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Control of Communicable Diseases

Gilbert Burnham, MD, MPH
Johns Hopkins University

Learning Objectives

- ◆ Know risk factors for communicable disease in emergencies
- ◆ Understand the effects of disease outbreaks
 - On the community
 - On the health system
 - On the host community

Learning Objectives

- ◆ Know the common communicable diseases in refugee populations
 - And which may cause epidemics
- ◆ Understand methods of disease prevention and control
- ◆ Know tools for assessment and control
- ◆ Be able to design control programs

Key Principles

1. The communicable disease cycle
2. Changing equilibrium
3. Risk factors
4. Effects of outbreaks
5. Disease prevention and control
6. Rapid assessment during disease outbreaks
7. Approach to childhood illness
8. Common communicable diseases

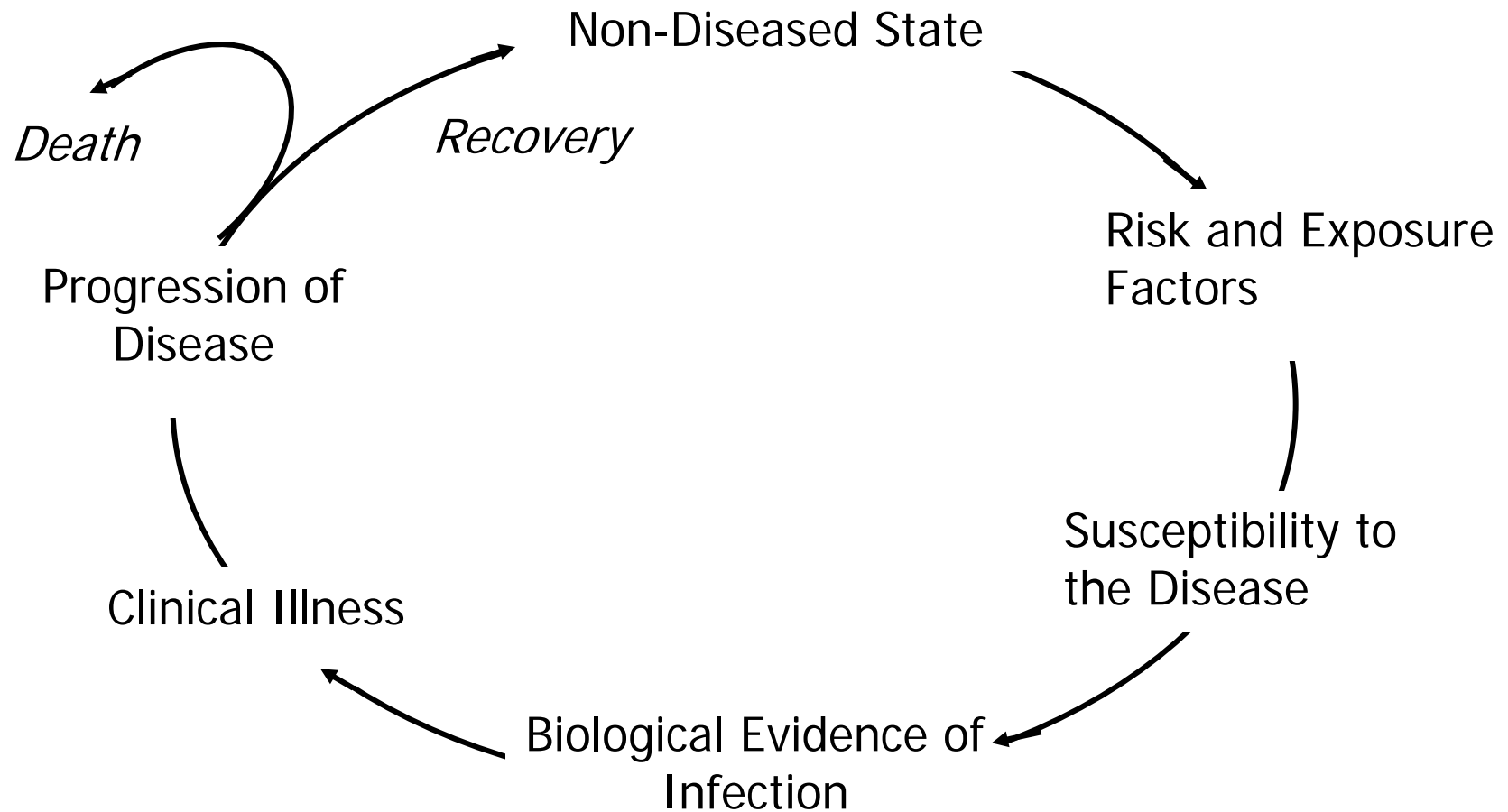


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Section A

The Communicable Disease Cycle

The Communicable Disease Cycle





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Section B

Changing Equilibrium

Changing Equilibrium

- ◆ Changing equilibrium between population and environment
- ◆ Changing equilibrium between needs and services

Changing Equilibrium between Population and Environment

Population

- ◆ Non-immune
- ◆ New pathogens
- ◆ Overcrowding
- ◆ Physical exhaustion
- ◆ Increased needs



Environment

- ◆ Poor climate
- ◆ Poor environment
- ◆ Lack of services
- ◆ Lack of support



Transmission of Disease

- ◆ Outbreaks unusual after natural disasters
- ◆ Organisms usually present in community
- ◆ More likely if water and sanitation systems are poor or destroyed

Transmission of Disease

- ◆ More common in displaced populations
- ◆ Related to level dependency
- ◆ Proven control measures may be less effective in refugee settings

Changing Equilibrium between Needs and Services

- ◆ Major loss of equilibrium may occur
 - Needs may have increased dramatically
 - Services may not have capacity to meet needs or they may have decreased or ceased to function

Problems — Resources Available = Unmet Needs

Changing Equilibrium between Needs and Services

- ◆ Loss of equilibrium manifest by . . .
 - Increased vulnerability by population
 - Increased individual susceptibility = populations at risk

Control of Communicable Diseases

- ◆ Control of communicable diseases involves
 - Restoring this equilibrium
 - Reducing vulnerability and susceptibility
 - Decreasing the population risk
 - Strengthen services that will address outbreak of communicable diseases



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Section C

Risk Factors

Risk Factors

- ◆ Risk factors for displaced populations
- ◆ Risk factors for host populations

Risk Factors for Displaced Populations

- ◆ Overcrowding
- ◆ Physical exhaustion
- ◆ High level of malnutrition

Risk Factors for Displaced Populations

- ◆ Low personal hygiene and lack of soap
- ◆ Inadequate quantity of water and poor water quality
- ◆ Poor sanitation

Risk Factors for Displaced Populations

- ◆ High percentage of children
- ◆ Lack of immunity
- ◆ Disruption of households
- ◆ Increase vector breeding
- ◆ Poor access to preventative or curative services

Risk Factors to the Host Population

- ◆ Introduction of new pathogens
- ◆ High presence of children as reservoir
- ◆ Damage to the environment
- ◆ Increase in vector-borne diseases

Risk Factors to the Host Population

- ◆ Effect on nutrition from deforestation
- ◆ Competition for resources
- ◆ Poor or disrupted health services (overwhelmed)

Sexually Transmitted Infections

<i>Diseases Possible</i>	<i>Diseases Likely</i>
Ulcerative diseases Discharge Other STIs: HIV	Ulcerative diseases Discharge Other STI: HIV

Vector-Borne Diseases

<i>Diseases Possible</i>	<i>Diseases Likely</i>
Malaria	Malaria + + +
Relapsing fever	Relapsing fever +
Yellow fever	Typhus +/-
Sleeping sickness	
Schistosomiasis	
Typhus	

Fecal or Fecal-Oral Diseases

<i>Diseases Possible</i>	<i>Diseases Likely</i>
Diarrhoea	Diarrhoea
Cholera	Cholera
Dysentery	Dysentery
Typhoid	
Amoeba	
Giardia	
Hepatitis	
Intestinal parasites	

Airborne Diseases

<i>Diseases Possible</i>	<i>Diseases Likely</i>
ARIs Measles Pertussis Tuberculosis Meningitis	ARIs Measles Pertussis Tuberculosis Meningitis



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Section D

Effects of Outbreaks

Effects of Outbreaks on Displaced Populations

- ◆ Create fear and panic
 - Especially cholera and meningitis

Effects of Outbreaks on Displaced Populations

- ◆ Health consequences
 - Loss of life

Effects of Outbreaks on Displaced Populations

- ◆ Economic consequences
- ◆ Social consequences—population movement
 - Prolonged illness

Effects of Outbreaks on the Health System

- ◆ Use up health resources
 - Cases overwhelm health system
 - Especially if already deteriorated
- ◆ Create panic, rumors, and unrealistic demands



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Section E

Disease Prevention and Control

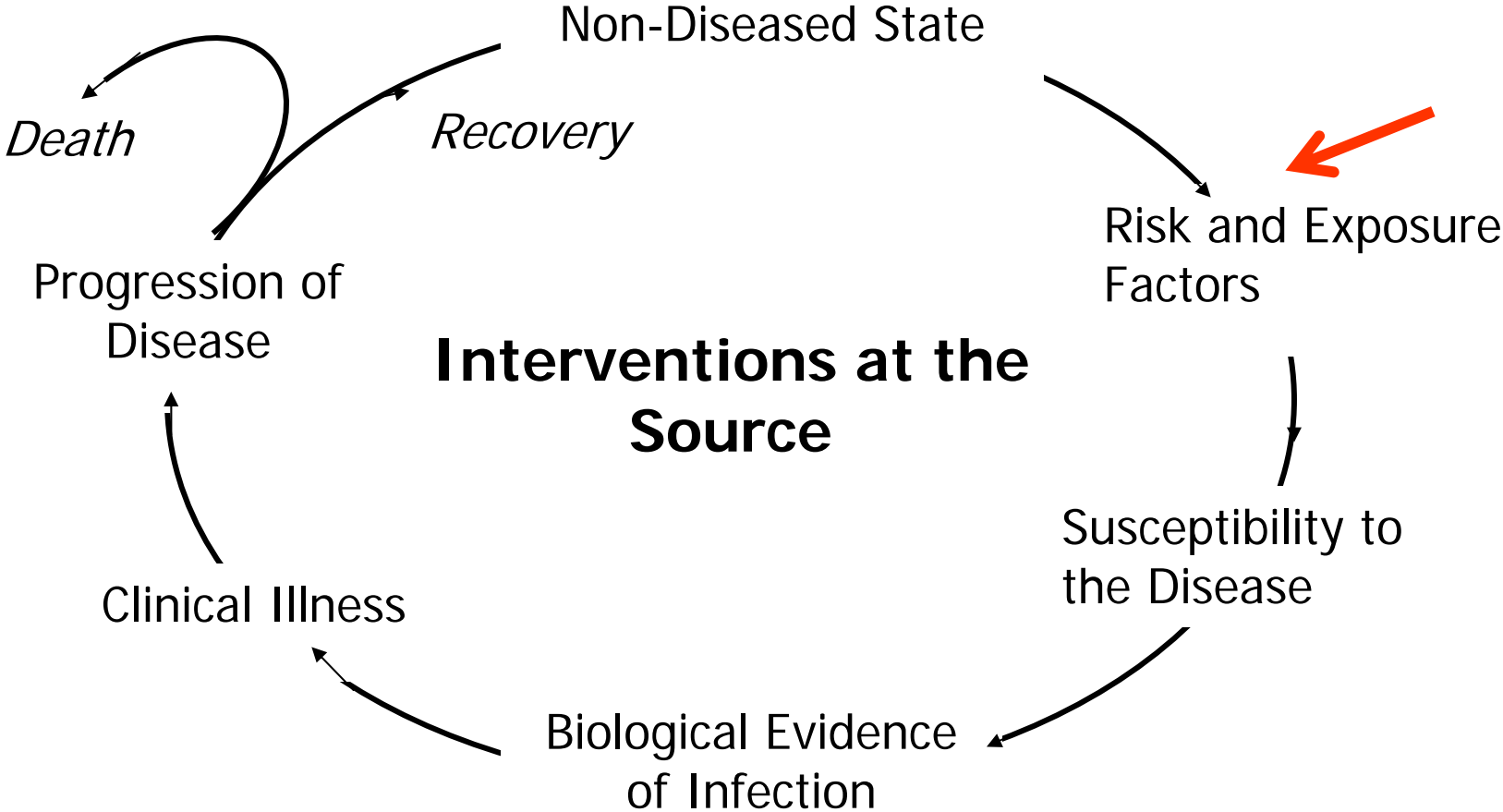
Disease Prevention and Control

- ◆ Several conceptual models
- ◆ Natural cycle of disease
- ◆ Preventive approach

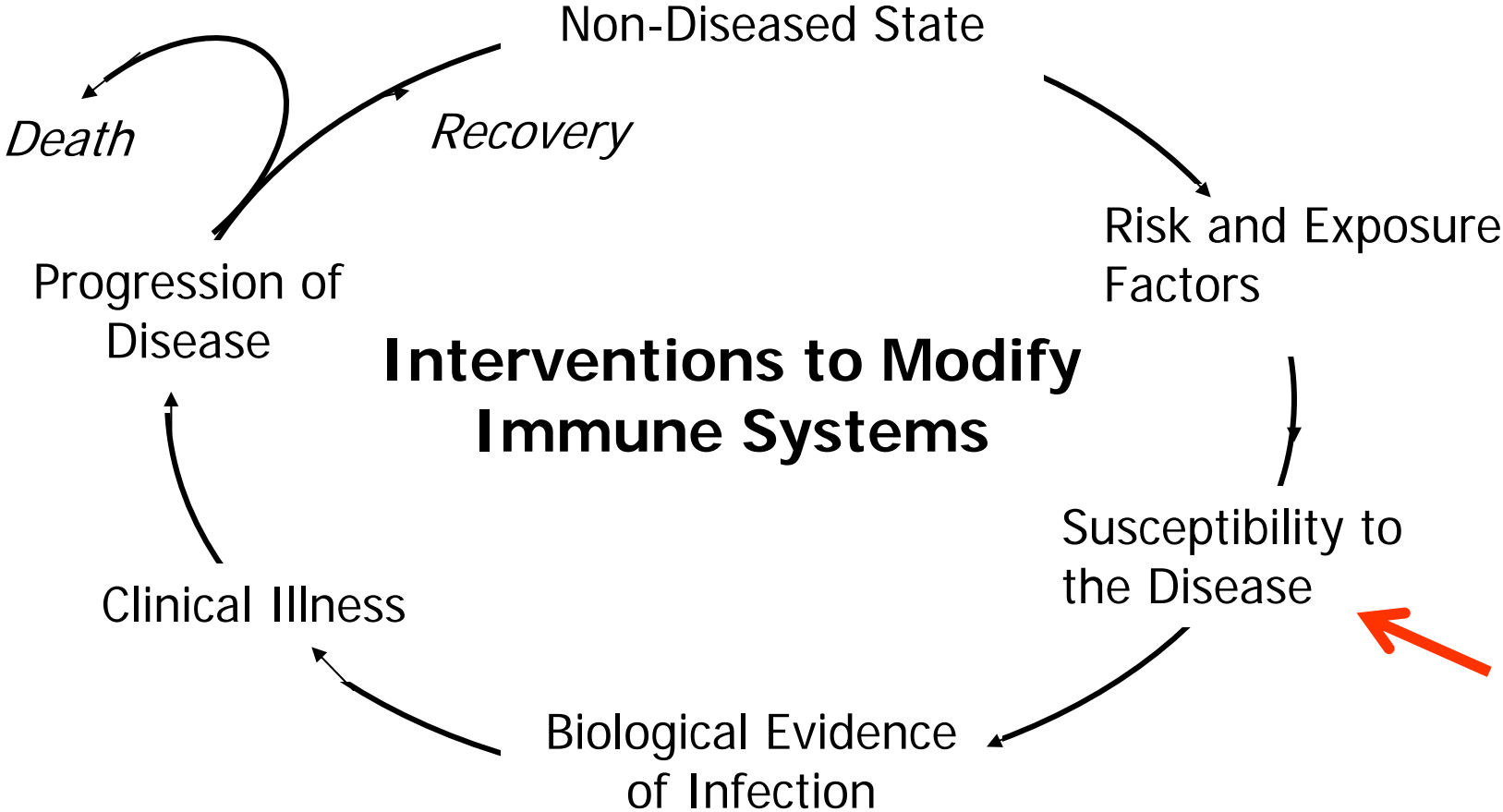
Natural Cycle of Disease

- ◆ Intervention at several levels

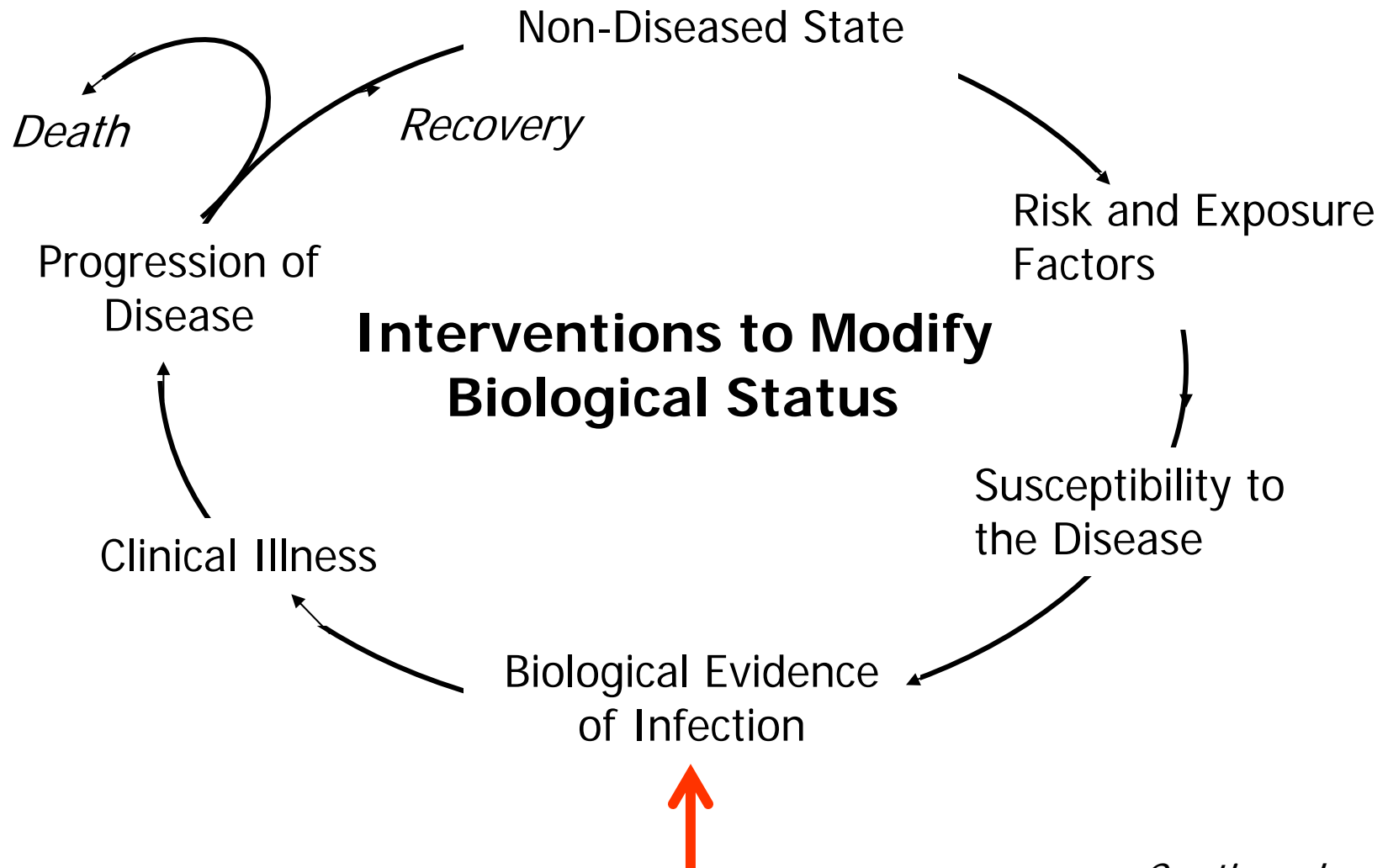
Natural Disease Cycle



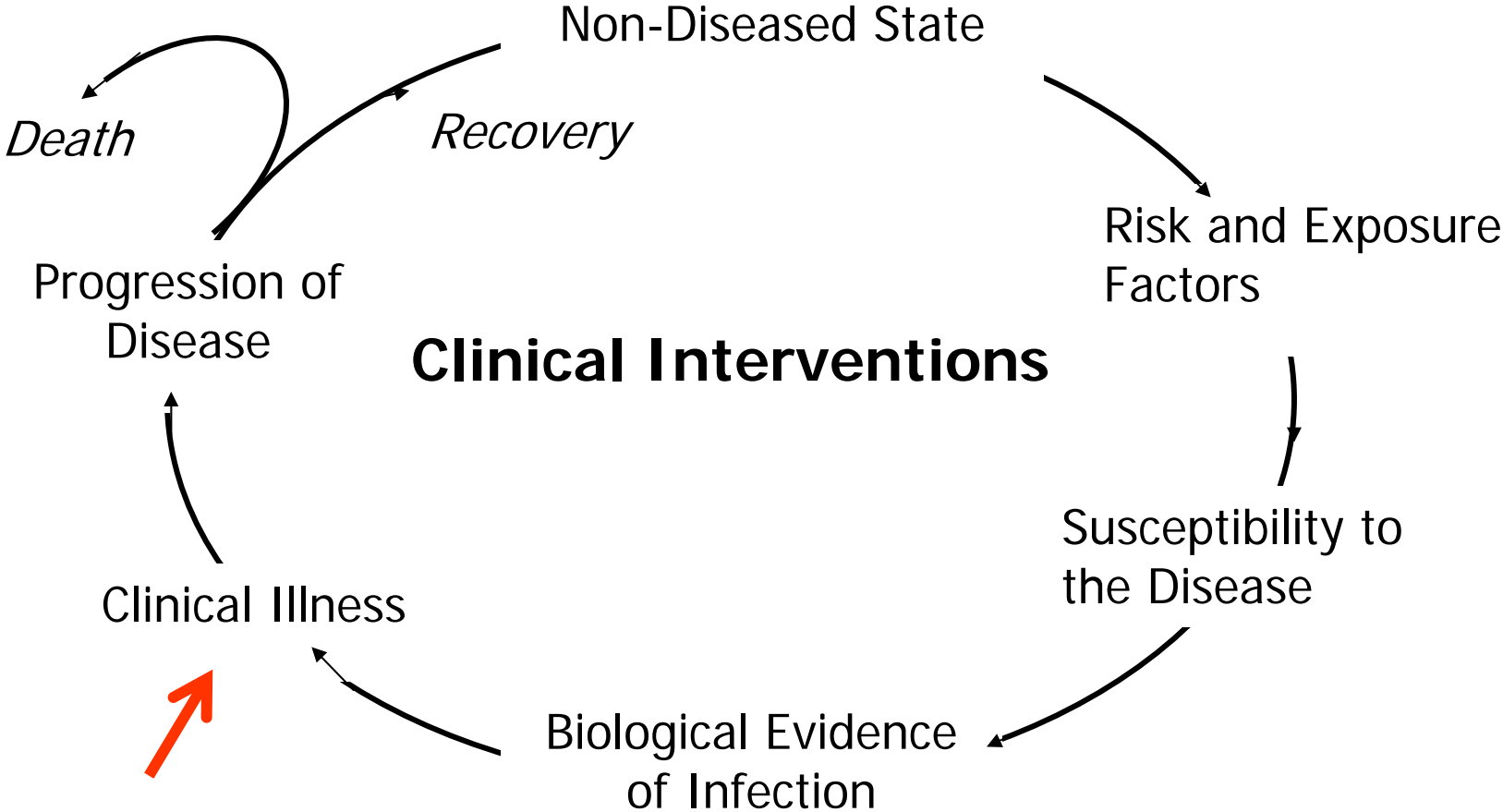
Natural Disease Cycle



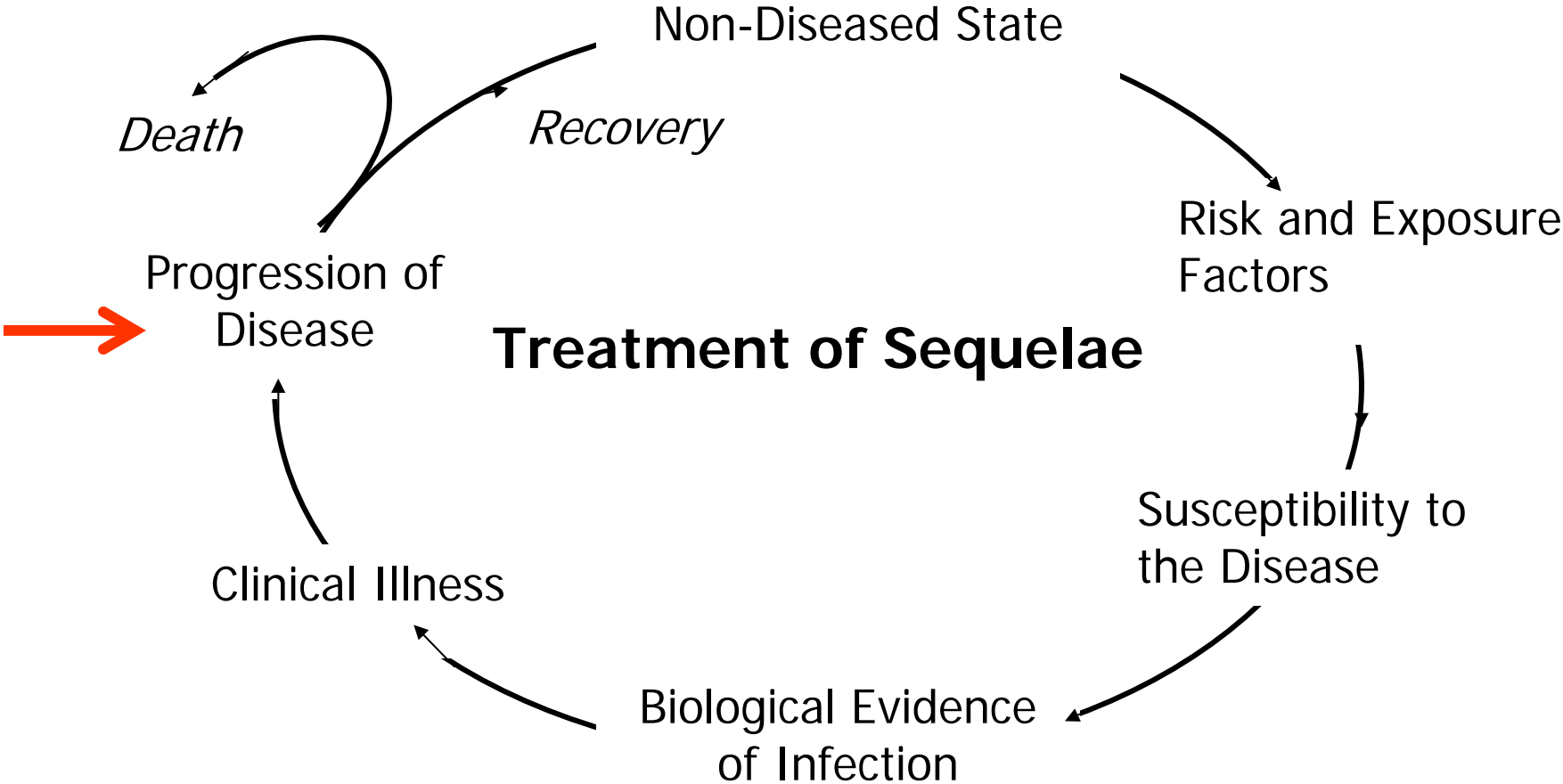
Natural Disease Cycle



Natural Disease Cycle



Natural Disease Cycle



Preventive Approach

<i>Primary Prevention</i>	Preventing infection
<i>Secondary Prevention</i>	Preventing serious consequences of infections
<i>Tertiary Prevention</i>	Rehabilitation following a disease
<i>Curative</i>	To stop disease transmission



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Section F

Rapid Assessment During Disease Outbreaks

Steps for an Epidemic Investigation

1. Confirm the existence of an epidemic
2. Confirm the diagnosis
3. Determine the number of cases
4. Establish *time, place, and person*

Steps for an Epidemic Investigation

5. Determine who is at risk
6. Make and test hypothesis on transmission or risk factors
7. Document your findings
8. Establish disease control program

Sources of Death Information

- ◆ In-depth interviews (verbal autopsy) of families with deaths
 - Using checklist of common disease symptoms
 - Using local names or descriptions
- ◆ Health facilities—simple data collection
- ◆ Community health workers

Sources of Death Information

- ◆ Information from burial grounds
 - Age and sex
 - Sometimes symptoms before death



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Section G

Approach to Childhood Illness

Commonly a Symptomatic Approach

- ◆ Clear case definitions for recording and treatment—may need to develop
- ◆ Use medical auxiliaries—sometimes inadequate training and skills

Commonly a Symptomatic Approach

- ◆ Integrated Management of Childhood Illness (IMCI) approach has been used in some emergencies
 - More thorough but time consuming

IMCI Approach

1. Check danger signs	6. Check for anemia and malnutrition
2. Ask about cough or difficult breathing	7. Check immunization status
3. Ask about diarrhea	8. Give vitamin A if needed
4. Ask about fever	9. Check for other problems
5. Is there an ear problem?	10. Schedule a return visit



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Section H

Common Communicable Diseases

Measles

- ◆ A serious disease with high mortality
 - West Africa case fatality rate $\pm 12\%$
 - Displaced populations up to 30%
 - UK (1960) case fatality rate 0.02%

Measles

- ◆ Low age of infection in developing countries
 - Risk begins at 5–6 months of age
- ◆ >30% of children infected by age one year

Manifestations of Measles

◆ Eyes

- Conjunctivitis, herpetic infection, corneal ulcers with vitamin A deficiency
- Common cause of blindness

Manifestations of Measles

◆ Mouth

- Child refuses to eat or drink due to buccal ulceration, *candida albicans*
- Cancrum oris may develop

◆ Larynx

- Hoarse voice, laryngo-tracheo-bronchitis (danger sign)

Manifestations of Measles

- ◆ **Lungs**
 - Pneumonia
- ◆ **GI tract**
 - Epithelial changes cause diarrhea and dehydration
- ◆ **Skin**
 - Desquamation leading to oozing, infected lesions

Risk Factors for Measles in Displaced Populations

- ◆ Often low measles-immunization coverage
- ◆ Overcrowding promotes spread
- ◆ Poor nutritional status increases risk of measles complications

Risk Factors for Measles in Displaced Populations

- ◆ Measles makes bad nutrition worse
 - Major cause of weight loss
 - Recovery may take 3–4 months
 - Overt malnutrition often begins with measles

Risk Factors for Measles in Displaced Populations

- ◆ Measles often followed by other disease
 - E.g., diarrhea
- ◆ Vitamin A deficiency linked with high CFR and corneal changes

Importance of Prevention

- ◆ Impact of a measles epidemic
 - Can overwhelm services
 - Can divert resources from critical preventive activities
 - Often results in a large number of deaths

Importance of Prevention

- ◆ Health managers aware of measles impact
 - Outbreaks less common than in 1970s and early 80s
 - Major cause of mortality in Sudan and Somalia
 - Uncommon in Rwanda and Bosnia

Measles Immunization

- ◆ Decide if measles immunization needed
 - 30 cluster survey for immunization carried out
 - Using history or card in a systematic sample

Measles Immunization

- ◆ If high level measles coverage
 - Can establish a routine immunization (EPI) program
- ◆ If uncertainty or low levels of measles immunization
 - Mass measles immunization program

Measles Immunization

- ◆ Decide if measles only or full immunization appropriate
 - Depends on resources
 - “Opportunity costs”
- ◆ In all situations, establish routine immunization program
 - In due course

Acute Respiratory Infections (ARIs)

- ◆ Often a major cause of death
 - Especially in cold areas
- ◆ Coughing may be common in children
 - 75% children may present with coughing
- ◆ Most health care by nurses and auxiliaries

Diagnosis of ARIs

- ◆ Differentiating between pneumonia and non-pneumonia
 - Lab and x-ray usually not available
 - Skill to make diagnosis by auscultation often absent
- ◆ Over-treatment with antibiotics common

Diagnosis of ARIs

- ◆ Alternative approach necessary—depends on counting respiratory rate
 - Pneumonia if >50 in child two to twelve months
 - Pneumonia if >40 in 12 months to five years

Management of ARIs

- ◆ For a successful program
 - Provide continuing support to sustain—
especially drugs
(Co-trimoxazole usually the standard drug)

Management of ARIs

- ◆ For successful program
 - First build health facility capacity
 - Sensitize community health workers
 - Create awareness among mothers

Sexually Transmitted Infections (STIs)

- ◆ Common in many developing countries
- ◆ 40% of population may have antibodies to syphilis (TPI)

Sexually Transmitted Infections (STIs)

- ◆ Very common in displaced populations due to . . .
 - Family separations
 - Increase in female-headed households
 - Lack of income-generating activities
 - Abuse of vulnerable women

Risk Factors for Increasing STIs

- ◆ Barriers to health care
 - Lack of access to health facilities
 - Poor health worker sensitivity common

Diagnosis of STIs

- ◆ Symptoms less obvious in women
- ◆ Diagnosis usually depends on laboratory
 - No training in syndromic approach
- ◆ Partial treatment from local medications

Problems with Control of STIs

- ◆ HIV increasing risk
 - Behavior change harder to establish among displaced populations
- ◆ Few programs address problem of STIs
 - Not a “relief” issue
- ◆ Population movement key factor

Approach to STI Treatment Programs

- ◆ Based on syndromic approach to STIs
 - Requires community awareness
- ◆ HIV control
 - Proper diagnosis of STIs
 - Condom availability and promotion

Approach to STI Treatment Programs

- ◆ HIV control
 - Behavior change
 - Protection and support of vulnerable
 - Introduction into school curriculum

Meningitis

- ◆ Epidemic meningitis caused by *Neisseria meningitidis*
- ◆ Common in meningitis belt of Africa
 - Particularly during dry, dusty times
- ◆ Droplet spread
- ◆ Increased transmission in crowded situations

Meningitis Epidemics

- ◆ Epidemic defined as
 - *> 100 cases / 100,000 people/week*
- ◆ Outbreaks are episodic
 - Hard to predict their occurrence

Management of Meningitis (Treatment)

- ◆ Critical choices when first cases appear
- ◆ Treatment straightforward
 - Chloramphenicol in oil (Tifomycin), single dose,
 - Second dose given to 25% of cases

Meningitis Epidemics

- ◆ Once an outbreak starts, it is hard to stop until it has run its course
 - Follows classic epidemic curve
 - Most exposed persons seldom show clinical disease
- ◆ Can overwhelm the health system
 - Can create hysteria

Management of Meningitis (Mass Immunization)

- ◆ Decision to immunize made when
 - Weekly incidence rises 2–4 fold
 - 15 cases/100,000/week within two weeks
- ◆ Start immunizations in affected areas
- ◆ Mass chemoprophylaxis ineffective

Tuberculosis (TB)

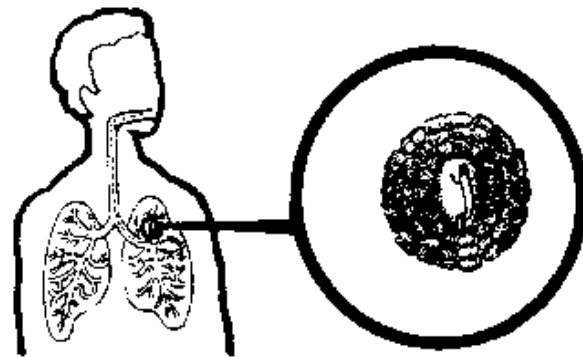
- ◆ Leading cause of preventable death in adults
- ◆ Risk factors for TB infections
 - Deteriorating health services
 - National TB control programs are overwhelmed

Tuberculosis (TB)

- ◆ Risk factors for TB
 - Poor nutritional status
 - HIV co-infection increasingly common
 - Overcrowding

Prevalence of Pulmonary TB

- ◆ Control measures concentrate on pulmonary tuberculosis
- ◆ Urgent situation exists if prevalence of pulmonary TB exceeds 1%
- ◆ Prevalence among many displaced populations is more than 4%



Drug Resistance in TB

- ◆ Drug-resistant TB emerging threat in many situations worldwide
- ◆ Partially or inadequately treated disease
 - Patients discontinue treatment when feeling better
 - Intermittent drug supplies
 - Patients leave treatment area
 - Drugs sold on open market
 - No TB control program in place

Guiding Principles for Treating TB in Refugee Populations

- ◆ If it can't be treated correctly in a functional system, then it should not be started
- ◆ Basic capacities must be present

Basic Capacities Necessary for Treating TB in a Refugee Population

- ◆ Capacity to Diagnose TB
- ◆ Supply of uninterrupted/continuous TB treatment
- ◆ Laboratory capacity
- ◆ Regular follow-up of TB medication users
- ◆ Tracing of treatment defaulters
- ◆ Evaluation of TB program
- ◆ Calculate a treatment completion ratio
- ◆ Ultimately—Can individuals be declared as cured?

When to *Start* a TB Program

- ◆ After the emergency phase
- ◆ Health system must be functioning
- ◆ Populations must be stable
- ◆ Agency must have capacity to run and evaluate program

When to *Stop* a TB Program

- ◆ When populations become unstable
- ◆ When health system is disrupted
- ◆ When agency becomes unstable
- ◆ When evaluation shows program is ineffective

Guidelines for TB Program

- ◆ Start with careful planning
- ◆ Concentrate on pulmonary TB
- ◆ Ideally integrate into national program
 - Same forms
 - Same treatment protocol
 - Same personnel
 - Same training

TB Treatment Protocols

- ◆ Basic principles—six, seven, and eight month programs in two phases
 1. Intensive phase (first two months)
 2. Maintenance phase (next four to six months)

TB Treatment Protocols

1. Intensive phase

- Four drugs—rifampicin, pyrazinamide, INH, ethambutol, or streptomycin

2. Maintenance phase

- INH, rifampicin, other variations
- Thiacetazone is out

Malaria

- ◆ Malaria is common in many displaced populations
- ◆ Infection of Plasmodium—four species
- ◆ “Benign” malaria
 - *P. vivax*, *P. malariae*, *P. ovale*
- ◆ “Malignant” malaria
 - *P. falciparum*

Malaria

- ◆ Carried by Anopheline mosquitos
 - Phenomenal vectorial capacity

Clinical Considerations

- ◆ Most common cause of fever in endemic areas
- ◆ Many persons self-treat
- ◆ Repeated infections give partial immunity
 - Usually acquired by age three to five
- ◆ Severe complications in non-immune
 - Massive hemolysis, cerebral malaria
 - Renal failure, malarial lung (ARDS)

Malarial Immunity

- ◆ Partial immunity
 - Protects against complications
 - Uncomplicated febrile attacks common
 - Requires regular parasitemia to maintain
 - Immunity decreases in pregnancy (especially among primigravida)

Why Problems of Malaria Arise

- ◆ Population is displaced from malaria-free area to malarious area
- ◆ Immunity normally developed in childhood is absent
- ◆ Population is displaced from a malarious area to a malaria-free area
- ◆ Health system unprepared for malaria and its complication

Setting up a Malarial Control Program

- ◆ Is this a priority?
- ◆ What is the malaria problem?
 - Prevalence of parasites
 - Incidence of severe or complicated malaria in this population

Setting up a Malarial Control Program

- ◆ How much effort can you devote?
- ◆ What are the options/priorities?
 - Improve clinical services or
 - Comprehensive malaria program

Malaria Case Management

- ◆ Coordinate with host government programs
- ◆ Establish case definitions
- ◆ Improve diagnostic/treatment skills
 - Of health workers and households
- ◆ Ensure a regular supply of appropriate drugs

Malaria Case Management

- ◆ Make drug supplies available outside the health system
- ◆ Confirm a sample of malaria diagnoses parasitologically

Chemoprophylaxis for Malaria

- ◆ A controversial issue appropriate for pregnant women, maybe correlated with miscarriage
- ◆ Not necessarily appropriate for children
- ◆ Appropriate for expatriate workers (who think they are not immune)

Vector Control

- ◆ May combine any of the following
 - Sanitation measures
 - Drain breeding sites
- ◆ Other control measures
 - Spraying interior of houses
 - Fogging area

Vector Control

- ◆ Other control measures
 - Bednets/curtains not always practical

Planning a Disease Control Program

- ◆ The planning cycle
- ◆ Assess the present situation
 - Extent of problem or “burden of disease”
 - Potential short-term and medium-term risk
 - Present activities to address problem, if any
 - Existing capacity to address problem

Planning a Disease Control Program

- ◆ Identify the problem
- ◆ Set the priorities
 - Consider alternatives
 - Choose solution
- ◆ Set goals and objectives
 - Choose indicators

Planning a Disease Control Program

- ◆ Take actions
 - What strategy and methods?
 - What are potential constraints?
 - What are your contingency plans?

Planning a Disease Control Program

- ◆ What resources you will require for a six-month program?
 - Supplies, personnel, equipment, transport

Planning a Disease Control Program

- ◆ How will you conduct on-going monitoring of your activities?
 - At the end of six months, how is the program evaluated?