Infectious Disease 1992

Epidemiology 160

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I. Infectious Diseases are Dead!

No Need to Study; Reduced Funding;
Decreased Interest.

Statements, and the Confidence of
1960s.

The Department of Epidemiology at UNC is a good example of the trends.

Initial strength and interest in infectious diseases, then cardiovascular and cancer became the main interests. Only in the late 1980 with the increased importance of HIV infections did the Department again to develop a program in infectious diseases.

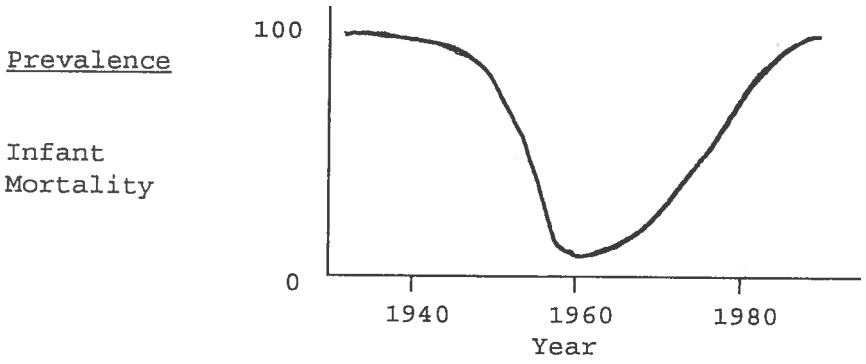
WHY? 1) The antibiotic ERA-development and successful control of infectious diseases by antibiotics.

2) Development of vaccines for viral and bacterial infections. The success of these vaccines i.e., for polio, small pox, tetanus, diptheria suggested that with the right technology, money and interest, vaccines could be developed for all infectious agents.

3) Success of earlier public health programs including sanitation, refrigeration, etc. there was already a decrease in a variety of infectious diseases, i.e. bacterial caused diarrheas, shigella, cholera, etc. (Snow-London).

4) Discuss malaria life cycle. Early success, and later reemergence of the parasite.

A. With the success of insecticides (vector) and antimalarials (quinine, chloroquine), the WHO was developing plans for the eradication of this disease and in many areas of the world it appeared that this might be possible. However, by the late 1980s to the present, the number of cases is similar to their original



levels, and in some areas maybe even above.

WHY? 1) The development of:

a) Insecticide resistance. Insecticide/environmental toxicity
Drug (multi) resistance.

b) Hope and faith in the development of a vaccine. None developed and possibly never although millions spent.

c) Decreased interest in developing tried and true methods of control.

Conclusions: The world is now faced with an increased incidence of new (legionnaires, HIV) and old (TB, nosocomial, syphilis, malaria) infectious diseases.

II. Basic concepts in the population dynamics of infectious diseases (from Anderson and May).

1) Koch's (1884) Postulates (the gold standard).

A) Microrganism (parasites) must be found in every case;

B) Organism must be isolated and grown in the laboratory;

C) The organism must reproduce the disease when inoculated into healthy susceptible animals; and

D) Must again, be recovered from inoculated animals, and be recovered in culture.

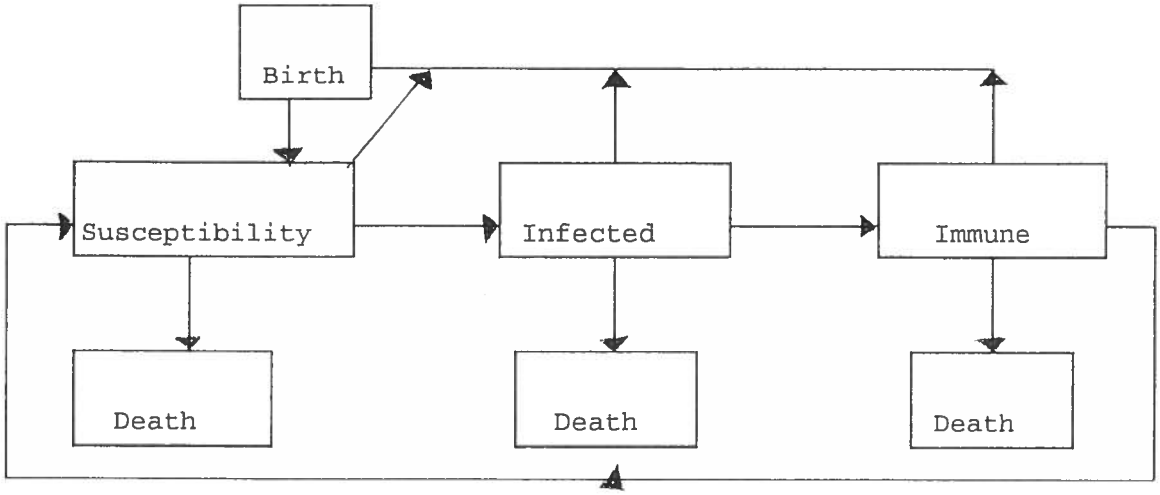
(I) NOTE: Success with tetanus, polio, etc.

(II) NOTE: Problems with HIV (AIDS) especially early in the epidemic. Need for indirect evidence (Epidemiology).

(III) NOTE: Some organisms (syphilis) have never been shown to fulfill all of Koch's postulates.

2) Simple epidemiological concept (model) from Anderson and May.

A) Population dynamics.



1) Explain Dynamics

A) Decrease Susceptible Population thru Deaths
Decrease Susceptible Population thru Immunity
Increase Susceptible Population thru Births, etc.

(I) NOTE: Epidemiology involved studies to determine what factors are involved in changes in numbers (i.e. smoking, alcohol, etc.)

2) Use Examples.

A) Influenza and Malaria.

B) Smallpox - American Indians
Measles - Eskimos
Leishmaniasis - U.S. Soldiers

C) TB

D) New Infectious Diseases.

3) Relationship of above to:

A) Parasite Density: Large congregated populations versus small scattered nomadic populations (Amazon tribes).

B) Define Susceptibility and Immunity.

1) Immunity

2) Humoral (B-cells)

3) Cellular (T-cells)

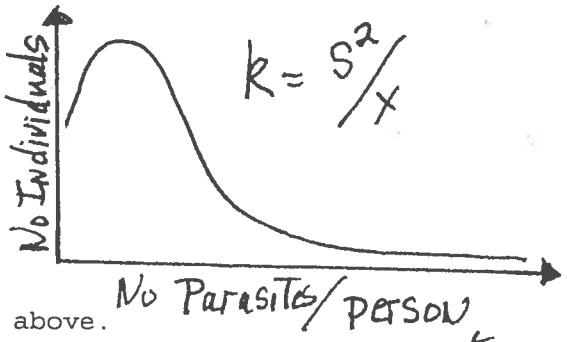
a) HIV

4) Macrophages (non-specific)

5) Cytokines

C) Overdispersion of parasites in human populations.

1) Describe.



2) NOTE: Possible reasons.

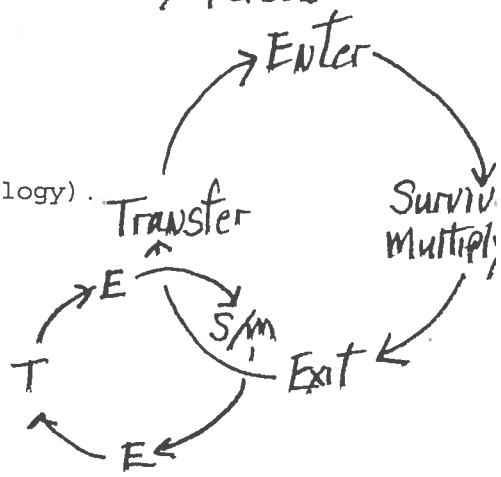
A) Genetics: Immunity

B) Physical Environment

C) Behavior

(I) Probably all of the above.

D) T. Smith's generalized life cycle.



1) Explain; use hookworm as the example.

A) Important to know life cycle (Biology).

B) Public health importance.

E) HIV (AIDS).

1) Epidemiological Problems.

A) Long incubation period
Multiple symptoms (carriers)

(I) Skin disease.

(II) Kaposi skin lesions.

B) Originally absence of a known infectious disease agent.

(I) Heros in the HIV story are epidemiologists, who associated infections with high risk groups and practices, with blood borne and semen transmission, etc.

(a) Only later with the isolation of a retrovirus, and the development of a serological test was the picture more clear.

E) Complications that can make identification of infectious agents, and the epidemiology more difficult to understand and study include:

1) Indirect (or vector mediated) transmission.

2) Zoonosis.

3) Seasonal infections.

4) Accidental or preferred hosts.

F) Need to know biology to truly understand the epidemiology of Infectious Diseases.

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