

TRAINING FOR IMPROVED PRACTICE: Public Health and Nutrition in Emergencies

Vaccine Preventable Diseases in Emergencies¹

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 and Prevention**

¹Excluding measles!

Vaccine preventable diseases in emergencies – Priorities?

• Measles!!

- Tuberculosis (BCG vaccine)
- Polio (OPV)
- Diphtheria, pertussis, tetanus (DTP vaccine)
- Yellow fever
- Meningitis

Establishing priorities for vaccination in emergencies

- Measles is almost always the first priority
- Measles vaccination should not be delayed in order to add additional antigens

Tuberculosis (BCG vaccine)

- WHO schedule: at birth
- Efficacy:
 - Only prevents spread from lungs
 - Doubtful for adults (0-80%)
 - Better in preventing disseminated disease in children (56%-90%)

Polio (oral polio vaccine [OPV])

- WHO schedule: Birth, then 6, 10, and 14 weeks
 - Birth dose does NOT count
- Target population in emergency settings 0-59 months
- Importance in emergency settings
 - Emergency-affected populations may constitute a high risk group
- Efficacy: three doses 95%
 - Seroconversion rates after three doses lower in tropical countries, due to competing enteroviruses

Diphtheria, pertussis, tetanus (DPT vaccine)

- WHO schedule: 6, 10, 14 weeks
- Target population in emergency-affected populations 6 wks - 5 years
 - Minimum of four weeks between doses
- Importance in emergency settings
 - Not in emergency phase, but implement as soon as possible
 - Must be able to deliver three doses
- Efficacy: three doses 90%

Neonatal tetanus (tetanus toxoid vaccine)

- At least 2 doses prior to delivery
 - Second dose 4 weeks after first, 3rd dose after 6 months, delivery, 4th and 5th dose after 1 and 2 years
- Target population in emergency settings: all women aged 15-49 years
- Importance in emergency settings?
 - Not in emergency phase, but a high priority immediately afterwards
 - Do not include in mass measles campaign
 - Neonatal tetanus is targeted for elimination
- Efficacy:
 - Five doses confers lifelong protection

UNICEF Core Corporate Commitments in Emergencies

Provide tetanus toxoid and such other critical inputs as vaccines, cold-chain equipment, syringes, training, and financial support for advocacy, and for the immunization of pregnant women, as well as adolescent girls.

Include in mass campaigns?

Vaccine preventable diseases with outbreak potential

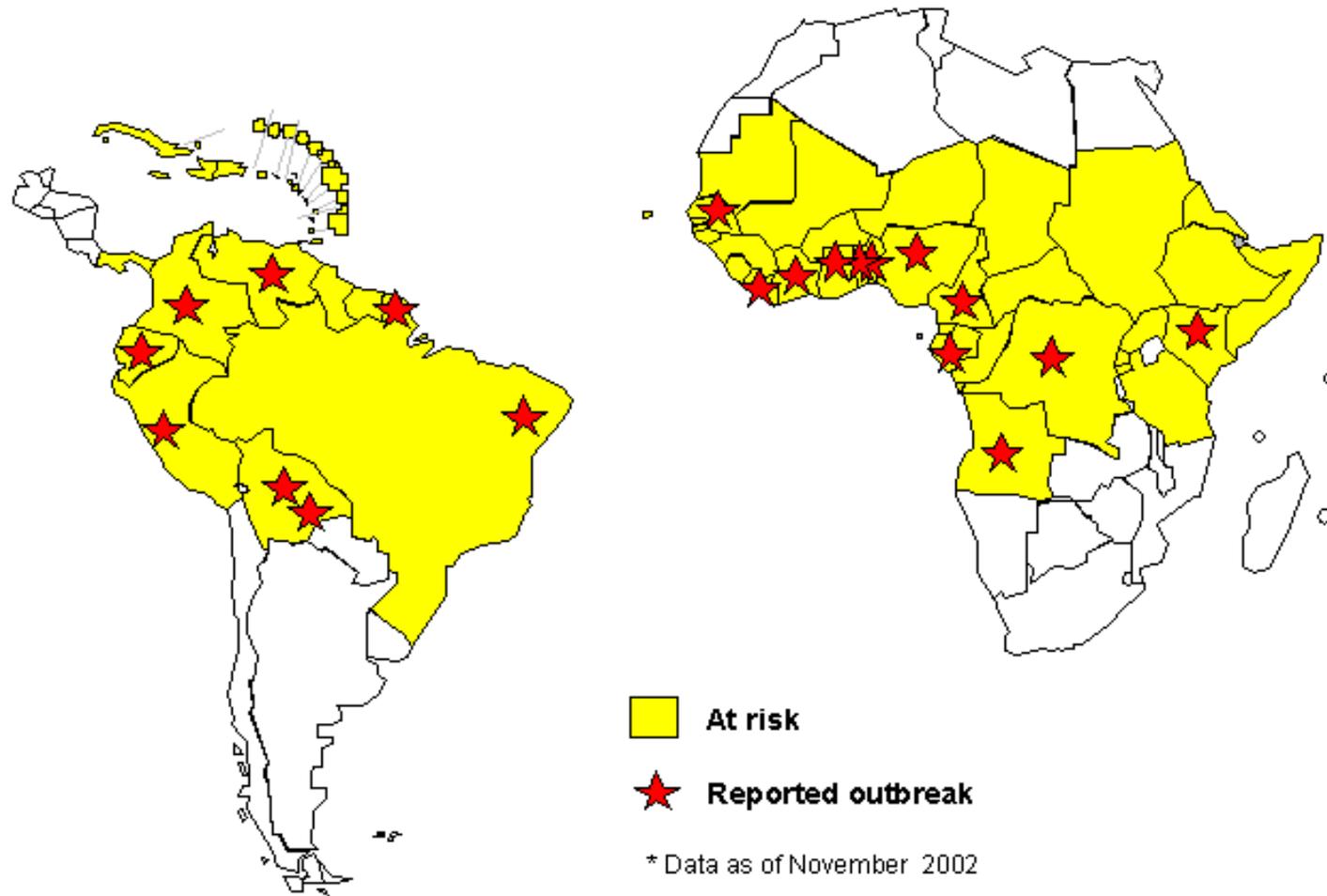
- Yellow fever
- Meningitis

- Are there others?

Yellow fever

- 200,000 cases per year
- 30,000 deaths per year
- Endemic in 34 countries in Africa
 - Population of 468 million
- Epidemic potential
- Incidence is increasing

Countries at risk for yellow fever and having reported at least one outbreak, 1985-2002*



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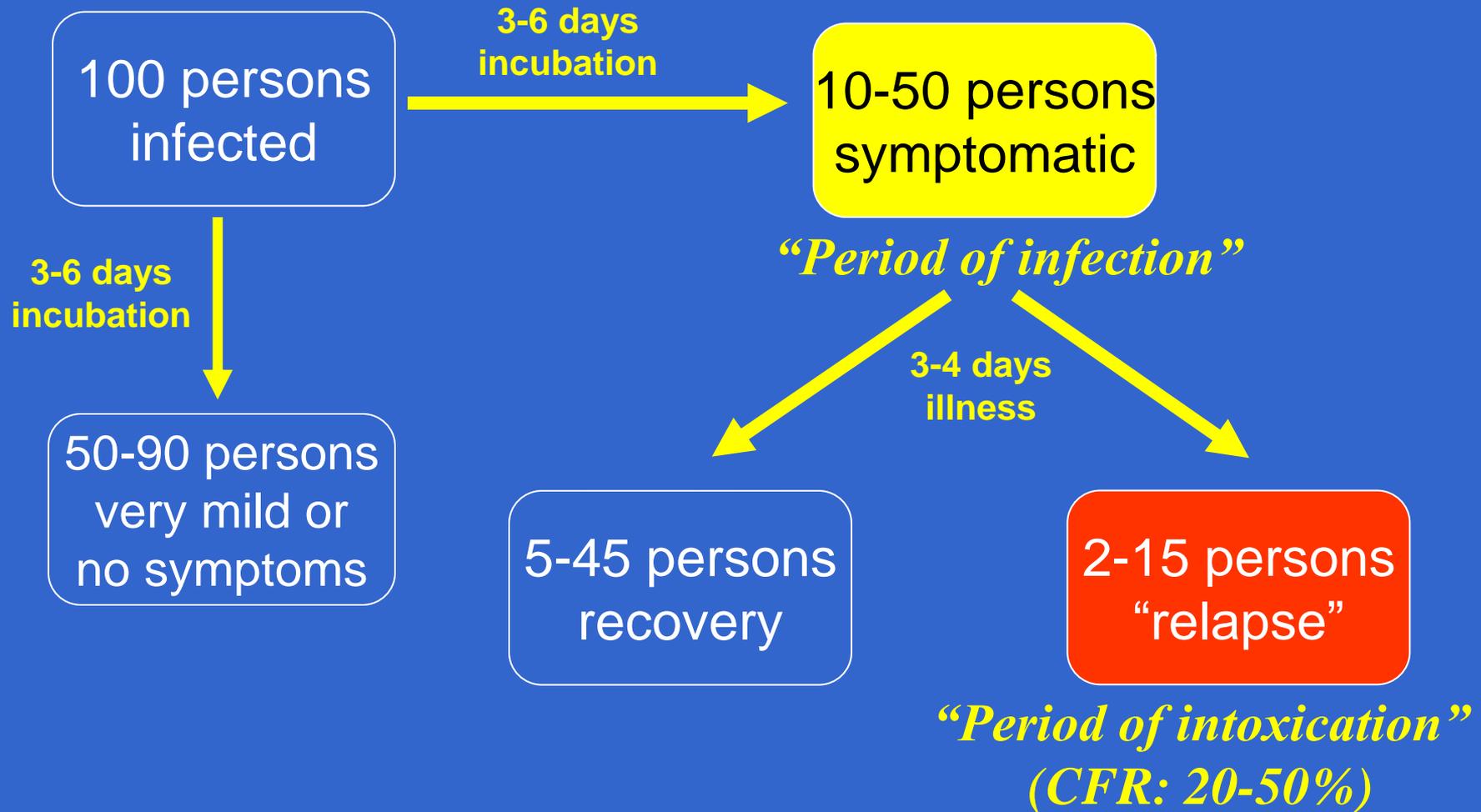


Yellow fever - Vector



Aedes aegypti

Yellow fever – Natural history



"Classic YF" is tip of the iceberg

Yellow fever - Surveillance

WHO recommended case definition

- Acute onset of fever, followed by jaundice within two weeks of onset of symptoms
- AND one of the following:
 - Bleeding from the nose, gum, skin or GI tract OR
 - Death within 3 weeks of illness onset

International health regulations

- Mandatory reporting of all suspected and confirmed cases to WHO within 24 hours

Yellow fever - Disease prevention

- Environmental control
 - Eliminate breeding conditions of *Aedes aegypti*
 - Kill adult mosquitoes
- Personal protective behaviors
 - Mosquito repellants
 - Protective clothing
- Household protective behaviors
 - Cover water sources
- Vaccination

Yellow fever vaccine – 17D

- One dose protective immunity 95% within 10 days
- Safe vaccine: Local & mild reactions 2-5% recipients within 10 days
- 35 African nations, WHO-UNICEF recommends co-administration with measles at 9 months
- Rare severe reactions
- Fatal encephalitis in 12 of 21 infants < 4 months
- Contraindicated in children < 9 months old except in children at very high risk; never less than 4 months

Yellow fever - Summary

- YF endemic in Africa and South America
- Refugees and IDPs are at increased risk
- In 35 African countries, YF vaccination recommended part of routine EPI
- Be prepared and act immediately!

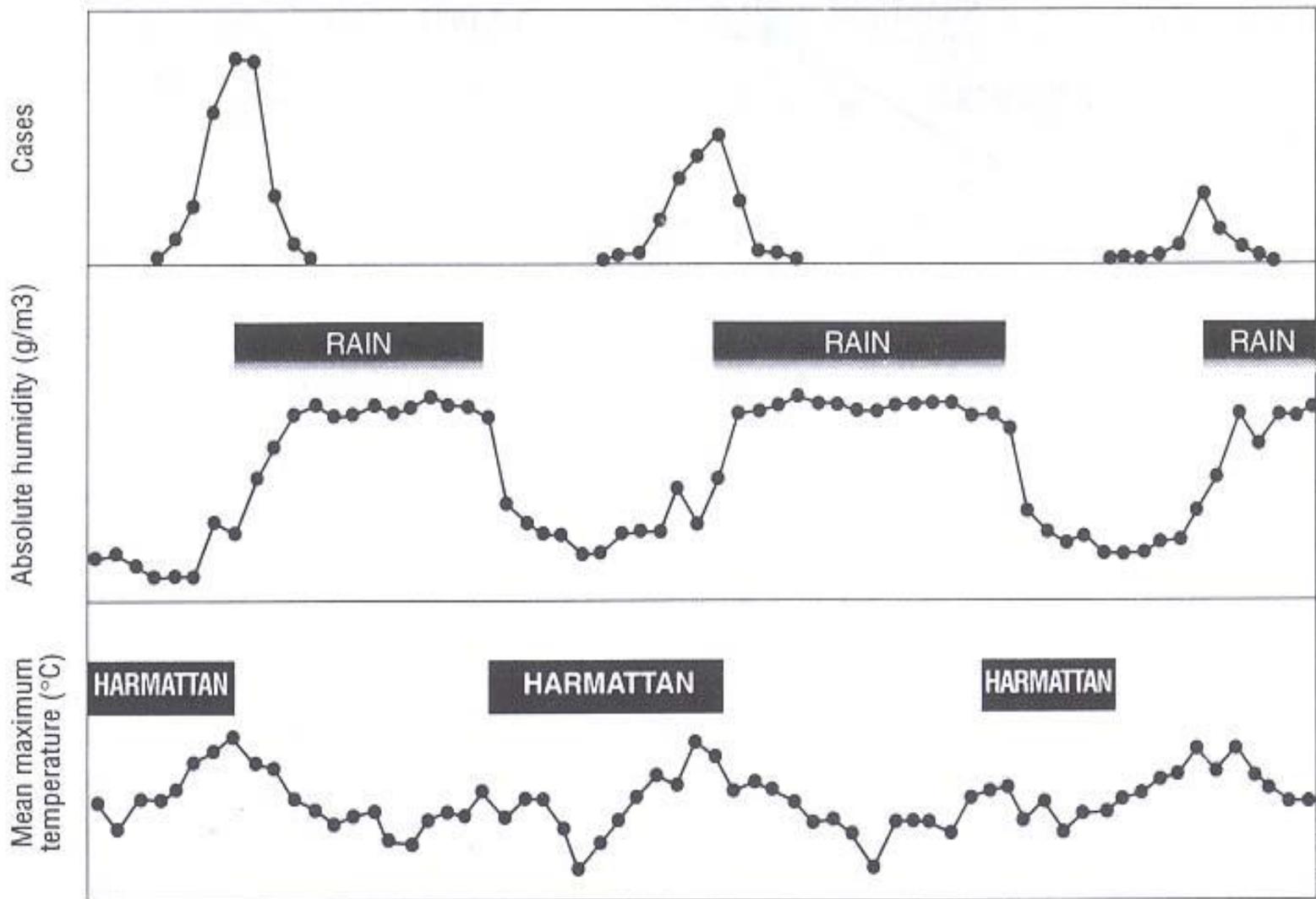
Meningitis

- Meningococcal disease includes
 - Meningitis
 - Only form of epidemic disease
 - Septicemia

Global epidemiology of meningococcal disease

- Incidence is highly seasonal
- Epidemics
 - Increased age including young adults
- High case fatality rate
 - 5 - 15%
 - In septicemia may exceed 15-20%

Figure 8. Relation of seasonal climatic factors to hospital admissions for meningococcal disease in Zaria, Nigeria, during 1977-1979





Meningococcal disease in emergency settings

- Thailand, 1978 -- CFR 28%
- E. Sudan -- 1985
- S. Sudan -- 1988
- N. Uganda -- 1994
- Goma -- 1994 (attack rate about 100/100,000 over a 2 month period)
- Burundi, Rwanda, Tanzania -- 2002

Population risk factors for meningococcal disease

- Household exposure
- Crowding
- Concurrent upper respiratory tract infections
- Active and passive smoking
- Indoor air pollution?

Case definitions for meningitis

	Children < 12 months	Children above 1 year and adults
Suspected acute meningitis	Fever AND Bulging fontanel	Sudden onset of fever (> 38.5 C) AND Neck stiffness
Probable bacterial meningitis	Suspected acute meningitis AND Turbid CSF	
Probable meningococcal meningitis	Suspected acute meningitis AND Gram-negative diplococci OR Ongoing epidemic OR Petechial rash	
Confirmed meningococcal meningitis	Suspected or probable case AND Positive CSF antigen detection OR Positive culture	

Treatment

- Early antibiotics!
 - Multiple antibiotics effective
 - Chloramphenicol still recommended in Africa
 - 1 dose IM
- Supportive therapy

Epidemic thresholds

Intervention	Population >30,000	Population <30,000
Alert threshold	5 cases/100,000/week	2 cases in 1 week or Increase in cases compared to previous years
Epidemic threshold*	If no epidemic x 3yrs + vacc. coverage <80% or alert early in dry season 10/100,000,week Other situations: 15/100,000/week	5 cases in 1 week or Doubling of cases in 3 weeks or Decision based on specific situation**

* If meningitis epidemic in neighboring area, alert threshold becomes the epidemic threshold

**1) Early in dry season, before March

2) High population density

3) For mass gatherings, refugees and displaced persons, 2 confirmed cases in one week are enough to vaccinate the population

What to do when thresholds exceeded?

- Alert threshold
 - inform authorities
 - investigate
 - confirm
 - treat cases
 - strengthen surveillance
 - prepare
- Epidemic threshold
 - **mass vaccination**
 - distribute treatment to health centers
 - treat according to epidemic protocol
 - inform the public

Vaccination campaigns

- Campaigns can curtail an epidemic
- To be effective
 - Start as early and quickly as possible
 - Vaccine must match the serotype of the epidemic strain
- Target population
 - District level or refugee camp
 - Group with the highest age specific attack rate
 - Typically persons 2 - 30 years of age in serogroup A outbreaks (vaccine not effective below age 2 years)
 - May need to vaccinate entire population
- Objective is 100% coverage

Meningococcal disease - Summary

- Epidemics occur suddenly
 - Common in emergencies
- Is fatal disease
- Prompt antibiotic treatment is crucial
- Mass vaccination can stop outbreaks
 - Must be done rapidly