

**TRAINING FOR IMPROVED PRACTICE:
Public Health and Nutrition in Emergencies**

COMMUNICABLE DISEASES:

Dysentery, Typhoid, Cholera

UNICEF Core Corporate Commitments Training

In collaboration with:

Feinstein International Famine Center, Tufts University

Mailman School of Public Health, Columbia University

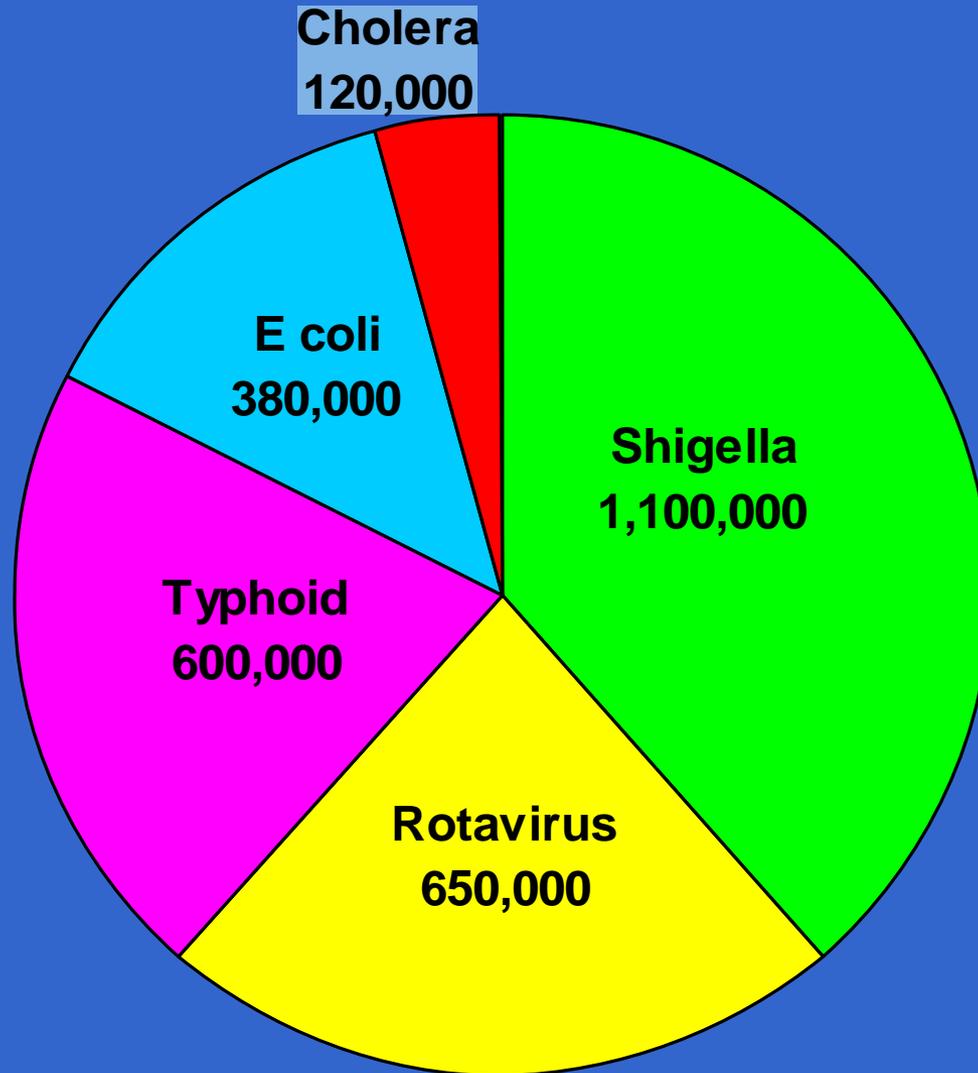
International Emergency and Refugee Health Branch,

Centers for Disease Control

Session Overview

- Three potentially epidemic diarrheal diseases – dysentery, typhoid, cholera
 - Overview of the disease
 - Case Management
 - Epidemic Response

Estimated annual mortality from diarrheal diseases – Total 2.85 million deaths globally, 2000, WHO



Dysentery

- **Overview of the disease**
- Case Management
- Epidemic Prevention, Preparedness & Response

What is Dysentery?

- Bloody Diarrhea
- *Shigella dysenteriae*, type 1, (Sd1) is the main cause of epidemic dysentery
- It is the *only* cause of large-scale, regional outbreaks of dysentery. In recent years, Sd1 has caused epidemic dysentery in Central America, south Asia, and central and southern Africa.

SHIGELLA DYSENTERIAE TYPE 1 (SD1)

- Symptoms:
 - bloody diarrhea, often with
 - fever,
 - abdominal cramps, and
 - rectal pain.
 - (However, Shigella can also cause acute non-bloody diarrhea)
- Potential complications: haemolytic-uraemic syndrome (HUS), seizures, sepsis, rectal prolapse and toxic megacolon.
- Case-fatality rate without prompt effective treatment ranges from 1% to 10%.

SHIGELLA DYSENTERIAE TYPE 1 (SD1) (cont)

- Can cause large and prolonged epidemics (20,000 deaths in Kivu, 1994; 4-year epidemic in Central America 1968-72)
- Most often severe or fatal in young children, the elderly and the malnourished.
- Transmission mostly person-to-person contact & contaminated food and water
- Highly infective organism requiring low dose to cause illness

Dysentery

- Overview of the disease

- **Case Management**

- Epidemic Prevention, Preparedness & Response

Treatment of Dysentery

- Give ORS and nutritional support
- Treatment with appropriate antibiotic (may require 3-5 days of ciprofloxacin)
- Ensure treatment compliance

PRINCIPAL STEPS IN THE MANAGEMENT OF PATIENTS WITH DYSENTERY CAUSED BY *SHIGELLA DYSENTERIAE* TYPE 1

- Refer immediately to hospital persons who are severely malnourished, appear seriously ill or are in another high-risk category.
- Treat all cases promptly with an oral antimicrobial effective against local Sd1 strains.
- Treat and prevent dehydration with oral rehydration therapy, or intravenous (IV) therapy if severely dehydrated.
- Give frequent small meals of the patient's usual food; continue to breastfeed infants and young children

Antibiotics for Sd1

- **Ampicillin** and **Trimethoprim-Sulfamethoxazole**
- **Nalidixic acid**
- **Pivmecillinam**, or **amdilocillin pizoxil**,
Ciprofloxacin
- **Ceftriaxone**

Distribution of Diarrheal Cases and Deaths and Estimated Impact of Case Management

	Distribution of		Estimated Deaths Prevented by:	
	100 Cases	100 Deaths	ORT Plus Feeding	Full Case Management*
Acute Watery Diarrhea	80	50	95%	99%
Dysentery	10	15	<1%	80%

*including antibiotics

Dysentery

- Overview of the disease
- Case Management
- **Epidemic Prevention,
Preparedness & Response**

Prevention of Dysentery

- safe drinking water (chlorination & safe storage)
- safe disposal of excreta
- personal hygiene & hand-washing with soap
- breastfeeding
- special attention to disinfection and hygienic practices in health facilities
- chemoprophylaxis is NEVER indicated for prevention

Management of Dysentery Epidemic

- Coordinating committee
- Surveillance & reporting (clear case definition)
- Confirm laboratory diagnosis & antibiotic sensitivity. NOTE: storage and transport of specimen is difficult
- Standard treatment policy
- Identify means of transmission and take appropriate action

Typhoid Fever

- **Overview of the disease**
- Case Management
- Epidemic Prevention, Preparedness & Response

Typhoid Fever

- Caused by *Salmonella typhi*
- Symptoms:
 - Sudden onset of sustained fever
 - Severe headache
 - Nausea
 - Severe loss of appetiteSometimes:
 - Hoarse cough, constipation, diarrhea
- **Clinical case definition.** Acute or insidious onset of sustained fever, headache, malaise, anorexia, relative bradycardia, constipation or diarrhoea and non-productive cough. (However, many mild and atypical infections occur.)
- Age group 3-19 years most commonly affected
- Case fatality rates of 10% can be reduced to less than 1% with appropriate antibiotic therapy

Typhoid Fever

- Transmitted by food and water contaminated by the faeces and urine of patients and carriers.
- Polluted water is the most common source of typhoid.
- In addition, shellfish taken from sewage-contaminated beds, vegetables fertilized by night soil and eaten raw, contaminated milk and milk products have been shown as a source of infection.
- 2-5% of those infected become chronic carriers

Typhoid Fever

- Overview of the disease
- **Case Management**
- Epidemic Prevention, Preparedness & Response

Treatment of Typhoid Fever

- Rehydrate with ORS or IV solution depending on the severity of dehydration
- Give an effective antibiotic

Effective drugs			
Susceptibility	Antibiotic	Daily dose mg / kg	Days
Fully sensitive	Chloramphenicol	50 – 75 mg	14 – 21
	Amoxycillin	75 – 100 mg	14
	Cotrimoxazole	8 – 40 mg	14
Multidrug resistance	Cefixime	15-20 mg	7 – 14
	Azithromycin	8-10 mg	7

Typhoid Fever

- Overview of the disease
- Case Management
- **Epidemic Prevention,
Preparedness & Response**

Prevention

- Protect and chlorinate public water supplies. Provide safe water supplies and avoid possible back flow connections between sewers and water supplies.
- Dispose of human faeces in a sanitary manner and maintain fly-proof latrines.
- Use scrupulous cleanliness in food preparation and handling.
- Educate the public regarding the importance of handwashing: this is important for food handlers and attendants involved in the care of patients and/or children. Thorough and frequent handwashing is essential, especially after a bowel movement.

Preparedness

- Health coordination meetings
- Surveillance system: weekly health reports to Ministry of Health and WHO
- Stockpiles: sampling kits, appropriate antibiotics, intravenous fluids
- Contingency plans for isolation wards in hospitals
- Laboratory support

Epidemic response

- Laboratory confirmation of suspected/presumed cases for confirmation
- Test for antibiotic sensitivity Samples of stool or urine may be taken after one week of treatment for confirmation of effectiveness.
- Organize temporary water purification and improved sanitation facilities
- To identify the source of the infection (carrier) and the means (water or food) by which the infection was transmitted, food and water samples should be taken from suspected sources for laboratory testing.
- Routine use of vaccine is not recommended in epidemic response. However...

Typhoid vaccine

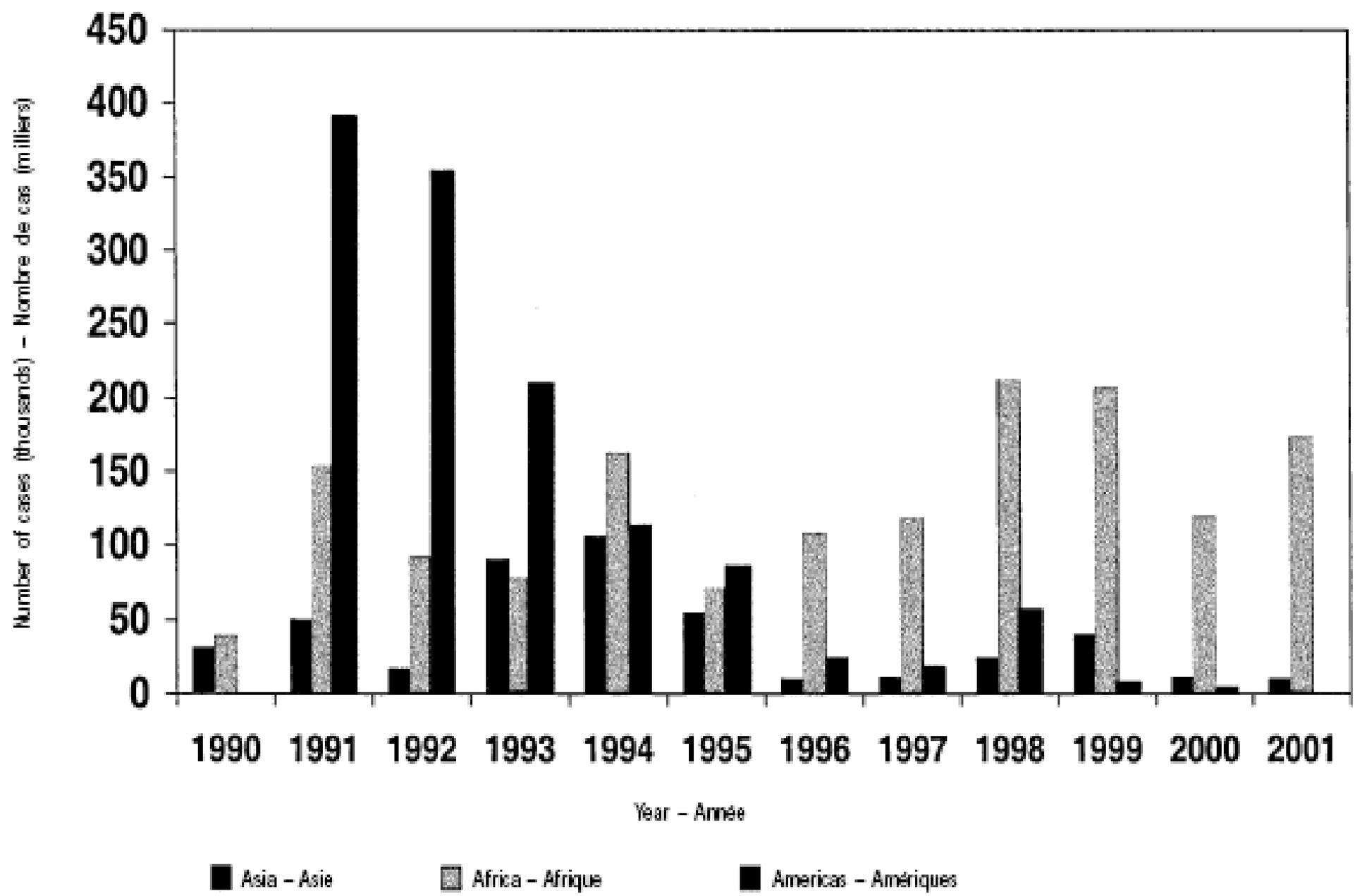
- Parenteral vaccine containing polysaccharide V1 antigen - now vaccine of choice for use in complex emergency situations.
- Oral live vaccine also available.
- Mass immunisation may be an adjunct for control during large epidemic especially in complex emergency situation or in case of MDR strain
- Priority if limited number of vaccines available should be 2-19 year olds

Cholera

- **Overview of the disease**
- Case Management
- Epidemic Prevention, Preparedness & Response

Fig. 2. Cases of cholera reported to WHO, by continent and by year, 1990-2001

Fig. 2. Nombre de cas de choléra déclarés à l'OMS, par continent et par année, 1990-2001



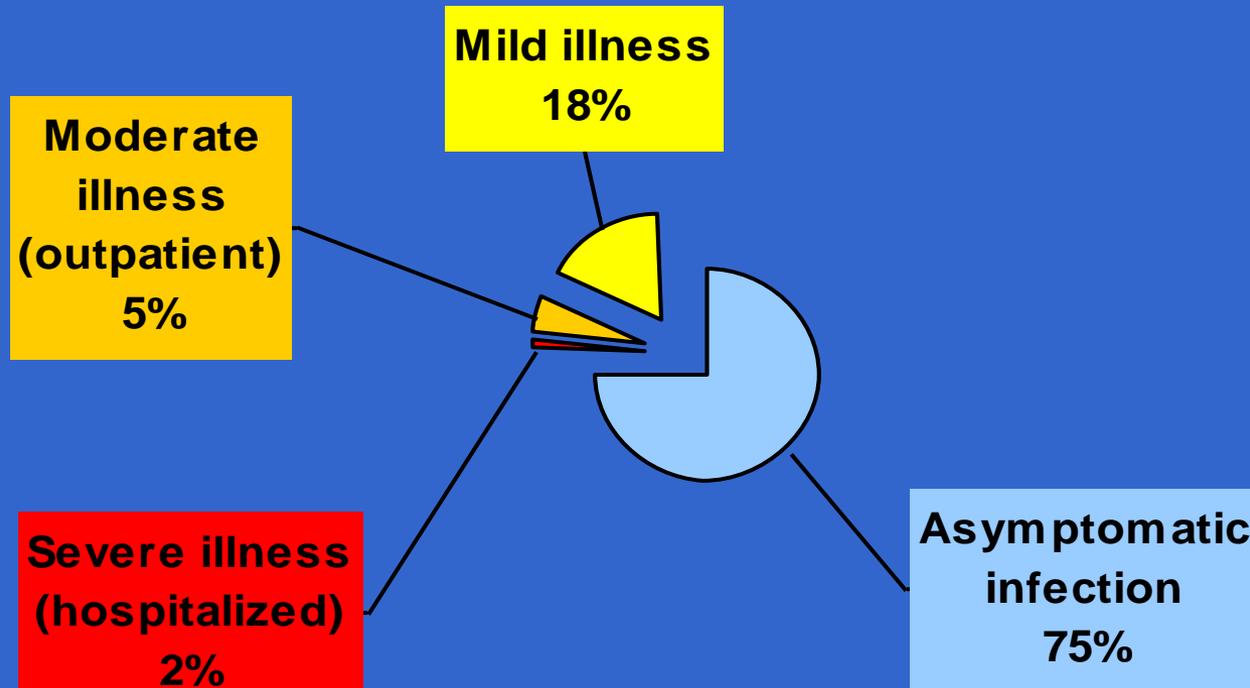
Cholera

- *Vibrio cholerae* – serogroup 01, (emergence of 0139 in India & Bangladesh in the 1990s)
- Classical and *el tor* biotypes (epidemics mainly *el tor*)
- *el tor* may live in the environment; water is an important reservoir
- Acute enteric disease with profuse watery stool
- Caused by gram negative bacillus which produces a powerful endotoxin

Cholera Transmission

- Infection from ingestion of organisms in food or water or directly from person to person by faeco-oral route
- Acute carriers including asymptomatic cases are important in transmission
- Contaminated water, food, shellfish, and fruit & vegetables implicated in transmission.
- Funeral ceremonies & feasts may be associated with transmission.

Spectrum of infection / illness



- Most infections are mild or asymptomatic; only up to 25% result in clinical illness, of which 10% at most are severe.

Cholera

- Overview of the disease
- **Case Management**
- Epidemic Prevention, Preparedness & Response

Case-management of cholera



- Aim: CFR < 1%
- Rehydration
 - ORS mainly
 - IV fluids for severe cases only
- Antibiotics (e.g., oral doxycycline or tetracycline) NOT required for cure, but be a public health intervention – reduces fluid loss, duration of illness, duration of excretion, spread of disease – must only be given after patient is rehydrated and vomiting has stopped
- Antibiotic sensitivity needed at onset of outbreak





Clinical Management of Cholera

- aim for case fatality ratio of 1% or less
- 80-90% of patients can be treated with ORS
- initiate treatment promptly
- intravenous therapy (Ringers/Hartmann's) only for severely dehydrated



Problems Contributing to High Early Case-Fatality Rates

- Narrow gauge intravenous (IV) needles
- Inappropriate IV fluid
- Shortages of Ringer's lactate
- Slow rates of initial rehydration
- Lack of patient monitoring

Cholera

- Overview of the disease
- Case Management
- **Epidemic Prevention,
Preparedness & Response**

How can we prevent Cholera in Emergency Settings?

- safe drinking water (e.g., chlorination)
- adequate water storage
- safe food handling
- adequately reheating leftover food
- safe disposal of excreta

Cholera Prevention Measures

- Antibiotics are not necessary for patient recovery, but are used as a public health measure.
 - Reduces fluid losses.
 - Reduces duration of illness.
 - Reduces duration of epidemic.
- Vaccination (mass chemoprophylaxis) and cordon sanitaire are NOT effective in controlling epidemics.
- Selective chemoprophylaxis is rarely practical.

Cholera Control Measures

- Early detection of cases
- Appropriate treatment of patients
- Health education
- Well supplied health facilities

Source: Guidelines for Cholera Control, National Department of Health
Directorate: Communicable Disease Control, Sub-Directorate: Emerging and Re-emerging Infectious Diseases, Pretoria, South Africa, June 2001

Surveillance for Cholera

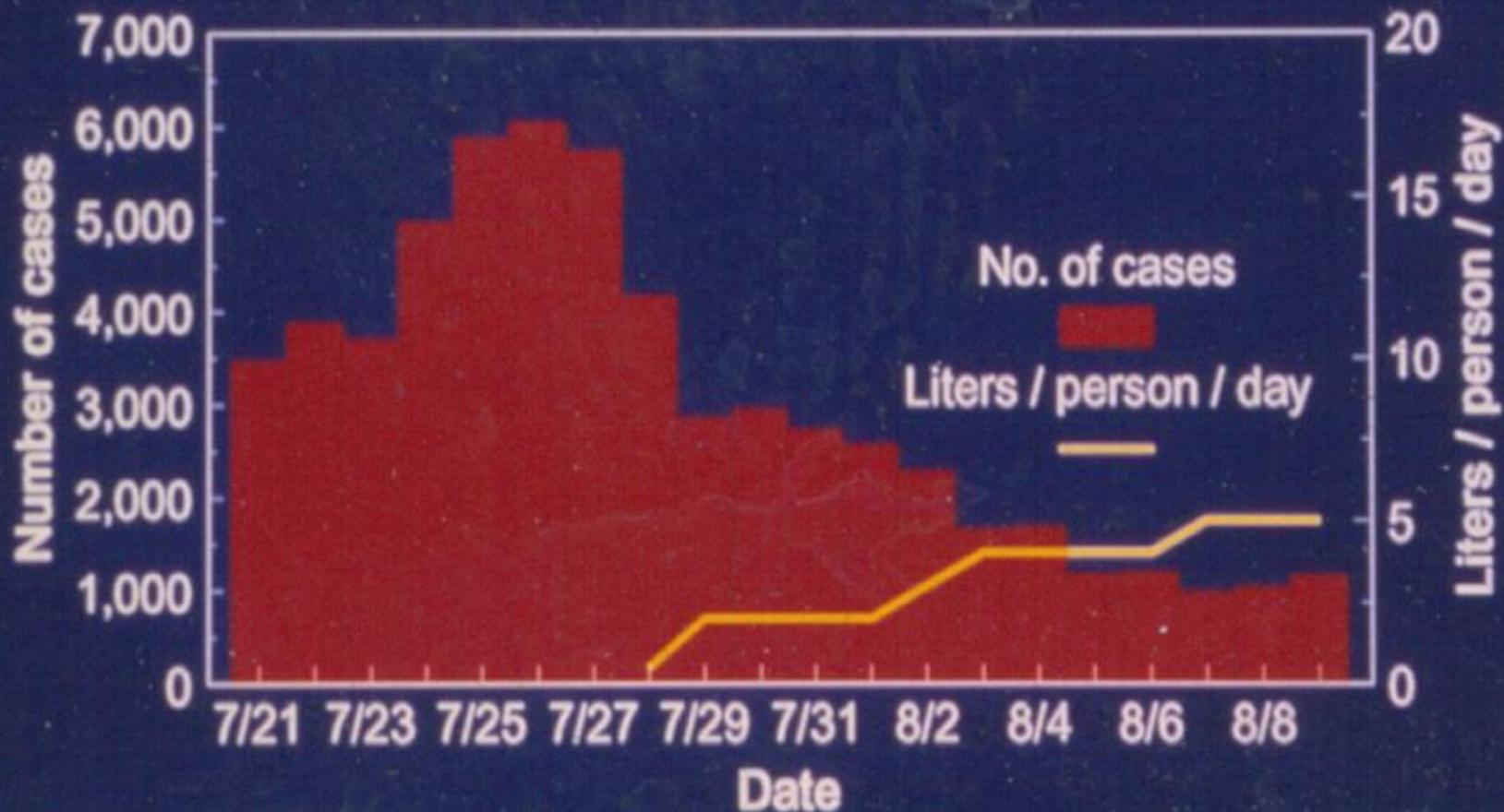
Suspect Cholera When:

- in an area where the disease is rare, a patient over 5 years of age develops severe dehydration or dies from acute watery diarrhea
- in an endemic area, a patient 5 years or older develops acute watery diarrhea

Outbreak Control Measures

- Investigate all bacteriologically proven cases to identify the sources of infection
- Assure safety of water supply
- Increase hygiene promotion activities

Number of cases of diarrhea and water trucked to refugee camps, N. Kivu, Zaire, July 21 - Aug. 9, 1994



Source: UNHCR/WHO

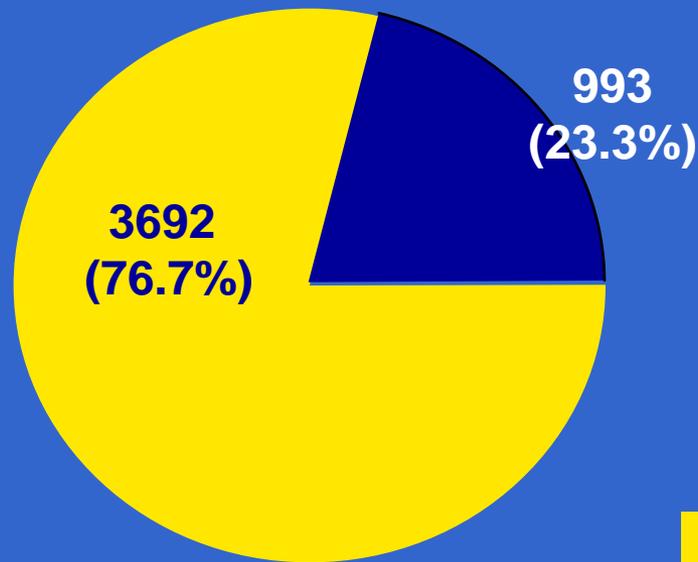
Outbreak Control Measures

- Exclude infected persons from handling food
- Wash vegetables and fruit in treated water before use
- Prepare and store food under proper hygienic conditions
- Cook food thoroughly in treated water and eat it while still hot
- Prevent contamination of food by contact with other contaminated raw food, contaminated surfaces or flies
- Wash hands thoroughly with soap after defaecation and before preparing or eating food
- Encourage breast-feeding of infants

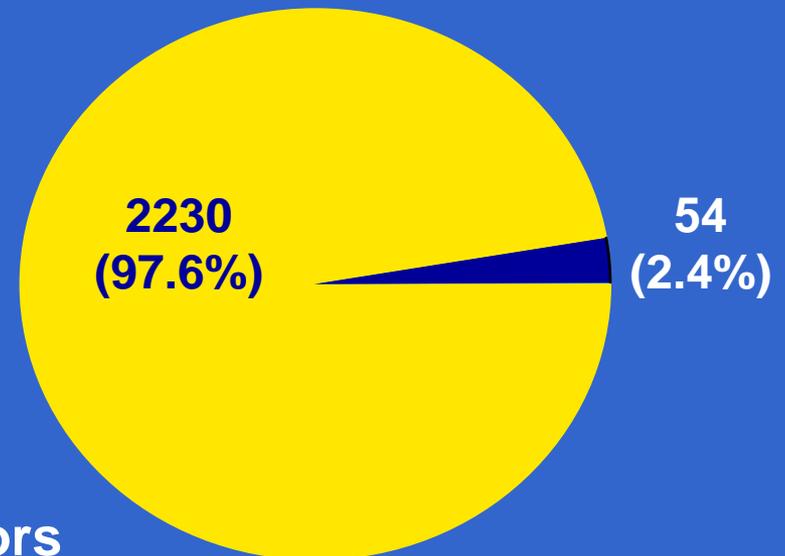
Source: Guidelines for Cholera Control, National Department of Health
Directorate: Communicable Disease Control, Sub-Directorate: Emerging and Re-emerging Infectious Diseases, Pretoria, South Africa, June 2001

Cholera Cases and Deaths Northwestern Somalia, 1985

Gannet Camp, Hargeisa



Seven NW Somalia Camps



 Survivors
 Deaths

Source: Centers for Disease Control and Prevention, Famine-Affected, Refugee, and Displaced Populations: Recommendations for Public Health Issues. MMWR, 1992;41(No. RR-13):19.

Cholera Vaccines

- Killed whole-cell/B sub-unit vaccine
 - Efficacy established in Bangladesh, 1985-1988
 - not good for epidemic control
 - not cost-effective
 - not easy to administer
 - new vaccine from Vietnam may overcome some, but not all, of these problems

Cholera

Dysentery

Typhoid

	» (V. Cholerae)	(Shigella)	(Salmonella)
• Diagnosis	watery stool	blood or mucus	fever, malaise
	» lab confirms	lab confirm	rose spots
• Transmission		direct or indirect	
		fecal-oral route	
• Incubation	2-3 days	1-3 days	3 d – 1 m
• Prevention		Sanitation and Hygiene	
• Immunize?	Maybe	No	Maybe