to stay around Thursday and drive to New York on Friday. At Walter Reed the mood was serious but everyone's spirits seemed good. It was good to be among friends again in a familiar atmosphere. For the time remaining for our leave in the States, we decided to relax, enjoy our friends and family, and avoid TV.

We went to meet with one of our former staff, Dr. Bob Restuccia. He gave us boisterous welcome, as was his manner, and offered us two chairs in his cramped office. As we settled down to engage in small talk, his phone rang. It was the department secretary.

"Hello...yeah they're here...okay...I'll tell them" He said that the secretary had a message for us but he didn't know what it was about. We told him we would be back later and excused ourselves, glancing anxiously at each other as we departed his office. We speculated on the nature of the message as we walked back to the pediatric office.

Carolyn Stoneburner was the department secretary and she had a serious look on her face. My wife's parents had called and said that we needed to call them as soon as possible.

Carolyn's parents were upset. They had received a call from our clinic chief in Germany and we were to call the clinic as soon as we could. It was late evening in Germany. Elaine Grammer, our chief was still in the hospital. She told us that the VII Corps was mobilizing. The Corps physician billets, which are usually staffed at 50% during peacetime, were being filled out. Several of the physicians in our hospital were being tasked for deployment to the Gulf, including Carolyn and me. We didn't need to return immediately from leave but we should prepare for mobilization upon our return. "Enjoy the rest of your time back home and relax!"

We hung up and told our chief and Mrs. Stoneburner what was happening. We paged Dr. Restuccia and told him about the phone call and apologized that we wouldn't be coming back to his office but would be leaving immediately that afternoon for New York. I called my parents in Indiana and sister in Ohio. Because this trip to the States was so short, we had not originally planned to meet together on this particular trip. Because of the circumstances, they wanted to see us and flew to meet us in New York the next day. Our visit with our families was somber and we didn't talk much on our return flight to Germany.

In August 1990, there were 251 pediatricians serving in clinical positions on active duty in the US Army. 98 were assigned to the Army's six major medical centers, the remaining in the community hospitals in the continental US, Alaska, or overseas. 37 of these pediatricians were deployed to Southwest Asia. Because the Surgeon General elected to maintain graduate medical education, only one resident, a volunteer, and 10 medical center staff members were deployed. The remaining 26 were sent from the Army's community hospitals. At the height of the deployment, pediatricians were 4.3% of the 865 active duty physicians in the Gulf. While a majority of the deployed pediatricians were generalists, eight were subspecialists. Most of the physicians were young captains from the community hospitals.

Pediatricians were assigned at all levels of responsibility. In time of war, our specialty indicator of 60P, pediatrician, is not extant, and we become a 62B, field surgeon, or general medical officer. As such, a majority of pediatricians were at or close to the front. 5 were assigned to battalion aid stations. The BAS is the second line in the echelon of trauma care on the battlefield, the first echelon being "buddy aid". A BAS usually consists of a physician, a physician assistant, and around 20 medics. Vehicles vary by the type of unit (armored, infantry, mechanized infantry, or airborne) but the medical supplies are uniformly limited to general adult sick-call and acute trauma management. Three to ten kilometers behind the maneuver battalions and BASs is the brigade support area that included the medical clearing companies. Except for the number of personnel (4 physicians, 2 PAs, 30-40 medics) and number of vehicles, the professional expertise and depth of medical care at the clearing companies were the same as a BAS. 12 pediatricians were assigned to clearing companies and the remainder were attached to hospital units of various sizes and capabilities.¹

Upon our return to Germany, the confusion that existed prior to our departure was magnified ten-fold. Since the end of World War II, the US Army Europe had prepared

¹ Pierce, JP. The role of the United States Army Active Component Pediatricians in Operations, Desert Shield, Desert Storm, and Provide Comfort. *Military Medicine*. 158, 2:105-108. 1993

for the Soviet threat. But while armored cavalry regiments tore through the German countryside on maneuvers, little planning seemed to have focused on other necessities. Uniform stores ran out of uniforms and supply units ran out of equipment. Boxer shorts were in short supply in European PXs, and unheard of in German stores. What happens with the dependent spouses and children? Do they remain or return to the States? What happens to the soldiers' cars and apartments?

For us, even more basic questions went unanswered.

"What unit are we assigned to?" Don't know yet.

"When will we know?" Don't know yet.

"When are we suppose to deploy?" Don't know yet but be ready to leave in 72 hours. Don't forget your will.

Eventually we received orders attaching us to medical clearing companies of the 3rd Armored Division, I was assigned to the C Company, 54th Support Battalion (Forward), 3rd Brigade, and Carolyn was assigned to C Company, 503rd Support Battalion (Forward), 1st Brigade. We didn't care for the "Forward" designation. Given the magnitude of what we were about to undergo, the 15 lines of our written orders seemed unceremoniously short.

For a brief while, we were assigned to the same battalion, the 54th. Because Carolyn had kept her maiden name for professional purposes, taskers were unaware that we were a married couple, thus we were separated when this became known. "This way if one of you gets killed, the other won't get upset," we were told. While we acquiesced, upon our arrival in our respective units, we found that there were numerous married couples within both of our new units.

The next several weeks were busy as we met with our units. Medical training was out of the question since all the time available was spent preparing vehicles and equipment. Most of the medics had never cared for another human being that they regarded as a "patient." I was frightened realizing that I was the "expert" in my unit, and I would have no backup on the battlefield. I spent my evenings reading about trauma and infectious disease. I tried to read what I could about the politics, language, and cultures of the Middle East but at that time, the Middle East had not captured the eye of the public, thus books and information was limited. One evening, we watched "Lawrence of Arabia" on videotape with close friends but we just found it empty and depressing and left before the end of the first tape. On the way home, we passed on the autobahns, enveloped in an eerie snowy silence, convoy after convoy of military vehicles heading to rail depots for transportation to the port of Bremerhaven, Germany.

On Christmas Eve our moods were brighter as we made preparations for a Christmas dinner. I left for the laundry room to retrieve some Christmas linens from the washing machine but when I returned, I found Carolyn on the sofa crying. She had just received the call. She was leaving on the 26th.

Christmas was a quiet affair. The day after Christmas, I drove her two hours north to join her unit in Kirch-goëns, Germany. We said good-bye to each other and kissed under the dark evening clouds, surrounded by the drizzle that permeates everything in the German winter, wondering when we would see each other again. Driving home alone was the loneliest I have ever been.

I spent the next couple of days reading, reflecting, putting our apartment in order, storing our cars, and wondering where Carolyn was. On January 1st, a friend and I were driven to Friedberg, Germany by military van to join the 54th Support Battalion for deployment to the Persian Gulf.

We left Rhein Main Airbase in Frankfurt, Germany by a C-141 cargo jet at midnight, landing in Saudi Arabia six hours later. When we deplaned, there wasn't anyone to greet us on the tarmac, no welcoming committee, and no military band. A chink in my confidence in the chain-of-command occurred when my battalion commander said, to no one in particular, "I wonder if we're at the right airport." Off to the side, there was a large pallet of 1.5 liter bottles of water. One of the training points we had been constantly exposed to while in Germany was "water discipline". No heat injuries are tolerable and everyone is to maintain water intake.

"Everyone get three bottles of water and drink one now!" we were instructed. Afraid that we would pass out at any moment from sunstroke, we ran and immediately ripped through the boxes to get to and drink our requisite bottles of water. Eventually, as we stood there under the cloudy sky, with the cool winter desert wind coursing through our uniforms, replete with water, fresh from our plane flight without facilities, without a privy in sight, we realized that the only danger we were about to suffer from was acute renal failure from voluntary bladder obstruction.

Eventually, buses arrived to take us to our staging area, the Rear Assembly Area, to await the arrival of our vehicles and equipment. From there, transport vehicles took us to the desert to make our final preparations for war. We trained our medics, feigning bravery and confidence in ourselves. We refreshed ourselves on the treatment of chemical casualties. We gathered supplies and equipment, using "alternative acquisition procedures" as necessary. We prepared our defensive perimeter with fighting positions and intersecting fields of fire for our weapons, I learned to sleep comfortably with a loaded .45 cal pistol under my pillow. We listened to BBC short-wave, praying for a diplomatic end to this craziness. We wrote letters to loved ones back home. I wrote a letter to Carolyn, telling her how much I had always loved her, addressed it, and put it in the Ziplock bag at the bottom of my personal bag, and left instructions with my friends to make sure she got it just in case...

On the 24th of February, 1991, the VII corps, commanded by LTG Frederick Franks numbering more than 142,000 soldiers, with more than 48,500 vehicles and aircraft, including 1,587 tanks, 1,502 Bradleys and armored personnel carriers, 669 artillery pieces, and 223 attack helicopters moved across the berm separating Saudi Arabia and Iraq to close with and destroy Iraq's Republican Guard. This time there was a band, as the 3rd Armored Division band stood on the berm and played patriotic songs while we filed past. This was one of the strangest sights of the war. Farther west, the XVIII Airborne Corps rapidly pushed north with the intention of cutting off retreat by the Iraqi army into Iraq. Simultaneously, U.S. Marine Corps and multinational coalition forces crossed into Kuwait to support the main attack.

"A female doctor in the 1st brigade has been killed by a landmine." This is how the rumor reached me. Carolyn was the only female physician in that brigade. Rumor control in war is non-existent, nor is there any ready means for the average soldier to confirm information heard in the trenches. But this, like many things to that point, seemed unreal. Maybe this is what they intended when they separated us at the beginning...but maybe not. Being distraught didn't seem like an option available for me. Grieving seemed premature. I asked my company commander to see what he could learn but for him and the higher chain of command, this issue was not a priority. The morning following the ceasefire, the division artillery command sergeant major (who happened to be the spouse of one of Carolyn's physician assistants) walked into our perimeter and told me that he has been "ordered" (by his wife), to pick me up and take me to the 503rd for a social visit. I ecstatically obliged. As it turned out, at the end of the hostilities, a mere 7

kilometers separated our two battalions. Except for the minefield through which we drove, it was like going to a Sunday afternoon date.

Modern weapons are designed to kill, and not maim. Most of our casualties were Iraqi, the relatively few American soldiers cared for by us were frequently victims of fratricide, “friendly fire”, an oxymoron. One hundred hours later, President Bush called a cease-fire and the war ended on February 28, 1991 with the regular Iraqi army decimated. However, the Republican Guard, while markedly reduced in capability, still existed and consequently was called upon by Saddam Hussein to quell the civilian uprising in southern Iraq.

With the ceasefire, the situation changed dramatically. While there was still an apparent military mission, to prepare for counterattack by the Iraqi forces, this seemed relatively unlikely. The more immediate situation appeared to be the situation of the displaced indigenous people. Shiite and Sunni Muslim participants in the uprising now streamed south to escape massacres and battles occurring in the Euphrates River valley. The combat brigades and some MASHs (mobile army surgical hospitals) were the only medical facilities in the region. However, there was no command authority to provide refugee care. Despite the apparent need, the military forces in the region were not prepared, politically or logistically, to care for the unexpected stream of displaced civilians and refugees.

Small efforts at individual sites informally developed to take of the civilians. The 1st Brigade of the 3rd AD was located in and around the southern Iraqi town of Safwan to provide security for that region. Carolyn’s unit, the 503rd FSB established an aid station in a yard of an abandoned electrical company. With time, a refugee population swelled into the thousands in the encampment. At one point, over 400 patients, many of them children, were being seen every day by three to four physicians or physician assistants. Medics were charged with simpler problems. My unit was situated farther north along the main highway to Al-Basrah, Iraq and provided checkpoint security. We set up medical aid stations to care for refugees along the way who were mostly intent on continuing south to Saudi Arabia and we air-evacuated those seriously ill patients such as automobile accident victims.

As the number of refugees grew, the policies regarding the refugees changed. The need for their care became obvious to the policymakers and commanders. The refugee care became official and formalized. Carolyn, whose usefulness was once doubted by her brigade commander because she was a pediatrician, now was touted as the “Angel of Safwan” and was shown off, much to her discomfort, to each congressional delegation and media party which came through.

One morning an infant whom Carolyn had sent the previous day to a reserve MASH for IV therapy because of profound dehydration and diarrhea reappeared at her aid station. Upon the infant’s arrival at the MASH, the infant was given Kaopectate and returned to the camp. No pediatricians were available to care for children sent to the hospital, Carolyn was told. Suddenly pediatricians, who once seemed a liability in a combat unit, were suddenly now an asset. Through the chain of command, Carolyn made it known that at that moment I, a pediatrician, was sitting in the open desert, combating desert flies and the sharqi, a southern Spring desert wind which blows all day, gusting up to 50 mph. So one evening, I was told to pack up and report to the MASH, I would be detached to them for the next couple of weeks. I now found myself doing inpatient pediatrics in the middle of the desert, and ironically, Carolyn’s “back-up”.

The range of illnesses varied from the simple, URIs and colds, to the serious, 3rd degree burns from tent cooking fires. Carolyn cared for a baby with clinical sepsis whom she treated empirically with daily IM ceftriaxone; inpatient facilities were not always available. The infant lived, to the eternal gratitude of the mother. Deserting Iraqi soldiers sought treatment of abscessed wounds of high-velocity projectiles. An old man showed up with UGI contrast study with an obvious tumor seeking chemotherapy, he was turned away. A toddler was brought by his mother because he was losing weight. His examination showed obvious pallor, marked hepatosplenomegaly, petechiae, and diffuse adenopathy. I sadly told the mother that there was nothing I could do, knowing in a different place and a different time I could help the child fight the disease and have a realistic hope of living life into adulthood.

There was the tragic, children killed and maimed by bomblets, which look like metallic toy balls, they found on the desert floor. There were malingers, young men trying to get treated by the female medics. There was the curious, the old woman who stopped by to see if we could give her a new bottle of IV gentamicin for her “kidney problem”. Then there was the hopeful, parents who brought their children with congenital orthopedic disorders to the American doctors to see what we could do. We could only turn them away.

When the 3rd Armored Division left the Safwan area of operations on May 7th, 1991, one million meals had been dispensed, one million gallons of water had been delivered, and 28,000 medical visits had been performed.

The adult medicines and trauma equipment were wholly inadequate to deal with our new missions. We cut Septra tablets into quarters for dosing. Antibiotic suspensions were either unavailable or impractical given the lack of clean water. We didn’t possess oral rehydration fluids so we concocted our own from our IV fluids stock. We improvised, touched and listened, doing what doctors have done for milleniums.

It seemed those that we couldn’t help were about equal in number to those that we could. Empiric medical decisions were made daily, decisions that would be derided in any medical rounds or conference...not enough data. The acute issues we handled well. Chronic issues we had no capacity to evaluate or manage. For this reason, while we saved a few lives, our presence in southern Iraq had no lasting impact upon the health and well-being of those people.

Our deployment to Southwest Asia and the Persian Gulf War was marked by frustration, fear, and depression. In the end, we learned a lot about ourselves. We learned that as physicians, intelligent caring is the most important part of taking care of others, and what is right in one situation may not be right for another, and sadly you may never know the right answer.

We learned about what is important and what is not. Hot meals and showers are luxuries never to be underestimated. Rush hour traffic and the inconveniences of modern life will only be nuisance, and never tragedies. And Carolyn and I realized just important we were to each other and how fragile life as we know it can be. One year to the day the 3rd AD left Safwan, our first child Emily was born in Heidelberg, Germany.

As a military physician, I learned some valuable lessons. Unfortunately some of what I learned I never understood until after I returned.

Know your medicine.

This is most important. Being a good physician in a military unit or refugee camp doesn't depend upon the type of formal training or residency. Approaching problems in a critical manner is vital. Practicing medicine in austere conditions is not the same as practicing bad or incomplete medicine. Your patients always deserve the best you can provide them. Upon deployment, take a few well-chosen references. Books to consider are the *Red Book* for infectious diseases (American Academy of Pediatrics), the *Manual of Emergency and Outpatient Procedures* (Little, Brown Inc), the *Manual of Medical Therapeutics* (Little, Brown Inc), the *Harriet Lane Handbook* (Mosby YearBook), and *Emergency War Surgery* (US Govt Printing)

Know your mission.

Learn as much as you can about where you are going and what you will be doing. The pediatricians in Operation Desert Shield/Storm served different roles. From staffing battalion aid stations to fixed and mobile hospitals, pediatricians were expected to serve as commanders, general medical officers, and administrators. Understand what your unit does and its expected mission. Understand its medical capabilities. Think about missions that may not be obvious and how your unit can modify its capabilities to meet this mission. Other missions might include performing refugee care, triaging mass casualties, improvising inpatient care, or treating biochemical injuries. If you can, pick up a foreign language book for the area to which you are to deploy.

Know the enemy.

Not just the one with the weapon. If possible, prior to deployment, learn about the threat of environmental injuries, indigenous flora and fauna that may be hazardous to military personnel, and regional diseases. Understand how to treat chemical and biological weapons injuries and disease.

Keep flexible

Understand that your unit's mission is an extension of political policy, and as such it is subject to the vicissitudes of negotiation and regional powers. One day you may be taking care of a refugee encampment but the next day you may be barred from caring for the same refugees, now standing confused outside your gates. This may seem arbitrary but unbeknownst to you, there may be a security problem that precludes adequate protection, a risk your commander is unwilling to accept. Caring for indigenous people requires a certain political cost or commitment which may not be acceptable to policy-makers but difficult for you to understand as a physician.

Don't be a hero.

Just being there makes you a hero. Don't endanger yourselves or fellow soldiers by senseless acts. Remember you are there to protect yourselves and the lives of your patients.

Be innovative and prepared

If you find yourself suddenly taking care of children from a trauma pack, learn how to improvise equipment and medications to make them suitable for children.

Understand your unit and chain of command.

Understand your unit, your commanders, and especially your NCOs. In medicine, especially in a medical center, there is an attitude that things only get done because you

make them happen. In maneuver units, the strength and cohesiveness of the unit depends upon the NCOs. Don't undermine them, utilize them extensively. Don't take over their job of unit organization and soldier training. Take the Officers' Advanced Course, the information here is invaluable when working with the line Army.

Prepare yourself personally

In addition to intellectual preparation, there needs to be emotional preparation.

Surrounding oneself with the comforts of home helps:

- ?? Minimize battery powered appliances. There aren't many 7-11s to restock your batteries.
- ?? Take a 35 mm autofocus camera with plenty of film. A small camera fits in an ammo pouch quite nicely and you never know when there will be a Kodak moment
- ?? Keep a diary.
- ?? Small photo album of loved ones and favorite places and things
- ?? Get a very short haircut
- ?? Computer diskettes. You never know if you'll need them.
- ?? 3 uniforms are plenty. One to wear, one to wash, and one just in case.
- ?? Good boots.
- ?? Cassette tape players are more durable and easier to maintain than CD players.
- ?? Take a Swiss army pocket knife or a Leatherman tool kit.
- ?? Buy an Army Gortex coat. It is expensive, but it packs smaller, weighs less and you might as well be comfortable. Think of all of the money you are saving being in the field instead of the post exchange.
- ?? Envelopes and letter paper. Enough said.
- ?? PT clothes and sweats. Believe it or not.
- ?? Take a long book you've always been meaning to read, like *War and Peace* or *les Miserables*. Why not.
- ?? Ensure a steady supply of care packages with easily stored food (...if you go to the desert, forget the sun screen, the sand will just stick to your face....)

DEPLOYMENT CHECKLIST

Briefcase

- _ Orders
- _ Maps
- _ Manifest
- _ Required documents
- _ Dog tags
- _ Ear plugs
- _ Flashlight
- _ Extra batteries
- _ Compass

Baggage

- _ Duffle bag (x2)
- _ Toiletry bag
- _ Helmet bag
- _ Camouflage gym bag
- _ Net bag
- _ LBE & ALICE pack
- _ Map case
- _ Weapon
- _ Protective mask

Athletic Wear

- _ Shoes; jogging, sandals
- _ Socks, white
- _ Gym shorts
- _ Shirts
- _ Jock
- _ Jogging suit
- _ Swim suit
- _ Cap

Civilian attire

- _ Pants: jeans, shorts
- _ Shirts: polo, dressy
- _ Shoes: dressy, slippers
- _ Socks: dressy
- _ Jacket
- _ Belt

Things Not To Take:
More than \$25 cash;
jewelry (exc. Wedding
band; Social Security
card; More than one
credit card; Narcotics
(like Tylenol #3);
anything you can't
afford to lose; Contact
lenses

Uniform

- _ BDUs (___ Sets)
- _ Belt, subdued
- _ Boots (___ Pairs)
- _ T-Shirts, brown
- _ Underwear
- _ Socks, green
- _ Insignia (extra sets)
- _ BDU coat w/liner
- _ Cap, BDU
- _ Handkerchiefs
- _ Shoe shine kit
- _ Helmet
- _ Gloves, black w/liner
- _ Sweater, brown
- _ Nightshirt
- _ Poncho
- _ Wet weather gear
- _ Poncho liner

Toiletries

- _ Med-sized wash basin
- _ Razors
- _ Shaving cream
- _ Shaving mirror
- _ After-shave
- _ Cologne
- _ Toothbrush
- _ Toothpaste
- _ Mouthwash
- _ Q-tips
- _ Deodorant
- _ Soap and dish
- _ Comb/brush
- _ Skin/face cream
- _ Shampoo/conditioner
- _ Foot powder/items
- _ Fingernail clippers
- _ Tweezers
- _ Alka seltzer, aspirin,
acetaminophen, band-aids,
bacitracin, ointment, other
needs

Taken from: Disease
Disaster, and Deployment
Seminar, Madigan Army
Medical Center, 1995

Miscellaneous

- _ Wallet
- _ Military ID card
- _ Geneva convention card
- _ One credit card
- _ Meal card
- _ Protective mask card
- _ Weapons card
- _ Driver's license (civ/mil)
- _ Money (for PX & return)
- _ Change purse
- _ Checks
- _ Watch (replace battery)
- _ Watch, spare (cheap)
- _ Alarm clock
- _ Letter-writing materials
- _ Envelopes
- _ Address lists
- _ Stamps
- _ List of phone numbers
- _ Keys: house, car, office
- _ Knives: pocket, Swiss
Army
- _ Plastic ziplock bags
- _ Powder detergent
- _ Liquid hand soap
- _ Baby wipes
- _ Canteen w/cup, thermos
- _ Iodine tablets
- _ Glasses (x2) w/strap
- _ Cheap sunglasses
- _ Pillow (air-filled) w/case
- _ Rope (det cord)-
clothesline
- _ Clothes pins
- _ Matches
- _ Disposable lighter
- _ Skin repellent (DEET)
- _ Clothing/netting
repellent (permethrin)
- _ Family picture
- _ Bible
- _ Camera (w/film)
- _ Extra camera batteries
- _ Radio w/extra batteries
- _ Short-wave radio
- _ Mini-cassette player/
recorder
- _ Cheap solar calculator